

## Review Article

# Role of Carbon-Based Nanomaterials in Enhancing the Performance of Energy Storage Devices: Design Small and Store Big

B. Yogeswari<sup>1</sup>,<sup>2</sup> Imran Khan,<sup>2</sup> M. Satish Kumar<sup>3</sup>,<sup>4</sup> N. Vijayanandam,<sup>4</sup> P. Arthi Devarani,<sup>5</sup> Harishchander Anandaram,<sup>6</sup> Abhay Chaturvedi<sup>7</sup>, and Wondalem Misganaw<sup>8</sup>

<sup>1</sup>Department of Physics, Sri Eshwar College of Engineering, Coimbatore, 641202 Tamil Nadu, India

<sup>2</sup>Jamia Millia Islamia (A Central University), Jamia Nagar, Okhla, 110025, New Delhi, India

<sup>3</sup>Department of ECE, Sri Vasavi Engineering College, 524101, Tadepalligudem, Andhra Pradesh, India

<sup>4</sup>School of Electronics Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India

<sup>5</sup>Department of Electronics and Communication Engineering, RAJK College of Engineering and Technology, Tamil Nadu, India

<sup>6</sup>Centre for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore, Tamil Nadu, India

<sup>7</sup>Department of Electronics and Communication Engineering, GLA University, Mathura 281406, India

<sup>8</sup>Ethiopian Defence University, College of Engineering, Department of Chemical Engineering, Ethiopia

Correspondence should be addressed to Wondalem Misganaw; [wondalem.misganaw@dec.edu.et](mailto:wondalem.misganaw@dec.edu.et)

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Energy storage is the process of storing previously generated energy for future usage in order to meet energy demands. The need for high-power density energy storage materials is growing across the board. The high ionic transport, superior electronic conductivity, rapid ion diffusion, high current tolerance, etc. are few among the numerous factors that can be considered the versatility of nanomaterials. This makes the nanomaterials suitable for energy storage applications. According to the allied market research, the global nanotechnology in energy industry was estimated at \$139.7 million in 2020 and is anticipated to hit \$384.8 million by 2030, registering a compound annual growth rate (CAGR) of 10.7% from 2021 to 2030. The extraordinary and improved properties of carbon-based nanomaterials and their tunable surface chemistry authorize them to be used in design of competent high-energy and high-power energy storage devices. Recent research and future progress focus on effective usage of low-dimensional carbon-based nanomaterials for energy conversion and storage systems. In particular, versatile carbon nanomaterials with multifunctional capabilities have attracted incredible attention in different types of batteries, solar cells, fuel cells, supercapacitors, and other energy storage devices. Engineering the carbon-based nanomaterials with efficient energy storage and remarkable conversion ability embraces the promise of creating a new path for their future development. This article reviews the role of few carbon-based nanomaterials in efficiently increasing the competence and dependability of energy storage applications.

## 1. Introduction

Developing efficient and sustainable technologies for generating and storing energy is becoming increasingly vital as the world's energy demand grows. Moreover, dependable energy generation at the lowest costs has turned out to be important for meeting out present energy supplies. For this

purpose, development of low-cost, scalable, efficient, and reliable catalysts is essential. Carbon-based materials have been shown to hold significant promise in improving the performance and reliability of energy storage and conversion devices. After decades of research and development, a collection of nanomaterials has emerged in picture in the field of energy storage. Along with materialization of other materials

## IoT Based Water Quality Monitoring System

M. Koteswara Rao<sup>1</sup>, N. Sri Harish<sup>2</sup> & J. Venkateswarlu<sup>3</sup>

<sup>1,2,3</sup>ECE, Dept., Sri Vasavi Engineering College and pharmacy (Autonomous), INTUJ, India

**ABSTRACT** Water is an essential need for humans, animals, and plants to survive on the earth. But, nowadays water pollution is increasing globally therefore a mechanism has been put forward to vigorously test the water quality and make it worthy for drinking. The pollution of water is largely due to the globalization. The water quality monitoring (WQM) has to be done effectively, so that the drinking water supply is safe. In this, a real-time WQM system is designed by using advanced technology like IoT (Internet of Things). This system comprises detectors namely pH (potential of Hydrogen), Total dissolved solids (TDS), Turbidity, and DO (Dissolved Oxygen), using which we can measure the physical as well as chemical parameters of the water. The sensor output values are fed as input to the raspberry pi. Then the obtained values are displayed in the serial monitor connected using raspberry pi. Then these values are differentiated from the WHO (World Health Organization) standard values. Finally, all the sensor data can be stored and visualized on the ThingSpeak cloud.

**Keywords:** IoT, Raspberry pi, pH sensor, Turbidity, Total Dissolved Solid, DO sensor, Cloud, Wi-Fi.

### I. INTRODUCTION

With a rapidly increasing population in the world, freshwater governance is very essential and is important for the life of human beings on earth. Most people around the world lack drinkable water. The increase of water pollution has become a global challenge. The world is facing problems due to drinking water facilities. For the growing population, the drinking water facilities are intensively low. The increased use of chemicals in the purification of water, use of pesticides and fertilizers in fields, and letting out the polluted water and industrial wastes into the water bodies led to the reduction of quality of water globally. It is a major concern as it affects the health of individuals adversely. Several water-borne diseases have increased and it resulted in higher mortality rate. Conventionally, the identification of water quality was used to be manually done and the water samples are used to be gathered and sent to the laboratories for further examination. It requires a long time to obtain the results and those old methods do not produce required information instantly. In this, the proposed system consists of a raspberry pi board and water quality sensors, which are small in size and can measure turbidity, pH level, Total Dissolved Solids (TDS), and Dissolved Oxygen (DO) of the water. The water is continuously monitored, and real-time data is continuously sent to the cloud wirelessly.

### II. Literature Survey

Water quality is a major issue in Indian villages, and there are many concerns with polluted water. Day-by-day with the increasing population, the quality of groundwater is affected by pesticides and industrial wastage. In order to eliminate these problems, different WQM (water quality monitoring) systems using Internet of Things (IoT) and using microcontrollers has been developed which can have high accurate results of different water parameters like pH, temperature, turbidity, conductivity, and TDS.

It also displays the measured values on LCD and on a wireless GUI for easy remote monitoring, and to know consumer-level water quality [1]. In another study [2,3], real-time water quality data was collected and displayed online using a smart city infrastructure. A cost-effective real-time WQM method is designed based on IoT and several sensors were used to obtain the readings of physical and chemical parameters.

The values are processed by Arduino and data is viewed using a Wi-Fi system [4]. A system to monitor water quality, contamination, and leakages in pipeline networks is designed and if there are any leakages, that data along with the parameters is sent to the AWS cloud-hosted in firebase. This data will be available to the admin as well as the user mobile app [5]. In a study [6,7], a system that can notify the user with the physicochemical parameters in real-time is proposed. They help in detecting water contaminants. The communication between the notification and measuring nodes is done by ZigBee receiver and transmitter modules.

A water quality measuring system using IoT is implemented for checking the quality of water in real-time. The sensor data is transmitted by the ZigBee module wirelessly to Raspberry Pi and GSM transmits it further to a Smartphone. An SMS alert will be sent to the user and data will be uploaded in the cloud [8,9]. To prevent contamination and ensure proper treatment, knowledge of water quality is necessary. There are several advanced methods based on wireless sensor networks for WQM, data acquisition, and communication [10,11]. In another study [12], a system with multiple sensors to measure desired quantities of water is proposed. It measures the quality of water and sends the data to the destination center at predefined times using the 8051 microcontroller and GSM. A reconfigurable smart interface for WQM based on IoT has been proposed in which it has an FPGA (Field Programmable Gate Array), sensors, ZigBee, and a PC. It uses high-speed programming like VHDL and Qsys tools to collect parameters in real-time from a number of sensor nodes [13]. In this paper, we are using raspberry pi 4 and the ThingSpeak platform to process data.

# Privacy-preserving data mining and machine learning in healthcare: Applications, challenges, and solutions

Vankamamidi S. Naresh<sup>1</sup> | Muthusamy Thamarai<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>2</sup>Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

Edited by: Sushmita Mitra, Associate Editor and Witold Pedrycz, Editor-in-Chief

## Abstract

Data mining (DM) and machine learning (ML) applications in medical diagnostic systems are budding. Data privacy is essential in these systems as healthcare data are highly sensitive. The proposed work first discusses various privacy and security challenges in these systems. To address these next, we discuss different privacy-preserving (PP) computation techniques in the context of DM and ML for secure data evaluation and processing. The state-of-the-art applications of these systems in healthcare are analyzed at various stages such as data collection, data publication, data distribution, and output phases regarding PPDM and input, model, training, and output phases in the context of PPML. Furthermore, PP federated learning is also discussed. Finally, we present open challenges in these systems and future research directions.

This article is categorized under:

Application Areas > Health Care

Technologies > Machine Learning

Commercial, Legal, and Ethical Issues > Security and Privacy

## KEYWORDS

data privacy, healthcare, privacy-preserving computational techniques, data mining, machine learning, federated learning

## 1 | INTRODUCTION

The significance of data mining (DM) and machine learning (ML) proliferates toward solving societal issues in crucial decision-making. Many researchers are working in this area. These systems have resulted in extensive adaptations in existing industries. However, as these areas or applications deal with private and sensitive data like healthcare or finance, the need for protecting sensitive becomes highly essential.

Big datasets are mined for patterns (knowledge), which can subsequently be represented and analyzed. The pattern may be an expression or model that is used to characterize the dataset subset. Pattern recognition techniques are frequently employed in DM since they entail finding and extracting patterns. In addition, it is possible to view ML and pattern recognition as "two sides of the same field." The aim of DM is to derive aggregate conclusions, which should not divulge sensitive information. However, the DM algorithms operate on databases that contain potentially sensitive information about specific individuals. In order to give high-quality aggregate conclusions while maintaining constituent individuals' privacy, privacy-preserving DM (PPDM) was created.

Researchers are working in this area and building efficient procedures that intelligently transform original data to remain valid for the DM process and preserve data privacy (Aggarwal & Philip, 2008). PPDM methods are vital for

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# REAL TIME CORN LEAF DISEASE DETECTION USING CONVOLUTION NEURAL NETWORK

Kamesh Sonti, M. Thamarai and P. Sudheer Chakravarthi

Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, India

## Abstract

Agriculture is the primary resource of livelihood, and the economy of our country highly depends on agricultural productivity. For this reason, plant disease detection plays a vital role in the agriculture sector. According to one survey, in India, nearly 70% of the population depends on agriculture which is composed of many crops. Disease identification in plants is very challenging for farmers as well as for researchers. We proposed a 24-layer deep learning model in our paper using convolution neural networks (CNN) for the detection of corn leaf diseases by using real time image dataset as input. The CNN model is trained with different corn leaf image samples and model performance is tested and is reported with the evaluation metrics. The obtained results are compared with CNN pre-defined models which shows the superior performance of the proposed model compared to other state-of-the-art approaches.

## Keywords:

Agriculture, Plant disease detection, Deep learning, Convolution neural networks, Corn leaf image

## 1. INTRODUCTION

Agriculture sector plays a dominant role in the economic system of a country and is the backbone of industries that involve the processing, promotion, and distribution of agricultural products. The economy of these industries mainly depends on Agriculture only [1]. Agriculture includes forestry, dairy, fruit cultivation, poultry, etc., also horticulture, sericulture, forestry, poultry, fishing, and logging are generating 17% of the country's GDP and providing maximum employment. Nowadays agricultural research and development are mainly focused on increasing the yielding capability of crops [2]. About 210 million acres of land in India are dedicated to agriculture. The popular crops include rice, wheat, corn, jowar, sunflower, etc. and popular fruits include mango, grapes, banana, grapes, apple, pomegranate, guava, etc. After rice and wheat, maize is the third most important crop in India. It is a popular food grain and if it is affected by any leaf diseases, there will be a loss in production occurs which leads to decay of country economy and risk the availability of food grains.

The main reason for decline in the yield of the crop is the occurrence of pathological issues and is a key challenge to control the effect [3]. In the early stages, the diseases in corn leaves manifest on various parts of the plants and exhibit the symptoms of color change, blight, and spots. Thus, the only method to ensure a higher yield is to discover the disease early and prevent it. As a result, the recent technologies in artificial intelligence using digital imaging techniques are used to increase yield and therefore contribute to the growth of the economy of a nation.

Agricultural image processing is one of the core applications and the most growing research area now. Image processing techniques are used in various fields, including agriculture. In

agriculture sector, the images are captured by images through cameras, aircraft, or satellites. These images are then processed and analyzed using computers via image processing techniques. It is made easy with new technological advancements in image capture and data processing to solve various problems in the fields of agriculture. The images are used to provide a visual view of pathogens in agriculture and related fields. The study and explanation of plant illness, its symptoms, and visual metrics, as well as the collected photographs of plant components, are useful for observation and analysis [4].

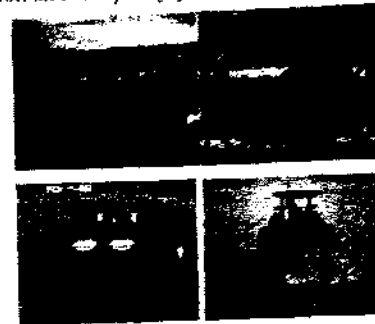


Fig.1. Traditional vs Modern Farming

The farming methods are changed from ancient days to modern days by adopting sophisticated equipment which is shown in Fig.1. The main aim is to use improved instruments and equipment combined with computer vision techniques to detect diseases in the field automatically. By utilizing image processing and machine learning techniques, diagnosis of plant diseases is done in early stages, and it will be extremely beneficial to the agriculture/horticulture industry [5].

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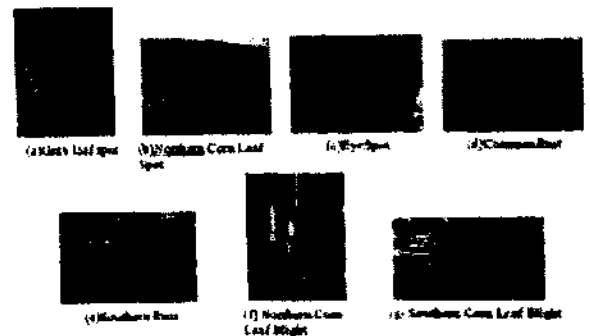


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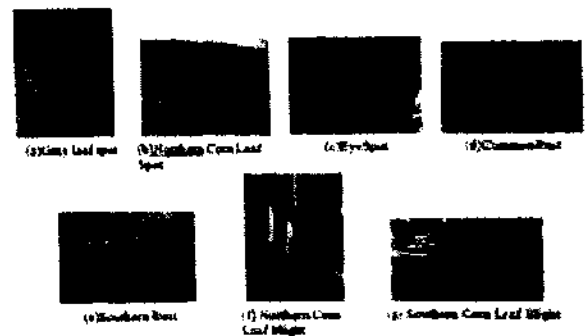


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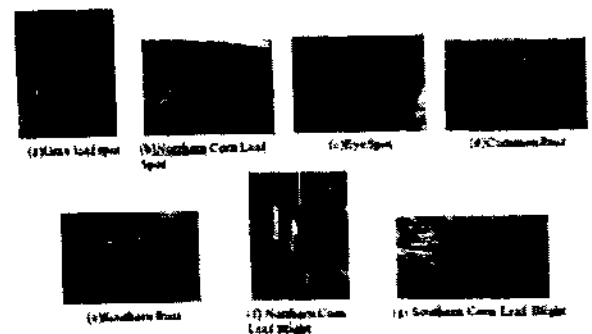


Fig.2. Types of Corn Leaf Diseases

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## Copy-Move Forgery Detection Using Superpixel Clustering Algorithm and Enhanced GWO Based AlexNet Model

Sreenivasu Tinnathi<sup>1\*</sup>, G. Sudhavan<sup>2</sup>

<sup>1</sup>Department of ECE, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India

<sup>2</sup>Department of ECE, R.V.R & J.C College of Engineering, Guntur, Andhra Pradesh, India

E-mails: sreenivasut@outlook.com / sreenivasut@sriivasaviengg.ac.in g.sudhavan@rvrjc.ac.in

**Abstract:** In this work a model is introduced to improve forgery detection on the basis of superpixel clustering algorithm and enhanced Grey Wolf Optimizer (GWO) based AlexNet. After collecting the images from MICC-F600, MICC-F2000 and GRIP datasets, patch segmentation is accomplished using a superpixel clustering algorithm. Then, feature extraction is performed on the segmented images to extract deep learning features using an enhanced GWO based AlexNet model for better forgery detection. In the enhanced GWO technique, multi-objective functions are used for selecting the optimal hyper-parameters of AlexNet. Based on the obtained features, the adaptive matching algorithm is used for locating the forged regions in the tampered images. Simulation outcome showed that the proposed model is effective under the conditions: salt & pepper noise, Gaussian noise, rotation, blurring and enhancement. The enhanced GWO based AlexNet model attained maximum detection accuracy of 99.66%, 99.75%, and 98.48% on MICC-F600, MICC-F2000 and GRIP datasets.

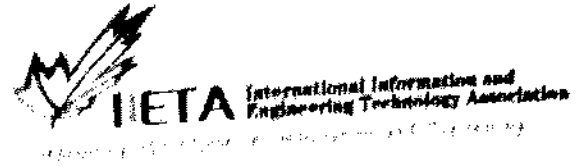
**Keywords:** Adaptive Matching Algorithm, AlexNet, Copy-Move Forgery Detection, Grey Wolf Optimizer, Superpixel Clustering Algorithm.

### 1. Introduction

In recent decades, abundant multimedia images are generated, due to the rapid growth of internet technology [1, 2]. The multimedia images are used in numerous research fields like media misinformation, social media, intelligence, military operations, newspapers, defamation of famous characters, evidence in courts and many other applications [3-5]. The image editing tools like paint shop Pro and Adobe Photoshop are used to modify the content and appearance of images without leaving perceptible artifacts [6]. Numerous authentication techniques are introduced to secure the image communication process, where the authentication techniques are categorized into two types: active and passive authentication. Active authentication includes the techniques like cryptography, watermarking, etc., and inactive authentication, the original image content is available and compared with the test image, where the original image content is unavailable in passive authentication [7]. The test image is



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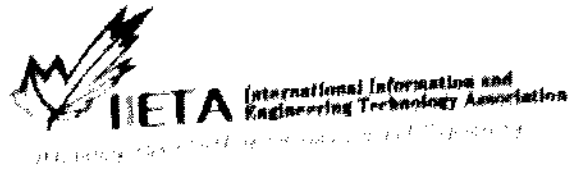
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Dear Paresh Chandra Sau, Purnima K Sharma, T J V Subrahmanyeswara Rao, E Kusuma Kumari, T V N L Aswini, Shilpa Jindal, Dinesh Sharma,

MS: A Kagome Crest Fractal Optimized Quad-Band Antenna for Wireless Applications

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## Design and Implementation of Time-Frequency Distributions for real time applications using Field Programmable Gate Array(FPGA)

B Murali Krishna

Assistant Professor, Department of ECE, Sri Vasava Engineering College,  
Pedatadepalli, Tadepalligudem, A.P, India, Pin Code: 524101, India \*  
muralikrishna.ecs@sriwasavainogy.ac.in

B.T. Krishna

Professor, Electronics and Communication Department, Jawaharlal Nehru Technological  
University Kakinada  
Kakinada, Andhra Pradesh, Pin code: 533003, India  
kbattula@gmail.com

K. Babulu

Professor, Electronics and Communication Department, Jawaharlal Nehru Technological  
University Vizianagaram  
Vizianagaram, Andhra Pradesh, Pin code: 535003, India  
kpbbl@gmail.com

In this paper, time frequency distributions (TFDs) and their hardware implementation on FPGA are presented. TFDs are evolved due to disadvantage of Fourier Transform (FT), which cannot provide time information in spectrum representation. Time Frequency Representations (TFRs) are helpful in providing simultaneous information about spectral contents of a signal with respect to time period axis. The major problem associated with hardware implementation of TFDs is limited on-board memory. Forward and Backward register allocation method (FBRA) is employed to obtain the optimum register occupation. A register of length 32-bit is considered for the input signal representation. The stored register values are applied to proposed TFDs and computed using real time hardware. FBRA is implemented during the computation of FFT in all TFDs. All the transforms are modeled using Verilog code and implemented on SPARTAN-6 FPGA. A real time ECG, earthquake and a quad chirp signals are taken as input to test the designed TFDs. Finally, a comparison of different hardware resources utilized on FPGA are compared with earlier conventional methods for better real time applications.

**Keywords:** Time-Frequency; Spectral contents; FPGA; Verilog; TFDs.

### 1. Introduction

Time Frequency Distributions (TFDs) and their practical implementation has been attained more importance recently due to wide range of applications<sup>1</sup>. Spectral

\*Assistant Professor, Department of ECE, Pedatadepalli, Tadepalligudem, A.P, India, Pin Code: 524101, India. Email: murali.ecs713@gmail.com

# Hardware Implementation of Stockwell Transform and Smoothed Pseudo Wigner Ville Distribution Transform on FPGA using CORDIC Algorithm

B Murali Krishna, B.T. Krishna, K Bahulu

**Abstract:** A comparison of linear and quadratic transform implementation on field programmable gate array (FPGA) is presented. Popular linear transform namely Stockwell Transform and Smoothed Pseudo Wigner Ville Distribution (SPWVD) transform from Quadratic transforms is considered for the implementation on FPGA. Both the transforms are coded in Verilog hardware description language (Verilog HDL). Complex calculations of transformation are performed by using CORDIC algorithm. From FPGA family, Spartan-6 is chosen as hardware device to implement. Synthetic chirp signal is taken as input to test the both designed transforms. Summary of hardware resource utilization on Spartan-6 for both the transforms is presented. Finally, it is observed that both the transforms S-Transform and SPWVD are computed with low elapsed time with respect to MATLAB simulation.

**Keywords:** Transforms, Chirp signal, FPGA and CORDIC.

## 1. INTRODUCTION

The advent of getting time indexes information and their mapped spectral components information together in time frequency plane, made time frequency distributions (TFDs) more popular recently. Time frequency distributions are majorly used for signal analysis applications [1]. Popular time frequency distributions are Stockwell transform [2] and Smoothed pseudo Wigner ville distribution (SPWVD) [3]. Both the transforms are effectively produces time frequency distribution (TFD) plane, when compared with other linear and quadratic transforms. The major problem associated with time frequency transforms are estimating complex calculation during signal analysis. This is due to some of the transforms produces poor resolution and cross term contents in TFD plane. Stockwell transform splices input signal into small parts by choosing gaussian window as filter. By nature, Gaussian window exhibits symmetric coefficients during computation, the computations generated will be repeated as half valued functions.

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\* Correspondence Author  
 B Murali Krishna, Assistant Professor, Department of ECE, Sri Vasavi Engineering College, Gannavaram, Tadipatri (A.P.), India. Email: murali.kr71@gmail.com  
 B.T. Krishna, Professor, Department of ECE, University College of Engineering, Anna University, Chennai, India.  
 K Bahulu, Professor, Department of ECE, University College of Engineering, Anna University, Chennai, India.

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Similarly, for SPWVD computation low pass filter (LPF) is used to slice the signal in to parts. When these transforms are used to analyze non stationary signals, the computation involves large floating values and produces significant rounding error. In addition to this, the limited on board memory allocation results in poor time frequency representation (TFR) [4]. From the literature survey, few methods are proposed earlier to implement these transforms on FPGA [5-11]. The proposed transforms are implemented on FPGA to overcome the disadvantages of DSPA [12]. The current paper is organized as, Section 2 gives the information about Stockwell transform and SPWVD functionality. Section 3 presents the design flow and hardware implementation of proposed transforms. Section 4 represents the simulation results and comparison of proposed designs with respect to earlier state of art methodologies. Finally, section 5 concludes the transform techniques implementation on FPGA.

## II. BACKGROUND THEORY

### A. Discrete Stockwell Transform (DST):

By the definition, Discrete Stockwell Transform for the sampled signal  $x(n)$  is defined as

$$DST\{x(n, m)\} = \sum_{n=-\infty}^{\infty} x(n)w(n - k, m)\exp(-j2\pi mk) \quad \text{Eq (1)}$$

Where discrete window filter function is Gaussian function given as

$$w(n - k, m) = \frac{1}{\sigma(m)\sqrt{2\pi}} \exp\left(-\frac{(n-k)^2}{2\sigma^2}\right) \quad \text{Eq (2)}$$

Analytical computation of DST carried out using Eq (1). The computation is performed initially by multiplying input signal and gaussian function. After the completion of multiplication process, Fourier transform is carried out for all the product terms to obtain DST. Discrete version of ST is considered in order to implement transform on FPGA. Gaussian window preserves the phase content of signal during transformation and retrieval content is projected in to TFR plane. This advantage makes DST suitable for many real time applications [14].

### B. Discrete Smoothed Pseudo Wigner Ville Distribution (DSPWVD):

DSPWVD for the sampled signal  $x(n)$  is defined as

$$DSPWVD(x(n)) = \sum_{n=-\infty}^{\infty} q(n - k) \sum_{m=-\infty}^{\infty} x(n + k)x^*(n - k)w(k)w^*(k)\exp(-j4\pi km) \quad \text{Eq (3)}$$





# Smart self-power generating garbage management system using deep learning for smart cities

M. Thamarai<sup>a</sup>, Vankamamidi S. Naresh<sup>b,\*</sup>

<sup>a</sup> Department of ECE, Sri Vasavi Engineering College, Andhra Pradesh, India  
<sup>b</sup> Department of CSE, Sri Vasavi Engineering College, Andhra Pradesh, India

## ARTICLE INFO

### Keywords

Garbage collector  
CNN  
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Power generator  
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Waste management

## ABSTRACT

Population growth and industrialization lead to a proportionate increase in cities' daily waste generation rates. Communities in developing cities often turn to waste disposal methods that have proven destructive to human health and the environment. Further, the disposal of waste is not treated and utilized for waste-to-energy (WtE)-based energy generation. To overcome this situation, many researchers proposed various solutions. However, the optimal utilization of this waste for power generation still needs to be solved. The proposed work discusses a self-powered garbage management system using a Convolution Neural Network and IOT for households in smart cities. The proposed system collects household wastes and segregates them into organic and inorganic wastes using a Convolutional Neural Network (CNN). The inorganic waste is sent to the recycling bin, and the organic waste is used for power generation. The residue of the organic waste after power generation is utilized as fertilizer for plants. The proposed system comprises five modules: a garbage collector, a segregation unit, a power generator unit, an inorganic waste collection bin with IoT-enabled sensors, and an electronic control unit. The garbage collector unit collects household waste. The CNN-based waste classifier in the segregator unit separates the waste into organic and inorganic, and the organic waste is sent to the power generation unit. The waste is grinded using a combustion unit in the power generator, producing biogas for electric power generation.

The system is fully automatic, and a Raspberry Pi controller controls the complete process with the help of sensors and various motors. The system monitors the inorganic waste collection bin level using sensors. It sends a notification to the municipality's Garbage Collection Van operator using the IoT module once the bin is full and can be sent for recycling. The accuracy of the proposed CNN for waste segregation is 98%. While comparing with other pre-trained CNN models, such as InceptionV3 and Inception ResNet, the proposed method produces satisfactory results with 14% and 12% accuracy gains, respectively. The segregated and decomposed 50 kg of organic waste can produce 6 m<sup>3</sup> of biogas which in turn can produce 114 MJ of electric energy, which can be utilized for street lights and also for the proposed smart self-power generating garbage management system to function. The proposed system is highly adaptable in smart cities for household municipal waste management with minimum routine monitoring and operational time requirements. Further, the system generates only a fraction of the required energy.

## 1. Introduction

Waste Management is vital in making cities and human settlements inclusive, safe, resilient, and sustainable. Solid Waste Management (SMW) is one of the significant challenges in developing countries due to rapid urbanization and industrialization. India generates approximately 62 million tonnes of waste per year. About 43 million tonnes (70%) are collected, of which about 12 million are treated, and 31 million are dumped at landfill sites [1]. Municipal solid waste generation in India is

estimated to be 165 million tonnes by 2030\* [1]. Due to the dumping of garbage along the coastal and landfills, wildlife's food habits are changing, affecting them. The landscapes of the garbage in the cities change with their geographical conditions, climate, and social and economic status. In India, megacities like Greater Mumbai, Delhi, and Kolkata generate vast amounts of waste [2] in daily life. A heterogeneous type of solid waste generated in these cities contributes 70% to 80% of total waste in India per day (MNRE, India, 2018). The generated waste is in different varieties, leading to more challenges for the

\* Corresponding author.  
E-mail address: vnaresh11@gmail.com (V.S. Naresh).



## Smart self-power generating garbage management system using deep learning for smart cities

M. Thamarai<sup>a</sup>, Vankamamidi S. Naresh<sup>b,\*</sup>

<sup>a</sup> Department of PCE, Sri Vasavi Engineering College, Andhra Pradesh, India  
<sup>b</sup> Department of CSE, Sri Vasavi Engineering College, Andhra Pradesh, India

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### ABSTRACT

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\* Corresponding author.  
 E-mail address: [vnaresh11@gmail.com](mailto:vnaresh11@gmail.com) (V.S. Naresh).

# Aes Based Blood Bank System Using Cloud Techniques

Dr. Jayasri Kottl<sup>1</sup>, Dr. Raja Ramesh Chundru<sup>2</sup>, Dr. J. Sudhakar<sup>3</sup>, Bulusu Sreenidhi<sup>4</sup>

<sup>1</sup> Professor, CSE Dept., Vignan's Institute of Engineering for women (VIEW), Visakhapatnam-530049, AP, INDIA,

<sup>2</sup> Associate Professor, Department of CSE, Sri Vasavi Engineering College, Tadepallegudem, AP, INDIA

<sup>3</sup> Professor, ECE Dept., Vignan's Institute of Engineering for women (VIEW), Visakhapatnam-530049, AP, INDIA

<sup>4</sup> Student of CSE Dept., Vignan's Institute of Engineering for women (VIEW), Visakhapatnam-530049, AP, INDIA

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## Abstract

Blood donation is required for saving human lives. Blood donor needs to check blood bank or donation camp for giving blood donation or blood booking. Blood donor may have doubt whether their personal data and medical histories are safely deposited and protected. For this purpose, proposed work uses cloud techniques to develop an online blood bank system and applying Advanced Encryption Standard (AES) algorithm for database security and encryption. Proposed system maintains central repository holding various blood deposits accessible along with related particulars accommodated on a cloud server. These particulars contain type of blood group, area of storage, date and location etc., This information support in maintaining and monitoring the deposits of blood. Proposed AES based blood bank system using cloud techniques is an online system that consents handlers to check whether the essential blood deposits of a particular group are available in the blood bank capably using a cloud server. Additionally, the system also has extra features such as patient details, blood booking and even the need for a certain blood group is posted on the website to find available donors for a blood emergency. Apart from this, system includes the concepts of database encryption using AES Algorithm to make sure that the security and confidentiality of users' information. This will help us keep their donation records protected from any threats from individuals with potentially malicious intentions, or any unforeseen hazards to the security of the data. Main aim of the proposed work is to reduce the time required to deliver obligatory blood to the needy in cases of emergency. AES Algorithm will help us keep their donation records protected from any threats from individuals with potentially malicious intentions, or any unforeseen hazards to the security of the data. This AES Based blood bank system using Cloud techniques is an online system that helps in handling several blood bank procedures successfully.

**Keywords:** Cloud techniques, Advanced Encryption Standard, Blood Bank, Data Encryption, Security.

## 1. INTRODUCTION

Due to blood unavailability throughout emergency, death rate is increasing during operations. This is because lack of awareness among people about blood donation, blood transfusion. Day by day the need of blood is increasing. Donation of blood is important for saving human lives. The collected blood bags from blood donation events are stored in one place is called as blood bank. The collected blood is stored, preserved and used whenever needed or demanded in a blood bank. Traditional blood banks include paperwork and unnecessary formalities. At the time of emergency situations traditional blood bank systems working is not that much efficient enough.

In many situations due to lack of appropriate communication between blood needy people and blood donors, emergency situation patients do not get blood in time and hence lose their lives. So, there is a terrible necessity of synchronization between donors, hospitals and blood banks. The proper management of blood bank reduces the wastage of the available blood inventory. All these difficulties can be dealt with by automating the present physical

# Blockchain IOTA Sharding-Based Scalable Secure Group Communication in Large VANETs

Vankamamidi S. Naresh<sup>✉</sup>, V. V. L. Divakar Allavarpu, and Sivaranjani Reddi

**Abstract**—The advent of group-oriented communication applications has triggered research on secure group communication (SGC) in vehicular *ad hoc* networks (VANETs). Given this, some researchers worked in this area and proposed various schemes. However, these systems lacking the dynamic nature, and struggling with larger processing loads, enormous storage, increased communications, security, and privacy concerns. Further, with the increase in the size of VANET, it is challenging to manage processing loads and storage requirements of group controller (GC)-centric group key agreement (GKA). To address these drawbacks in existing VANET communications, we propose a blockchain IOTA sharding-based smart contract-centric GKA for SGC in large VANETs. In this scheme, we partition the main network into  $r$  sharded subnetworks using blockchain sharding technique, with  $G_1, G_2, G_3, \dots, G_r$  as smart contract (SC) instances generated by GC,  $G_i$  which functions as Sub-GC (Sub-GC) to their respective shards. Under the Elliptic curve decision Diffie-Hellman (ECDDH) and group-Elliptic curve Diffie-Hellman (GECDDH) assumptions, the proposed protocol is proven to be secure. The suggested protocol outperforms the other protocols for secure communication in large VANETs, according to the performance analysis.

**Index Terms**—Blockchain, group key agreement (GKA), group controller (GC), IOTA, privacy preserving, sharding, smart contract (SC).

## I. INTRODUCTION

VEHICLE networks are emerging as one of the most promising and yet challenging among all existing communication systems. Current innovations in secure communication for large vehicular *ad hoc* networks (VANETs) make use of blockchain technology in two ways that make it potential and promising for vehicular network applications. One is the structural aspect of blockchain technology that offers security services and data integrity without relaying on a third party. The other is functionality aspect of SCs that can execute complex tasks for providing secure communication in large VANETs.

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Vankamamidi S. Naresh is with the Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, India (e-mail: vsnaresh111@gmail.com).

V. V. L. Divakar Allavarpu is with the FinTech Academy, GITAM (Deemed to be University), GITAM School of Business, Visakhapatnam 530045, India.

Sivaranjani Reddi is with the Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology and Science, Visakhapatnam 530013, India.

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We studied group controller (GC)-based group key agreement (GKA) [1]. To address the issues, such as reduced communication, lightweight computing, personal privacy preservation, decentralized certification, traceability, and accountability in contemporary GKAs. Some researchers developed blockchain-based GKA protocols with an SC acting as GC ([2], [3]) to reduce computation and communication burden to suit resource constraint networks.

However, with the increase in VANET size, the processing burden on the SC grows as well, limiting the SC's ability to work beyond a specific group size threshold. As a result, divided and conquer must be used to address this challenge. To reduce the overload on the SC for GKA among the nodes, we separated the large group of size  $n$  into  $r$  subgroups, each of which had a size  $\leq l$ . As a result, as  $l \ll n$ , all subgroup controller (Sub-GC) can easily handle computations of the subgroup key. These Sub-GCs can now perform the GKA protocol with the GC to create the final group key.

In view of distributed nature of blockchain-based schemes, they are struggling with major drawbacks such as low scalability, throughput due to longer processing time, and high energy consumption for consensus and mining. Further, they impose monetary costs on users since they must pay a fee to peers who validate the authenticity of the stored access rights/policies and execute SCs to process access requests. These limitations may make applying blockchain-based techniques to large-scale VANET systems difficult.

To address these issues in blockchain-based GKA schemes, we adopted the IOTA [4] platform for enabling secure group communication (SGC) in VANETs using hierarchical-based GKA.

### A. Contributions

The main contribution is to design blockchain IOTA sharding-based VANET communication framework for SGC in large VANETs with the following.


- 1) An hierarchical blockchain IOTA Sharding-based-GKA (VBIS-GKA) which can reduce time complexity from  $n = l * r$  to  $l + r$ .
- 2) IOTA-based VANET communication system supported by VBIS-GKA with the following advantages.
  - a) No VANET member can influence the entire group key with its contributory nature.
  - b) Any malicious vehicle attempts to disrupt the establishment of VBIS-GKA can be easily detected and tracked.



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# A novel Leaky Rectified Triangle Linear Unit based Deep Convolutional Neural Network for facial emotion recognition

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## Abstract

In numerous fields, Facial Expression Recognitions (FER) is employed, which is a vital topic. The Facial Expressions (FE) is categorized by the FER into human emotions. Most networks are formed for facial Emotion Recognitions (ER); however, they all still possess some challenges like performance degradation together with the lowest accuracy. A novel Leaky Rectified Triangle Linear Unit (LRTL) Activation Function (AF) based Deep Convolutionals Neural Networks (DCNN) is proposed for achieving better CA. To pre-process the input images, the unique filtering technique Adaptive Bilateral Filter Contourlet Transform (ABFCT) is used. The Chehra face detector was then used to detect the face in the filtered image. The Facial landmarks are recovered from the facial detected

## Transfer Learning Based Effective Emotional Face Recognition using DCNN via Cropping Techniques

Anjani Suputri Devi D.\*, Suneetha Eluri\*\*

\*,\*\* Department of Computer Science and Engineering, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India.

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### Abstract

Facial Expression Recognition (FER) has grown in popularity as a result of the recent advancement and use of human-computer interface technologies. Because the image position, etc. it is challenging for current machine learning and deep learning models to identify facial expression. If the database is small, it doesn't operate well. Feature extracted characteristics can be separated, even a straightforward approach can help tremendously. Deep learning techniques and automated feature extraction, allow some important features. In this paper, we deal with limited data and simply extract useful features from images. To make data more numerous and allow for the extraction of just important innovative face cropping, rotation, and simplification procedures and advocate using the Transfer Learning technique to construct DCNN for building a very accurate FER system. A layer(s) with FER, a pretrained DCNN model is adopted, and the model is then modified with facial expression data. The training of the dense layer(s) is followed by adjusting each turn. This new pipeline technique has gradually increased the accuracy of FER to a higher degree. On the CK+ and JAFFE datasets, experiments were run to assess the suggested on the CK+ and JAFFE databases, high average accuracy in recognition of 99.49% and 98.58% were acquired.

### Keywords

Convolutional Neural Network (CNN), Deep CNN (DCNN), Transfer Learning, CK+, JAFFE.

### How To Cite This Article?

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# Heterogeneous sensor data fusion acquisition model for medical applications

Jyoti Dhanke<sup>a,\*</sup>, M. Pradeepa<sup>b</sup>, R. Karthik<sup>c</sup>, Veeresh Rampur<sup>d</sup>, I. Poonguzhali<sup>e</sup>, Hemanand Chittapragada<sup>f</sup>

<sup>a</sup> Department of Engineering Science (Mathematics), Bharati Vidyapeeth's College of Engineering, Lavale, Pune, 412115, Maharashtra, India

<sup>b</sup> School of Information Technology and Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, 632 014, India

<sup>c</sup> School of Electronics and Communication Engineering, REVA University, Bangalore, India

<sup>d</sup> Dept of Electronics, Government First Grade College, Maubad, Bidar, 585401, Karnataka State, India

<sup>e</sup> Department of ECE, Panimalar Engineering College, Poonamallee, 600123, Tamilnadu, India

<sup>f</sup> Department of CSE, Sri Vasavi Engineering College, Tadepalligudem, 534101, Andhra Pradesh, India

## ARTICLE INFO

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Fusion model

## ABSTRACT

Electrocardiogram (ECG) and portable technologies with Internet of Things (IoT)-based biometric authentication have recently gained popularity. As a cutting-edge, potent technique utilized in numerous ways to increase authentication effectiveness over the past few decades, ECG-based biometric verification has garnered a lot of attention. However, a user's ECG signal may alter based on their health or physical condition, which would prevent verification. It should be vital to create a trustworthy method that takes into account unique ECG variations for verification to be successful. An effective and trustworthy ECG check technique is provided in this study. Using the concept of domain customization, this study presents a novel supervised learning platform. Data from many systems has been combined into a unique feature and given to a particular grader, like a Support Vector Machine (SVM), for verification. Cross-validation searches on two accessible data sets were used to assess how effective the proposed verification scheme was. The evaluation results show that the effectiveness of our suggested system achieved a verification prediction performance of 99.4% with a high level of quality & memory. The conclusions showed that the suggested strategy was well suitable for actual-time software to execute the task.

## 1. Introduction

Biometrics would be the quantitative assessment of an individual's distinctive physical and behavioral traits. It should be used to describe users being monitored or to regulate entry [1–3]. The fundamental principle of biometric authentication is that each person can be precisely classified according to their traits [4]. The biometric terms, which may refer to physical or behavioral objectivity, originate from the Greek words life and measure, respectively. Based on physiological or behavioral features, the two major categories of biometric identifiers were described in Ref. [5]. Consumer electronics, point-of-sale software, workplace, and public safety systems, and biometric authentication are increasingly common. Since no passwords or security codes need to be carried about, and biometric systems, that track a user's stride, could work without any direct experience with the individual being watched,

the motivation behind biometric verification has been convenience as well as protection [6–8].

The biggest privacy concern about the use of biometrics was that the physical characteristics, retinal vascular drawings, and fingerprints have also been generally repaired and may not be modified. This sets them apart from non-standard variables like passwords and unique tokens that could be replaced if they were hacked, as was the case with the more than 20 million people whose fingerprints were stolen [9]. Office of Staff. The iris scanning authentication method was broken in 2015 by Jan Chrysler, popularly as "Starbug", a biostatistics study to the Chaos Computer Club. In 2017, Krissler also revealed the breaking of the scanner authentication mechanism. Earlier studies have already demonstrated that Touch ID's fingerprint verification system was unreliable by reproducing its clients' fingerprints from a high-resolution photograph [10]. The Samsung Galaxy S8 mobile phone uses an iris

\* Corresponding author.

E-mail address: [jyoti.dhanke@bharatividyapeeth.edu](mailto:jyoti.dhanke@bharatividyapeeth.edu) (J. Dhanke).

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Article

# Distributed-Ledger-Based Blockchain Technology for Reliable Electronic Voting System with Statistical Analysis

Rupa Ch <sup>1</sup>, Jaya Kumari D <sup>2</sup>, Thippa Reddy Gadekallu <sup>3,\*</sup> and Celestine Iwendi <sup>4,\*</sup>

<sup>1</sup> Department of Computer Science and Engineering, VR Siddhartha Engineering College, Vijayawada 520007, India

<sup>2</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, India

<sup>3</sup> School of Information Technology and Engineering, Vellore Institute of Technology, Vellore 632014, India

<sup>4</sup> School of Creative Technologies, University of Bolton, Bolton BL3 5AB, UK

\* Correspondence: thippareddy.g@vit.ac.in (T.R.G.); c.iwendi@bolton.ac.uk (C.I.)

**Abstract:** In today's society, voting is crucial to choosing the representatives of the people. The current voting process is filled with a vast array of disputes and manipulations. The leader must be selected in a precise manner without any malpractices. In addition, the people and authorities are not happy with the election results and label them unpredictable. We offer a better solution to the current problems, such as tampering, non-residents voting outside of the polling place, quick results analysis, quick counting, and reduced use of staff and funds during the electoral franchise process. In this offer, blockchain technology is used to create the distributed application (dApp) framework that will be used for the proposed e-voting system. Additionally, it offers unique characteristics such as immutability, transparency, privacy, and reception freedom that reduce crimes involving the processing of sensitive data in the electoral process. Ganache, MetaMask, and specified dagger hashing algorithm are used to develop the dApp. A key strength of this paper is the statistical analysis of transactions on the blockchain. Moreover, it also provides security to voters' identity and leads to immediate acceptable counting results with more accuracy.

**Keywords:** blockchain; e-vote; unique ID; Ethereum; secure preservation

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Gadekallu, T.R.; Iwendi, C.

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## 1. Introduction

Electronic voting (sometimes known as e-voting) is a mode of voting in which votes are cast and counted via electronic methods. E-voting may employ freestanding electronic voting machines (EVM) or computers connected to the Internet, depending on the implementation. It might include a variety of Internet services, ranging from simple transmission of tabulated results to full-function online voting via ordinary connectable household devices. Persons with limitations can have full access to electronic voting machines. Electronic machines can use headphones, sip-and-puff, foot pedals, joysticks, and other adaptive technology to provide the necessary accessibility. Punched card and optical scan machines are not fully accessible for the blind or visually impaired, and lever machines can be difficult for voters with limited mobility and strength. Blockchain ensures transparency by storing information in such a way that it cannot be altered without recording the changes made using the necessary encryption and control mechanisms.

The necessity of a paper trail in connection with EVMs is acknowledged on a global scale. In several countries, electronic voting was implemented. The security, precision, dependability, and verifiability of electronic elections, however, were quickly disputed. The types of hacking are always evolving, and the advisors for Electronics Corporation of India Limited (ECIL) identified that when two wires were soldered together (the "diode and triode period"), the data can be tampered with. They are unable to refute the claim made by worldwide experts that no electronic device has ever been created that cannot be



# Optimized deep learning system for smart maize leaf disease detection in IoT platform via routing algorithm

Loshma Guniseti<sup>1</sup> · Shirin Bhanu Koduri<sup>1</sup> · Veeraraghavan Jagannathan<sup>2</sup>

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## Abstract

Automatic recognition of leaf disease in plant is a difficult task in trending intelligent agriculture because of the variances of appearances and surroundings of crop diseases. In this paper, initially, the IoT nodes are simulated for gathering leaf information and the gathered information is transmitted through the optimal routes where the routes are selected using developed Competitive Shuffled Shepherd Optimization (CSSO) algorithm. The CSSO algorithm is designed by the integration of Competitive Swarm Optimizer (CSO) and Shuffled Shepherd Optimization algorithm (SSOA) for selecting the optimal path. The Leaf disease detection process is performed in the base station, where the detection process includes, pre-processing, feature extraction and disease detection. The pre-processing is carried out through ROI extraction, and the features, like Convolutional Neural Network (CNN) features, statistical features and energy texture features is employed to extract the relevant features. Finally, the maize leaf disease is detected from the extracted features using Deep Quantum Neural Network (Deep QNN), where the weight of Deep QNN is trained using developed CSSO algorithm. The experimental result demonstrates that the developed method outperforms than the existing methods based on the accuracy, sensitivity, specificity, F-Measure, energy, and delay of 95.037%, 96.404%, 93.35%, 95.12%, 99.9 J and 11.3 s, respectively.

**Keywords** Leaf disease detection · Routing · Statistical features · Competitive swarm optimizer · Competitive shuffled shepherd optimization

## 1 Introduction

The Internet of Things (IoT) has become an important concept in information technology and academia. The importance of IoT device is recently increasing in various sectors, which

✉ Loshma Guniseti  
loshmagunis69@gmail.com

<sup>1</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, India

<sup>2</sup> Senior Software Developer, Bharat Clouds Private Limited, Chennai, India



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✉ Loshma Guniseti  
loshmagunis69@gmail.com

<sup>1</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, India

<sup>2</sup> Senior Software Developer, Bharat Clouds Private Limited, Chennai, India

## Facial Emotion Recognition Using Transference Learning in the Deep CNN Through the Strategies of Face Crop and Rotation

Anjani Suputri Devi D<sup>\*1</sup> & Suneetha Eluri<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India.

<sup>2</sup>Department of Computer Science and Engineering, Jawaharlal Nehru Technological University, Kakinada (JNTUK), Kakinada, Andhra Pradesh, India

### ABSTRACT

Facial expression recognition (FER) has grown in popularity as a result of the recent advancement and use of human-computer interface technologies. Because the photos can vary in brightness, backdrop, position, etc. It is challenging for current machine learning and deep learning models to identify facial expression. If the database is small, it doesn't operate well. Feature extraction is crucial for FER, and if the derived characteristics are enough being severable, even a straightforward approach can help tremendously. Deep learning techniques automated feature extraction, allowing some irrelevant features to conflict with important features. In this paper, we deal with limited data and simply extract useful features from images. To make data more numerous and allow for the extraction of just important facial traits, suggest innovative face cropping, rotation, and simplification procedures and advocates using the Transference Learning technique to construct very Deep CNN (DCNN) for building a very accurate FER system. By replacing the dense top layer(s) with FER, a pre-trained DCNN model is adopted, and the model is then modified with facial expression data. The training of the dense layer(s) is followed by adjusting each of the pre-trained DCNN blocks in turn. This new pipeline technique has gradually increased the accuracy of FER to a higher degree. On the CK+ and JAFFE datasets, experiments were run to assess the suggested methodology. For 7-class studies on the CK+ and JAFFE databases, high average accuracy in recognition of 99.49% and 98.58% were acquired.

**Keywords:** Convolutional neural network (CNN); deep CNN; transference learning, CK+, JAFFE.

### 1. INTRODUCTION

Emotions are intrinsic human characteristics that are crucial to social communication. As they provide the observer with meaningful information, facial expressions are among the most significant characteristics that reflect a person's emotional state [1]. More than the sum of voice and words, facial expressions account for more than half of a message's communication [2]. Anger, disgust, fear, happiness, sadness, and surprise are the six fundamental categories into which facial expressions can be separated. The ability to decipher emotion from facial expressions has recently attracted researchers' attention in the fields of psychology, psychiatry, and mental health [3]. For smart living [4], health care systems [5], emotion disorder diagnosis in autism spectrum disorder [6], schizophrenia [7], human-computer interaction (HCI), human-robot interaction (HRI), and HRI-based social welfare schemes [8], automated emotion detection from facial expressions is also necessary. Due to its numerous potential uses, facial emotion recognition (FER) has caught the interest of the research community. Machine learning is becoming more and more significant in this field. Numerous strategies, notably those that make use of deep learning techniques, have been put out in recent years for FER [13]. In FER, deep learning techniques perform well [9]. The two main categories of facial expression recognition algorithms are those based on a photo sequence [10] and those based on static images [11]. These two expressions from the same individual produce a contrast that makes it easier to extract the features of each expression in methods that use an image sequence. The sequence shifts from a neutral to a peak expression in these methods. Facial expressions are distinguished using static image-based approaches by analysing the peak expression image without taking into account timing. The primary goal of FER is to map their many facial expressions corresponding emotional states. The two major components of the traditional FER are feature extraction and emotion recognition. Additionally, image preprocessing is required. This includes face detection, cropping, scaling, and normalising. Face detection first crops the facial region before removing the background and non-face areas. Feature extraction from the processed image is the most important task in a classical FER system, and current systems use unique approaches such discrete wavelet transform (DWT), linear discriminant analysis, etc. [12,13]. In order to understand emotions, the collected features are then categorised, often using a neural network.

Due to their built-in feature extraction mechanism from images, Deep NNs (DNNs), particularly convolutional neural networks (CNNs), have gained attention in FER at the moment [14,15]. A few efforts using CNN to solve FER difficulties have been described [16]. Though its deeper model has been demonstrated to perform better at various image-processing tasks, the CNN was only taken into account by the existing FER methods [17]. The difficulties with FER may be the real cause of this. The first requirement for emotion recognition is a reasonably high-resolution image, which calls for working with high dimension data. Second, the work of classifying faces becomes more difficult



# Facial emotion recognition using Hybrid approach for random forest and convolutional neural network

Anjani Suputri Devi D<sup>1\*</sup>, Suneetha Eluri<sup>2</sup>

## Abstract

Facial expression recognition is a crucial component of emotion research and a prerequisite for human-machine interface. In general, face detection, feature extraction, and feature classification are part of a facial expression recognition system. Although traditional machine learning techniques have achieved significant success, the majority of them have difficult computational issues and cannot extract complete and abstract information. Deep learning-based techniques can achieve a greater detection accuracy for facial emotions, but they have a high hardware need and require a lot of training data and tuning parameters. In order to address the aforementioned issues, this paper suggests a method that combines features extracted by a convolutional neural network (CNN) with the C4.5 classifier to identify facial expressions. This method not only identifies the deficiencies of manually created features but also avoids the need for a deep learning model with a high hardware configuration. Random forest is also used to address several issues with C4.5 classifier so it is based on the concept of ensemble learning, which is a process of combining multiple classifiers to solve a complex problem and to improve the performance of the model. By combining these two methods, the proposed system achieves high-level accuracy and these procedures enable the identification of the facial emotions: anger, disgust, surprise, sadness, fear, happiness, and neutral. Performance of the proposed system is evaluated using JAFFE and CK+ data sets.

**KeyWords:** Convolutional neural network(CNN), Random Forest(RF), JAFFE, CK+.

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**NeuroQuantology**2022; 20(10):3072-3081

3072

## Introduction

Human emotion categorization is defined as the technique of identifying human emotion through the measurement of different physiological signs as well as facial expressions, verbal expressions, gestures, and bodily movements. There is no denying the importance of human emotions in the creation of modern technology. In the modern world, human-computer interaction, automated tutoring systems, image and video retrieval, smart surroundings, and driver warning systems all place a high value on the analysis and recognition of emotion [1]. Additionally, psychologists and psychiatrists use emotion recognition to identify a variety of mental health issues. Researchers and scientists have put forth several algorithms and

strategies over the last few decades to identify emotions from speech and facial data. Due to its complexity, it continues to be a difficult subject in the fields of artificial intelligence, computer vision, psychology, and physiology. Researchers and scientists generally concur that the most important factor in identifying human emotion is facial expression. However, due to the sensitivity of the external factors, such as lighting conditions and dynamic head movements, it is challenging to interpret human mood simply using facial expression features [2]. In current years deep learning techniques have achieved great success as well as achieved better accuracy than traditional methods due to the inexpensive computational

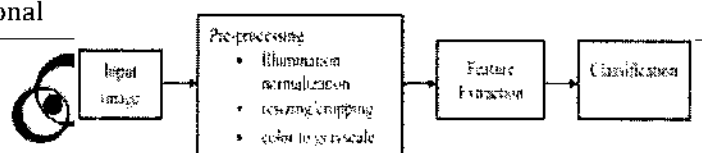
**Corresponding author:** Anjani Suputri Devi D

**Address:** <sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India, <sup>2</sup>Department of Computer Science and Engineering, Jawaharlal Nehru Technological University, Kakinada (JNTUK), Kakinada, Andhra Pradesh, India

E-mail:

anjanihasini@gmail.com

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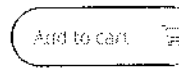
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# Voltage instability curtailment and quality improvement with phasor measurement unit in power system

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## Abstract

### Purpose

The earlier methods are more resilient to improvements such as load shift and path change. This results in problems such as a voltage drop and a high reactive flux. In addition, due to the delay, congestion or interruption of the transmission, the system cannot receive all phasor measurement unit (PMU) measurements at the relevant time as well as the presence of noise in the received data.

### Design/methodology/approach

With the development of wide area measurement system technologies, it seems to be possible to track voltage stability online via time-stamped PMUs. As the voltage instability causes a voltage decomposition, voltage instability is one of the most important problems when monitoring the power supply.

### Findings

This harmonic distortion significantly decreases the data quality in the grid. As a result, instability ascertainment based on PMU has been suggested as a method for detecting voltage instability in power systems monitored with PMU. In addition, a technique called instability amendment via load dropping has been proposed to keep the device from collapsing due to voltage failure.

### Originality/value

To improve the power output, the power prominence melioration technique was developed. This proposed system has been implemented in MATLAB Simulink and compared with the recent researches.

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Soil fertility improvement increases maize yield and reduces loss during mechanized grain harvest

# Minimization of Power Loss in Distribution System by Tap Changing Transformer using PSO Algorithm

Chodagam Srinivas<sup>1\*</sup>, I Kranthi Kumar<sup>2</sup>, N D V Prasad Pandalaneni<sup>3</sup> and N Madhusudhan Reddy<sup>4</sup>

<sup>1,4</sup>Department of EEE, Sri Vasavi Engineering College, Tadepalligudem

<sup>2</sup>Department of EEE, SRKR Engineering College, Bhimavaram

<sup>3</sup>Department of EEE, Dr. YSR ANU College of Engineering & Technology, Acharya Nagarjuna University, Guntur

\*Correspondence: Chodagam Srinivas; srinivas.chodagam@gmail.com

**ABSTRACT**- Energy is a primary requirement for everyone and it is available in different forms in nature, in all forms of energy "Electrical Energy" is the most significant and useful in the daily life of humans. In the last two decades, the usages of electrical & electronic devices are rapidly increased and technology modernizes lifestyles as well as simplified their lives. In this way, the load demand also significantly increased and leads to an imbalance between generated power and load demand. Load uncertainty also increased with the rise of load demand; it leads higher power losses & poor voltage in distribution system (DS). The main objective of this paper is going to discuss the minimization of losses by adjusting tap settings of the distribution transformer with the help of particle swarm optimization (PSO) algorithm. The proposed approach verified on 15 bus distribution system using MATLAB. Electric vehicle charging stations are located in the distribution system to represent the load uncertainty.

**Keywords:** SCSA, BP, Photo plethysmography, CNN, Non-invasive, Cuff-less Distributed Generation, Distribution transformer, EV Charging Stations, Radial Distribution System (RDS), Voltage Profile.

## ARTICLE INFORMATION

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## 1. INTRODUCTION

More nonlinear loads are connected to the distribution system, these nonlinear loads cause and inject harmonic currents into the power system, which reflects the quality of the power system [1]. Nowadays consumer satisfaction would be maximized; customers are expecting high power quality but in the distribution system, 10-13% of generated power is dissipated as I<sup>2</sup>R losses [2] and 20-25% distribution losses present [3]. Normally the distribution system is a radial structure because of the simplicity, it has mainly feeders and distributors, and the main feeders originate from the substation and pass-through different consumer loads, these systems are facing a problem with high resistance to reactance ratio problem [4]. For solving this problem system should upgrade by providing DG and capacitors [5]. DG units are expanded day by day as it advances in innovation [6].

In DG technology nearby load side small generating units are connected, DG's are both renewable and non-renewable. As fossil fuels are depleted day by day reflects renewable-based generating units are the top priority [3]. There is no. of renewable technologies in DG such as fuel cells, photovoltaics,

wind, etc. In all those wind is going to dominate the electricity because of their environmentally friendly and abundantly available resource [8]. Using wind power minimizes some losses, but some losses have existed in the power system even after placing DG. In this project, the PSO method is implemented by controlling transformer tap settings in the distribution system. Losses are moving with the forward-backward sweep technique. The transformer plays a key role in the distribution system as well as transmission. It is intermediate to transmission and distribution, the transformer tap changing's of two types one is off circuit tap changing and on-circuit tap changing. Under normal load conditions, the transformer tap changes within an acceptable range from 0.95 to 1.05 p.u., if indicates below 0.95p.u means poor voltage. In this case, the transformer tap settings are changed from 0.80 to 1.20 p.u. with step 0.01. In this way, the losses will be minimized, and improve system voltage profile.

## 2. LITERATURE SURVEY

In [9], determines the minimum investment required to satisfy the reactive device's suitable reactive constraints. For this problem, capacitor placement is the solution, implemented the capacitor allocation solution with a deterministic and genetic algorithm. The proposed algorithm was tested on SICILY and CIGRE Networks. In [10], uses a combinatorial search algorithm with alternative combinatorial approaches to examine location of the capacitance placement. In [11], power losses are minimized and energy costs are minimized by the perfect location of capacitors. When tested on 22,69,85, and 141 bus systems, the teaching-learning based optimization (TLBO) algorithm and results shows outperforms compared with GA, PSO, DS, and mixed integer linear programming approach. In [12], clustering-based optimization is used to solve the shunt capacitor problems like position, estimating, etc., the proposed

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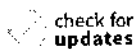
# Development of an Enhanced Selective Harmonic Elimination for a Single-Phase Multilevel Inverter with Staircase Modulation

Govind S.<sup>1</sup>, Anilkumar Chappa<sup>2,\*</sup>, K. Dhananjay Rao<sup>3</sup>, Subhojit Dawn<sup>3,†</sup> and Taha Selim Ustun<sup>4,\*</sup><sup>1</sup> Department of Electrical Engineering, National Institute of Technology Raipur, Raipur 492010, India<sup>2</sup> Department of Electrical & Electronics Engineering, Sri Vasavi Engineering College (Autonomous), Tadepalligudem 534101, India<sup>3</sup> Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, India<sup>4</sup> Fukushima Renewable Energy Institute, AIST (FREA), Koriyama 963-0298, Japan

\* Correspondence: anilkumar.chappa201@gmail.com (A.C.); selim.ustun@aist.go.jp (T.S.U.)

**Abstract:** A low device switching frequency is recommended for the operation of multilevel inverters (MLIs) to achieve reduced switching losses. Selective harmonic elimination (SHE) and total harmonic distortion (THD) minimization are the two primary switching angle estimation methodologies for low-frequency modulation control. In this regard, a new generalized condition has been developed in this paper for the SHE technique. This original condition will give an output voltage with improved THD in comparison to the conventional SHE technique, while achieving its primary objective of eliminating the specific harmonic content from the output voltage. The proposed condition has been formulated by estimating the error associated with the staircase waveform and the desired sinusoidal output at the fundamental frequency. An infinite harmonic count has been considered for the evaluation of the quality of output, to obtain an accurate THD value without any underestimation. The proposed technique is analyzed, and its critical features are studied in Simulink. The effectiveness of the present work has been also validated by the experimental results.

**Keywords:** multilevel inverter (MLI); selective harmonic elimination (SHE); total harmonic distortion (THD); staircase modulation; cumulative absolute error (CAE)



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## 1. Introduction

In recent years, there has been an exponential rise in industrial sectors that demand high-power devices [1]. Connecting a conventional two-level inverter for a medium voltage grid is difficult, due to the increased voltage stress on power semiconductor switches. To overcome this difficulty, the concept of multilevel converters was introduced as a feasible and viable alternative [2]. To achieve higher power, the MLIs try to produce a staircase voltage waveform by utilizing power semiconductor switches in series with lower voltage dc sources. Batteries, renewable energy sources and capacitors can be used as multiple dc voltage sources [3–5]. MLIs are of great significance in medium- and high-voltage applications [3,6–8], where the quality of output is critical. MLIs have the capability to operate at the fundamental switching frequency and higher switching frequencies. To attain improved performance of MLIs, the low device switching frequency is employed [9]. The key step in employing the low-frequency modulation control is to choose the switching angles.

Selective Harmonic Elimination (SHE) and Total Harmonic Distortion (THD) minimization are the two major switching angle estimation approaches [8]. SHE is a feasible and practical alternative compared to the other modulation techniques which are used in variable speed drives or ground power units, due to the numerous advantages offered by the technique such as direct control over output waveform harmonics [10]. When SHE is

## Research Article

# Consumer-Centric Rate Design for Peak Time Energy Demand Coincidence Reduction at Domestic Sector Level-A Smart Energy Service for Residential Demand Response

Swathi G,<sup>1</sup> Srinivasa Varma P,<sup>1</sup> Sudha Rani Donepudi,<sup>2</sup> and Ramash Kumar K<sup>3</sup>

<sup>1</sup>Department of Electrical and Electronics Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India

<sup>2</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Andhra Pradesh, India

<sup>3</sup>Department of Electrical and Electronics Engineering, Dr.N.G.P. Institute of Technology, Coimbatore-48, Tamilnadu, India

Correspondence should be addressed to Ramash Kumar K; [ramashkumar@drngpit.ac.in](mailto:ramashkumar@drngpit.ac.in)

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Reducing demand coincidence of customers with distribution system peak hours is very essential in the modern world energy sector. There is a great scope for peak demand coincidence reduction at the customer level, especially in the residential sector through Residential Demand Response programs. Through smart meter installations along with IT-enabled technologies, many of the distribution company's initiatives like residential demand response programs can be taken to domestic customers with ease, less cost, and less technology deployment. Rate design is one such effective approach. Even though time-varying rates like Time of Use have been used as an effective approach for reducing peak electricity demand in different sectors around the world, the residential sector has not gained much attention due to a few challenges like externality problems, high on-peak and low off-peak prices, improper pricing mechanisms. Hence, considering the above challenges and constraints, a rate design, named consumer-centric time of use tariff is proposed in this article for domestic customers. The tariff is consumer-centric such that each customer gets a unique on-peak unit price and off-peak unit price based on their consumption during peak hours both at the house-level and utility level rather than common and fixed on-peak and off-peak prices for all the customers, thus addressing the above-mentioned constraints. For this, customers are classified into different clusters using the Machine Learning Algorithm K-Means. The proposed rate design model has been analyzed on synthetic smart meter data of 10 houses, and it is observed that the proposed tariff shows an increase in the monthly revenue by 4.3% for the utility and a variation of -0.4% to 7% of energy charge for different customers. This study and analysis show that the proposed consumer-centric time of use rate design provides a better pricing mechanism with a win-win strategy for both customers and utility, thereby avoiding windfall gains or losses to both. Furthermore, the proposed tariff influences each residential customer of different consumption levels to reduce peak demand coincidence as well as energy consumption for the power sector.

## 1. Introduction

Peak load or peak demand is one of the five smart grid-specific drivers in the electricity sector identified by the International Energy Agency (IEA), with issues such as significant stress on the grid, increasing the risk of blackouts and brownouts, increased power prices for consumers, and the need to build additional plants. To meet this peak demand due to fluctuating load variations, such as increased

demand in the early morning or evening, grids must provide additional peaking capacity, i.e., additional energy generating capacity, which increases the utility's cost. Furthermore, smart metering and proper electricity rate design for consumers must be developed as part of Demand Response (DR) programs for peak load management. Small customers, such as Low Voltage (LV) customers, have been subsidized by large customers, such as HV customers, and low load factor customers have been subsidized by high load factor



## A Survey of Machine Learning Applications in Renewable Energy Sources

Pulavarthi Satya Venkata Kishore<sup>1</sup>, Jami Rajesh<sup>2</sup>, Nakka Jayaram<sup>2</sup> and Sukanta Halder<sup>3</sup>

<sup>1</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India; <sup>2</sup>Department of Electrical Engineering, National Institute of Technology, Tadepalligudem, Andhra Pradesh, India; <sup>3</sup>Department of Electrical Engineering, Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat, India

### ABSTRACT

Renewable energy is now in high demand due to the deterioration of the global climate and the depletion of conventional sources. Renewable energy sources (RES) such as wind and solar are extremely intermittent, making it impossible to sustain system reliability with an unacceptably high proportion of renewable energy injection. An intrinsic attribute common to all renewable power plants is that the production of energy relies on environmental conditions such as temperature, pressure, wind speed, humidity, clouds, etc. Therefore, the power from RES cannot be completely regulated or pre-planned. It is important to forecast the amount of electricity that can be produced in a power grid for future demand. Machine learning (ML) is an emerging technology and used in all fields nowadays to perform different tasks. In this paper, the applications of machine learning in renewable energy sources are discussed. These ML techniques are mainly used to predict the power from renewable energy sources like wind, solar, hydro, biomass, tidal, and geothermal. Fault detection is a significant aspect in renewable energy systems to reduce the operation and maintenance cost and to deliver the continuous power to the loads. This paper also focusses on the use of ML techniques in predicting the faults before it occurs, early detection of faults and also to diagnose the faults in renewable energy systems. Along with the above-mentioned applications, these ML techniques used in RES for different purposes are also discussed.

### KEYWORDS

Faults; Forecasting; Machine learning; Prediction; Renewable energy sources; Solar energy; Wind energy

### ABBREVIATIONS

1DCNN	One-Dimensional CNN	DMPC	Diurnal Mean Power Curve
ABC-SSELM	Artificial Bee Colony algorithm and Semi-Supervised Extreme Learning Machine	DT	Decision Tree
ANFIS	Adaptive Neuro-Fuzzy Inference System	DTR	Decision Tree Regression
ASH	Ash content	EDCNN	Efficient Deep CNN
BDTR	Boosted Decision Tree Regression	ELM	Extreme Learning Machine
BLR	Bayesian Linear Regression	FC	Fixed Carbon
BP	Back Propagation	FRNN	Fully Recurrent Neural Network
BPNN	Backward Propagation Neural Network	GBRT	Gradient Boosted Regression Trees
CART	Classification and Regression Tree	GBT	Gradient Boosting Tree
CC	Correlation Coefficient	GPR	Gaussian Process Regression
CNN	Convolutional Neural Networks	GRNN	Generalized Regression Neural Networks
d	Index of agreement	GRU	Gated Recurrent Unit
DA	Discriminant Analysis	HHV	Higher Heating Value
DB-LSTM	Bi-Directional Long Short-term Memory	HOG	Histogram of Oriented Gradient
DBN	Deep Belief network	ILQR	Iterative Linear Quadratic Regulator
DDPG	Deep Deterministic Policy Gradient	kNN	Kernel and Nearest Neighbor
DFR	Decision Forest Regression	K-SVD	K-Singular Value Decomposition
DK-SVD	Discriminative K-SVD	LASSO	Least Absolute Shrinkage Selector Operator
		LBP	Local Binary Pattern
		LR	Linear Regression
		LSR	Least Square Regression
		LSSVM	Least Square Support Vector Machine
		LSTM	Long Short-Term Memory

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## TOPICAL REVIEW

# Emerging Intelligent Bidirectional Charging Strategy Based on Recurrent Neural Network Accounting EMI and Temperature Effects for Electric Vehicle

SAIRAJ ARANDHAKAR<sup>1</sup>, (Member, IEEE), NAKKA JAYARAM<sup>1</sup>,  
YANNAM RAVI SHANKAR<sup>2</sup>, GAURAV<sup>3</sup>, (Student Member, IEEE),  
PULAVARTHI SATYA VENKATA KISHORE<sup>3</sup>, (Student Member, IEEE),  
AND SUKANTA HALDER<sup>4</sup>, (Member, IEEE)

<sup>1</sup>Department of Electrical Engineering, National Institute of Technology Andhra Pradesh, Tadepalligudem 534101, India

<sup>2</sup>School of Electrical and Computer Engineering, Dire Dawa University, Dire Dawa 1362, Ethiopia

<sup>3</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, India

<sup>4</sup>Department of Electrical Engineering, Sardar Vallabhbhai National Institute of Technology, Surat 395007, India

Corresponding author: Yannam Ravi Shankar (yannam.ravi@ddu.edu.et)

**ABSTRACT** Transportation is currently advancing towards Electric Vehicle (EV) technology. This paper presents a brief and systematic analysis of the real-time issues obtained in Electric Vehicles (EVs) due to the various ranges of energy storage devices. In general, EV energy management system is integrated with power electronic circuits for effective power conversion and reliable operation. Some issues are addressed while using the batteries in EV systems such as charging time, efficiency of battery, and raw materials. Not only battery issues but also real-time non-technical issues and operational issues are also discussed in this paper. During energy conversion with power electronic circuits, the system attains extreme temperature levels which in turn reduces the performance of the system. To maintain an optimum temperature level, it is important to study the temperature effect of the system at the most prior levels. Due to the adaption of power electronic components, some extent of noise is generated, technically treated as Electromagnetic Interference (EMI), as system capacity increases the EMI content also improved proportionately. Therefore, to mitigate the EMI effect, the low pass filter-based EMI filter is introduced in the system such that the noise level is suppressed. Bidirectional Charging System (BCS) is one of the emerging technologies in EV to obtain autonomous power supply systems in the form of Vehicle to Grid (V2G), Grid to Vehicle (G2V), and Vehicle to Load (V2L). To know the behaviour of BCS the proposed RNN controller is employed and is compared with ANN bidirectional charging model. BCS charging system with RNN controller has better dynamic response to exchange the power via DC/DC converter and AC/DC converter as compared to ANN controller.

**INDEX TERMS** Power electronic converter (PEC), electromagnetic compatibility (EMC), electric vehicle (EV), fuel cell electric vehicle (FCEV), EMI filter.

## I. INTRODUCTION

Across the globe, most Internal Combustion (IC) engines are replaced with electric motors. Not only for the hike of fuel

charges but also for the concern of the environment [1]. Vehicles powered by IC engines emit 20%-30% of greenhouse gas emissions. Additionally, there is a severe problem with fossil fuel depletion and growing awareness of deteriorating climate conditions has prompted the development of alternative energy sources [2]. Therefore, electric vehicles (EVs)

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## RESEARCH ARTICLE

# Quadruple Boost Switched Capacitor-Based Inverter for Standalone Applications

SRIMANNARAYANA KOVVALI<sup>1</sup>, NAKKA JAYARAM<sup>1</sup>,  
SATYA VENKATA KISHORE PULAVARTHI<sup>2</sup>, (Student Member, IEEE),  
YANNAM RAVI SHANKAR<sup>3</sup>, JAMI RAJESH<sup>1</sup>, AND V. GOURI PRASANT<sup>1</sup>

<sup>1</sup>Department of Electrical Engineering, National Institute of Technology Andhra Pradesh, Tadepalligudem 534101, India

<sup>2</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, India

<sup>3</sup>School of Electrical and Computer Engineering, Dire Dawa University, Dire Dawa 1362, Ethiopia

Corresponding author: Yannam Ravi Shankar (yannam.ravi@ddu.edu.et)

**ABSTRACT** Conventional energy sources will not be sufficient to meet future electrical demands, and also pollute the environment. Therefore, to meet their electrical energy needs, and maintain clean and green environmental conditions, people are focusing more on renewable energy sources. Small-scale PV solar standalone AC loads or grid integration applications need high voltage at a desired level, transformer/inductor less operation, high gain DC-DC front-end converters, and DC-AC converters. To achieve all the above objectives, this paper proposes a step-up quadruple boost nine-level inverter, it works on switched capacitor technique with a reduced count of components for the application of renewable energy systems. The proposed topology balances the capacitor voltages with the control scheme itself without using any sensors. A level-shifted pulse-width modulation (LPWM) technique can be used in the control strategy of the proposed topology. This paper covers the operational modes of the proposed topology, voltage stress calculations, capacitors calculations, and losses calculations at various stages and compared with recent literature, that reveals this topology is more advantageous in terms of less total standing voltage, switch count, cost factor, better efficiency and the number of gate driver circuits. The theoretical performance can be validated through MATLAB/Simulink-based simulation and their results are validated through prototype experimentation. Further, the experimental results contain modulation index variations, frequency modulation, switching frequency variations, input voltage variations, and load variations. Finally, the max efficiency of 96.5% is achieved for the experimental prototype of the proposed topology.

**INDEX TERMS** Switched capacitor (SC) based inverter, high gain inverter topologies, solar PV, self-voltage balance and level shifted pulse width modulation (LSPWM).

## I. INTRODUCTION

The demand for electrical energy can increase rapidly throughout the world from day to day. Electrical energy is majorly generated by the combustion of fossil fuels like coal, petroleum, natural gas, and nuclear materials. Those materials can expose harmful gases to the environment, which leads to an environmental imbalance that can exist throughout the world. The solution to meet the demand for increasing electrical energy, with environmentally friendly renewable energy sources is gaining more popularity. Renewable energy



generating stations are far away from the load centers. Therefore, the transmission and distribution losses are increased to deliver the electrical energy from generating stations to load centers. To overcome this problem, rooftop distributed solar PV systems are introduced in current years. The available power and voltage ratings for small-scale solar PV rooftop systems are 0.5kw-5kw and 60-100v [1], [2], [3]. To supply the AC power at distributed voltage levels, the available R.M.S voltages are 230V for a single phase and 415V for a three-phase system. Solar rooftop PV cells can generate power in D.C nature at lower voltage levels. The lower voltage levels of DC can be stepped-up by high-gain DC-DC converters and DC-AC conversion will be needed to meet the

The associate editor coordinating the review of this manuscript and approving it for publication was Poki Chen.





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## Detection and classification of DC and feeder faults in DC microgrid using new morphological operators with multi class AdaBoost algorithm


P.K. Dash<sup>a</sup>  , Smruti Rekha Pattnaik<sup>b</sup>, Eluri N.V.D.V. Prasad<sup>c</sup>, Ranjeeta Bisoi<sup>a</sup>

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### Abstract

DC microgrids with energy storage systems based on photovoltaic (PV) and wind energy are gaining popularity as a means to offer users with reliable supply in either a stand-alone or grid connected mode. However, because DC and AC side faults have similar current–voltage profiles, developing a viable safety strategy for the proposed integrated DC microgrid is difficult. Traditional protection techniques based on pre-defined thresholds are unable to discriminate between DC and AC side faults, and so fail to offer independent control actions in both circumstances. In this context, new morphological operators with improved AdaBoost algorithm is proposed for detecting and classifying the AC and DC side faults in the proposed DC microgrid. To explore this, current signals are captured at the DC bus of the proposed integrated DC microgrid. The captured signals comprise background noise which is eliminated by dilation erosion difference operator (DEDO) and opening closing difference (OCDO) operators. The two operators work together to meet the accurate fault detection to avoid nuisance tripping by multiscale operation of structuring element (SE). For effective outcomes the multiple scales are optimized by sparse kurtosis (SK) index. The optimized scales are passes through target features to retrieve the data. The acquired data is sent into the multi-class AdaBoost approach, which recognizes faults by modifying the distribution of data and iteratively adjusting the weight of each instance. The proposed system's efficacy is tested using the MATLAB/Simulink platform under various operating situations such as load variation, irradiation and fault resistance changes. The proposed algorithm's superiority is demonstrated by comparing it to existing approaches using confusion matrix (CM) parameters.

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## AC-DC UPF charging circuit for two-wheeler electric vehicle application

Swathi Karike<sup>1</sup>, Sudha Rani Donepudi<sup>2</sup>, Kuthuri Narasimha Raju<sup>1</sup>

<sup>1</sup>Department of Electrical and Electronics Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India  
<sup>2</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

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### ABSTRACT

Extinction and the emission of greenhouse gases from fossil fuels led the field of energy studied took a revolutionary turn towards non-conventional natural sources achieving zero-pollution power. Electric vehicles (EVs) are trending in this new era to reduce the global warming. Due to limitations in storage systems, electric vehicles are not much popular but to reduce the pollution from vehicles, EVs are in must condition and recommended for (public/personal) transportation. EV (battery) is charged through a DC source (converting the available AC supply to DC). The conversion process diminishes the input source power factor and is a worrying factor. This paper addresses the power factor issue while charging the battery of EVs. The paper focuses on maintaining the unity power factor on the source side while charging the battery of the EV from AC-DC conversion. The model is developed and the results are discussed (for three different battery levels) using MATLAB/Simulink software.

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### Corresponding Author:

Kuthuri Narsimha Raju  
Department of Electrical and Electronics Engineering, Koneru Lakshmaiah Education Foundation  
Vaddeswaram, India  
Email: Narsimharaju\_eee@kluniversity.in

## 1. INTRODUCTION

The emission of carbon gases leads to global warming depleting the ozone layer and creating a harmful environment for living species. Vehicles using IC engines with crude oil products as fuel are one major system that contributes to depleting the ozone layer and raising the Earth's temperature [1]. With the transition of vehicle systems using sustainable sources like PV-solar system, stability in human-involved climatic conditions can be achieved. The use of electric vehicles (EVs) [2]–[5] shows a progressive move toward controlling global environmental issues. Solar-powered electric vehicles [6] are also becoming popular. Using EVs over gasoline engine vehicles can reduce the running cost significantly while saving environmental energy. The main constraint of using EVs is their range of operation. The use of advanced battery technology and converter technology can help increase the range of EVs and their efficiency.

EVs are vehicles that run purely on electrical appliances and converter technology where the wheel of the EV is driven by an electric motor through a gear system. The charging system placed onboard [7] is trending these days for EVs, which is made possible because of growing technology in power electronics in the automotive sector. The battery system which is installed on the board of EV is charged [8], [9] from the grid (AC) source after being converted to DC type through an AC-DC converter. The battery supplies the power to the motor and the mechanical output of the motor through the gear system is connected to the wheel of the EV. A review of the issues related to the power quality that occurred while interfacing electric vehicles to the distribution system and various techniques to mitigate these problems have been done in [10]. In a grid reactive voltage regulation technique has been proposed that reduces the power losses enhances the stability

## Bad data analysis and detection using PMU with UPQC integration to grid during fault conditions

Preeti Kabra<sup>1</sup>, Suraparaju Venkata Naga Lakshmi Lalitha<sup>1</sup>, Sudha Rani Donepudi<sup>2</sup>

<sup>1</sup>Department of Electrical Engineering, Koneru Lakshmaiah Education Foundation, Vijaywada, India

<sup>2</sup>Department of Electrical Engineering, Sri Vasavi College of Engineering, Tadepalligudem, India

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### ABSTRACT

Analysis of bad data in an IEEE 14 bus system with phasor measuring units (PMU) devices is carried out in this paper. The normal operating condition data achieved from the PMU in the bus system is compared to the data achieved during faults in the bus system. A principal component analysis (PCA) technique is proposed in this paper for distinguishing the difference between data transmission during normal and fault conditions. The PCA approach detects the dynamical magnitudes of the measurements taken and also determines the noise caused by the disturbances. The grid system is updated with unified power quality conditioner (UPQC) improvising the parameters of the system to mitigate the fault. The PMU devices use PCA technique for a comparative analysis of the measured components analyzing the performance of the system under different operating conditions. The simulation of these modules is carried out in Simulink environment of MATLAB software with PCA done concerning time.

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### Corresponding Author:

Preeti Kabra  
Department of Electrical Engineering, Koneru Lakshmaiah Education Foundation  
Vijaywada, India  
Email: mail.preeti.kabra@gmail.com

## 1. INTRODUCTION

In modern power systems, it is a mandate of utilizing real-time measurements for better control and management of the system. The real-time measurements [1] help us to even protect the devices connected to the system during fault conditions. With faster measurement readings taken from the system, a rapid response can be created avoiding many fatal conditions. This can be achieved using phasor measuring units (PMU) devices [2] connected at different locations of the power system. The placement of these devices can also be selected as per the requirement of sensitive devices. PMUs are used for multiple applications including assessment of power system stability and security and improving grid protection. These PMUs telecommunication devices have an issue of interfacing with external signals introducing disturbance and creating errors in the measured signals. These measured signals also have disruptions when the grid system is induced by any fault on the transmission lines [3].

For the analysis of different data measured by the PMU measuring devices an IEEE 14 bus system is considered with fault introduced at different locations of the bus system [4]. The signals from the PMU devices are compared with nominal operating conditions with bad data created when a fault is introduced in the bus system. Figure 1 shows IEEE 14 bus system, a single-line diagram with multiple sources and loads connected at different locations.

# PERFORMANCE EVALUATION OF AC-DC ACTIVE-PFC BASED CHARGING DEVICE FOR TWO-WHEELER EV APPLICATION.

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- **Abstract:** Fossil fuels emit greenhouse gases during their usage process. The emission of greenhouse gases leads to global warming. Alternative energy resources with zero pollution are a viable option in these modern days to protect the environment. Vehicular pollution contributes more to global warming and Electric vehicles (EVs) driven from a battery source can control this condition. Due to limitations in the storage system, electric vehicles are not much popular but to reduce the pollution from vehicles, EVs are a must and is recommended for (public/personal) transportation. EV (battery) is charged through a DC source (converting the available AC supply to DC). The conversion process diminishes the input source power factor and is a worrying factor. This paper addresses the power factor issue while charging the battery of EVs. The paper focuses on maintaining the unity power factor on the source side while charging the battery of the EV from AC-DC conversion. The model is developed and the results are discussed (for three different battery levels) using MATLAB/SIMULINK software.
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# SPECIFIC HARMONIC ERASURE IN MULTILEVEL INVERTERS USING SWARM INTELLIGENCE

Mr. V. Rama Narayana\*,  
Mr. J. Sainadh Chakravarthi\*\*, Mr. G. Karthik Sai Dinesh\*\*, Mr. M. Kiran Babu\*\*,  
Mr. M. Shanmukha Saddhayi\*\*

\*Assistant professor, Sri Vasavi Engineering College

\*\*UG student, Sri Vasavi Engineering College

Department of Electrical and Electronics Engineering, Tadepalligudem

**Abstract :** High-voltage dc transfer, electronic cars, and variable drive systems are just a few areas where inverters are used. However, harmonics in the inverter's output can cause problems with electricity quality. The Particle Swarm Optimization Algorithm is suggested in this project as a method for determining the best switching angles for selective harmonic removal in a cascaded H-bridge multilevel inverter. The project's goal is to use nonlinear equations to remove low-order harmonics and arrives at the desired fundamental component. The suggested method can improve the output from the inverter by reducing selective harmonics and Total Harmonic Distortion (THD) by determining the best-triggering pulses. By implementing 5-level and 7-level inverters and analyzing their performance using the suggested technique by using MATLAB

**Keywords -** Multilevel inverters, SHE, PSO, Harmonics, Fitness function, SPWM.

## I. INTRODUCTION

Multilevel inverters have become an increasingly popular option in power electronics applications due to their ability to provide high-quality output voltage with decreased harmonic distortion. To create the desired output voltage waveform, these designs combine numerous power electrical valves and voltage sources. They have benefits like greater electricity capability, decreased electromagnetic interference, and better efficiency. Electric cars, high voltage DC transfer, motor drives, and green energy systems are all areas where multilevel inverters have been found useful. The capacity of multilevel inverters to generate high-quality output voltage patterns with lower total harmonic distortion is one of their main advantages. (THD). Multiple layers of DC voltage sources are used to accomplish this, which lowers the harmonics' peak amplitude in the output waveform. Multilevel inverters can also work at high switching rates, which improves their efficiency when handling high-power uses.

## II. MULTILEVEL INVERTER TOPOLOGIES

### 2.1 Neutral-Point-Clamped (NPC) inverter

A particular kind of power electrical gadget used to transform DC energy into AC voltage is called a Neutral Point Clamped (NPC) multilevel inverter. It is a multilevel inverter design that, in comparison to other multilevel topologies, enables the production of high-quality output waveforms with decreased harmonic distortion and lower switching losses.

The NPC inverter divides the DC voltage source into a number of levels by arranging a number of capacitors and switches in a particular order. This makes it possible for the converter to produce a stepped waveform that is close to the sinusoidal pattern needed for many AC uses.

### 2.2 Flying Capacitor Multilevel Inverter

A multilevel inverter that produces numerous voltage levels by using capacitors as energy storage components are known as a flying capacitor multilevel inverter. The capacitors are switched and connected in series to create a pattern that closely resembles a sine wave in the inverter.

## Analysis of ANFIS based Multi-Level Inverter for Rural Electrification

Y. Lalitha Kameswari<sup>1</sup>, Arvind R. Singh<sup>1,\*</sup>, D. Sudha Rani<sup>2</sup> and Hemant Kumar<sup>3</sup>

<sup>1</sup>Department of EEE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Gutore, India

<sup>2</sup>Department of EEE, Sri Vasavi Engineering College, West Godavari, India

<sup>3</sup>Department of EEE, Sree Vidyanikethan engineering college, Tirupati, India

\*Corresponding Author: Arvind R. Singh<sup>1</sup>

### Abstract

Now-a-days with the use of solar panels for the rural electrification is increasing with the help of Government based schemes. The main use of Solar based electricity generation is for lighting and Irrigation purpose. The solar based electricity with the use of appropriate inverter helps to facilitate the timely day time irrigation supporting the farmers in large scale. The inverter which converts the DC Power generated from Solar Panels (PV) must be converted for Induction Motor based Water pumping system for Irrigation. The performance or efficient working of Induction Motor solely depends on inverter which must provide good power/quality power so that the Induction Motor (Pump) must not deteriorate its life as well as performance/functions. The poor quality of power supplied to Induction Motor will lead to Induction damage due to overheating, low torque generation due to low fundamental frequency voltage amplitude or excessive heating due to dc current component in the inverter output voltage. This all will leads to the burning, short circuiting the Induction motor winding and permanent damage to its core (Stacked metal plates). Hence its very important to study the inverter which are mostly used for Induction Motor (Pumping) irrigation systems. To overcome this problem, this study validates the single-phase thirteen level cascaded H-Bridge Multilevel Inverter administrated by the fuzzy logic controller to progress the Power Quality by reducing the total Harmonic Distortion at the output voltage of the inverter used in Irrigation Systems. Addition to this technique, a Neuro-Fuzzy Controller and ANFIS Controllers are proposed to improve the Quality of Power by reducing the inverter output voltage THD. Multilevel Inverter of Cascaded type is preferred for this work as its structure is simple and requirements of components are less when compared to other types of Inverters. The performance evaluation of THD is done and is executed in MATLAB working platform.


**Keywords:** Multilevel Inverters, Fuzzy logic Controller, ANFIS, THD, Power Quality.

**Abbreviation:** MLI- Multilevel Inverter, CMLI- Cascaded Multilevel Inverter, FLC-Fuzzy logic Controller, NFC-Neuro Fuzzy Controller, ANFIS-Adaptive Neuro Fuzzy Inference System

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Original Paper | [Published: 25 January 2023](#)

# Analysis on significance of various statistical texture features in vision-based surface roughness prediction in end milling process

[D. V. N. Prabhakar](#) , [A. Gopala Krishna](#) & [M. Sreenivasa Kumar](#)

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## Abstract

The aim of this study is to identify the significant statistical texture features involved in surface roughness characterization. The vision-based approaches for assessing the surface roughness involve features extracted from the sampled surfaces. Conventional models use all the extracted features in prediction, thereby resulting in computational complexity and larger execution time. Hence, the development of an effective method which reduces the feature space to optimum is attempted in this work by conducting CNC end milling experiments on aluminum 3025

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Original Paper | [Published: 23 July 2022](#)

## Effect of Diethyl Ether Additive on Reformulated Bio-Mix Blends from a Mixture of Different FEED Stock's

[G. V. Subhash](#), [S. P. Sivapirakasam](#) , [Sreejith Mohan](#), [Nandakumar Subramanian](#) & [K. Harisivasri Phanindra](#)

*Waste and Biomass Valorization* **14**, 261–276 (2023)

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### Abstract


The current study focuses on the use of diethyl ether as a fuel additive to enhance the properties of bio-mixture test samples. In this research, the raw bio-mix oil was extracted from a mixture of various raw feedstocks of borassus flabellifer oil (non-edible) and waste cooking oil (edible) to obtain the optimum raw bio-mix blends based on their acid value. The optimum raw bio-mix fuels were converted to purified bio-mixture test fuel through a transesterification reaction process.

Transesterified bio-mix samples were selected as optimum blends and mixed with 5% Diethyl ether for further investigations. The fatty acid composition of samples was identified using gas

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## Abstract

Water is a vital component of human survival. Drinking water is scarce in several large provinces around the world. Only saline water, which may be demineralised and utilised for drinking, is available in this situation. For extended journeys, normal water is required in boats and submarines. Self-demineralised equipment is usually installed in vehicles, but it consumes more conventional gasoline and is, therefore, more expensive. To address this problem, solar still can be used, which has the primary aim of converting seawater into consumable desalinated water. In this work, a solar still with phase change material (PCM) – RT58 which have better thermo-physical properties has been incorporated and investigated for thermo-economic performance. It is observed from the results that the RT-58 PCM achieved a greater yield compared to conventional solar still (CSS) without any PCM as an energy storage material. The productivity of solar still with PCM is increased by 46% relative to CSS. Also, the economic analysis revealed that the solar still with PCM is more economically viable than CSS in terms of cost per litre production of freshwater and payback period.



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







# Effect of natural sisal fibre on enhanced condensation rate of solar still for water production

Subbarama Kousik Suraparaju <sup>a</sup>, Sendhil Kumar Natarajan <sup>b</sup>  

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## Abstract

The primary purpose of the current study is to assess the energy-eco by reducing glass cover temperatures using sisal fibers. In this regard modified with a water-dripping arrangement integrated with sisal f experimental analysis on conventional solar still without any glass c dripping arrangement without fibers for Glass Cooling (SSGC), and S dripping and Sisal Fibers (SSGCF) is conducted under similar climati natural fibers on the clean water production of solar still. It is noted SSGCF are lowered by 16% and 30% compared to CSS. Also, the potat enhanced by 104.5% and 71.8% relative to CSS and SSGC. Neverthele by about 19.1% relative to CSS. Besides thermal performance, the pri from SSGCF is \$ 0.021 with a payback time (PT) of 3.9 months while 0.036 with a PT of 5.5 and 7.1 months respectively.


## Introduction

The world is facing a fresh and pure drinking water problem at an es water reports, water scarcity, climate change, and water distribution across the globe in the coming future [1], [2]. The plausible solution

Author



Subbarama Kousik Suraparaju

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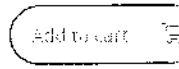
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/ Performance analysis of a novel solar cogeneration system for generating potable water and electricity

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[Subbarama Kousik Suraparaju](#), [Arjun Singh K.](#), [Vijesh Jayan](#), [Sendhil Kumar Natarajan](#)

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## Abstract

### Purpose

The utilisation of renewable energy sources for generating electricity and potable water is one of the most sustainable approaches in the current scenario. Therefore, the current research aims to design and develop a novel co-generation system to address the electricity and potable water needs of rural areas.

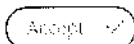
### Design/methodology/approach

The cogeneration system mainly consists of a solar parabolic dish concentrator (SPDC) system with a concentrated photo-voltaic module at the receiver for electricity generation. It is further integrated with a low-temperature thermal desalination (LTTD) system for generating potable water. Also, a novel corn cob filtration system is introduced for the pre-treatment to reduce the salt content in seawater before circulating it into the receiver of the SPDC system. The designed novel co-generation system has been numerically and experimentally tested to analyse the performance at Karaikal, U.T. of Puducherry, India.

### Findings

Because of the pre-treatment with a corn cob, the scale formation in the pipes of the SPDC system is significantly reduced, which enhances the efficiency of the system. It is observed that the conductivity, pH and TDS of seawater are reduced significantly after the pre-treatment by the corncob filtration system. Also, the integrated system is capable of generating 6–8 litres of potable water per day.

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# The Efficacy of Kahoot! In Enriching Students' English Vocabulary during Covid-19 Pandemic

Manipatruni Venkata Ramana<sup>1</sup>, Dr. Nannapaneni Siva Kumar<sup>2</sup>, Karibandi Venkata Rama Rao<sup>3</sup>, Tanuja Chundru<sup>4</sup>

<sup>1</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>2</sup>Head & Associate Professor of the Department of Communication & Soft Skills, Malla Reddy University, Hyderabad, Telangana, India

<sup>3,4</sup>Sr. Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

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## ABSTRACT

If language is a big highway, the words in it are the vehicles without which it looks empty. It is applicable to any language and English is no exception to it. As the English language has been the professional language that connects people globally, learners are obliged to master it to communicate and even to procure their dream careers in India or abroad. But mastery of a language is proportional to the enhancement of its vocabulary which is the currency of one's communication. We know our words are our ambassadors which program us for either success or failure. But in a traditional classroom, we often tend to see some students become hard up for vocabulary while speaking or writing English. With COVID-19 wreaking havoc, the chances of getting students synchronously to improve their vocabulary slowed down. Yet this pandemic compelled the teachers to have dug out a plethora of tools of educational technology to sustain the lost spirit of teaching and learning. Kahoot! is one of the various Edtech tools which has been instituted exclusively to gamify learning in the form of quizzes of various types. Our research analyzes the role of Kahoot! in enriching students' English vocabulary online and further, brings forth the outcome of experimentation with Kahoot! through a new approach to asynchronous teaching and learning during the COVID-19 pandemic.

**Keywords:** Vocabulary, enrichment, gamify, Kahoot!, asynchronous learning

---

## INTRODUCTION

There have been various traditional methods and approaches followed and proved successful prior to the pandemic but with COVID-19 still lingering, teachers and educationists had to dig out various EdTech tools not only to teach students online synchronously but also to engage the students in online learning asynchronously. Thus, the gap caused by the COVID-19 pandemic is being filled.

Acquisition of vocabulary is the best recipe for learning any language and English is no exception to it. Burgeoning job opportunities demand students to master English which helps them seize the opportunities that come their way. The growing interest in global trade, the availability of most of scientific resources, and literature in English escalated the necessity of mastering the English Language. But to learn English, students must enrich their vocabulary on a regular basis through rigorous practice. There are four skills; listening, speaking, reading, and writing that the students need to learn to master English. Yet the students should understand the importance of words, pronunciation, and grammar to have command over English and the most significant component of language is its vocabulary [12]. As part of mastering English as a second/foreign language, learning vocabulary in a traditional way seems monotonous to many students. But the technology that can gamify the learning of vocabulary makes it more engaging. Students with technical backgrounds can easily acclimatize to digital learning as they prefer edutainment; a way of making activities both educational and enjoyable [14]. Learning English using various language learning applications makes it more interesting and entertaining. This way the gap between traditional classroom instruction and students' interest in the acquisition of English vocabulary is bridged [2]. Teaching online, especially during this COVID-19 pandemic is not an easy task for teachers. Keeping the students motivated throughout the class and engaging them in serious learning needs herculean efforts from the teachers. This case becomes more difficult in the case of higher education if there is no active response from the students during online classes. Though there are many language learning tools in use, Kahoot! stands out from the rest in helping students learn English vocabulary because it gamifies the quizzes [13].



## ENHANCING ENGLISH LANGUAGE SKILLS USING CUTTING-EDGE TECHNOLOGY

Srinivasa Rao Gundu<sup>1</sup>, KV Rama Rao<sup>2</sup>, K Radha Madhavi<sup>3</sup>,  
Ch Mutyala Rao<sup>4</sup>, Venkata Ramana Manipatruni<sup>5</sup>

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<sup>4</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh,

<sup>5</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh,

### ABSTRACT

Technology plays a significant role in the learning process in and out of class. Technology makes it easier for students to find information quickly and accurately. Search engines and e-books are partially replacing traditional textbooks. Instead of personal tutors, students can get one-on-one help through educational videos – anytime and anywhere – and massive open online courses. Every language class usually uses some form of technology. Technology has been used to both help and improve language learning. It enables teachers to adapt classroom activities thus enhancing the language learning process. It also continues to grow in importance as a tool to help teachers facilitate language learning for their learners. It encourages learners to learn individually and acquire responsible behaviors, and develop higher-order thinking skills. It helps them solve their learning struggles and find methods to use what they learn in ways that are effective and meaningful. Social Media Channels, Remote Teaching Tools like Zoom MS Teams, Skype, and Google Meet are being used for Conducting effective Online Lessons these days. This article focuses on the role of using new technologies in learning English as a second language. It discussed different tools and online platforms which support English language learners to increase their LSRW skills by using various online tools and digital platforms.

**KEYWORDS:** Technology, language learning, online tools, Digital platforms.

### INTRODUCTION

The role of Technology in every aspect of life has become indispensable and English language learning has no exception to it. The COVID-19 pandemic has opened many opportunities for English language learners to learn English using Technology and post-COVID-19, the use of technology in English language learning has got upstairs and it turned many technophobes into technophiles. Tools of Educational Technology like Kahoot!, Flip, Quizizz, Edpuzzle, Socrative, Quill, and Cambridge's Write & Improve became part and parcel of academic learning including language learning. Not only do these tools support the student's learning but also give them enjoyable learning experiences.

#### What Kahoot is used for?

What is Kahoot!?! Kahoot! is a tool that delivers and presents questions to students. It is set up as a game that students can play either individually or in groups. Instructors provide students with multiple-choice questions, which are projected on a classroom screen.

#### How do students use Kahoot!?

You can host a Kahoot! live to teach in class or remotely, or assign a student-paced challenge. When playing live in class, kahoots are displayed on a shared screen everyone in the classroom can see. Students join in and answer using their own devices with an internet connection - for example, a tablet or computer.

#### Why is Kahoot so popular?

Kahoot's easy-to-use format and catchy music make it a favorite among teachers and students to learn and revise school work. As of today, Kahoot! has managed to host more than 1 billion cumulative players on its platform in less than four years from launch.



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## OPPORTUNITIES FOR ENGLISH LANGUAGE TEACHING AND LEARNING USING MODERN E-TOOLS

**Pavan Kumar Nowbattula**

Assistant Professor of English, S.R.K.R. Engineering College (A), Bhimavaram, India.  
[pavankumar.nowbattula@gmail.com](mailto:pavankumar.nowbattula@gmail.com)

**Aruna Kumari K**

Assistant Professor of English, S.R.K.R. Engineering College (A), Bhimavaram, India.  
[aruna.kaanuri@gmail.com](mailto:aruna.kaanuri@gmail.com)

**K.V. Rama Rao**

Assistant Professor of English, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, India, [ramaraokaribandi@gmail.com](mailto:ramaraokaribandi@gmail.com)

### Abstract:

The emergence and development of English as a world language has altered perceptions of the extent to which the ways in which English is taught are changing in the current technology-driven global society. "In spite of the growth of the internet in various languages, English is the backbone of the Internet users" (Nowbattula, PK, Devi, VR, Nimniala, T, 2016). Internet tools have started to be used in teaching and learning, particularly in the study of English Language. Technology in language teaching and learning has increased the necessity to review the main goal of English Language Teaching and Learning (ELT&L) and the intended programme outcome. The role of technology in the modern classroom is vibrant and became the order of the day (K, ArunaKumari&Rupa Jhansi Rani, R, 2018). There are also many changes in the technologies as they are being updated day-to-day. It is crucial to include new trends and technologies in education to advance the educational system given how modernity and technology impact our lives. In this context, mobile applications and web technologies, which can be considered E-Tools, play a very significant role as recent trends in the present scenario of ELT&L for imparting language skills, viz., Listening, Speaking, Reading and Writing Skills. Hence, this paper mainly discusses the opportunities for ELT&L using various E-Tools, like Doodly, Cambly, edTed, Moodle, etc. The methodology that is used to collect data for this paper is qualitative method.

**Keywords:** English Language Teaching and Learning, E-Tools, modern technologies

### Introduction:

Teaching and Learning process has completely been changed today, due to the rapid expansion of technology. Every educational setting now uses the term "e-Learning" as a dialect in teaching English. The 21st century confronts its citizenship with new choices, opportunities and challenges due to the all-pervading technology into all spheres of life (Chhabra, Purva, 2012). There is a glut of e-Learning tools which can be utilized by the teachers to develop teaching and learning contexts. The use of technology in a variety of teaching and learning environments is now widely acknowledged as a vital instructional and supplementary tool. Digital tools or e-tools are now

RESEARCH ARTICLE



## SOUL LONGING FOR AGAPE LOVE IN THE POEM "REMEMBER" BY CHRISTINA ROSETTI

G.Chandu

(Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh.)

Email [chandupaulganta@gmail.com](mailto:chandupaulganta@gmail.com)


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### ABSTRACT

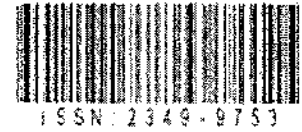


"Literature is the art of discovering something extraordinary about ordinary people and saying with ordinary words something extraordinary." says -Boris Pasternak. Several literary works engage readers deeply by the narratives they tell or the messages they convey. Readers are consistently motivated by biographies of notable people as well as true tales of bravery, selflessness, and other admirable traits. Such books act as both a bible of values and a window into the life of notable people for the general public. The main types of literature: *Drama, Fable, Autobiography, Biography, Poetry, Prose, Science Fiction, and Journalistic Literature*. Poetry is a great motivator when we try to learn it. It is rich in tradition, culture and language and gives a great opportunity to learn a language. The main function of poetry is to interpret life. There are poets who have pictured death as both a friend and an enemy. Some claim that passing away can provide relief from troubles and anguish, while others claim that it is cruel and robs a person of the fun and pleasure the world has to offer. In this paper, an attempt has been made to present Christina Rossetti's longingness to be remembered even after death that separates her from her lover in the poem "Remember".

**Keywords:** *Literature, Poetry, Death, Remember.*

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## RESEARCH ARTICLE



## MARITAL MALADJUSTMENT AND DISPOSITION IN ANITA DESAI'S 'BYE-BYE BLACK BIRD'

A. Kiranmayee<sup>1</sup> , P. V. Padmavathi<sup>2</sup>

<sup>1</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh-534101, India. ([kiranmayee.eng@srivasaviengg.ac.in](mailto:kiranmayee.eng@srivasaviengg.ac.in))

<sup>2</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh-534 101, India. ([padmavathi.eng@srivasaviengg.ac.in](mailto:padmavathi.eng@srivasaviengg.ac.in))

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### ABSTRACT

Literature is one of the most prevailing and ancient ways of understanding life as well as the world. Especially women and literature are clearly related to each other because women writings revealed the true state of society and its treatment of women. Unlike other writers Anita Desai didn't use conventional and not influenced by folk tales, myths and epics but presented her novels in realistic manner by adapting current problems related to woman-man relationship, cultural conflicts, disposition, mangled psyche and marital maladjustment. Bye- Bye Black bird is such a novel. The story deals with two main characters Dev and Adit in London. Adit an Anglophile turns into a hopeless nostalgic returnee and Dev an Anglophobe turns into a hopeful Anglicized inhabitant of London. Sarah, an English woman, moves away from her parents and marries Adit. The Conflict idea between the Indianess of Adit and Sarah's own Westernself runs in her mind throughout the novel. This paper mainly aims to analyze marital maladjustment in Anita Desai's Bye- Bye Black Bird."

**Keywords:** *Literature, Man and woman relationships, life, Marital maladjustment.*



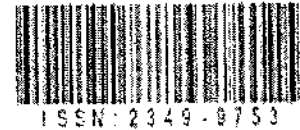
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RESEARCH ARTICLE



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A. Kiranmayee<sup>1</sup>, P. V. Padmavathi<sup>2</sup>

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## TEACHING GRAMMAR IN CONTEXTUAL APPROACH FOR EFFICACIOUS ENGLISH COMMUNICATION

**Tanuja Chundru**

Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem,  
Andhra Pradesh, India,  
chtanusurya@gmail.com

**Ch Manjeera**

Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem,  
Andhra Pradesh, India,  
manc351@gmail.com

### **Abstract:**

This paper, "Teaching Grammar in Contextual Approach for Efficacious English Communication" deals with creative ways to teach grammar at various levels to make it practicable. Grammar in many languages is an appendage to give the main trunk of thoughts, an organized and orderly body. With no exaggeration one can say the righteous knowledge of grammar is always mandatory for any speaker and it is damn requisite for written communication. But for many reasons this key knowledge has always been a trouble zone and a neglected one. This paper contrasts and compares the traditional grammar teaching methods to modern, improvised methods of grammar teaching. In conventional mode of grammar teaching, it is treated as an isolated concept with certain pre-designed tables of structures and formats. With such "within the box" mode of teaching, one can hardly expect effective communication skills and outcomes. This method restricts and controls the acquired knowledge of the concept. It also prevents the learner from having practice aid. On the other hand, the contextual method of grammar teaching comes in handy to the learners at the time of need. As in this way of learning, the learner remembers the given concepts with situational examples. Fancying fluent and accurate English speaking is very common among a number of learners particularly from rural educational backgrounds. Here language is simply considered as any other subject like math and physics, ignoring that language is learnt by practice like fine art, and observed from marks point of view only. But it is not the case with some national and International educational systems, where language and grammar are integral parts and contextual grammar teaching methods are adopted. They rarely give isolated grammar concepts. So let us discuss the pros and cons of each method and derive the most useful and executable way of grammar teaching.

**Keywords:** Grammar Teaching, Traditional Method of Grammar Teaching, Contextual Method of Grammar Teaching, Inductive Method of Teaching Grammar, Deductive Method of Teaching Grammar

### **Introduction:**

Even though one spent years on learning, grammar always remains a mystery to many learners. This ensues either to ignore or to fear the grammar. Learners who are alien to a particular language need not fear the grammar, if everything is put in its right place, that means if the

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## Acquiring Listening And Speaking Skills In Mixed-Level Groups

Dr.B. AnandaRao, Sr. Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem  
U. Aparanjani Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem

### Abstract

The purpose of this paper is to find out the works of scholars about the problems of listening and speaking in learning foreign languages. We try to analyze the difficulties in doing listening and speaking exercises in mixed-level groups. In our study, we refer to Wenden's statement (1986), who noted that we need to find out listening problems in order to improve listening skills. According to it, we discovered difficulties not only in listening but also in speaking to students in mixed-level groups.

These difficulties helped us to find ways of improving students' abilities to listen to authentic materials and apply them in communication. Problems in listening and speaking in mixed-level groups can be taken from the results of the questionnaire. Students' questionnaire determined the effective ways of using role plays and various activities in practice. The result of our study showed that the textbook was worse used in mixed-level groups. Different creative activities in English classes motivate students to learn foreign languages and improve their knowledge.

**Keywords:** listening, speaking, Mixed-Level Groups, role plays, motivate

### Introduction

"English is desirable in modern life and it is necessary tomorrow." (Nazarbayev, 2006) Hence, speaking and listening skills in English plays a vital role for nowadays students. For this, we have searched some ways of improving speaking and listening skills in mixed-level groups in this study. All of our students have different language proficiency levels because most of them are trained under the weak influence of English grammar at secondary schools. Some students cannot learn English individually, and others just are in the habit of doing textbook exercises and reading given materials. Ultimately, in higher schools, they have difficulties in speaking and listening. They have difficulties in pronouncing words, understanding the meaning of the words, and phrases, using linking words, and grammatical structure, expressing their ideas, and thoughts, sharing their opinions in English and analyzing the problems. In fact, speaking and listening are closely integrated skills in learning any foreign language.

According to the requirements of our life, English listening and speaking have important utility values in all spheres. Speaking and listening are more important in human communication and daily life. As a fact, any language develops from listening and speaking.

Considering self-practices in teaching English in mixed-level groups, we determined some difficulties in listening and speaking skills. According to scholars, such as Yung (1994), Higgins (1995), Flowerdew, and Miller (1996), the main problems in listening are pronunciation, the speed of delivery, new vocabulary or terminology, and concept. We agree that students face these problems not only in listening but also in speaking skills. During listening and speaking, there is a difference between a native speaker and a non-

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native speaker, where the speed of speech varies. Students can meet with difficulties in determining the meanings of words, idioms, and phrases of colloquial languages, and pronunciation. In our study, we try to find the solutions to solve these problems.

The aim of our study is to improve the English listening and speaking skills of students in mixed-level groups. In order to reach this aim, we put several objectives:

1. To conduct a listening and speaking questionnaire (LSQ) about students' attitudes toward speaking and listening skills;
2. To identify learning efficient activities in developing listening and speaking skills
3. To find solutions to reduce difficulties and improve the listening and speaking skills of students in mixed-level groups.

### Literature review

Different scholars have different concepts of listening and speaking but they all agree with one very important feature of listening and speaking that is a two-way process between the speaker and listener.

Listening plays an important role in second language teaching for several reasons (Rost, 1994). If you cannot hear it well, you will find it hard to communicate or perhaps you cannot do the listening task properly. In fact, students often take the wrong way when listening and this leads them to poor result. It is said that the learner's perception of their listening problem and strategies can affect their understanding both positively and negatively (Wenden, 1986). Thus, in order to help students to improve their listening skills, it is important to find out their listening problems that cause difficulties to them. We strongly agree with this



## Acquiring Listening And Speaking Skills In Mixed-Level Groups

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# Curcumin based pyrazole-thiazole hybrids as antiproliferative agents: Synthesis, pharmacokinetic, photophysical properties, and docking studies

Rambabu Palabindela<sup>a</sup>, Ramu Guda<sup>b</sup>, Gondru Ramesh<sup>c</sup>, Ramakrishna Bodapati<sup>d,e</sup>, Satheesh Kumar Nukala<sup>f</sup>, Prabhakar Myadaraveni<sup>a</sup>, Gangalla Ravi<sup>g</sup>, Mamatha Kasula<sup>a,\*</sup>

<sup>a</sup> Department of Chemistry, Kakatiya University, Warangal, Telangana 506009, India

<sup>b</sup> Advanced Centre of Research in High Energy Materials (ACRHEM), University of Hyderabad, Hyderabad, Telangana 500046, India

<sup>c</sup> Environmental Monitoring and Exposure Assessment (Air) Laboratory, ICMR-NIREH, Bhopal, Madhya Pradesh 462030, India

<sup>d</sup> School of Chemistry, University of Hyderabad, Hyderabad, Telangana 500046, India

<sup>e</sup> Sri Vasavi engineering college, west Godavari, Tadepalligudem, Andhra Pradesh 534101, India

<sup>f</sup> Department of Chemistry, Chaitanya (Deemed to be University), Kishanpura, Hanamkonda, Telangana 506001, India

<sup>g</sup> Department of Microbiology, Kakatiya University, Warangal, Telangana 506009, India

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EGFR/HER2

Photophysical Properties

ADME/Tox profiles

## ABSTRACT

A series of new curcumin pyrazole-thiazole hybrids (C<sub>1</sub>-C<sub>8</sub>) were synthesized and characterized by fundamental spectral analysis. The synthesized compounds were tested for antiproliferative activity against the colorectal cancer cell line (COLO-205), breast cancer cell line (MCF-7), liver cancer cell line (HepG-2), lung cancer cell line (A549), and cervical cancer cell line (HeLa) using cisplatin as a positive control. The compounds C<sub>7</sub> (IC<sub>50</sub> values of 8.57 ± 1.09 μM for COLO-205, 9.22 ± 0.73 μM for MCF-7, 16.95 ± 1.16 μM for HepG-2, 8.48 ± 1.36 μM for A549, and 7.22 ± 1.08 μM for HeLa), C<sub>2</sub>, and C<sub>5</sub> displayed the most potent antiproliferative activity against the growth of all tested cell lines. For the three compounds (C<sub>2</sub>, C<sub>5</sub>, and C<sub>7</sub>), which were shown to have high *in vitro* anti-cancer activity, we have carried out a kinase inhibitory assay against the EGFR and HER2, where the compound C<sub>7</sub> has exhibited double inhibitory potency towards the EGFR when compared to reference erlotinib. Furthermore, *in silico* molecular docking studies on EGFR (PDB ID: 4HJO) and HER2 (PDB ID: 3P0Z) proteins revealed that the potent ligands exhibited higher affinity with an active pocket of receptors showing strong hydrogen bond interactions. The compounds C<sub>3</sub> and C<sub>2</sub> showed potent antioxidant activity. In addition, the drug-likeness of the hybrids was assessed by predicting their physicochemical, pharmacokinetic (ADME), toxicity profiles, and photophysical properties.

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## 1. Introduction

Cancer is characterized by the uncontrolled growth and proliferation of abnormal cells and is the second leading cause of morbidity and mortality in the world [1]. The epidermal growth factor receptor is a prominent cell-surface receptor stimulated by the binding of particular ligands [2]. Amongst the various anticancer drug targets known, protein kinases are the most studied as drugable targets [3]. The epidermal growth factor receptor (EGFR) belongs to the ErbB family of receptor tyrosine kinases [4] and is one of the most effective drug targets owing to its overexpression and elevation in multiple cancer subtypes, including non-small cell

lung cancer (NSCLC), breast cancer, and ovarian cancer [5,6]. The biological motivating force of a subset of 20–30% of human breast cancers is HER2 gene amplification, which results in overexpression of the HER2 protein on the cell surface [7,8]. It triggers the HER3/PI3K/Akt pathway and the mitogen-activated protein kinase cascades. These pathways support cell survival and proliferation [9,10]. Overexpression of HER leads to various cancers, such as stomach, adenocarcinoma of the uterine, breast, lungs, and ovary [11,12]. It could be targeted with kinase inhibitors and monoclonal antibodies [11]. For the docking studies, we selected the target protein receptors HER2 and EGFR based on the aforementioned factors. In recent years, a significant amount of research in medicinal chemistry has been directed toward discovering new anticancer agents such as dual EGFR and HER2 inhibitors [13–19].

Curcumin (diferuloylmethane) (Fig. 1), the active substance in the common herbal prevention and food Indian spice turmeric, was

\* Corresponding author.

E-mail address: [mamatha\\_kasula@kakatiya.ac.in](mailto:mamatha_kasula@kakatiya.ac.in) (M. Kasula).

## THE EFFICACIOUS INFLUENCE OF VISUAL MERCHANDISING ELEMENTS ON CONSUMERS ATTENTION OF RETAIL OUTLETS

**Dr. Dhadurya Naik M**

Department of Business Administration, Prasad V Potluri Siddhartha Institute of Technology,  
Vijayawada.

**Dr.K. Narendra Kumar**

Assistant Professor, Department of MBA, Koneru Lakshamaiah Education Foundation,  
Hyderabad, Telangana.

**Dr.P. Rama Krishna**

Professor & HoD, Department of Management Science, Sasi Institute of Technology &  
Engineering, Tadepalligudem, West Godavari Dt, Andhra Pradesh.

**P. Ramaswamy**

Assistant Professor, Department of Management Science, Sasi Institute of Technology &  
Engineering, Tadepalligudem, West Godavari Dt, Andhra Pradesh.

**K. Murali Krishna**

Assistant Professor, Sri Vasavi Engineering College, Tadepalligudem, West Godavari Dt,  
Andhra Pradesh.

### **Abstract:**

Over the past decade, visual merchandising has emerged as a key promotional strategy for retailers. Researchers set out to document the positive impact that good visual merchandising may have on the retail sector. The determination of this study is to examine the relationships between demographics and visual merchandising factors such store layout, mannequin placement, impulse purchases, and shoppers' mentalities. Participants in the study were given instructions on which stores to shop at and given general descriptions of those businesses. SPSS was used to do an analysis of variance on the collected data (ANOVA). The outcomes of the study designate a positive correlation between the demographic variables of the respondent pool and the visual merchandising component, both of which have been shown to influence consumer behavior and shopping intentions.

**Keywords:** Visual Merchandising, Consumer attention, retail store

### **1. Introduction**

Modern shopping has become more enjoyable as the economy grows. Urbanization and economic growth increased consumer buying power. Due to demand and brand recognition, retail market boosts global economy. India's retail industry has many alternatives. Indian retail will expand more quickly because of the country's sizable middle class and mostly untapped retail sector, which are the primary draws for global retail behemoths looking to enter emerging countries. Branded clothing, footwear, beverages, watches, foods, cosmetics, and even jewelry

**A STUDY ON TECHNICAL PROBLEMS RELATED TO  
ATM AND INTERNET BANKING SERVICES  
COMPARATIVE STUDY BETWEEN ANDHRA BANK  
AND ICICI BANKS**

**Krishnamurthy Naidu S, Sri Vasavi Engineering College  
Rambabu K, Sri Vasavi Engineering College  
Rama Swathi R.S.V., Koneru Lakshmaiah Education Foundation, KL  
(DEEMED to be UNIVERSITY)  
Satyanarayana D, Sri Vasavi Engineering College**

**ABSTRACT**

*The analysis of various elements of ATM problems will help the bankers to improve the customer satisfaction. In the present study, the problems faced by customers of Andhra Bank and ICICI Bank are studied and presented. The problems faced by the customers in operating ATM are Cards get blocked, Machine out of cash, Nonprinting of statement, Machine out of order, long waiting time in queues and Reduction in balance without cash payment. All these problems have been studied and compared between Andhra Bank and ICICI Bank in selected regions of Andhra Pradesh.*

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**INTRODUCTION**

International Journal of Business Journal

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### INTRODUCTION

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## A STUDY ON TECHNICAL PROBLEMS RELATED TO ATM AND INTERNET BANKING SERVICES: A COMPARATIVE STUDY BETWEEN ANDHRA BANK AND ICICI BANKS

Krishnamurthy Naidu S, Sri Vasavi Engineering College  
Rambabu K, Sri Vasavi Engineering College  
Rama Swathi R.S.V., Koneru Lakshmaiah Education Foundation, KLU  
(DEEMED to be UNIVERSITY)  
Satyanarayana D, Sri Vasavi Engineering College

### ABSTRACT

*The analysis of various elements of ATM problems will help the bankers to improve the customer satisfaction. In the present study, the problems faced by customers of Andhra Bank and ICICI Bank are studied and presented. The problems faced by the customers in operating ATM are Cards get blocked, Machine out of cash, Nonprinting of statement, Machine out of order, long waiting time in queues and Reduction in balance without cash payment. These problems have been studied and compared between Andhra Bank and ICICI Bank in selected regions of Andhra Pradesh.*

**Keywords:** Nonprinting, Block, Waiting Time, Cash Payment.

### INTRODUCTION



**ORIGINAL RESEARCH PAPER**

Management

**MODERN RECRUITMENT: SOCIAL MEDIA VIEW**

**KEY WORDS:** LinkedIn, Network, Social life, Profiles

<b>Dr. S. Krishnamurthy Naidu</b>	Associate Professor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP
<b>Dr. G.V. Subba Raju*</b>	Professor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP*Corresponding Author
<b>Dr. Kalneedi Rambabu</b>	Assistant Professor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP
<b>P.Sreemvasulu</b>	Assistant Professor, MBA Dept, Santhi Ram Engineering College, Nandyal, A.P.

**ABSTRACT**

The growth in the use of social media sites became a common situation. Recruiters need to be where candidates are in order to engage them in the recruitment process. This needs engaging with talent across a wide range of social networking platforms. They need to work together. Social media can be fast, efficient and cost effective when used as a recruitment tool and having its own limitations. Social media is increasingly becoming the space where professional life starts. The decision by Facebook to update user profile pages to offer a 'LinkedIn style' professional view, suggests that social media is becoming a medium for work as well as play. Social Networking Sites entered the business landscape, in particular the recruitment landscape leads to a demand for knowledge about recruitment trends regarding Social Networking Sites. The study is concern phenomena of Social Networking Sites in recruitment were explored. One cannot deny that social media has a major effect on a recruitment.

**Introduction:**

The rise in the use of social media websites in recruitment is fascinating. Since 2010, Twitter has grown in use by 9%, Facebook by 11% and LinkedIn by 15%. It has also been found that 7 out of 10 employers have successfully hired a candidate through social media showing a great partnership between recruitment and social media. With such promising results companies yet to explore the benefits of using social media are majorly missing out.

HR magazine reported in October 2012 that Integrating social networking sites into the traditional recruitment process is key not only to reaching potential candidates. This means that not only does the company benefit through the initial recruitment process, but jobseekers can get an insight into how a company works. LinkedIn is a great way of networking, and if we go by the saying of 'it's who you know, not what you know' then the social media base is the perfect way of networking.

**Social Networking Sites and Tools.**

Facebook is social media tool where the users can create their profiles and share their posts to selective friends group or to the public. In the Facebook, a group also can be created through which the people with common interest can join in the group for the commonly interested messages. The Facebook also provide messenger to chat and interact with other friends and public on this platform.

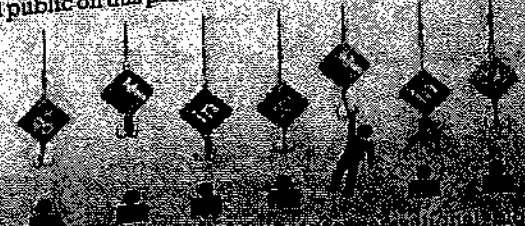
**LINKEDIN:** LinkedIn is most effective social media networking platform for professionals. LinkedIn provide opportunity for professionals to build and upload their profile and make networking with their peers. This network of professionals can be used for various purposes such as sharing ideas with the peers in the same community, sharing the latest updates in the group, finding jobs for the right candidates ad also various business opportunities.

My Space is online community of users or consumers. In My Space, members of this community share various feedback and user experience to others in the group. This is a great platform for socializing with consumer or user community.

**PODCAT** is one type of digital media consisting various material and content related to various interested areas. This consists PDF material, Audio and Video presentations on a particular concept or event.

Santhosh Kumar A.V - Social networking websites are effective job search tools. Job fairs are finding stiff competition in the social media, evidently been visible that a lot of companies have their own formal pages on the social websites, where job seekers can learn about the organization, business, culture, ethics etc. Hence Recruiters have a large pool from this source from which they can select the prospective employees. Essential part of the recruitment through social media is needed to complete the recruitment tools for recruitment.

Social networking sites such as Facebook, LinkedIn, and other social media sites are becoming increasingly popular for recruitment. These sites provide a platform for employers to reach a large pool of potential candidates and for job seekers to find opportunities. The use of social media in recruitment is growing rapidly, and it is expected to continue to do so in the future.





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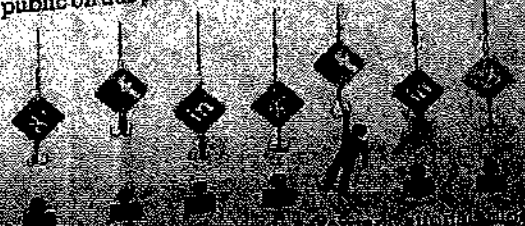
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Social networking sites such as LinkedIn, Facebook, MySpace, etc. are becoming popular among job seekers and employers. These sites provide a platform for job seekers to showcase their skills and experience, and for employers to find potential candidates. The use of social media in recruitment is growing rapidly, and it is expected to continue to do so in the future.



## Design of CPW Feed Complementary Split Ring Resonators Loaded Microstrip Antenna for Brain Tumor Detection

Dr. E. Kusuma Kumari<sup>1</sup>, Dr. Purnima K Sharma<sup>2</sup>, Dr. D. Rama Devi<sup>3</sup> and Dr. Dinesh Sharma<sup>4</sup>

<sup>1,2</sup>ECE Department, Sri vasavi Engineering College, Tadepalligudem, Andhra Pradesh  
Email: kusuma.madhu.eco@gmail.com, purnima.kadali@srivasaviengg.ac.in

<sup>3</sup>ECE Department, MVGR Engineering College, Vizianagaram, Andhra Pradesh

<sup>4</sup>ECE Department, Chandigarh College of Engineering & Technology, Chandigarh  
Email: {second.author, third.author}@hostname2.org

**Abstract**—The CST programme was used to create a novel and compact Microstrip patch antenna with Complementary Split Ring Resonators (CSRR) to identify and see tumours inside the human brain. To represent the head phantom, appropriate tissue parameters such as permittivity and conductivity at the antenna resonant frequency were used. The antenna will broadcast an equivalent signal and receive backscattering signals from the stratified human head model. To improve performance, a complementary Split Ring Resonator with metamaterial structure was created, and a faulty ground structure was incorporated on the antenna ground plane. To investigate antenna performance, rectangular structures are presented. The CSRRs were used in the antenna design, together with a defective ground plane structure, to improve return loss, impedance bandwidth, and antenna gain as compared to a patch antenna without split ring resonators. Tumors of various forms and sizes were studied in this study to detect the presence of tumours at an early stage. Various parameters like Electric field intensity (E), magnetic field intensity (H), Current density, Power Loss Density are observed, and simulated results compared with and without tumor in the brain.

**Index Terms**— Microstrip patch antenna, Complementary Split Ring resonator, Defected Ground Plane, Brain tumor detection, Human head phantom.

### I. INTRODUCTION

The brain is the most important organ in the human neurological system. The proliferation of abnormal cells in our brain causes a brain tumour. Because it affects the most critical organ in the human body, brain cancer is one of the most serious public health issues worldwide. The invasive features of tumours create a high fatality rate, making brain cancer a dangerous condition. But this problem can be easily overcome by detection of the tumor at the early stages. Because it is far easier to provide efficient and successful treatment at an early stage of development than it is to provide treatment at a later time. Microwave transmissions, with their nonionizing electromagnetic waves, can easily permeate human body tissues without causing health problems [1]. The main concept behind this antenna design is the variation in electrical characteristics between healthy and cancerous tissues.



# MULTI-BAND CIRCULARLY POLARIZED HYBRID CYLINDRICAL DRA WITH RECTANGULAR DGS

M Sreenivasulu<sup>1</sup>, Dr. E.Kusuma Kumari<sup>2</sup>, Dr. R. Ramana Reddy<sup>3</sup>, S.B.T.Abhyuday<sup>4</sup>  
<sup>1</sup>P.G.Scholar, <sup>2,3</sup>Professor, <sup>4</sup>M.Tech  
<sup>1,4</sup>JNTUACBP, Pulivendula, A.P, India, <sup>2</sup>Sri Vasavi Engineering college, AP, India

## Abstract:

The effect of dielectric resonator (DR) and defective ground structures (DGS) on fractal antenna operating over multiple frequency bands is analyzed in the proposed work. The Minkowski fractal geometry is etched on square shaped microstrip patch in four iterations to increase electrical length within same footprint. On the 4th iteration antenna, cylindrical DR is placed in different configurations on four fractal arms to increase efficiency by reducing metallic losses. Rectangular defects are introduced in ground surface at different orientations to enhance performance at higher frequencies. The performance of minkowski fractal antenna with various combinations of DRA and DGS is analyzed and tabulated. Of all combinations investigated Iteration 4 antenna with 4 DRA's and DGS at 135° operates at multiple frequencies from 7.35 GHz to 20.68 GHz and offers 8.2 dB peak gain at 21.64 GHz. The proposed antenna exhibits circular polarization with axial ratio of 2.22 dB at 9.04 GHz, 2.21 dB at 10.66 GHz, 2.34 dB at 11.92 GHz and 2.54 dB at 15.34 GHz.

Keywords— minkowski fractal, defective ground structure (DGS), Dielectric Resonator Antenna (DRA), multi-band, circular polarization (CP)

## I. INTRODUCTION

With increase in usage of wireless connectivity for communication there is demand for antennas operating at higher frequencies capable of delivering higher data rates for catering multiple users and applications simultaneously. When communication systems operate at higher frequencies losses due to metallic parts of antenna become more evident which can overcome by usage of dielectric materials. DRA with low metallic losses, high radiation efficiency and flexible feeding mechanism form viable option to operate at microwave frequency bands. Apart from metallic losses conventional microstrip antennas also suffer from narrow bandwidth and lower impedance bandwidth which can be overcome by the usage of fractal geometry and DGS. The self-similarity property of fractals and current distribution altering property of DGS enable microstrip antennas to operate over multiple frequency bands with optimal impedance bandwidth possible. Many research works are presented in literature on design of antennas containing DRA, fractal architecture and DGS.

A minkowski fractal structure is generated on square patch in 3 iterations [1] excited by microstrip feed line. The performance of 3 iterations is compared. The results show that return loss is improving by increasing the number of iterations. A frequency selective band reject filter is designed [2] using minkowski fractal shape. The proposed antenna gives good stability in the frequency range 3.13 GHz to 5.25 GHz covering a bandwidth of 2.12 GHz. Minkowski fractal geometry is generated on double layer microstrip patches

# Low Power and High-Speed 4 Bit Full Adder Using XOR/XNOR Gates Exploring with the 22nm CMOS Technology

BHARANI LAKKOJU<sup>1</sup>, Dr.U.YEDUKONDALU<sup>2</sup>

M-Tech Student

Associate Professor

Department of ECE

Department of ECE

SRI VASAVI ENGINEERING COLLEGE(AUTONOMOUS)

Tadepalligudem, West Godavari, AP, India

[lakkojubharani@gmail.com](mailto:lakkojubharani@gmail.com)

[drykudara@gmail.com](mailto:drykudara@gmail.com)

## ABSTRACT:

Low power circuits are playing a very important role in the modern VLSI system, especially in the optimization of portable electronic devices. This paper introduces two novel circuits such as XOR/XNOR and concurrent XOR/XNOR to carry out the required function. The proposed architecture is a 4-bit full-adder using full-swing XOR/XNOR gates. These gates are used to achieve high speed and optimized delay with low power consumption which are due to low output capacitance and low short-circuit power dissipation compared to existing circuits.

A new transistor size technique will be developed in order to optimize the PDP of the circuits. In the proposed method, the numerical computation particle swarm optimization algorithm is going to achieve the desired value for optimum PDP with less iteration. The optimized circuits will be studied in terms of variations of the supply and threshold voltages, output capacitance, input noise immunity, and the size of transistors. The simulation results will be carried from the Cadence Virtuoso tool. The future architecture results are related to area, power and speed of the existing architecture.

**Keywords:** CMOS Technology, 4 bit full adder, XOR/XNOR gates, optimization of power, delay.

## 1. INTRODUCTION

Addition is one of the common and widely used fundamental arithmetic operation in many VLSI systems. Other similar arithmetic operations are subtraction, multiplication, division, address calculation etc. Using binary adders the full adder is designed and improving 1-bit full adder performance plays an important role in VLSI. To improve the performance of adder there we have two methods.

### Existing system:

Hybrid FAs are made of two modules, including 2-input XOR/XNOR (or simultaneous XOR- XNOR) gate and 2-to-1 multiplexer (2-1-MUX) gate. The XOR/XNOR gate is the major consumer of power in the FA cell. Therefore, the power consumption of the FA cell can be reduced by optimum designing of the XOR/XNOR gate. The XOR/XNOR gate has also many applications in digital circuits design. Many circuits have been proposed to implement XOR/XNOR gate, which a few examples of the most efficient ones are shown in Fig. 1(a) shows the full-swing XOR/XNOR gate circuit designed by double pass-transistor logic (DPL) style. This structure has eight transistors. The main problem of this

## Subsampled Circulant Matrix Based Wideband Spectrum Sensing Using Fusion Based Recovery Algorithm

V. N. C. Aswini<sup>1</sup>, Padma Raju K<sup>2</sup>, Leela Kumar H<sup>2</sup>

<sup>1</sup> Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India

<sup>2</sup> Jawaharlal Nehru Technological University Kakinada, Kakinada 533003, Andhra Pradesh, India

Corresponding Author Email: [aswini.thota@srivasaviengg.ac.in](mailto:aswini.thota@srivasaviengg.ac.in)

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### Keywords:

modulated wideband converter, circulant matrix, deterministic sequence, compressive sensing, orthogonal matching pursuit

### ABSTRACT

This paper reflects the problem of wideband spectrum recovery. The demand for spectrum usage is increasing exponentially as the wireless technologies evolve the world. To meet this need, Cognitive Radio is one of the emerging technologies, which intelligently allocate the spectrum to the secondary users. Since the spectrum is wideband, the capability of spectrum sensing is improved by introducing sub-Nyquist sampling under compressive sensing framework. In this paper, a sub-Nyquist sampling technique of Modulated Wideband Converter (MWC) is used as it possesses  $m$ -parallel channels providing fast sensing and robust structure. A circulant matrix method is used to improve the hardware complexity of MWC. Also at the reconstruction of MWC, a fusion based recovery algorithm is proposed which became an added benefit for perfect recovery of the support. The results are compared with conventional MWC in terms of support recovery, mean square error and SNR gain. Simulations proved that the proposed algorithm performs superior at low as well as high SNR with increased gain.

### 1. INTRODUCTION

Now-a-days, the digital world rules our everyday life. Telecommunications, medical services, education and entertainment need digital media. The existence of digital world is possible with perfect analog to digital conversion. This development has increased the demands of wideband spectrum and paved way to a new radio frequency (RF) technology of cognitive radio. This has led to spectrum congestion. Cognitive Radio (CR) is an intelligent software defined radio which intelligently allots the unused spectrum to the secondary users. Of all the different works of CR, spectrum sensing plays a vital role. A major challenge is to sample the wideband signal at high rates satisfying good resolution. The well-known Shannon-Nyquist sampling theorem says that a signal which is bandlimited can be sampled and reconstructed perfectly provided the sampling rate must exceed twice its bandwidth. The signal here is a wideband signal which cannot be processed by normal analog-to-digital converters (ADC). Due to its low spectrum utilization, the wideband spectrum is inherently sparse, hence applying the concept of compressive sensing (CS), samples the wideband signals at sub-Nyquist rates [1-4]. Under CS framework, most of the proposed architectures included random demodulator (RD) for spectrally sparse signals, periodic non-uniform sampling (PNS) for sparse multitone signals [5] and modulated wideband converter (MWC) [6] for sparse multiband signals.

The Modulated Wideband Converter (MWC) is a multichannel architecture which mixes a multiband signal with a periodic random sequence and passed through a low rate sampler. It is constructed with  $m$  channels with parallel structure in which each channel comprises of a mixing function, a low pass filter (LPF) and an analogue-to-digital

converter (ADC). Due to its flexible design and parallel structure, it is used in many practical wireless applications like cognitive radio, channel estimation, radar, etc. This paper focuses on two problems and improves the performance of MWC. The first problem focuses on hardware complexity of MWC [7, 8] in which the measurement matrix of length  $m \times M$  plays a vital role. The random sequence of Bernoulli or Gaussian is considered with a length of  $M$ . Now  $m \times M$  measurement matrix is constructed by circular shifting the sequence  $m$  times or taking  $m$  different combinations of the sequence. In this process, it needs  $mM$  flip-flops of shift registers. Some binary sequences like deterministic sequences, which are identical to random Bernoulli matrices, also suitable for this case. The deterministic sequences are not fully random. Hence to reduce the hardware complexity of MWC, alternating methods of using deterministic sequences is preferred which guarantees better reconstruction and good choice of hardware. Out of all the other sequences, the maximum length sequence, Gold, Kasami codes exist for a finite prime length of  $2^n - 1$  where  $n$  is the degree of the primitive polynomial and  $n \in M$ , which are not feasible for all applications [8-13]. The Legendre sequence is one of the deterministic sequence exist for any choice of length provided it should be a prime. Li et al. [9] proposed a circulant matrix structure in which each row is attained by random cyclic shift of the deterministic sequence. This circulant measurement matrix provides memory efficient hardware since only  $M$  flip-flops are required and only  $M \log M$  multiplications are needed indicating it is also faster [14-17].

The second problem is to find the suitable reconstruction algorithm [18, 19] which improves the support recovery performance of MWC. In this regard, a fusion based algorithm [20-24] is proposed and compared with existing simultaneous

## Detection of Sugarcane Mosaic Diseases Using Deep Learning Architecture to Avoid Annealing Temperature of PCR Primer in Laboratory Testing

Thamarai Muthusamy<sup>1\*</sup>, Gomathi Eswaran<sup>2</sup>

<sup>1</sup> Department of ECE, Sri Vasavi Engineering College, Tadepallandem 514101, Andhra Pradesh, India

<sup>2</sup> Department of ECE, Kalaingar Karunanidhi Institute of Technology, Coimbatore 641402, Tamil Nadu, India

Corresponding Author Email: thamarai.muthusamy@srivasaviengg.ac.in

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### ABSTRACT

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#### Keywords:

sugarcane leaf diseases detection, convolution neural network, pretrained models, sugarcane mosaic disease and sugarcane streak, mosaic disease

The sugarcane leaf diseases such as mosaic and streak mosaic are difficult to differentiate using image processing techniques because both diseases show similar visual attributes such as pattern and color. To identify the type of diseases, we need to perform Polymerase Chain Reaction (PCR) testing which is used for the classification of diseases in laboratories. The accuracy of the PCR test depends on reaction mix preparation, reaction time, and DNA/RNA extraction. The major problem influencing the PCR test accuracy is the Annealing temperature of the primers and needs a standardized set of samples. In addition, it is a time-consuming process. In this paper, we proposed a Diversified Deep Learning Architecture (DDLA) which is developed with the input images after various pre-processing steps such as denoising using Discrete Wavelet Transform (DWT) and enhancing using histogram equalization in HSI color space to improve the similar pattern disease prediction accuracy. The performance of the proposed model is analyzed for a set of diseased leaves and the results are compared with the output of the popular pertained models such as VGG16, InceptionV3, ResNET50, Inception ResNET, and DenseNET201 with and without pre-processing. The training accuracy of the proposed model is 97% and the testing accuracy is 87%. The DDLA model produces ground truth test results with an accuracy of 98.7% for mosaic and 85.7% for streak mosaic with a less computational time of 152sec compared to the lab test duration of 6 hrs. The performance of the model is also measured in terms of Precision, F1 Score, Specificity, and Sensitivity. The Proposed DDLA model's F1 score is higher than the pre-trained models with a minimum test loss of 1.167. Moreover, the DDLA structure occupies less memory space when compared to the pertained models.

## 1. INTRODUCTION

In India, sugarcane is cultivated in all the regions of the country irrespective of climate and temperature. There are 50 varieties of sugarcane plants cultivated around the year. The sugarcane plant diseases are classified into 30 different types and they occur according to the climate, temperature, and soil type. Among the 30 varieties of diseases, few are visually identified, and few diseases are identified through lab tests. The major diseases affecting sugarcane production are Redrot, Smut, Wilt, Yellow leaf, Rust, Grassy shoot, Red Stripes, and Streak Mosaic. These diseases cause severe loss to the farmers due to improper identification of diseases and chronic in nature which leads the farmers to change crops often.

The characteristics of mosaic and streak mosaic diseases are shown in Table 1. These two sugarcane leaf diseases are similar in pattern, color, and texture that are marked with similar color circles. These diseases cannot be identified through visual interpretation.

These viruses are identified using a laboratory-based technique known as Polymerase Chain Reaction (PCR) test. PCR is a molecular-based diagnosing method for leaf disease detection in laboratories. PCR test amplifies or creates millions of identical copies of a particular DNA sequence within a tiny reaction tube. PCR test is applicable only for the organism with known genome information/ Gene sequence.

The accuracy of the PCR test depends on reaction time and DNA/RNA extraction.

Now, advanced PCR tests like single plex Reverse Transcription-PCR (RT-PCR) and Multiplex RT-PCR are used for the identification of sugarcane viruses in lab tests [1, 2]. Multiplex RT-PCR is used for simultaneous detection and identification of more than one sugarcane viruses. There are five different types of viruses such as Sugarcane mosaic virus (SCMV), Sorghum mosaic virus (SrMV), Sugarcane streak mosaic virus (SCSMV), Sugarcane yellow leaf virus (SCYLV), and Sugarcane bacilliform virus (SCBV), that are detected simultaneously with multiplex RT-PCR method. Different primers are used for amplifying the target virus DNAs and suitable assays [2].

The PCR test is performed because the morphological features of Sugarcane Mosaic Virus (SCMV) and Sugarcane Streak Mosaic virus (SCSMV) are similar. However, PCR is an expensive and time-consuming process. Hence, the researchers began to develop image-processing based methods to identify the sugarcane leaf diseases.

Scientists have used a combination of various Digital Image Processing algorithms such as thresholding feature-based rules, etc., to classify various kinds of plant diseases [3]. These algorithms are more efficient and consume less amount of time for identifying the leaf diseases. However, due to various problems during image acquisition such as noise, lighting, the



## Analysis of Brain Tumor Classification using Pre-Trained CNN models

Dr. M. Thamarai<sup>1</sup>, Dhivya S P<sup>2</sup>

<sup>1</sup>Professor, ECE Department, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.

<sup>2</sup>Senior System Engineer, Infosys, Bangalore, India.

**Abstract:** Brain tumor detection is one of the crucial tasks in medical image processing. The difference between normal cells and infected cells is very less and almost both appear similar. So, the detection by the radiologist is inaccurate and there is a need for an automated system for brain tumor detection. This paper proposes an automated brain tumor classification system using 3D Magnetic Resonance Brain Images using Convolution neural network transfer learning concept. The transfer learning concept is used to modify or fine-tune the standard CNNs according to the user applications. This concept reduces the huge amount of input data requirements and minimizes the training and thus in computation time of the process. The top layers of benchmark CNN architectures like VGG16, ResNet 50, and InceptionV3 are fine-tuned and utilized for tumor detection. The performance of the CNN structures is analyzed in terms of performance metrics such as Accuracy, specificity, sensitivity, and various losses.

**Keywords:** Brain tumor detection, magnetic resonance imaging, convolution neural network, and Transfer learning

### 1. INTRODUCTION

Recently, Deep learning evolves as a major area for researchers, because of its high prediction accuracy and less error rate. Deep Learning algorithms/Structures perform better than humans even in large volume of data. DL algorithms performance is highly dependent on input data. So, we can say deep learning networks are like hungry networks and we need a huge amount of data to make the network learn. The transfer learning concept introduced in machine learning helps to utilize CNN applications with less available data.

Convolution neural networks are the advanced structure in Deep Learning and are designed especially for various image processing applications such as segmentation, feature extraction, and enhancement. The applications of CNN in medical image processing are mainly for the classification of cancer cells such as breast cancer, lung cancer, and brain tumor detection. The conventional automatic segmentation methods need a classifier with features which is a challenging task. CNN algorithm solves complex features such as healthy brain tissues and tumor tissues through multimodal MRI brain images. This paper discusses brain tumor classification from MRI Brain images.

The human brain does a complex job in controlling the other organs that work with billions of cells. A brain tumor occurs when an uncontrolled division of cells forms an abnormal group of cells around or inside the brain. These groups can affect the normal functionality of brain activity

and destroy healthy cells (Kavitha et al, 2016). Brain tumor classifies as grade I, grade II, grade III, and grade IV. Grade I and Grade II are termed as lower-grade (Benign). Grade III and Grade IV are termed as high grade (malignant). Benign tumors are nonprogressive (non-cancerous) so considered to be less aggressive, they originated in the brain and grow slowly; also, they cannot spread anywhere else in the body. However, a malignant tumor is cancerous because the cancerous cell grows rapidly in irregular boundaries. The tumor cells which originated in the brain itself is called a primary malignant tumor and the tumor cells originated in any other part of the body and spread to the brain are called a secondary malignant tumor (KambhataKruti G et al, 2016, Kaur, G et al, 2016) The medical modalities are X-ray, CT (Computed Tomography) and MRI (Magnetic Resonance Imaging). MRI is one of the best imaging techniques that researchers use for the detection of brain tumors due to its high resolution and interpretation in images. So, it is used in brain tumor detection and treatment phases.

MRI images are more suitable for automatic brain tumor analysis because of their ability to provide a lot of information about the brain structure and abnormalities within the brain tissues due to the high resolution of the images [2,5]. Researchers presented different automated approaches for brain tumor detection and type classification using brain MRI images since it became possible to scan and load medical images to the computer.

## Distinct $p$ -based model of silicon N-channel double gate MOSFET

Hameed Pasha Mohammad<sup>1</sup>, H. C. Hadiman<sup>2</sup>, Vidara Yedukondala<sup>1</sup>, Srinivasa Rao Vidara<sup>3</sup>

<sup>1</sup>Department of Electronics and Communication Engineering, Visvesvaraya Technological University, Belagavi, India

<sup>2</sup>Department of Electronics and Communication Engineering, G M Institute of Technology, Davangere, India

<sup>3</sup>Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, A.P., India

<sup>4</sup>Department of Electronics and Communication Engineering, S J J Institute of Technology, Bangalore, India

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Device capacitance  
Double gate MOSFET  
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MOSFET scaling  
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### ABSTRACT

Growing endless demand for digital processing technology, to perform high speed computations with low power utilization and minimum propagation delay, the metal-oxide-semiconductor (MOS) technology is implemented in the areas of very large scale integrated (VLSI) circuit technology. But MOS technology is facing the challenges in linear scaling the transistors with different channel modelling for the present day microelectronic regime. Linear scaling of MOSFET is restricted through short-channel-effects (SCEs). Use of silicon N-channel double gate MOSFETs (DG MOSFETs) in present day microelectronic regime features the short channel effect of MOSFET through a reasonable forward transfer admittance with the characteristics of varying input capacitance values ratio. In this research paper, a distinct  $p$ -based model is designed to simulate SCEs through the designed silicon N-channel double gate MOSFETs with the varying front and back gate doping level and surface regions to estimate the varying junction capacitances can limit the intrusion detection systems (IDS) usage in VLSI applications. Analytical model for channel length and simulated model for total internal device capacitance through distinct  $p$ -based model are presented. The proposed distinct  $p$ -based model is suitable for silicon nanowire transistors and the effectiveness of the proposed model is validated through comparative results.

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### Corresponding Author:

Hameed Pasha Mohammad

Department of Electronics and Communication Engineering, Visvesvaraya Technological University

Belagavi, Karnataka, India

Email: hameedjits@gmail.com

### 1. INTRODUCTION

In the modern era, the silicon-based semiconductor industry is developing rapidly and playing a pivotal role in the design of integrated circuits, wireless communication systems, mobile devices and so on according to Moore's Law. The technical and scientific advancement have moved further these semiconductor industries to explore different materials and technologies to serve the purpose of power, cost, area and speed in a high integration density application.

In further approach complementary metal-oxide-semiconductor (CMOS) [1] is facing fundamental physical limits in terms of circuit, device and material, alternative silicon on insulator (SOI) devices [2], which can be scaled more aggressively than bulk CMOS. SOI and its variants partially depleted (PD) and fully depleted (FD) uses the same substrate, the same material with the same fabrication process, but it is very susceptible to floating body effects with scaling constraints as bulk device [3]-[5] causing the threshold

# APPLICATIONS OF MACHINE LEARNING AND AUXILIARY TUMOR TREATMENT IN THE PROCESS OF MEDICAL RESOURCE ALLOCATION

<sup>1</sup>Dr. Udara Yedukondalu, <sup>2</sup>Vijayalakshmi, <sup>3</sup>Dr. Swapna Thouti, <sup>4</sup>Dr. K. Basava Raju

<sup>1</sup>Assoc. Prof. Dept of ECE, Sri Vasavi Engineering College(A), Tadepalligudem

<sup>2</sup>Assistant Professor Dept of IT, KITS Warangal, TELANGANA STATE, INDIA.

<sup>3</sup>Assoc. Prof. Dept of ECE, CVR COLLEGE OF ENGINEERING TELANGANA STATE, INDIA.

<sup>4</sup>Assoc. Prof. Dept of IT, ANURAG UNIVERSITY, HYDERABAD, TELANGANA.

## ABSTRACT

In the last decade, machine learning has become very interesting, driven by cheaper computing power and costly storage—so that growing numbers of data can be saved, processed and analysed effectively. Enhanced algorithms are designed and used to identify hidden insights and correlations between non-human data elements in broad datasets. These insights help companies to better decide and optimize key indicators of interest. Machine learning is becoming more common because of the agnostic use of learning algorithms. The paper presents a number of machinery and auxiliary tumour processes to assign health resources, and proposes a number of new ways to use these resources at the time of artificial intelligence in order to make human life part of this process and explore the good conditions which are shared by both the medical and computer industries.

**Keywords:** Machine learning, AI, Medical resource, Healthcare.

## INTRODUCTION

With the ongoing digitisation of medical data, as well as data from advanced medical equipment provided to us by the patient, we are becoming widespread with large volumes of patient data. One common outcome of the information revolution is the daunting task of data understanding and interpretation. It is not only overwhelming to gain the sense of such a vast data collection; manual tools and techniques that can be a slow and tedious process are often impossible to use. There is great need for data-driven approaches to computer science in order to help the understanding of the data. Such approaches can be used to analyze the medical information in order for patients and doctors to better decide critical health information. Both industry and academia now start to invest heavily in the application of data scientific technologies to support medical data analysis. The amount of data generated in medicine will grow quickly and in future years, data science will play an important role.

The growing impact of digital treatment on diagnostics and the handling of diseases in the near future has an increasing impact on daily life and Artificial Intelligence (AI) and Machine Learning (ML). Tech advances in AI and ML have opened the way for self-contained tools to diagnose disease using big data sets to address the future challenges of human disease detection, particularly in cancer, early. ML is an AI subset that develops the neural network base algorithms for a machine to learn and solve problems such as the brain of humans [1, 2]. Deep Learning is, in turn, a subset of ML which imitates the ability of the human brain for processing images, objects, languages, drug-detection improvements, precision upgrades, diagnostics and human decision making. It can also work and propose an output without human monitoring [3]. DL can use the Artificial Network (ANN) to imitate human neuronal architecture, including medical imaging, and is composed of inputs, outputs and various hidden multi-stage networks that improve the processing power of machine learning; (Fig. 1).



## Shape and texture based identification of glaucoma from retinal fundus images

Kamesh Sonti<sup>a</sup>, Dr. Ravindra Dhuli<sup>a,\*</sup>

<sup>a</sup> School of Electronics Engineering, VIT AP University, Andhra Pradesh 522237, India

### ARTICLE INFO

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Exponential polynomial support vector machines

### ABSTRACT

Among the eye disorders, glaucoma occurs due to the increase of intra-ocular pressure that causes irreversible damage of the optic nerve and leads to blindness. Therefore to avoid high cost machine usage, a novel method proposed for detecting glaucoma using shape and texture features. Initially, the retinal fundus images are decomposed using quasi bi-variate variational mode decomposition (QB-VMD) technique, the frequencies obtained from QB-VMD subjected to pyramid histogram oriented gradient (PHOG) and invariant Haralick texture features. The extracted combinational features are classified using combination of exponential polynomial support vector machines (EP-SVM) and bagged ensemble approach. The proposed method simulated on ACRIMA and Drishti-GS1 datasets using 10-fold cross validation and evaluated the performance metrics like accuracy, sensitivity, specificity and F-score. The simulation results and evaluation metrics show that the proposed approach achieves superior classification performance compared to other state-of-the-art approaches.

### 1. Glaucoma Overview

Glaucoma is a chronic ocular disease which results in the neuro degeneration of the optic nerve and may lead to peripheral vision loss. The world health organization (WHO) declared glaucoma as the second largest reason towards blindness and the affected public approaches 111.8 million by 2040 [1]. It is often referred to as "silent thief of sight" since it exhibits no early symptoms and in the advanced stage, making its prevention complex and cause permanent blindness [2]. Due to the invisible symptoms of this disorder, more than 90% of the cases are identified only at the time of the survey [3].

Glaucoma originates due to increase in intra-ocular pressure (IOP) caused by aqueous humor, the fluid inside the human eye. If the amount of liquid produced is equal to the amount of liquid discharged, it indicates a healthy eye condition and the liquid will be restricted in abnormal case, hence increases stress on the eye resulting in damage of the optic nerve which communicates information between the brain and the eye [4]. The increase in pressure may result in a severe destruction to the optic nerve and end with irreversible vision loss. When the optic nerve is damaged, most of the individual nerve fibers are lost and the affected areas are visible as the textural changes in the fundus image as shown in Fig. 1 [5].

In the era of diagnostic challenges, recent advances in biomedical imaging recommend effective quantitative imaging techniques for the

diagnosis and management of glaucoma. The structural changes in the eye are one of the vital sources to diagnose glaucoma. Different imaging modalities such as funduscopy [6] and optical coherence tomography (OCT) [7] enable ophthalmologists to analyze structural and functional abnormalities in the eye [8]. To diagnose the risk of glaucoma, fundus photography is an effective and extensive tool [9]. Computer-aided diagnosis (CAD) systems can be preferred to overcome the limitations of visual interpretation and inter-observer variabilities with the fundus images [10].

The organization of the paper is as follows: In section-2 a clear view previously implemented algorithms were discussed. In section-3 proposed methodologies discussed and section-4 helps in understanding the results acquired, compared with existing approaches. Section-5 concludes the paper.

### 2. Literature Survey

Many studies related to automatic detection of glaucoma from retinal fundus images are discussed in this section. The CAD based detection can be broadly classified into two approaches, with and without segmentation. The first one involves the evaluation of the clinical indices such as cup-to-disc ratio (CDR), rim-to-disc-ratio (RDR), inferior-superior-nasal-temporal (ISNT) rule, disc damage likelihood scale (DDLS), etc. from the segmented results [11]. These methods emphasize

\* Corresponding author.

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# Design and performance analysis of a low-pull-in-voltage RF MEMS shunt switch for millimeter-wave therapy, IoT, and 5G applications

P. Ashok Kumar<sup>1,2</sup> · Srinivasa Rao Karumuri<sup>1</sup> · Grijja Sravani Kundaviltee<sup>1,3</sup> · Koushik Guha<sup>1</sup>

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## Abstract

Recent advancements in wireless communication systems utilize miniaturized devices based on microelectromechanical system technology for present and future 5G wireless applications. Nowadays, RF devices are utilizing frequencies up to 30 GHz with substantial signal propagation that leads to a slow data rate. On the other hand, there is a huge spectrum available in the millimeter-wave frequency range of 30–300 GHz. The millimeter-wave spectrum is attractive for the development of smart systems based on 5G technology. In this paper, a low-pull-in-voltage capacitive type RF MEMS switch is proposed to operate at frequencies above 30 GHz. The switch is proposed with a new iterative meandering technique where the span length of each section in the meanders differs relative to the first section. A low pull-in voltage of 1.8 V is achieved with a large capacitance ratio of 63. The switch exhibits low insertion loss of  $-0.24$  dB at 41 GHz and possesses high isolation of  $-46.7$  dB at 38 GHz. The design is validated by comparing the theoretical and simulated results, and the switch can be efficiently utilized for millimeter-wave applications.

**Keywords** Iterative meander · Millimeter wave · 5G applications · High isolation · Low insertion loss · Low pull-in voltage

## 1 Introduction

Over the past decade, the evolution of microelectromechanical (MEMS) technology has contributed significantly to the development of modern-day devices, especially in the fields of wireless communication systems, sensors, and biomedical applications [1]. Nowadays, MEMS devices operating in the radio-frequency (RF) range have shown superiority over contemporary semiconductor devices and paved the way for the development of a wide variety of reconfigurable

devices [2], which can change their characteristics based upon the application. Passive components such as reconfigurable antennas, reconfigurable filters, variable inductors, and phase shifters are major devices in communication systems [3] which utilize RF MEMS switches as their primary component for their reconfigurable functionality. Traditionally, semiconductor switches such as PIN diodes and field effect transistors (FETs) have been used in these architectures to develop reconfigurable functionality, but they suffer from serious RF losses when operating at high frequencies (above 3 GHz). Therefore, in high-frequency applications, RF MEMS switches have evolved as a best alternative for semiconductor switches. They possess negligible leakage current, high isolation, and low insertion losses during signal transmission and have large tuning ratios and low power consumption [4].

RF MEMS switches are mainly classified into series and shunt types based on the configuration. The series type switches can be easily realized with metal-to-metal contact, whereas the shunt configuration utilizes a capacitance model which does not establish any physical contact to change its state [5]. Series switches are developed using a cantilever beam structure and require less voltage to actuate, whereas capacitive shunt switches are bridge type models connected

✉ Srinivasa Rao Karumuri  
srinivasakarumuri@gmail.com

<sup>1</sup> MEMS Research Center, Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation (Deemed to be University), Green Fields, Vaddeswaram, Guntur, Andhra Pradesh 522502, India

<sup>2</sup> Center for Research in MEMS Technology, Department of Electronics and Communication Engineering, Sri Vasavi Engineering College (Autonomous), Pedatadepulli, Tadepalligudem, West- Godavari, Andhra Pradesh 534101, India

<sup>3</sup> National MEMS Design Center, Department of ECE, National Institute of Technology, Silchar, Assam, India

# ANALYSIS OF VARIOUS METHODS OF OFDM SYSTEM FOR REDUCTION OF PAPR

Dr. Vidara Vedukondalu

Associate Professor Sri Vasavi Engineering College (A) Tadepalligudem-51101, A. P., India

Dr. Purnima K. Sharma

Associate Professor Sri Vasavi Engineering College (A)

Dr. V. Vijayasri Bollsetty

Associate Professor Aditya College of Engineering & Technology

Surampalem - 533437AP, India

## ABSTRACT

High peak-to-average power ratio (PAPR) is a major drawback of orthogonal frequency division multiplexing (OFDM) systems. Among the various PAPR reduction techniques, companding transform appears attractive for its simplicity and effectiveness. This paper proposes a new companding algorithm. Compared with the others, the proposed algorithm offers an improved bit error rate and minimized out-of-band interference while reducing PAPR effectively. The increasing demand on high bit rate and reliable wireless and wire line system has junction rectifier to several new rising modulation techniques. One among the techniques are going to be Orthogonal Frequency Division Multiplexing (OFDM), that offers reliable high bit rate wireless system with cheap complexity. The first reason OFDM is most popular in most high information measure potency transmission systems is as a result of it effectively resists Inter Symbol Interference (ISI) and is powerful towards multipath weakening. This paper describes the problem of the height to Average Power magnitude relation (PAPR) in OFDM that could be a major downside, and presents new and variations to existing algorithms to cut back it.

## 1. INTRODUCTION

Broadband wireless is a technology that provides connection over the air at high speeds. Orthogonal frequency division multiplexing (OFDM) system has generally been adopted in recent mobile communication systems because of its high spectral efficiency and robustness against intersymbol interference (ISI). However, due to the nature of inverse fast Fourier transform (IFFT) in which the constructive and destructive behaviour could create high peak signal in constructive behaviour while the average can become zero at destructive behaviour, OFDM signals generally become prone to high peak-to-average power ratio (PAPR) problem. In this chapter, we focus on some of the techniques to overcome the PAPR problem (Krongold and Jones, 2003; Bauml, et al. 1996).

The other issue in wireless broadband is how to maximize the power efficiency of the power amplifier. This can be resolved by applying digital predistortion to the power amplifier (PA) (Varahram, et al. 2009). High PAPR signal when transmitted through a nonlinear PA creates spectral broadening and increases the dynamic range requirement of the digital to analog converter (DAC). This results in an increase in the cost of the system and a reduction in efficiency. To address this problem, many techniques for reducing PAPR have been proposed. Some of the most important techniques are clipping (Kwon, et al. 2009), windowing (Van Nee and De Wild, 1998), envelope scaling (Foomouljareon and Fernando, 2002), random phase updating (Nikookar and Lidshem, 2002), peak reduction carrier (Tan and Wassell, 2003), companding (Hao and Liaw, 2008), coding (Wilkinson and Jones, 1995), selected mapping (SLM) (Bauml, et al. 1996), partial transmit sequence (PTS) (Muller and Huber, 1997), DSI-PTS (Varahram et al. 2010), interleaving (Jayalath and Tellambura, 2000), active constellation extension (ACE) (Krongold, et al. 2003), tone injection and tone reservation (Tellado, 2000), dummy signal insertion (DSI) (Ryu, et al. 2004), addition of Gaussian signals (Al-Azoo et al. 2008) and etc (Qian, 2005).

Clipping is the simplest technique for PAPR reduction, where the signal at the transmitter is clipped to a desired level without modifying the phase information. In windowing a peak of the signal is multiplied with a part of the frame. This frame can be in Gaussian shape, cosine, Kaiser or Hanning window, respectively. In companding method the OFDM signal is companded before digital to analog conversion. The OFDM signal after IFFT is first companded and quantized and then transmitted through the channel after digital to analog conversion. The receiver first converts the signal into digital format and then expands it. The companding method has application in speech processing where high peaks occur infrequently. In PTS, by partitioning the input signal and applying several IFFT, the optimum phase sequence with lowest PAPR will be selected before being transmitted. This technique results in high complexity. In SLM, a copy of input signal is used to choose the minimum PAPR among the multiple signals.

# INVESTIGATION ON A BIT ERROR RATE BASED OFDM SYSTEM

Dr Purnima K Sharma

Department of ECE Associate Professor Sri Vasavi Engineering College (A)

Dr Vidara Yedukondala

Associate Professor Department of ECE Sri Vasavi Engineering College (A)

Chadepalligudem-534101, A. P, India

Dr V Vijayarat Bolisetty

Associate Professor Aditya College of Engineering & Technology Surampalem - 533437AP India

## Abstract

Although tremendous research has conducted on high speed communications but still number of research works which are reported in literature are fails to meet the real time requirement. The main drawbacks in the conventional communication techniques are low spectral efficiency, lack of high rate, interferences, etc. The OFDM communication model overcomes the drawbacks of conventional communicational model and offers the high data rate, and high spectral efficiency. Compared to conventional approaches the 4th generation Long term evolution application has better spectral efficiency in terms of accuracy and high data rate, the 4th generation Long term evolution approach is formed by the collaboration of OFDM and MIMO. Although OFDM has many advantages over FDM but it suffers from inter carrier interference and inter symbol interference when multiple carriers are used and due to this interferences loss of Orthogonality happens, in order to overcome these interferences usage of cyclic prefix has become mandatory. But usage of cyclic prefix shows huge negative impact on bandwidth efficiency as the cyclic prefix approach consumes nearly 20% of bandwidth and BER performance too affected. In this paper a novel wavelet based OFDM model is presented which is mainly intended to provide good Orthogonality and better spectral efficiency using various modulation techniques, the unique thing in the usage of wavelet based OFDM is it does not need any spectral efficiency and absence of the cyclic prefix increases bandwidth efficiency when bandwidth increases simultaneously spectral efficiency increases. Finally the usage of the wavelet based OFDM shows improved BER over conventional FDM communication model. The simulation results indicates the usage of wavelet based OFDM in place of DFT based OFDM in LTE and finally the comparison between wavelet based OFDM and DFT based OFDM.

## 1. INTRODUCTION

Basic concept of OFDM is the orthogonality principle. Orthogonality principle can be explained that any two vectors must be linearly independent from each other. Here the subcarriers must be orthogonal to each other. This means that

even if waveforms overlap, the orthogonality ensures zero interference. An overlap of sub carriers is seen in frequency domain of sub carriers; hence we don't have ICI in the band efficiency [2][5][7] OFDM is a digital modulation technique which uses multiple carriers, that use abundant tightly spaced orthogonal subcarriers. Initial data is sent in form of a single stream which is then converted to parallel form [3]. The parallel data or small chunks of data is then coded and then modulated on to a sub-carrier. These sub-carriers are modulated using any modulation schemes, usually quadrature amplitude modulation. These subcarriers are modulated at a low symbol rate maintaining same data rates similar to convention single carrier modulation scheme for same bandwidth. This is the reason we observe lower bit rates on sub carrier compared to single carrier. This modulated data is transmitted on multifading channels such as Rayleigh fading channel. In this Project, we use Additive White Gaussian Noise (AWGN) channel. Conventionally, OFDM uses fast Fourier transform for generation and detection. Wavelet Transform seems to have the potential to replace DFT. Using Wavelet transform we can have time-frequency localization. Wavelet transform is able to provide the time as well as the frequency information simultaneously, hence it gives us a time-frequency representation of the signal. Wavelet transforms works almost same as Short-time Fourier transform (STFT) to find the unknown data in particular bandwidth. The problem with STFT is that the window size is fixed for all the data. The problem arises when we take a window size less than that the interested Bandwidth, we cannot completely find out the information from that signal. This is where Wavelet Transform comes in. Wavelet Transform provides us with a variable window size. The advantage of this is we can extract any large chunks of data. Because of this variable size, the resolution of time frequency signals is improved [4]. Wavelet Transform can be briefly described as follows. On passing the time domain signal through several high pass and the low pass filters, which results in either a high frequency or a low frequency signal. This entire process is repeated several times every single time a small part of a signal related to its respective frequency will be removed. This is how it works, on considering a frequency of a signal to be in the range between 1000 Hz. This 1000Hz signal is passed through high pass and low pass filters and

RESEARCH ARTICLE

# A novel foot-shaped elliptically embedded patch-ultra wide band antenna with quadruple band notch characteristics verified by characteristic mode analysis

Venkata Naga Koteswara Rao Devana<sup>1</sup> | Emandi Kusuma Kumari<sup>2</sup> |  
Karnam Serkadu Chakradhar<sup>3</sup> | Purnima Kadali Sharma<sup>2</sup> |  
Danthuluri Rama Devi<sup>4</sup> | Chebrolu Manohar Kumar<sup>5</sup> | Valluri Dhana Raj<sup>6</sup> |  
Devathoti Rajendra Prasad<sup>1</sup>

<sup>1</sup>Associate Professor(ECE Department, Aditya Engineering College (A), Surampalem, India

<sup>2</sup>ECE Department, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>3</sup>ECE Department, Sree Vidyanikethan Engineering College, Tirupathi, India

<sup>4</sup>ECE Department, MVGR College of Engineering, Vizianagaram, India

<sup>5</sup>ECE Department, Gayatri Vidya Parishad College for Degree and PG Courses (A), Visakhapatnam, India

<sup>6</sup>ECE Department, B.V.C. Engineering College (A), Odalarevu, India

## Correspondence

Venkata Naga Koteswara Rao Devana, Associate Professor, ECE Department, Aditya Engineering College (A), Surampalem, India.  
Email: dvnkrazo@gmail.com

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## Summary

A novel foot-shaped elliptically embedded patch (EEP) ultra wide band (UWB) antenna with four band elimination features is demonstrated. The designed antenna incorporates embedded ellipses as its structure, a 50  $\Omega$  microstrip line feed, and a defective rectangular ground structure (DRGS). The antenna has 22  $\times$  32 mm<sup>2</sup> in size, with a frequency spectrum of 2.8–13.3 GHz, and a fractional bandwidth (FBW) of 130%. On the radiating element, four half-wavelength inverted U-shaped slots are used to create four band-stop characteristics and are verified by using characteristic mode analysis (CMA). The antenna has four band rejection characteristics, exhibiting  $S_{11} > -10$  dB at 3.37 GHz for Worldwide Interoperability for Microwave Access (WiMAX) (3.17–3.61 GHz), 3.95 GHz for C (3.70–4.34 GHz), 5.49 GHz for wireless local area network (WLAN) (5.16–5.82 GHz), and 8.31 GHz for ITU-8 (8.10–8.64 GHz) bands. The proposed EEP radiator with four notch characteristics has voltage standing wave ratio (VSWR) values of 10.5, 25.6, 8.9, and 3.8 for notch center frequencies of 3.37, 3.95, 5.49, and 8.31 GHz. The proposed antenna peak gain fluctuates from 1.6 to 4.4, peak efficiency is 98.92%, group delay variations are less than 0.65 ns, linear phase response, and transfer function is less than  $-35$  dB all across the entire UWB operating bandwidth except for notched frequency bands, which makes it appropriate for UWB portable applications.

## KEYWORDS

ITU-8, quadruple Notch, slots, ultra wide band (UWB), WIMAX, WLAN

## 1 | INTRODUCTION

With the Federal Communications Commission (FCC) designating the 3.1–10.6 GHz spectrum for UWB applications,<sup>1</sup> there is a surge of interest in ultra wide band (UWB) technology. Despite its many benefits, including its ultra wide unlicensed bandwidth, fast data rate, and compact design space, UWB technology has several practical issues. One of

RESEARCH ARTICLE

# A novel foot-shaped elliptically embedded patch-ultra wide band antenna with quadruple band notch characteristics verified by characteristic mode analysis

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Devathoti Rajendra Prasad<sup>1</sup>

<sup>1</sup>Associate Professor, ECE Department, Aditya Engineering College (A), Surampalem, India

<sup>2</sup>ECE Department, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>3</sup>ECE Department, Sree Vidyanikethan Engineering College, Tirupathi, India

<sup>4</sup>ECE Department, MVGR College of Engineering, Vizianagaram, India

<sup>5</sup>ECE Department, Gayatri Vidya Parishad College for Degree and PG Courses (A), Visakhapatnam, India

<sup>6</sup>ECE Department, B.V.C. Engineering College (A), Odalarevu, India

## Correspondence

Venkata Naga Koteswara Rao Devana, Associate Professor, ECE Department, Aditya Engineering College (A), Surampalem, India.  
Email: [dvnkrao@gmail.com](mailto:dvnkrao@gmail.com)

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## KEYWORDS

ITU-R, quadruple Notch, slots, ultra wide band (UWB), WiMAX, WLAN

## 1 | INTRODUCTION

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## Detection of Leishmania Donovanii Using Microchannel Based MEMS Biosensor

P. Ashok Kumar<sup>1</sup>, M. Koteswara Rao<sup>1</sup>, S. V. V. Satyanarayana<sup>1</sup>, Mohammad Taj<sup>2</sup> & Rama Vasantha Adiraju<sup>3</sup>

<sup>1</sup>Department of ECE, Sri Vasavi Engineering College, Podatadepalli, Tadepalligudem, Andhra Pradesh - 534101, INDIA.

<sup>2</sup>Department of ECE, Vignan's Foundation for Science, Technology and Research, Guntur, Andhra Pradesh - 522213, INDIA.

<sup>3</sup>Department of ECE, Aditya College of Engineering & Technology, Surampalem, Andhra Pradesh-533291, INDIA

**ABSTRACT** The need for reliable fast diagnostics is closely linked to need for safety. To achieve this, MEMS based biosensors are predominant devices which utilizes non - invasive methodology and can be easily integrated with any portable electronic systems. Leishmania Donovanii is the protozoan parasite which is responsible to cause kala - azar diseases. This work presents the design of MEMS based biosensor to detect Leishmania Donovanii in amastigote form present in the blood. Microchannel based biosensors are proposed for sensing by capacitance transduction principle. The design and simulation work are carried out using CMOSOL FEM tool. The proposed device, the cylindrical serpentine channel gives high capacitance sensitivity of 0.9 during the parasite detection.

**Keywords:** Amastigote, Biosensor, Capacitance, Kala Azar, Leishmania Donovanii, Microchannel, Sensitivity.

### 1. INTRODUCTION

Kala - Azar is one of the neglected tropical diseases caused by parasite called genus Leishmania protozoa. It is the second deadliest disease after malaria and epidemic over 76 countries with nearly 200 million people are at risk of infection [1]. Sandfly bites acts as a carrier for these parasites and are migrated to the internal organs of the body which causes fever, anorexia, liver enlargement and bone marrow suppression [2]. At the initial stages, these parasites are developed into amastigotes which are in oval shape with size ranges from 3 - 6  $\mu\text{m}$  in length and 1 - 3  $\mu\text{m}$  in width and count can be 7 - 10 amastigotes for each blood cell [3, 4]. Detection of these type of amastigotes is carried out by different techniques such as Dipstick testing [5], Direct agglutination test (DAT) [6], Enzyme-linked immunoassay (ELISA) [7], KAtex, Leishmanin skin test (LST) [8]. These diagnosis methods are slow, invasive and need clinical laboratories for parasite detection. Hence there is immense need for miniaturized biosensors with high sensitivity and rapid detection of the parasites [9].

Biosensors are predominant devices used for diagnosis of various diseases in clinical applications. Now a days, the coupling of biosensors with electronic chips produces Lab - on - chips which replaces the clinical laboratories [10]. Based upon the transducing mechanism, Biosensors are classified into four categories: electrochemical, FETs, Optical and Piezoelectric. Among them, electrochemical transduction principle is fast, less - cost, label - free and highly sensitive in disease detection [11]. Electrochemical biosensors are broadly classified into voltametric, amperometric and impedance or capacitive sensors. Capacitive biosensors have so far been successfully utilized for detection of nucleotides, proteins, saccharides, small organic molecules and microbial cells [12]. The miniaturization of capacitive biosensors is very important for many portable integrated system applications and there is huge urge to develop miniaturized biosensors which are compatible to integrated with electronic circuits and devices [13]. This is achieved by Microelectromechanical systems (MEMS) technology which involves in development of micro/nano scale devices by micro/nano fabrication process [14]. A receptor based biosensor is developed for generic detection of chemical agents in the battlefield with the combination of molecular biology and receptor biochemistry. This sensor is based on biological recognition and cannot utilized for long term diagnosis [15]. B R. Martins et al., developed a Electrochemical Immunosensor for detection of kala azar disease with gold coated carbon electrodes. The biosensor is only limited to detect antigens within the concentration of ng/mL [16]. A nanostructured biosensor system is developed by A. C. Perinoto et al., which can handle the concentration of  $10^{-5}$  mg/mL for anti-leishmania antibodies detection which is very high in the present context. The structure consists of interdigitated electrodes which are coated with immobilized proteoliposomes incorporated with antigenic proteins [17]. The interdigitated electrode in the biosensor helps to realize capacitance transduction principle but cannot be associated with microfluidic flow.

In this paper, a microfluidic biosensor is proposed based on formation of cylindrical microchannel structures to detect specific anti-leishmania antibodies. The cylindrical channel is proposed to ensure the laminar flow of the fluid which helps to use the device for large number of cycles. The immobilization of L-donovani parasites is processed by phospholipid liposomes incorporating membrane antigenic proteins. The capacitance transduction principle of the proposed devices can be realized by positive and ground electrodes present on either side of channel and change in

# A review on wireless power transfer new paradigm for low power devices

J. Rajendra <sup>a,b</sup>, Dr. Dinesh Sharma <sup>c</sup>

<sup>a</sup> Research Scholar, CECF, Chandigarh, India/Assistant Professor, ECE Dept, WCE, Unepalligudem, India, rajendra@cecf.ac.in

<sup>b</sup> Assistant Professor, ECE Dept, CECF, Chandigarh, India, dsharma@cecf.ac.in

**Abstract:** Rapid development in technology, led to the extensive use of low power devices in medical field and engineering disciplines. Low power devices are battery operated, which limit the performance and lifetime of the devices. WPT is a new technical paradigm for powering low power devices including sensors and actuators in WSNs and IoT, as well as implantable devices for biomedical applications. It is a difficult effort to design and implement a high-efficiency WPT system. Size of devices, remoteness intervening the transmitter and receiver, alignment of transmitter and receiver, and operating frequency are important characteristics to reckon with in planning of WPT systems. Several practical issues and related to WPT systems were covered in this article.  
**Keywords:** Wireless power transfer (WPT), Multi-hop WPT, Microwave WPT, Implantable devices

## 1. Introduction

The flying advancement of IoT and Biomedical microsystems led to the rapid utilization of low power appliances functioning as sensors, actuators, cardiac pacemakers and medical implantable devices. Continuous powering this low power devices is a strenuous task, which is accomplished by using batteries. Reconditioning and restoring batteries for larger number of devices is complex and unfeasible which is overcome by wireless charging of the devices achieved with help of Wireless power transfer [20, 47]. To alleviate air pollution, futuristic road transportation is based on zero-emission regulations requiring automobiles to employ only alternative fuels or innovations such as hybrid or electric vehicles (EVs). This trend, along with the continuous evolution of distributed solar power electricity generation, has sparked significant interest in electric vehicles. The majority of these automobiles feature batteries that must be recharged efficiently and decisively. Traditionally, a physical plugged connector is used to replenish the battery from an external source of energy. Wireless power transfer (WPT) provides efficient means for charging of Electric vehicles (EVs) which relies on conventional heavy electric cables for powering them and reduces the effect electric hazards caused due to conventional cables [18]. In [21] author proposed the design of efficient WPT system using metamaterials to operate at radio frequencies to improve proficiency of delivered power. The Primove system was created for tramways, light trains, and automobiles to overcome the hassles and risks inherent via the use of electrified catenaries in urban areas [11]. The ultra-high-speed MAGLEV that uses a superconducting magnet has gotten a lot of interest as a future green transportation network as superconducting magnets can carry a lot of levitation force. [60, 39]. Wireless Sensor Networks (WSNs) have a limited lifespan due to battery life, and they can only perform for a brief span of time. Various strategies for extending the life of sensor networks have been explored, which have shown the enhancement in energy usage in WSNs, power consumption and life span abide as a performance restricting parameters of WSN and has hindered the deployment of WSNs in vast areas. Energy usage and life span issues of WSNs were addressed by using the WPT technique [27].

Nikola Tesla was the first to make a substantial contribution to WPT technology, whose studies rely on inductive coupling WPT [2]. A contactless charging device based on inductive coupling WPT was engineered by in 1894 by M. Hutin and LeBlanc for powering the E-vehicles

[1]. In 1960s W.C. Brown performed the experiments on WPT based flying drone using microwaves [3].

## 2. Classification of WPT

The WPT technique has a potential of transferring the energy from source to the target along the free space rather than wired interconnections. Near-field WPT and far-field WPT are two types of WPT used in this new energy access technology. Non-radiative electromagnetic fields, such as inductive, capacitive, and resonant processes, are used in the near-field method. As the energy carrier, radiative electromagnetic fields, optical, and microwaves can be used to accomplish the far-field WPT [22, 49].

### 2.1. Inductive Coupling WPT

Inductive coupling is a WPT approach where power is relayed between coils placed at two distant stations using Faraday's Induction principle. Inductive power transfer is more efficient at accommodating a wide set of possible loads, and it is being used in a multitude of applications due to its productiveness over shorter distances. Inductive coupling is adopted at frequencies below 1MHz with power levels varying from a few  $\mu$ W to kW, reducing the effects of electromagnetic interference and radio frequency hazards [5, 9].

The energy from the transmitter coil is transmitted inductively via the air-gap to the reception coil in an IPT system, which is made possible by specially designed coils. The ability of energy transfer as well as quality factor Q of the coils at resonance frequency, have a significant impact on power transmission efficiency [35-36]. Intermediate couplers used between the sender and acceptor coils improves coupling and enhances the transmission distance in inductive power transfer. Effect of coplanar intermediate coupler on coupling between the coils and power transfer efficiency is presented [37].

In assessing the accuracy of transmission, the mutual location and distance of the transmitter and receiver are critical. The quantity of power transfer and transmission efficiency will be diminished when the distance seen between coils is increased. [34,40]. The author has developed a method for enhancing a resonant inductive wireless power transmission network

## FPGA Implementation of Fractional Fourier Filtering Technique to Reduce Cross Terms in Wigner Ville Distribution

<sup>1</sup>B Murali Krishna, <sup>2</sup>B. T. Krishna, <sup>3</sup>K Babulu

<sup>1</sup>Assistant Professor, Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, A.P. India, Pin Code: 534101. Email: murali.eee713@gmail.com

<sup>2</sup>Professor, ECE Department, UCEK, JNTU Kakinada, Pin code: 533003, A.P. India.

<sup>3</sup>Professor, ECE Department, UCEV, JNTU Vizianagaram, Pin code: 535003, A.P. India.

### Abstract:

Hardware realization and FPGA implementation of Fractional Fourier filtering technique to rectify cross terms in Wigner Ville Distribution (WVD) is presented. WVD gives efficient time frequency representation (TFR) view for power density components of a signal. By definition, WVD involves product of signal and its conjugate symmetric signal. This operation leads to interference or cross terms in TFR plane, whenever input signal contains multi frequency components. Sobel filter is used as window to detect cross terms while performing fractional Fourier transform (FrcFt). The detected interference terms are eliminated using suitable band pass and stop band filters. WVD is performed on obtained individual auto terms of the signal to exhibit interference term free TFR. The design flow of proposed methodology and its implementation on FPGA using Verilog hardware description language (HDL) is presented. Design summary of different resource utilization factors for on board FPGA Spartan-6 is given for better practical interpretation. Finally, Chirp signal with two multi frequency components is taken as input to test the developed architecture for better real time analysis.

**Keywords:** Wigner Ville Distribution (WVD), Fractional Fourier Transform (FrcFt), Power spectral components.

### I. Introduction

Fourier transform (FT) is a powerful tool in switching signal from time domain to frequency domain. But as a result, FT projects only spectral contents information but not about its corresponding time domain indices [1], Fractional Fourier transform (FrcFt) is developed to convert signal from time domain to frequency domain by its indexed angled rotation, which gives parallel information about time and frequency during transformation [2]. This advantage leads to many time frequency applications [2]. Wigner Ville Distribution (WVD) recently gained more popularity in signal analysis due to its advent nature of representing power spectral components in time frequency plane [3]. As WVD computation involves correlation of the signal and its conjugate symmetric itself, makes suitable for many time frequency distribution (TFD) applications [3]. By nature, this correlation operation of WVD in turn returns the cross terms (CTs) problem in time frequency representation (TFR) plane. If the signal contains more than one multi frequency components, then



## RESEARCH ARTICLE

# Dynamic distributed $KC_i$ -slice data publishing model with multiple sensitive attributes

N. V. S. Lakshmi pathi Raju<sup>1</sup> | Vankamamidi S. Naresh<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Gayatri Vidya Parishad College of Engineering (A), Visakhapatnam, India

<sup>2</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

## Correspondence

N.V.S. Lakshmi pathi Raju, Department of Computer Science and Engineering, Gayatri Vidya Parishad College of Engineering (A), Visakhapatnam, India.  
Email: suribabu205@gvpce.ac.in

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India.  
Email: vsnaresh111@gmail.com

## SUMMARY

Privacy-preserving data publishing (PPDP) provides scope for performing various types of analytics by the researcher on the published data without revealing the individuals' privacy. However, it is necessary to consider the data from all the available locations to obtain accurate results from the published data. Then only the derived associations from the published data are helpful to make new decisions by an organization. Existing PPDP models on multiple sensitive attributes like *KC-slice* (K stands for bucket size, C stands for constant threshold), *KC<sub>i</sub>-slice* (K-bucket size, C<sub>i</sub>-variable threshold), *Novel KC<sub>i</sub>-slice*, and *Optimal KC<sub>i</sub>-slice* models are concentrated only when data is located at a single location. This research work introduces a new model called "*distributed KC<sub>i</sub>-slice*," which considers the data with multiple sensitive attributes from various locations to obtain accurate results. Initially, this model proposes a novel technique called a distributed algorithm to merge the different data sets into a single data set. It combines the data differently, so that it is not possible to identify any record of a specific data set from the merged data. The proposed model also uses a new bucketization algorithm named *(l,m,d)-anonymity* (*l* stands for distinct semantic categories of the sensitive values of a sensitive attribute in a specific bucket, *m* stands for the number of sensitive attributes, and *d* stands for different sensitive categories for the sensitive values of a sensitive attribute in each sensitive bucket) for the bucketization of the tuples into the buckets. It imposes the privacy constraints only on high sensitive values of each sensitive attribute by considering the semantic and sensitive levels of sensitive values. The distributed *KC<sub>i</sub>-slice* model finally publishes the data in the form of multiple sensitive tables and one quasi table. This model is implemented based on attribute sensitiveness to enhance the utility and privacy levels of the published data.

## KEYWORDS

anonymization, distributed data publishing, *KC<sub>i</sub>-slice*, multiple sensitive attributes, privacy, utility

## 1 | INTRODUCTION

Privacy-preserving data publishing (PPDP) shows a path to obtain new relations from the published data without disturbing an individual's social status. Different existing techniques are available to anonymize the personal privacy of an individual involved in the published data. All these anonymization techniques have their own merits and demerits. It is necessary to choose a suitable anonymization technique for publishing the data.<sup>1</sup>

N.V.S. Lakshmi pathi Raju and Vankamamidi S. Naresh contributed equally to this work.

## RESEARCH ARTICLE

# Crime data optimization using neutrosophic logic based game theory

Naga Venkata Jagan Mohan Remani<sup>1</sup> | Vankamamidi S. Naresh<sup>2</sup> | Sivaranjani Reddi<sup>3</sup> | Kadali Dileep Kumar<sup>4</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sagi Ramakrishnam Raju Engineering College, Bhimavaram, Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>3</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, Andhra Pradesh, India

<sup>4</sup>Department of Computer Science and Engineering, Swarnandhra College of Engineering and Technology, Narsapur, Andhra Pradesh, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

Sivaranjani Reddi, Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Andhra Pradesh, 530003, Visakhapatnam, India  
Email: sivaranjani.cse@anits.edu.in

Kadali Dileep Kumar, Dept of Computer Science and Engineering Swarnandhra College of Engineering and Technology Andhra Pradesh, India  
Email: dileepkumarkadali@gmail.com

## Summary

The significance of prisoner's dilemma in making two completely rational individuals might not cooperate even their best interest to do so. Every criminal investigation is strongly reliant on crime data classification and optimization. In this work, we extended prisoners' dilemma for crime data classification and its optimization. A confusion matrix-based optimization technique for crime data with game theory model in order to identify the person involvement in crime is to be predicted and clustered them into confess, not confessed, and indeterministic states based on the neutrosophic logic principle. In this technique, first we map neutrosophic logic into crime system to break the uncertainties in crime clustering. Next, we preliminary cluster the crime data pairs that indicates two offenders neutrosophic values into three clusters. However, some pairs lie in intersections of two or three clusters. So we optimize the clustering into disjoint clusters will be done based on the ratio of intra-cluster and inter-cluster distances. We have implemented the proposed method. The experimental result shows that the quality of proposed method based on accuracy, precision, and recall parameters, observed more than 90% accuracy.

## KEYWORDS

confusion matrix, factors optimization, game theory, machine learning, neutrosophic logic

## 1 | INTRODUCTION

In present eras, there has been a rising attention in machine learning in the software industry and academia. Current uses include modeling, assessment, optimization, decision-making, control, confirmation, and information. In particular, the machine learning method is well suited to the mastery of the system field. For example, machine learning techniques are applied in the field of criminology as an indication for crimes that are present in any person or not.

The analysis of crime<sup>1</sup> is law enforcement that contains methodical study for classifying and studying patterns proposed by Wang et al.<sup>2</sup> and trends in crime and complaint. This fact on patterns can help law enforcement organize resources in a more in effect way and help detectives in classifying a catching perpetrators. Dandir<sup>3</sup> proposed an in-depth examination and depiction of the crimes committed, Indian Crime Data Analysis from toward data sciences in India, between 2001 and 2011, the Asian Center for Human Rights in India documented 48,338 occurrences of rape against juveniles, a 336% rise from 2113 incidents in 2001 to 7112 incidents in 2011. In 2017, the World Health Organization projected that 1 billion

## RESEARCH ARTICLE

# Secure lightweight multi-party key agreement based on hyperelliptic curve Diffie–Hellman for constraint networks

Vankamamidi S. Naresh<sup>1</sup> | Sivaranjani Reddi<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, Andhra Pradesh, India

**Correspondence**

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

**Abstract**

With recent developments in hyperelliptic curve cryptographic system (HECC) processing and the proposed work, the myth that HECC is not suited for practical applications in constrained networks is dispelled. This article proposes dynamic authenticated contributory group key agreement (DACGKA) protocol using HEC-DH. The DACGKA is less costly and ideally appropriate for resource-restricted networks such as VANETs, MANETs, and WSNs because of its lesser key sizes and advancements in operational processing. The suggested protocol is implemented across a finite field using an HEC of genus 1 (ECC), genus 2, and genus 3, with promising results, including a significant reduction in key size and exchange overhead, an increase in key safety, and a broader range of applicability. According to a comparison of the proposed approach on different genus curves, HECC over genus 2 with a suitable key length can be applied for memory and power restricted devices to increase data secrecy and system efficiency. Further, HECC can outperform ECC for low-cost, secure group communication applications. As a part of security analysis, first, we proved that each coordinate of HEC-DH secret value is as hard as the entire DH value, and then concrete security proofs based on the HEC-DLP were established.

**KEYWORDS**

constraint networks, group key agreement, hyperelliptic curves, Jacobian, key exchange operations

## 1 | INTRODUCTION

A range of collaborative applications focusing on secure group communication (SGC) is becoming a more active study field in cryptography. It is based on specific distribution and management strategies. All group key agreement (GKA) protocols can be classified into one of two groups. The key is generated by a single group member and distributed to the remaining members in the first. However, it necessitates the involvement of a reliable third party and a safe route between a trustworthy third party and the group members. As a result, key distribution and administration become more complicated. On the other hand, contributory group key agreements (CGKAs) are GKAs in which each member gives a portion of the group key (GK). The focus of this work is on a protocol that falls into the second category.

GKA allows SGC across an unprotected, open network by producing the GK. Well-established GKA<sup>1–10</sup> allows participants to agree on a GK in the presence of an alive opponent using signature techniques. To guarantee confidentiality and integrity in the SGC, group members use their authenticated group key with cryptographic techniques.

The simplicity and beauty of the 2-party Diffie–Hellman (DH) key agreement<sup>11</sup> has prompted several researchers to apply it to group situations. The majority of GKA protocols are based on DLP. On the other hand, Constraint networks require longer key lengths and higher computational demands. Elliptic curve cryptography (ECC)<sup>12,13</sup> is the natural solution to this problem since, with reduced key sizes, cheaper computational costs, and increased efficiency, it can provide good security.



# Provably secure blockchain privacy-preserving smart contract centric dynamic group key agreement for large WSN

Vankamamidi S. Naresh<sup>1</sup> · V. V. L. Divakar Allavarpu<sup>2</sup> · Sivaranjani Reddi<sup>3</sup>

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## Abstract

The contemporary Group Key Agreement (GKA) entails lightweight computing, reduced communication, decentralized certification, personal privacy protection, traceability, and accountability. In this paper, we adopted blockchain technology in GKA to incorporate these features. This work first presents a blockchain-based two-party Elliptic Curve Diffie–Hellman key agreement. Subsequently, we extend it to an  $n$ -party key agreement to propose a Blockchain-based Dynamic Authenticated Contributory Group Key Agreement (BDACGKA). In this technique, the privacy-preserving smart contract (PPSC) acts as a Group Controller in the first round and generates two-party shared keys with each group member. The PPSC computes partial group keys in the second round and sends them to the respective group members. After receiving the partial group keys sent by the PPSC, each group member generates the group key by multiplying the received product with its shared key. Furthermore, we built a Formal Security Model for the proposed protocol. Finally, the performance analysis demonstrates that the proposed protocol is more proficient than the examined protocols and highly adaptable to large wireless sensor networks.

**Keywords** Group key agreement · Blockchain · Privacy-preserving smart contract · Secure data transfer · Elliptic curve Diffie–Hellman · Wireless sensor networks

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✉ Vankamamidi S. Naresh  
vsnaresh111@gmail.com

<sup>1</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India

<sup>2</sup> FinTech Academy, GITAM (Deemed To Be University), GITAM Institute of Management, Visakhapatnam, Andhra Pradesh 530045, India

<sup>3</sup> Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology and Science, Visakhapatnam, Andhra Pradesh 530003, India

## PREDICT THE ACCURACY OF CROP YIELD PRODUCTION USING NEURAL NETWORK MODELS

PRAVEEN KUMAR KARRI <sup>#1</sup>, MAMILLAPALLI CHILAKA RAO <sup>#2</sup>, NAGESWARA RAO ARAMANDA <sup>#3</sup>, G VENKATA LAKSHMI NARAYANA <sup>#4</sup>, M.V.V.KRISHNA <sup>#5</sup>

### ABSTRACT

Data mining is the process of extracting useful information from a large data source and this will be helpful for extracting lot of valuable information. As we all know that agriculture is considered as one of the main sector for any country and almost the GDP of the country will depend on agriculture and its production. The income obtained from the agriculture was totally depend on yield which is obtained at the end and also the price which is fixed by the current market. If the yield is more we will get more income and profit from that production and if the same yield is very less then we may get less GDP from the agriculture. Hence there is substantial need of yield monitoring for improving the income resources of our country. Till now all the primitive models are manual approaches to calculate the yield prediction based on the plant and its current state. But manual approach is not giving complete accurate prediction outcome as they may have some false inputs. This motivated me to develop a new mechanism by taking some sample neural network models and then check the yield prediction based on that model. Here we try to use some deep learning and its hybrid techniques such as LSTM,CNN and RNN models for verifying the accurate yield prediction and then finally come to an conclusion which one gives best accurate report. By conducting various experiments on our current models using some agriculture production datasets collected from Kaggle Website,

<sup>#1,#2,#3,#5</sup> Assistant Professor, Department Of Computer Science And Engineering, Sri Vasavi Engineering College(A), (Approved By A.I.C.T.E & Affiliated To Jntuk,Kakinada) Tadepalligudem,Andhra Pradesh, India.

<sup>#4</sup> Assistant Professor, Department Of Computer Science And Engineering, ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI, K KOTTURU, ANDHRA PRADESH, INDIA.

Email : [mtsldpraveen@gmail.com](mailto:mtsldpraveen@gmail.com) <sup>#1</sup>, [chilakarao@gmail.com](mailto:chilakarao@gmail.com) <sup>#2</sup>, [aramanda.vijji@gmail.com](mailto:aramanda.vijji@gmail.com) <sup>#3</sup>, [gvinaravana.it@aditvatekkali.edu.in](mailto:gvinaravana.it@aditvatekkali.edu.in) <sup>#4</sup>, [veerukhannan@gmail.com](mailto:veerukhannan@gmail.com) <sup>#5</sup>

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<sup>#1,#2,#3,#5</sup> Assistant Professor, Department Of Computer Science And Engineering, Sri Vasavi Engineering College(A), (Approved By A.I.C.T.E & Affiliated To Jntuk,Kakinada) Tadepalligudem,Andhra Pradesh, India.

<sup>#4</sup> Assistant Professor, Department Of Computer Science And Engineering, ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI, K KOTTURU, ANDHRA PRADESH, INDIA.

Email : [mtsldpraveen@gmail.com](mailto:mtsldpraveen@gmail.com) <sup>#1</sup>, [chilakarao@gmail.com](mailto:chilakarao@gmail.com) <sup>#2</sup>, [aramanda.vijji@gmail.com](mailto:aramanda.vijji@gmail.com) <sup>#3</sup>, [gvlnarayana.it@adityatekkali.edu.in](mailto:gvlnarayana.it@adityatekkali.edu.in) <sup>#4</sup>, [veerukhannan@gmail.com](mailto:veerukhannan@gmail.com) <sup>#5</sup>

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<sup>#1,#2, #3, #5</sup> Assistant Professor, Department Of Computer Science And Engineering, Sri Vasavi Engineering College(A), (Approved By A.I.C.T.E & Affiliated To Jntuk,Kakinada) Tadepalligudem,Andhra Pradesh, India.

<sup>#4</sup> Assistant Professor, Department Of Computer Science And Engineering, ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI, K KOTTURU, ANDHRA PRADESH, INDIA.

Email : [mtsldpraveen@gmail.com](mailto:mtsldpraveen@gmail.com) <sup>#1</sup>, [chilakarao@gmail.com](mailto:chilakarao@gmail.com) <sup>#2</sup>, [aramanda.viji@gmail.com](mailto:aramanda.viji@gmail.com) <sup>#3</sup>, [gvlnarayana.it@adityatekkali.edu.in](mailto:gvlnarayana.it@adityatekkali.edu.in) <sup>#4</sup>, [veerukhannan@gmail.com](mailto:veerukhannan@gmail.com) <sup>#5</sup>

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PRAVEEN KUMAR KARRI <sup>#1</sup>, MAMILLAPALLI CHILAKA RAO <sup>#2</sup>, NAGESWARA RAO ARAMANDA <sup>#3</sup>, G VENKATA LAKSHMI NARAYANA <sup>#4</sup>, M.V.V.KRISHNA <sup>#5</sup>

### ABSTRACT

Data mining is the process of extracting useful information from a large data source and this will be helpful for extracting lot of valuable information. As we all know that agriculture is considered as one of the main sector for any country and almost the GDP of the country will depend on agriculture and its production. The income obtained from the agriculture was totally depend on yield which is obtained at the end and also the price which is fixed by the current market. If the yield is more we will get more income and profit from that production and if the same yield is very less then we may get less GDP from the agriculture. Hence there is substantial need of yield monitoring for improving the income resources of our country. Till now all the primitive models are manual approaches to calculate the yield prediction based on the plant and its current state. But manual approach is not giving complete accurate prediction outcome as they may have some false inputs. This motivated me to develop a new mechanism by taking some sample neural network models and then check the yield prediction based on that model. Here we try to use some deep learning and its hybrid techniques such as LSTM, CNN and RNN models for verifying the accurate yield prediction and then finally come to an conclusion which one gives best accurate report. By conducting various experiments on our current models using some agriculture production datasets collected from Kaggle Website,

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<sup>#1,#2,#3,#5</sup> Assistant Professor, Department Of Computer Science And Engineering, Sri Vasavi Engineering College(A), (Approved By A.I.C.T.E & Affiliated To Jntuk,Kakinada) Tadepalligudem, Andhra Pradesh, India.

<sup>#4</sup> Assistant Professor, Department Of Computer Science And Engineering, ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI, K KOTTURU, ANDHRA PRADESH, INDIA.

Email : [mts1tdpraveen@gmail.com](mailto:mts1tdpraveen@gmail.com) <sup>#1</sup>, [chilakarao@gmail.com](mailto:chilakarao@gmail.com) <sup>#2</sup>, [aramanda.vijji@gmail.com](mailto:aramanda.vijji@gmail.com) <sup>#3</sup>, [gvnarayana.it@adityatekkali.edu.in](mailto:gvnarayana.it@adityatekkali.edu.in) <sup>#4</sup>, [veerukhannan@gmail.com](mailto:veerukhannan@gmail.com) <sup>#5</sup>



# COMPARISON OF TWO DATA PRE-PROCESSING TECHNIQUES FOR EFFICIENT DATA CLEANING

MAMILLAPALLI CHILAKA RAO <sup>#1</sup>, NAGESWARA RAO ARAMANDA <sup>#2</sup>,  
POTHURAJU RAJU <sup>#3</sup>, P.SUNEETHA <sup>#4</sup>, SANAM SIVA RAMARAJA <sup>#5</sup>

## ABSTRACT

Data mining is the process of extracting useful information from a large data source and this will be helpful for extracting lot of valuable information. There are several stages present in the data mining process and one among them is pre-processing. This pre-processing plays a vital role for any ML or DL algorithms because of its importance in finding the missing or in-correct values from the dataset. Normally there are multiple factors which affect the performance of any machine learning or deep neural network algorithms, one among them is data pre-processing. In this process the user will try to figure out the noise or irrelevant information from the data, during the process of knowledge discovery. If the input data contains a lot of noise or irrelevant information then knowledge discover gives incorrect accuracy and displayed result will be wrong. Hence data pre-processing plays a vital role in the ml and dl models before we train any system. In this current work we are going to discuss the 2 best pre-processing models which are used in real time for pre-processing and we will show the pros and cons of each model by taking some sample dataset. For performance calculation of each and every model we will try to collect some sample dataset from KAGGLE website and then check the performance of individual model and finally decide which one is best.

**Key Words:** Kaggle, Pre-Processing, Machine Learning, Deep Learning, Data Mining, Deep Neural Network.

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<sup>#1,#2,#4</sup>, Assistant Professor, Department of Computer Science and Engineering,  
SRI VASAVI ENGINEERING COLLEGE(A), (APPROVED BY A.I.C.T.E & AFFILIATED TO  
JNTUK,KAKINADA) TADEPALLIGUDEM,ANDHRA PRADESH, INDIA.

<sup>#3</sup> Assistant Professor, Department of Computer Science and Engineering,  
SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN(A),(APPROVED BY A.I.C.T.E & AFFILIATED TO  
JNTUK,KAKINADA),VISHNUPUR, WEST GODAVARI DISTRICT, BHIMAVARAM-534202

<sup>#5</sup> Assistant Professor, Department of Computer Science and Engineering,  
SASI INSTITUTE OF TECHNOLOGY & ENGINEERING, (APPROVED BY A.I.C.T.E & AFFILIATED TO  
JNTUK,KAKINADA) TADEPALLIGUDEM,ANDHRA PRADESH, INDIA.

<sup>#1</sup> [chilakarao@gmail.com](mailto:chilakarao@gmail.com), [aramanda.vijji@gmail.com](mailto:aramanda.vijji@gmail.com) <sup>#2</sup>  
[rajupcse@svecw.edu.in](mailto:rajupcse@svecw.edu.in) <sup>#3</sup>, [suneetha.69@gmail.com](mailto:suneetha.69@gmail.com) <sup>#4</sup>, [sivaramaraja.535@gmail.com](mailto:sivaramaraja.535@gmail.com) <sup>#5</sup>

## Bestow Immaculate Environment exerting Sprucing Environment Method and Precognition Clustering.

Divya Vani Yarlagadda<sup>1</sup>, Dr D Jaya Kumari<sup>2</sup> M Babu Rao<sup>3</sup> G. Prasanthi<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Computer Science and Engineering Sri Vasavi Engineering College Tadepalligudem. divyasudha99@gmail.com

<sup>2</sup>Head of Department Department of Computer Science and Engineering Tadepalligudem. hod\_cse@srivasaviengg.ac.in

<sup>3</sup>Assistant Professor Assistant Department of Computer Science & Engineering Sri Vasavi Engineering College Tadepalligudem. baburao.cse@srivasaviengg.ac.in

<sup>4</sup>Assistant Professor Department of Computer Science and Engineering Sri Vasavi Engineering College Tadepalligudem. prasanthi.cse@srivasaviengg.ac.in

### *Abstract:*

At present procuring snug environment is very impotent. So many new diseases are betided because of unusual changes in the climate and this is because we are ravishing the environment. So everyone should have proper cognizance and care to make environment ravish. To immaculate environment proper deputation should be done by deputation department and to procure this coadjutors are allotted. An escort system can be developed by coadjutors to collect testimony about deputation quality performed by deputation department from people staying at multifarious fiefdoms. In this paper on the accumulated testimony about quality of cleaning done by deputation department Sprucing Environment method and Precognition Clustering are applied with the help of coadjutors. Coadjutors accrue the output of department sprucing environment method and precognition clustering to deputation department. By analyzing the output deputation department can agilely ameliorate the cleaning works at fiefdoms where deputation is not proper. A interlacement can also developed so that coadjutors can work for bestowing cognizance to people about keeping the environment deperate. Like this in this paper we can knock down immaculate environment by exerting sprucing environment method and precognition techniques.

**Keywords:** Environment, Deputation Department, Fiefdoms, Quality of Cleaning, Sprucing Environment, Precognition Clustering, Coadjutors.

### 1. Introduction

A mucky environment marshals to a paltry stipulation of a fiefdom, thereupon it is tectonic to focus. In this aspiration we concede in this paper to rack up that the environment is rejuvenated for offing generations. This paper procures revamping of quality cleaning in fiefdoms to have prim environment and usher healthy life.

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## A Novel Method to Identify Fake Profiles by Using Artificial Neural Networks

K. Praveen Kumar<sup>#1</sup>, Dr. D. Jaya Kumari<sup>#2</sup>, Dr. P. Laxmikanth<sup>#3</sup>

K. Satyanarayana<sup>#4</sup>, K. Sowmya Sree<sup>#5</sup>

<sup>#1</sup>, <sup>#4</sup> Assistant Professor, Department of Computer Science and Engineering,  
<sup>#2</sup> Professor & HOD, Department of Computer Science and Engineering,  
<sup>#3</sup> Associate Professor, Department of Computer Science and Engineering  
Sri Vasavi Engineering College (Autonomous), Pedatadepalli, Tadepalligudem,  
Andhra Pradesh-534101

<sup>#5</sup> Senior Lecturer, Varsity Educational Management Ltd,  
Kommadi Rd, madhuravada post, Visakhapatnam, Andhra Pradesh 530048.

### ABSTRACT

Now a days it is very difficult to identify the fake profiles in online networks and all the primitive methods are not completely success in identifying the fake or phony profiles. Hence this motivated me to develop thus proposed work by utilizing Artificial Neural Networks (ANN) module from deep learning to recognize whether given record subtleties are from certified or counterfeit clients. This ANN will be calculated based on past history of clients with the varying record information from certain point. This ANN calculation will be prepared with all past clients fake profile data and veritable record information and afterward at whatever point we gave new test information then that ANN train model will be applied on new test information to distinguish whether given new record subtleties are from real or fake clients. Online interpersonal organizations, such as facebook or twitter contains client's complete information and some malignant clients will hack informal organization data set to take or penetrate client's data. In order to ensure security of client's information we are using ANN model to identify fake profiles from online social networks.

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K. Satyanarayana<sup>#4</sup>, K. Sowmya Sree<sup>#5</sup>

<sup>#1</sup>, <sup>#4</sup> Assistant Professor, Department of Computer Science and Engineering,

<sup>#2</sup> Professor & HOD, Department of Computer Science and Engineering,

<sup>#3</sup> Associate Professor, Department of Computer Science and Engineering

Sri Vasavi Engineering College (Autonomous), Pedatadepalli, Tadepalligudem,  
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K. Satyanarayana<sup>#4</sup>, K. Sowmya Sree<sup>#5</sup>

<sup>#1</sup>, <sup>#4</sup> Assistant Professor, Department of Computer Science and Engineering,  
<sup>#2</sup> Professor & HOD, Department of Computer Science and Engineering,  
<sup>#3</sup> Associate Professor, Department of Computer Science and Engineering  
Sri Vasavi Engineering College (Autonomous), Pedatadepalli, Tadepalligudem,  
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## Diagnosing angiographic disease status with the aid of deep neural network

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D. Jaya Kumari

Computer Science and Engineering Department,  
Sri Vasavi Engineering College (Autonomous),  
Pedatadepalli, India'  
Email: phd.jaya@gmail.com

**Abstract:** In this decade, one-third of all global deaths reason as cardiovascular diseases – a report from the World Health Organization (WHO). Early diagnosing conserves human lives from cardiovascular diseases, which is possible through computational techniques. This research intends to identify normal/abnormal conditions of heart diseases appropriately with the aid of the artificial intelligence (AI) technique. This research includes deep neural network (DNN) to identify heart conditions adequately. It is evident from the investigation that DNN unveils 93.4% accuracy, which is proficient performance over other employed techniques. The performance of the research evaluates through nine-measures, where the DNN shows the superiority over contest techniques in all performance measures while predicting heart disease conditions.

**Keywords:** artificial intelligence; AI; deep neural network; DNN; angiographic disease; prediction/classification/diagnosing.

**Reference** to this paper should be made as follows: Kumari, D.J. (2021) 'Diagnosing angiographic disease status with the aid of deep neural network', *Int. J. Medical Engineering and Informatics*, Vol. 13, No. 6, pp.474–486.

**Biographical notes:** D. Jaya Kumari has obtained her BTech in CSE from the Narasaraopeta Engineering College, Narasaraopeta, MTech in CS from the JNTU, SIT, Hyderabad and PhD from the Andhra University, Visakhapatnam. She is currently working as a Professor in the Department of Computer Science and Engineering in Sri Vasavi Engineering College (Autonomous), Pedatadepalli. She is having around 14 years of teaching experience.

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### 1 Introduction

Today, heart disease and vascular are the primary sources of death among individuals. A standout amongst the most widely recognised cardiovascular diseases is coronary artery disease. Numerous variables will raise the danger of heart disease such as cholesterol, blood pressure, lack of exercise, smoking, and so on (Kabirirad et al., 2016). According to the World Health Organization (WHO), 31% of global deaths result from cardiovascular diseases (CVDs) in 2016. Over 75% of CVDs related deaths happen in middle and low-income countries (Kose, 2019). Several heart-related defects called heart disease that fundamentally spoils the heart. It causes death everywhere throughout the world (Poornima and Gladis, 2018). Generally, medicinal specialists reach at diagnoses



## FACIAL EMOTIONS RECOGNITION SYSTEM FOR TESTED IMAGES BY USING NAIVE BAYES CLASSIFICATION

D. ANJANI SUPUTRI DEVI, CH. SATYANARAYANA  
and M. KISHORE KUMAR

Computer Science and Engineering  
Sri Vasavi Engineering College  
JNTUK, Kakinada, A.P., India  
E-mail: anjanahasini@gmail.com  
chsatyanarayana@yahoo.co.in

Electronics and Communications Engineering  
Sri Vasavi Engineering College  
JNTUK, Kakinada, A.P., India  
E-mail: mkishorekumar.hasini@gmail.com

### Abstract

Facial Expression Recognition (FER) has challenging task in computer vision. These expressions are very important carriers for human to convey emotions in communication. Here we present basic expressions like angry, fear, neutral, sadness, surprise and disgust. One of the non-verbal communication method by which one understands the mood of a person is the expression of face. Colored image or an image in a video sequence is the input of the processing system. Different classifications and algorithms are available for FER, of which different classifications gives different accuracies. The existing SVM and Naïve Bayes classification is proposed to classify the facial expressions and the accuracy of detecting the emotion is calculated.

### I. Introduction

Faces play a crucial role in FER. Interaction with others humans possess and express various emotions. Emotions are mainly reflected through facial

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2010 Mathematics Subject Classification: 94A08.

Keywords: facial features, facial emotion recognition, measurement ratios, Naive Bayes classifier, support vector machine.

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ORIGINAL ARTICLE

## A Novel Cascaded-Deep Learning Classifier for Diagnosis of Covid19 and Pneumonia Disease in Chest X-Ray

SAMPATHI CHANDRA KUMARI <sup>#1</sup>, Dr. D JAYA KUMARI <sup>#2</sup>

<sup>#1</sup>M.Tech Scholar, Department of Computer Science and Engineering,

<sup>#2</sup> Professor, Department of Computer Science and Engineering,

Sri Vasavi Engineering College(Autonomous) Pedatadepalli, West Godavari Dist.,  
Tadepalligudem, Andhra Pradesh 534101.

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### Abstract

Computer-aided diagnosis (CAD) systems are considered a powerful tool for physicians to support identification of the novel Coronavirus Disease 2019(COVID-19) using medical imaging modalities. Therefore, this article proposes a new framework of cascaded deep learning classifiers to enhance the performance of these CAD systems for highly suspected COVID-19 and pneumonia diseases in X-ray images. Our proposed deep learning framework constitutes two major advancements as follows. First, complicated multi-label classification of X-ray images have been simplified using a series of binary classifiers for each tested case of the health status. **KEYWORDS:**

Semi-Markov Decision Process (SMDP), Reinforcement Learning(RL) Algorithm, Vehicular Cloud System, Neural-Network, Quality of Experience (QoE), Quality of Service (QoS).

### 1. Introduction

The COVID-19 is named by the World Health Organization (WHO) as a novel infectious disease, and it belongs to Coronaviruses (CoV) and perilous viruses [2, 3]. It results in some cases a critical care respiratory condition such as Severe Acute Respiratory Syndrome (SARS-CoV), leading to failure in breathing and the death eventually. Recently, situation report no. 74 of the WHO announced that the risk assessment of COVID-19 is very high at the global level on 3 April

# Personified Behavioural Demand Response Model for the Reduction of Peak Time Energy Consumption Coincidence of Domestic Sector with the Utility

SWATHI G<sup>1</sup>, SUDHA RANI DONEPUDI<sup>2</sup>, K. RAMASH KUMAR<sup>3</sup>

<sup>1</sup>Department of Electrical and Electronics Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, INDIA.

<sup>2</sup>Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Andhra Pradesh, INDIA.

<sup>3</sup>Department of Electrical and Electronics Engineering, Dr.N.G.P. Institute of Technology, Coimbatore-48, Tamilnadu, INDIA.

*Abstract*- Curtailment of discrete customer's demand coincidence with utility demand during peak time ends up in good benefits to the utility at different levels as this coincidence is very expensive due to additional requirement of demand. Though few Demand Response(DR) programs are working towards this peak time energy coincidence reduction, they are not that successful due to either requirements of technological installations near customer premises or penalising the customer or lack of encouraging the customer to achieve the reduction. This work proposes a Personified Behavioural Demand Response (P-BDR) model especially for residential customers as they are good contributors of peak time demand. Rather than coaxing or compelling the customer, the proposed model relies on customer's motivation regarding the peak time energy conservation, setting targets based on their monthly contribution to utility peak time demand and measuring their achievements through feedback models. P-BDR model comprises of Target/Goal setting model based on forecasted data and feedback model based on real time data of individual customer. This model is observed on synthetic smart meter data of 20 discrete domestic customers. For the better application of the model, customers are clustered into 4 categories using K-Means Machine learning algorithm. The model sets an individual target of 5%-15% energy consumption reduction during utility peak time based on the customer classification. The model achieves an overall consumption reduction of 14.9% during peak time with the proposed model.

*Keywords*: Utility Peak time demand coincidence, Behavioural Demand Response strategy, individual domestic customer, K-means algorithm, Machine learning, Peak time energy consumption limit.

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## 1.Introduction

Variation of electricity demand with the time of the day results in peak and off-peak loads [1], thus stressing the utility to maintain peak demand by investing in additional generation plants and equipment. Wrong investment either excessive or insufficient by the utility in reaching the peak demand, results in either wastage of the asset or power shortage problems that causes discomfort to both

suppliers and consumers. Also, these peak demand hours which are usually met by fossil fuel sources like coal, oil etc., are more prone to high carbon emissions than off-peak hours [2]. Customers can reduce electricity production, distribution and supply cost thereby total electricity charge by reducing their demand coincidence with the utility peak demand. Peak time energy conservation helps to greatly reduce network loading and hence

# A MODEL FOR PEAK TIME DEMAND COINCIDENCE REDUCTION AT RESIDENTIAL CUSTOMER LEVEL USING BEHAVIOURAL DEMAND RESPONSE STRATEGY

Swathi G<sup>1,\*</sup>, Sudha Rani Donepudi<sup>2</sup>, K. Ramash Kumar<sup>3</sup>

<sup>1</sup>Research Scholar, Department of Electrical and Electronics Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India

<sup>2</sup>Associate Professor, Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, Andhra Pradesh, India.

<sup>3</sup>Professor, Department of Electrical and Electronics Engineering, Dr.N.G.P. Institute of Technology, Coimbatore-48, Tamilnadu, India

## ABSTRACT

*Coincidence of customer's demand with peak demand at utility level is very expensive due to the additional capacity requirement to meet the additional demand. Hence reduction of demand coincidence with the utility peak demand by the consumer results in huge electricity charge savings at different levels. There is a great scope for peak time energy conservation at residential level with advanced metering along with behavioural interventions at the customer end. One such is Behavioural Demand Response (BDR) that focuses on motivating, goal setting and providing feedback to the customers to achieve the demand shift rather than enticing or coercing the customer. This work proposes a personified BDR model that sets monthly peak time energy consumption reduction target to individual customer based on the individual smart meter forecasted data and real-time feedback to measure consumer's target achievement. The model has been explored on 20 individual consumers synthetic smart meter data. Consumers are clustered into different categories based on their peak time energy consumption as well as their contribution to the utility level peak load using machine learning algorithm K-means. with the proposed model, 15.4% of peak time energy consumption reduction can be achieved at utility level if the customers reach their individual goals.*

**Keywords:** Behavioural Demand Response strategy, domestic customer, Feedback, Goal, Peak time demand coincidence, Utility Peak demand.

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## A Systematic Approach to Smart Agriculture Using Iot Initiative

S.Shyam Moha <sup>(1)</sup> Moola Ramu <sup>(2)</sup> K. Venkata Reddy <sup>(3)</sup>

<sup>(1)</sup> Assistant Professor of Electrical and Electronic Engineering , Maturi Venkata Subba Rao (MVSRR) Engineering College, Hyderabad, India.

<sup>(2)</sup> Assistant Professor of Electrical and Electronic Engineering , Vaagdevi College of Engineering, Warangal, Telangana, India.

<sup>(3)</sup> Assistant Professor of Electrical and Electronic Engineering , Sri Vasavi Engineering College, Andhra Pradesh, India.

### Abstract

*Environment changes and normal precipitation has been extremely powerful over last decade. Because of the present circumstance, environment keen techniques called as shrewd horticulture is received by farming area. Brilliant horticulture is a robotized and coordinated data innovation carried out with the IoT. IOT is growing quickly and broadly applied in every single remote climate. In this paper, sensor innovation and remote organizations mix of IOT innovation has been examined and evaluated dependent on the real circumstance of rural framework. A consolidated methodology with web and remote interchanges, Far off Checking Framework is proposed. Significant goal is to gather constant information of horticulture creation climate that gives simple admittance to farming offices like alarms through Short Kneading Administration and advices on climate design, crops and so on*

### Author Keywords

Smart agriculture, IOT, Sensor technology

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## Research Article

# Battery Energy Forecasting in Electric Vehicle Using Deep Residual Neural Network

Mohamad Reda A. Refaai,<sup>1</sup> Jyothilal Nayak Bharothu,<sup>2</sup> T. V. V. Pavan Kumar,<sup>3</sup> Chodagam Srinivas,<sup>4</sup> M. Sudhakar,<sup>5</sup> and Anirudh Bhowmick<sup>6</sup>

<sup>1</sup>Department of Mechanical Engineering, College of Engineering, Prince Sattam Bin Abdulaziz University, Alkharj 16273, Saudi Arabia

<sup>2</sup>Department of Electrical & Electronics Engineering, AP IIIT-NUZVID, Rajiv Gandhi University of Knowledge Technologies, Nuzvid, 521202 Andhra Pradesh, India

<sup>3</sup>Electrical and Electronics Engineering, KG Reddy College of Engineering and Technology, Hyderabad 501504, India

<sup>4</sup>Department of EEE, Sri Vasavi Engineering College, Tadepalligudem, 534101 Andhra Pradesh, India

<sup>5</sup>Department of Mechanical Engineering, Sri Sairam Engineering College, Chennai-600044, Tamilnadu, India

<sup>6</sup>Faculty of Meteorology and Hydrology, Arba Minch Water Technology Institute, Arba Minch University, Ethiopia

Correspondence should be addressed to Anirudh Bhowmick; [anirudh.bhowmick@amu.edu.et](mailto:anirudh.bhowmick@amu.edu.et)

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In the recent decade, it is possible to use electric vehicles in a safe, cost-effective, and environmentally friendly manner, but only if accurate and trustworthy state parameter predictions are produced prior to their disposal. The state of health (SOH) of the lithium-ion batteries (LIBs) must be precisely forecasted in order to ensure that the LIB can operate safely. The inability of physical SOH estimators to cope with the dynamic character of SOH when operating in a highly nonlinear environment is a common limitation when operating in nonlinear environments. Traditional SOH estimation techniques have demonstrated that they have limits that can be overcome by data-driven methods. TCN, a new machine learning technique, combines the advantages of residual neural networks (ResNet) with the computing efficiency of neural networks to produce a technique that is both efficient and effective. The results of rgw simulation show that the proposed method has reduced placement cost, and also a TCN can accurately estimate the SOH of a LIB with an MSE error of less than 1% over the LIB lifetime. The performance of an electric car battery, which are numerous and diverse, can be anticipated more precisely using this approach.

## 1. Introduction

The hybrid electric vehicle (HEV) is one of the most rapidly expanding means of transportation today. As a result of research into green energy and transportation systems, electric vehicles (EVs) will be widely employed throughout the world. When compared to driving a car that is powered by gasoline, driving a battery-powered vehicle produces no hazardous exhaust fumes as a result of its operation. This is why studies that develop effective capacity estimation algorithms [1, 2] are critical to the advancement of EV battery life and range prediction research.

If the users are looking for things that run on batteries, rechargeable batteries are the best example of industrial manufacturing. In recent years, Li-ion batteries have gained popularity over other battery chemistries due to their high energy density and other advantages [3, 4]. Although Li-ion batteries have some intrinsic limitations, such as a limited temperature and voltage operating window and the need to fine-tune the accuracy of capacity estimation, they are no more restrictive than any other cell type in this regard. The performance of lithium-ion batteries is also influenced by a variety of external and internal factors [5]. To put it in another way, all of the factors described above



## Power quality improvement and analysis of interconnected bus system with PMU using VSM-STATCOM

Preeti Kabra<sup>1</sup>, Donepudi Sudha Rani<sup>2</sup>

<sup>1</sup>Department of EEE, Deccan College of Engineering and Technology, Hyderabad, India  
<sup>2</sup>Department of EEE, Sri Vasavi College of Engineering, Tadepalligudem, Andhra Pradesh, India

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### ABSTRACT

The traditional static synchronous compensator (STATCOM) present in the power grid to compensate instability problem will not be able to maintain stability of the system due to fluctuations in point of common coupling (PCC) voltage and frequency variation that may result in poor synchronization of the grid. The solution for this is the improvement in conventional STATCOM to virtual synchronous machine–static synchronous compensator (VSM-STATCOM). In this paper an interconnected IEEE-14 bus system is considered for analysis with VSM-STATCOM for improvement in voltage profile on weakest bus of the system. In order to find the weakest bus, load flow analysis is carried out on the bus system using Newton Raphson method. A VSM-STATCOM is connected at that weakest bus in synchronization to the grid injecting reactive power. For the analysis a fault is introduced on any of the line and voltage profile of the weakest bus is observed with and without VSM-STATCOM. The VSM-STATCOM is also compared to a conventional control STATCOM which has no inertia module. A comparative analysis is carried out with parameters of voltage magnitude and frequency of the weak bus taken into consideration. The voltage magnitude and frequency parameters of conventional STATCOM and VSM-STATCOM are measured using phasor measurement units. The model is designed using MATLAB Simulink power systems library block sets with graphical user interface (GUI) environment.

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### Corresponding Author:

Preeti Kabra  
Department of EEE, Deccan College of Engineering and Technology  
Darussalam Rd, Darus Salam, Aghapura, Nampally, Hyderabad, Telangana 500001, India  
Email: mail.preeti.kabra@gmail.com

### 1. INTRODUCTION

Most of the urban grid systems are designed and fabricated with interconnected bus system for sustainable power generation during failure of any source. The multiple sources availability at different bus locations helps the system to maintain power supply during failure [1] of any power generation unit. There is also an advantage of eliminating a complete line for repair from the grid during faults on the line, maintaining power [2] for the other lines with continuity of power supply. This elimination of faulty line from the grid system will mitigate damage to the equipment (sources and loads transmission lines) connected to it. As compared to radial distribution system the interconnected bus system has lower power quality problems. The major power quality issues [3]–[5] in any grid system are voltage sags and swells, harmonics in voltages and currents. Each power quality issue will be resolved with different devices, for harmonics problem active or passive filters are used whereas for voltage related problems and for reactive power

## An artificial intelligent prediction model for evaluating the engine performance and emission characteristics using waste cooking oil biodiesel blends

Bio-fuels or bio-diesels are biodegradable fuels and are not toxic in nature. In this study, bio-fuels are produced by transesterification process from waste oils of cooking, animal fat and vegetable oils. During the process, these oils are reacted with an alcohol generally ethanol or methanol in the presence of sodium hydroxide as catalyst resulting in ester called as bio-diesel with a byproduct of glycerin. The manufactured pure bio-diesel is generally less flammable when compared to diesel and having burning point of 50 degrees celsius. Bio-diesel blends are formed by combination of bio-diesel and petroleum diesel in different proportions and the flash and gel points lie between those of pure fuels depending on the mixture.

Artificial neural networks (ANNs) are soft computational models that mimic the behaviour of human neurons. ANNs are formed by the interconnections between the building blocks called neurons which are simple processing units that process the data and the performance of network depends on parameters involved and the architecture used. These are used for obtaining the correlation between the dependent and independent process parameters that are nonlinear in nature. ANNs find application in classification and prediction problems, provides results that are fast and are very close approximation to actual output.

This study indicates bio-diesel is produced from waste cooking oil methyl ester and various blends are made with different proportions of bio-diesel and petroleum diesel. The experiments are conducted on diesel engine with bio-diesel blends and the performance parameters are brake power (BP), specific fuel consumption (SFC), brake thermal

that blends of bio-diesel and petroleum diesel. The effect of blend on the emission characteristic of the engine is studied. The ANN model can predict the engine performance well.

**Keywords:** ANN, engine performance, emission, waste cooking oil biodiesel blends

**D**r. G. Lakshmi Devi et al. studied the effect of blend of bio-diesel and petroleum diesel on the engine performance and exhaust emission characteristics. The ANN model is made to find the optimum blend of bio-diesel and petroleum diesel for all the blend ratios. The ANN model is used to predict the engine performance and HC for all the blend ratios. The conclusion is that the ANN model is a good method for estimation of engine performance and HC. The ANN model has good predictability of engine performance and HC values.


B. Ghobadian et al. developed a model for diesel engine performance prediction of BP, torque, SFC, and HC. The engine is operated at different load conditions and were fuelled with the blends of bio-diesel and petroleum diesel. The ANN model was developed. It was observed that the ANN model can predict the engine performance and emission characteristics well. The ANN model has good predictability of engine performance and HC values with correlation coefficient of 0.95. The ANN model can predict the engine performance and HC emissions respectively.

From the paper the ANN model can predict the engine performance well.

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Original Paper | [Published: 29 October 2021](#)

# Mechanical Behavior and Metallographic Characterization of Microwave Sintered Al/SiC Composite Materials – an Experimental Approach

[Shoba Chintada](#) , [Siva Prasad Dora](#) & [Dorathi Kare](#)

*Silicon* **14**, 7341–7352 (2022)

161 Accesses | 6 Citations | [Metrics](#)


## Abstract

It is traditionally thought to be challenging to incorporate tougher ceramic particles into a softer aluminium matrix. Powder metallurgy has emerged as a significant fabrication technology in this context. Silicon carbide (SiC) is reinforced to aluminium with varying reinforcement, i.e., 5, 10, and 15 %. The samples were sintered in a microwave sintering furnace at  $550\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ . The scanning electron microscope and the field emission scanning electron microscope (FESEM) were used to inspect the microstructure (structure/shape, dislocations, and grain distribution) of prepared powders and sintered

[Home](#) > [Silicon](#) > Article

Short Communication | [Published: 04 November 2021](#)

## Damping Behavior of Al/SiC Composites Fabricated by Powder Metallurgy

[Dorathi Kare](#), [Shoba Chintada](#) & [Siva Prasad Dora](#) 

*Silicon* **14**, 8255–8261 (2022)

**114** Accesses | **1** Citations | [Metrics](#)

### Abstract

In this article, Al/SiC composites with varying reinforcement of 5, 10 and 15 % by weight were produced using powder metallurgy route. The samples were sintered at  $550\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  in a microwave furnace. Damping capacity ( $\tan\delta$ ) and storage modulus ( $E'$ ) of the fabricated samples were measured using dynamic mechanical analyzer at frequencies such as 0.1, 1 and 10 Hz using 3-point bending mode at constant strain amplitude and 10 N as dynamic load. The microstructural analysis is effectively studied using FESEM. Results confirmed that the  $\tan\delta$  and  $E'$  increases with the increase in the percentage of SiC particulates.  $E'$  was found to increase by a maximum of 44.7 % whereas  $\tan\delta$  increased by 2.48 times when

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Composite materials - novelties in manufacturing and application

## An overview on the microstructure and mechanical properties of sintered aluminum-based composites

**Shoba Chintada**

Dept of Mechanical Engineering, GITAM (Deemed to be University), Visakhapatnam, 530045, INDIA

**Siva Prasad Dora**

Dept of Mechanical Engineering, GITAM (Deemed to be University), Visakhapatnam, 530045, INDIA

**Dorathi Kare**

Dept of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, A.P. INDIA and Research Scholar, Dept of Mechanical Engineering, GITAM (Deemed to be University), Visakhapatnam, 530045, INDIA

DOI: <https://doi.org/10.30544/687>

**Keywords:** sintering; composites; powder metallurgy; aluminum.

### Abstract

Sintered composites have revolutionized as a thermal treatment to consolidate a wide range of engineering materials where the transition of powders takes place thermally in a thermodynamical equilibrium state with a decrease in free surface energy in materials owing to their specific capability. Sintering aids in providing effective bonding between the reinforced powder particles. However, the inadequate understanding of the sintering mechanism may limit the practical application of a few materials such as aluminum metal matrix composites. In addition to the rapid growth of various sintering related technologies, researchers need attention to highlight the structural barriers and forecast the emerging demands while dealing with such composites. A review report is made in this paper regarding the sintering mechanisms and sintering techniques. Common sintering techniques such as traditional, microwave assisted, hot pressing, hot isostatic sintering, and spark plasma sintering are identified and discussed here. As a result, the key challenges in sintering aluminium metal matrix composites that can affect sintering parameters are investigated. From the review, spark plasma is identified to attain densified and pore-free green composites and, microwave sintering is the best technique for achieving uniform microstructure in powder metallurgy samples.

# DEVELOPMENTS IN SINTERED ALUMINUM-BASED COMPOSITES

Shoba Chintada, Siva Prasad Dora, Dept of Mechanical Engineering, GITAM University, Visakhapatnam, India;  
 Dorathi Kare, Dept of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, A.P. India;  
 Parameswara Rao Venkata Doddi, Dept of Mechanical Engineering, Andhra University, Visakhapatnam, A.P. India

**S**intered aluminum (Al) based composites are providing unique properties in the present-day manufacturing sectors when compared to traditionally used structural materials. From past decades there is a tremendous research for conventionally developed composites and there is a vast insight for conventional ones rather than sintered based composites. The objective of this work was initiated due to the rapid growth in the sintering science and methodology. An attempt is therefore made to develop substantial interest for producing a new class of composite materials through the sintering route.

The parameters that influence these composites and their applications in various fields have had remarkable attention but limited studies have mentioned the effect of those factors that influence structural refinement, porosity and mechanical properties in the sintered composites. Hence the present paper focuses on the unexplored data and information pertaining to recent developments in sintered Al-based metal matrix composites. A review of the latest contributions in the microstructure, mechanical and other properties of sintered Al is also presented so as to guide future researchers.

## INTRODUCTION

Sintering is a significant task in the method of powder metallurgical process. It is a thermally activated cycle for processing a ceramic particle compact into the base solid [1]. Due to the concentration gradient through particle/matrix interfaces, the main driving force for sintering lies in the reduction of specific surface area [2], although there is also a chemical driving force when hardened powders are used. Sintering, which is an irreversible process, consumes surface energy to bond particles together into strong, high performance shapes. The Al-based matrix composites with micron or submicron-scale particles are processed via mechanical alloying and compacting and are then sintered using techniques as shown in Figure 1.

Powder is primarily pressed into an extremely porous pellet with 50-60% of the maximum theoretical density in a standard thermal sintering procedure. This compact powder, or 'green pellet', is heated which densifies it. The debinded compacts or green pellets operated at 650°C for 5h in an elevated temperature regulated atmosphere furnace with 10°C/min heating and cooling rates [3]. The sintering method is carried out under N<sub>2</sub>/Ar/H<sub>2</sub> gas-flowing conditions to prevent surface oxidation of the compacts.

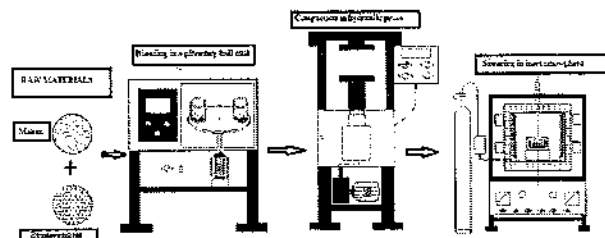


Figure 1: Schematic representation of the different stages in sintering composites.

## THE PARAMETERS THAT EFFECT THE SINTERING PROCESS

Various sintering parameters – such as pressure, temperature, time, sintering atmosphere (argon or nitrogen), the type of sintering technique, the size and shape of the reinforced particles, volume fraction and the composition of reinforcement in the matrix – significantly affect the microstructure and mechanical properties of the sintered-based metal matrix composites [4,5].

### Sintering temperature

While developing sintered Al-based composites, sintering temperature plays a key role and can impact the behavior of the composites. Nuruzzaman et al [6] fabricated Al composite with 5, 10 and 15% Al<sub>2</sub>O<sub>3</sub> as reinforcement under 20 ton compaction load. At a sintering temperature of 580°C, uniform distribution and hardness of 22.6, 23.5 and 24.8HV were achieved for 10% reinforced composites. When silicon carbide (SiC) is used as reinforcement, decomposition of ceramic strengthening phase and an elevated sintering temperature of 600°C helped in achieving peak hardness values for Al/SiC composites [7] as shown in Figure 2.

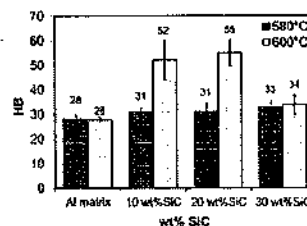


Figure 2: Variation of Al/SiC hardness with sintering temperature [7].



## Metal Powder Report

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Technical Paper

# Damping characteristics of pure aluminum: A comparison of microwave and conventional sintering

Dorathi Kare, Shoba Chintada, Siva Prasad Dora, Prafulla Kumar Swain

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### Abstract

The current research focuses on how heating mode in powder metallurgy affects the damping properties of pure aluminum. The aluminum powder was compacted in a hydraulic press measuring 40 x 12 x 1.5mm<sup>3</sup> and heated in a muffle furnace (conventional) and a microwave sintering furnace. The damping measurements were conducted on the samples using a dynamic mechanical analyzer under dual cantilever mode at various vibrating frequencies of 0.1, 1 and 10Hz from room temperature (RT) to 150°C at constant strain. Results demonstrated that the microwave sintered samples exhibit high storage modulus and high damping capacities compared to conventional sintered samples. The mechanisms that support this behavior are investigated and presented.

### Introduction

Powder metallurgical components have become increasingly popular in recent years for automotive and structural applications. Powder metallurgy (PM) processing has many benefits over traditional casting methods, including relatively low processing temperatures, higher final densities, near-net forming, more material use and a much more refined microstructure that offers improved mechanical properties.


PM entails blending the powders, compaction at a desired pressure and eventually sintering the sample by heating it. The physical/mechanical properties of the components mostly depend on parameters like heating temperature, sintering time, heating mode and the compaction pressure. The microstructure is influenced by the sintering temperature, which plays a major role in improving the properties of composites [1, 2, 3, 4, 5].

Xuchao Wang et al [6] experimented with different parameters such as sintering temperature, dwell time and applied pressure to see how they affected mechanical properties. The authors were able to achieve the optimal sintering conditions, resulting in a refined grain structure with high densification. When sintered at

[Home](#) > [Journal of Materials Engineering and Performance](#) > [Article](#)

Technical Article | [Published: 13 April 2022](#)

## Powder Metallurgy versus Casting: Damping Behavior of Pure Aluminum

[Shoba Chintada](#) , [Siva Prasad Dora](#), [Dorathi Kare](#) &  
[Srinivasa Rao Pujari](#)

*Journal of Materials Engineering and Performance* **31**,  
9122–9128 (2022)

**234** Accesses | **1** Citations | [Metrics](#)

### Abstract

The microstructure and mechanical properties of a material are influenced by their fabrication method. This paper addresses how the fabrication process influences the damping behavior of pure aluminum. The samples were fabricated using two routes: powder metallurgy (PM) and casting (CT). Powder mixing, compacting, and sintering of the powder mixture are the basic manufacturing steps in PM, while in casting, the material is heated to liquidus condition and poured into the mold. The samples thus obtained were tested for damping measurements. Damping behavior was obtained at constant strain and at various frequencies of 0.1, 1, and 10 Hz from room temperature to 150°C under



# DESIGN ENGINEERING

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## Performance of Bacillus Pasteurii and Calcium lactate on mechanical Properties of Self Healing Concrete

Pavan Kumar Jogi, Dr.T.V.S.Vara Lakshmi

### ABSTRACT

Present days, Cracks are creating major problems in constructions industry. Due to these cracks, the strength and durability decreasing in most of the structures. There are lot of methods are there to fix this type of cracks problem but all those methods are expensive and not environmental free. Recently most of scientists came up with new approach and innovative technique is self-healing concrete which heals cracks automatically once it is exposing to environment. This is method is the only solution to address most of the cracks in different structural elements. An experimental study to stop the cracks in the concrete with the use of bacillus Pasteurii and calcium lactate is presented in this report. The selection of bacteria in the alkaline environment depends on their survival. In this investigation, calcite lactate bacterial Pasteurii bacteria with 5, 10, 15 percent cement by weight for M40 concrete are utilized in varied percentages. The experiments are carried out with river sand and M- sand replacement in concrete along with Bacillus Pasteurii and calcium lactate.

PDF

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## INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

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# EDUCATION EMANATES EFFERVESCENT ELUCIDATIONS

**Dr. T Sujani**

Associate Professor of English, Sri Vasavi Engineering College, Tadepalligudem, AndhrPradesh534101. India.

**K. Radha Madhavi**

Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh-534 101. India.

Education is the basis of all human progress that rapidly develops a society with enhanced awareness and consciousness of the environment that one is entangled with. It emanates the spirit of fraternity and understanding that fosters human values which are essential to tread the path of rectitude. It harbours strong values that help us design the future we envisage and cherish to accomplish. This paper “Education Emanates Effervescent Elucidations” presents the meaning and significance of Education and shows how education when intertwined with values and principles makes a human being a man of deeds by instilling courage and confidence to elucidate his views in an emphatic and assertive way. It also discusses the pros and cons of Education with and without values in the technologically developed society.

**Key words:** Education, society, emanate, effervescent, elucidate, values, courage, confidence, pros and cons, Technological advancements

The word “ Education is derived from the Latin term “Educatum” which means the act of teaching or training. A group of educationists say that it has come from another Latin word “Educare” which means “to bring up” or “to raise”. According to a few others, the word “Education” has originated from another Latin term “Educere” which means to lead forth” or “to come out”. All these meanings indicate that education seeks to nourish the good qualities in man and draw out the best in every individual. Education seeks to develop the innate inner capacities of man.

Education develops the power of discretion, increases logical sense, widens the sense of understanding, imparts skills and prepares pupil intellectually to face life and its challenges. It is a discipline that shows a way of life. According to Dictionary.com., “Education EDUCATION, TRAINING imply a discipline and development by means of study and learning. EDUCATION is the development of the abilities of the mind (learning to know): *a liberal education*. TRAINING is practical education (learning to do) or practice, usually under supervision, in some art, trade, or profession: *training in art, teacher training*. 4. EDUCATION, CULTURE are often used interchangeably to mean the results of schooling. EDUCATION, however, suggests chiefly the information acquired. CULTURE is a mode of thought and feeling encouraged by education. It suggests an aspiration toward, and an appreciation of high intellectual and aesthetic ideals: *The level of culture in a country depends upon the education of its people*”

# Learning – Thrives In Pandemic Due To Digitalisation

Dr.T Sujani<sup>1</sup>, Associate Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhr Pradesh 534101. India.

K. Radha Madhavi<sup>2</sup>, Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh-534 101. India.

## Abstract

This paper "Learning – Thrives in Pandemic due to Digitalisation" discusses the compulsive need among the student community to opt for Digital Learning. Electronic gadgets like Mobile, Computer, Laptop & I pad have become very essential in the lives of the students and with no exaggeration, one can say that they are the extended limbs with a negative & malign effect on the eyes and ears of the students. The paper defines and compares the traditional education methods to the current rapid digitalization in the education system. Earlier, students were controlled, restricted and monitored while using the mobiles. Now, controlling, restricting and monitoring have taken a back seat due to rolling out of classes through online because of pandemic. Prior to pandemic, Digital Learning is a fancy phrase that attracted young minds to a new method of pedagogy. Now, due to Covid, "Digital Means" has become an inevitable source of acquiring, disbursing and assessing knowledge. It also discusses the various "Digital Tools" used by the educationalists to impart lessons and motivate the students towards learning. The pros and cons of E-learning.

**Keywords:** E-Learning, Traditional methods of learning, Electronic gadgets, pandemic, endemic, knowledge, students, on-line classes

## Introduction

The unprecedented pandemic has demanded unforeseen developments in the educational system. It has marginalized the necessity of leveraging digital methods in learning. With the lockdown in force and clueless closure of institutions for an uncertain tenure, the academic year 2020 has become a Digital compulsive era. The easiest way to get connected to students by the teachers is through digital means. Communicating one-on-one to large masses has been the sole necessity of every Educational Institution.

"Learning – Thrives in Pandemic due to Digitalisation" discusses the compulsive need among the student community to opt for Digital Learning. Electronic gadgets like Mobile, Computer, Laptop & I pad have become very essential in the lives of the students and with no exaggeration, one can say that they are the extended limbs with a negative & malign effect on the eyes and ears

of the students. The paper defines and compares the traditional education methods to the current rapid digitalization in the education system.

Earlier, students were controlled, restricted and monitored while using the mobiles. Now, controlling, restricting and monitoring have taken a back seat due to rolling out of classes through online because of pandemic. Prior to pandemic, Digital Learning is a fancy phrase that attracted young minds to a new method of pedagogy. Now, due to Covid, "Digital Means" has become an inevitable source of acquiring, disbursing and assessing knowledge. It also discusses the various "Digital Tools" used by the educationalists to impart lessons and motivate the students towards learning. The pros and cons of digitalization and the scope for research in this area are discussed.

Worried Parents, flabbergasted teachers and easy going students are clustered in the world of technological media. Even illiterate parents got familiarized with the term on-line classes. Technology is no longer confined to one particular group of people. It has expanded its horizons to each and every branch of learning irrespective of their educational background. Even a teacher with no access to digital tools got adapted to the latest pedagogical strategies. Teachers who remained orthodoxical got stuck in their career. In some, the pandemic has brought out the latent abilities of rapid learning and quick transformation.

## Traditional Learning

Traditional method of learning is confined to time, place and person. It has several restrictions. It is teacher-centric and is driven by the teacher. It demands physical presence of both the teacher as well as the student. Attending classes physically is compulsory. Every activity is done under the strict surveillance of the teacher and it is designed to promote the learning abilities of the students. The class work is organized in such a way that all the students attend to the classes on time and in a way, students become habituated to a systematic way of learning and attending to the classes on time. This develops punctuality and discipline in them. Besides, students have an opportunity for peer learning and confidence building. They can face academic challenges collectively. Here the teacher

# The Magical Majesty of Linguistics

Dr.Sujani Tata, Head English Section & Associate Professor, Sri Vasavi Engineering College,Tadepalligudem

## Abstract

"The Magical Majesty of Linguistics" discusses the significance of Linguistics, the Structural approach and Cognitive approaches of Language learning. The structural approach builds the syllabus on structures and grammatical items. In structural methodology, language is viewed as a system of structurally related elements – syllables, words, structures for encoding of the meaning of a sentence and the main characteristics of this approach. It also mentions about Chomsky's Cognitive approach and refers to the features of language like Arbitrariness, Discreteness, Reflexiveness and Creativity. It concludes saying how, these features helped in forming a language and became a part of accepted usage and shows the difference between applied linguistics and socio-linguistics.

**Keywords:** Linguistics, Language, Structural, Cognitive, Approach, Features of Language.

## INTRODUCTION

Linguistics is the science of language, a means to express views and a vehicle of thoughts. It plays a vital role in constructing the nation's ideology and forming culture and viewing society as an institution that transforms human race into a civilized form of living beings. Thus it is the language, which differentiates human beings from the rest of the species. Acquiring mother tongue is an effortless task. It requires no practice, as language is ubiquitous and is very natural. But when it comes to grammar and pronunciation, there is much to think of and in fact Linguistics is a way to help people solve the problems of language. Linguistics is not about the usage of language but it is the objective study of language. There are different approaches to study linguistics. The most important approaches are structural approach and cognitive approach.

**Structural approach:** The second phase in the development of linguistics started during the late 19th century with the emergence of linguists like Ferdinand de Saussure in Europe and Leonard Bloomfield in America. The structural approach is a technique where in the learner masters the pattern of sentence structures or different arrangements of words in an accepted style of the other. It includes various modes in which clauses, phrases or words might be used. It is based on the assumptions that language can be best learnt through a scientific selection and grading of structures or patterns of sentences and vocabulary.

The structural approach builds the syllabus on structures and grammatical items. In structural methodology language is viewed as a system of structurally related elements – syllables, words, structures for encoding of the meaning of a sentence. The structural approach was introduced in Madras state and later it became popular all over the country.

For structural approach grammar or structure is the starting point in teaching a language. It also focuses and completely aims at presentation and practice of carefully related and graded structures in effective meaningful situations.

## THE MAIN CHARACTERISTICS OF THIS APPROACH ARE:

Language learning begins with spoken form, therefore, material is taught orally before it is presented in written form.

2. Difficult areas of the language are identified and dealt accordingly.
3. The oral presentation and practice of the structures and vocabulary enable the learner to gain mastery.
- t. The language is presented systematically as the structures and vocabulary are selected and graded according to the levels of learning.

## COGNITIVE APPROACH

As its name implies the cognitive approach deals with mental processes like memory and problem solving. By emphasizing mental processes, it places itself in opposition to behaviourism which largely ignores mental processes. Chomsky rejected the structuralist view that the function of linguistics was simply to provide a classification and terminology to talk about language. He argued that the linguistic theory must be able to capture the psychological aspect of the knowledge of the language.

## FEATURES OF LANGUAGE

The most important features of Language are Arbitrariness, Discreteness, Reflexiveness and Creativity.

**A. ARBITRARINESS** - as a feature of human language Arbitrariness is a feature which means the absence of any natural or necessary connection between a word's meaning and its sound or form. That means there is no inherent connection between sounds and the objects they refer to.

There is nothing scientific or logical about the relationship between words and meanings they indicate. For example the linguistic form of a word like 'lion' has no natural or iconic relationship with that of a four-legged ferocious animal. There can be no logical explanation why



## CERTIFICATIONS CALIBRATE THE CALIBRE OF THE STUDENTS

Venkata Ramana Manipatruni<sup>1</sup>, Dr.Sujani Tata<sup>2</sup>, Ananda Rao Bonthu<sup>3</sup>

<sup>1</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh

<sup>2</sup>Associate Professor of English, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh

<sup>3</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh

### ABSTRACT

We aspire to be a teacher, a scholar, a scientist or even an ardent learner, whatever our aspiration might be, we usually keep watching conference presentations, attending workshops, reading news, and journal articles in order to craft our art, in other words, which we describe as the development of language teaching and promotion of language acquisition. But for a student, the means of learning a second language are manifold and all he/she needs to acquire is their serious engagement with rapt attention both inside and outside the classroom. As learning language is a natural process, first one needs to be surrounded by the language to acquire and develop any unknown language. But it's equally noticeable that a few technical tools working based on Artificial Intelligence would also help the students learn a second language (English) better in due course of learning. Transcending the traditional and old-fashioned techniques that don't intrigue students' learning any longer, Our paper proposes various language development techniques and technical tools that help students acquire the second language quicker and better and subsequently develop it to the maximum extent with utmost accuracy. It also discusses various internationally acclaimed certifications like Business English Certificate (BEC) conducted by Cambridge English, Global English Testing Services (GETS HE), by Qualifications and Assessments and International and such certifications for improving the second language that helps students become proficient in the second language and competent in the workplace.

**KEYWORDS:** Student engagement techniques, Transcendental, ardent learner, BEC, GETS HE, Technical tools

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"Enjoy living in the moment but remember that learning English will prepare you for the future", a well-known statement that makes a lot of sense. We know pretty well that the English language is part and parcel of our life, in other words, a passport that takes us anywhere across the globe. We must be cognizant of four core skills i.e. Listening, Speaking, Reading and Writing for the acquisition and development of any language, for that matter English is no exception to it and we have known the significance of English in all walks of life. English is the only language that remains a deciding factor of everyone's career in many non-native English-speaking countries. But the people who speak the language are considered to be the owners of that language. Even the applicants or aspirants of any employment would write the languages they speak as the languages known to them in their Curriculum Vitae, Resume or Bio-Data. Therefore Speaking English is of paramount importance across the globe. Above all, Speaking is a skill like the other three skills can be acquired and mastered.

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## TRAUMATIC HISTORY, TRAIN TO PAKISTAN BY KHUSHWANT SINGH

Dr. KHANDAPU VENKATARAO, Sr Asst Prof of English Sri Vasavi Engg College, Tadepalligudem, West Godavari District, Andhrapradesh Pin 534101. 2B. ANANDARAO, ASST PROF OF ENGLISH SRI VASAVI ENGG COLLEGE TADEPALLIGUDEM SENIOR ASST PROFESSOR OF ENGLISH SRI VASAVI ENGINEERING COLLEGE TADEPALLIGUDEM WEST GODAVARI DISTRICT, 2ASST PROF OF ENGLISH JANDHIRA UNIVERSITY & ACHARYA NAGARJUNA UNIVERSITY, 2ANDHRA UNIVER SIT

### CHAPTER-II TRAIN TO PAKISTAN

If we take a glance at the nation before partition, we understand that it was one organic whole, at least politically with one Central Government at Delhi and the other states being accountable to the Centre. By and large there was communal amity and peaceful existence among the various sections of Indians.

The stalwarts of the Indian National Congress of a century ago knew only one India. The Congress Presidents W.C. Bennerjee, Dadabhai Naoroji, Badaruddin Tyabji, Pherozeshaw Mehta, Anandacharyulu, Surendranath Bannarjee, Rahimtuallah Sayani, Sankaran Nair, A.M. Bose, G.K. Gokhale – were Indians first, and Hindu, Muslim, Christian or Parsi only afterwards. Among the Congress Presidents, there were non-Indians George Yule, Sir William Wedderburn, Alfred Webb, Sir Henry Cotton, and Annie Besant. But emotionally and spiritually, they were all Indians. Today we consider

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At that time, there was no fantasy of two nations. The two-nation theory was "beyond geography and history, beyond the







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# LIFESTYLE OF THE TRIBALS IN INDIA

## B. Ananda Rao

Assistant Professor, Sri Vasavi Engineering  
College

DOI:

### Abstract

*In India, tribal communities have been residing since the past and even in the present existence there are tribal groups throughout the country. Tribal groups are the people that are normally isolated and dwell in forests and hilly areas, the educational levels are low amongst them and they are engaged in various kinds of jobs such as selling products, some migrate to the other regions to work as agricultural laborers and so forth. This research paper focuses upon the lifestyle of the tribals, and*

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## GIRISH KARNAD: A TRUE CHAMPION OF TRADITION AND CULTURE

**Ananda Rao Bonthu**

Asst Prof, Department of English, Sri vasavi engg college,  
Tadepalligudem

**Keywords:** multi-faceted, excavates, renaissance,  
delve, myth, legend, folk-lore

### Abstract

*Girish Karnad, a multi-faceted genius, attained an early interest in drama and dramatized contemporary socio-political and cultural issues in his plays through the use of myth, legend and folk-lore. While dealing with history and culture he has tried to relate them with contemporary issues. He carefully uses the substance to reshape our society.*

**CULTURAL INFLUENCE IN ENGLISH LANGUAGE TEACHING AND LEARNING**E. R. Kumar<sup>1</sup>, P. Revathi<sup>2</sup>, K. V. Rama Rao<sup>3</sup>, A. R. Bonthu<sup>4</sup> and N. Sankara Babu<sup>5</sup><sup>1</sup>Avanthi Institute of Engineering and Technology, Tagarapuvalasa, AP.<sup>2</sup>Raghu Engineering college.<sup>3,4</sup>Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh,<sup>5</sup>Government Degree College, Palakonda.

drranjitphd@gmail.com, sairishi2@gmail.com, ramaraokaribandi@gmail.com,

banandarao1972@gmail.com, bhagyasankar7@gmail.com

**ABSTRACT**

English plays an essential and significant role in our daily work and life. English teaching is a big and popular project in China, with the further development of China's reform and opening-up. There is a natural relationship between culture and language. Whenever we teach English, we transmit western cultures to our students unavoidably. When taking in the essence of western culture, students may learn English quickly and well. This thesis focuses on the relationship between Culture and language and difficulties and challenge on how to teach English effectively considering the cultural impact.

**Keywords:** Culture introduction, Cultural Teaching, English teach

**Introduction**

With the development of modernization, as we all know the world itself is becoming a "global village". Opportunities for Indian to contact with westerners are growing more and more. Due to the differences in history, geography, development level, culture, Misunderstandings often occur in English teaching and learning process. For people with different cultures, the same words or expressions may not mean the same. A serious question may cause amusement or laughter due to cultural differences; speakers may get blank faces or stony silence. After several years of English study, even English majored college students still find it's difficult to deal with English speakers, especially for some slang or buzz words. Teaching should focus on culture study and learn the skills of communication.

This paper includes five parts. The first part is about the differences between language and culture. The second part is about the differences between Indian and English teaching. The next part is a brief introduction on difficulties in teaching English aroused by culture differences. The third part is about the importance of Cultural Background Knowledge in Language Teaching. The last part concerns some advice on English with culture. It is about suggesting teaching methods in cultural learning and teaching.

**Language-culture relationship**

What is culture? Different people may have their own answer. It can be approached from different perspectives and therefore defined in very different approaches. Most of us agree that culture refers to a country or group's customs and beliefs, art, way of life and social organization. It's fictitious, actually, but leads one's thought, way, work and life. Culture broadly means a nation's or person's way of life, including customs, customs, objects, institutions, techniques and languages that characterize the lives of the human community. Culture, in a narrow sense, can refer to local practices, beliefs or customs, mainly found in folk culture, corporate culture, food culture and so on. Culture is an inclusive complicated system, and can be broadly divided into material culture and spiritual culture. Material culture refers to all the concrete and substantial cultural aspects of human society. Spiritual culture, on the contrary, refers to abstract and implicit cultural aspects of human society, including ideology, patterns of thought, values, beliefs, conventions, traditions, social norms and customs, assumptions, interpersonal relationships, etc.

Through mentioned above, we can have a brief understanding of culture. So what is the connection between language and culture? Who can reply to that question? All we can say at least is that language and culture have a

close and intimate connection. Nobody would dispute the relationship between language and culture. Language unconsciously expresses cultural connotations, reflects people's thoughts, beliefs, views of life, world views

Culture is strongly linked to language. Each nation's specific culture can be reflected in a variety of ways, but there is nothing else that shows as much content as its language of its culture. From a language and social culture

# The Role Of Edpuzzle In Online English Language Teaching And Learning-A Revolution Through Gamification During COVID-19 Pandemic

Venkata Ramana Manipatruni<sup>1</sup>, Dr. Siva Kumar Nannapaneni<sup>2</sup>

<sup>1</sup>Research Scholar Id: 193240017

Department of English, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh,

<sup>2</sup>Associate Professor, Department of English, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India

Email: <sup>1</sup>mvenkataramana29@gmail.com, <sup>2</sup>sivakumar.n@kluniversity.in

## Abstract

*The sudden paradigm shift in teaching and learning due to COVID-19 pandemic is just tantamount to this pandemic itself, as online teaching and learning turned up quite a shock for teachers and learners. Though there have been many Edtech tools even before COVID-19 pandemic, this pandemic furthers teachers and learners' dependence on Edtech tools conspicuously better than ever before. However, teachers and learners had to acclimatize to this unexpected shift in the realm of teaching and learning due to COVID-19. It would be intriguing to see teaching methodologies gain more momentum than curriculum does, during this crisis-hit situation. This shift in teaching and learning emphasizes Bertrand Russell's point of view as in 'More than the curriculum is the question of the methods of teaching and the spirit in which the teaching is given'. During this pandemic, at the outset, many teachers must have found it difficult to teach online using various Edtech tools which they may not have got acquainted with. But the problems with online teaching gradually dwindled, because of the teachers' acquaintance with the Edtech tools. At this juncture, our paper discusses how the Edtech tool Edpuzzle plays an important role in online teaching and learning, how it gamifies the activities and thus intrigues teaching and learning online and how it bridges the gap between teaching and learning online. Our paper would analyse numerous advantages of using Edpuzzle in teaching and learning English online and the very purpose of using it with a few limitations as well.*

## Keywords

*Paradigm shift, COVID-19 pandemic, Edtech tools, Edpuzzle, gamification teaching methods, curriculum*

## 1. INTRODUCTION

Many countries have had months and months of lockdown with COVID-19 pandemic to fight this Coronavirus outbreak. Schools, colleges, and universities have been unexpectedly placed on lockdown for months together at the cost of quality education, but with a view to



# Religion – A Double-Edged Sword in Women’s Empowerment

1Venkata Ramana Manipatruni, 2Srinivasa Rao Gundu, 3Venkata Rama Rao Karibandi  
1Assistant Professor of English, 2Assistant Professor of English, 3Assistant Professor of English  
1Sri Vasavi Engineering College (Autonomous),  
2Sri Vasavi Engineering College (Autonomous),  
3Sri Vasavi Engineering College (Autonomous)

## Abstract

Although Religion is strictly followed by women in society, *“Religion is against women’s rights and women’s freedom. In all societies women are oppressed by all religions”* once said Taslima Nasrin long back. But it’s quite apparent that Women even in the present era are suppressed by some monstrous and faceless customs of their religion, which make women burn at both ends of their lives from womb to tomb. Despite the livelihood of women in the 21<sup>st</sup> century seems much of a muchness to that of men, it’s not worth fully convincing. It’s not just India but the whole world witnesses today the way that the women are subjugated. At the behest of religion, women get victimized in such a way that it makes them slavish as if they were just the endorsement to help men execute their needs. Religion in a larger sense if we dispense with the formalities, would not allow women to grow further by chaining them to both the family and kitchen in perpetuity. Till the late 19<sup>th</sup> century, religion witnessed a very brutal treatment of women in the form of Sati (an obsolete funeral custom where a widow immolates herself after her husband's death) and women weren’t allowed to live a life of their choice, even life in general till now.

Through this paper, I would rather present various eccentric religious practices that have been imposed on women in the name of traditional women and discuss how the religion made women helpless by putting the skids under them for ages. For instance, a man(Sunni Muslim) in Islam can divorce his wife on his whim(even without his wife’s consent) just with the pronouncement of Triple Talaq either spoken or written form and there are many other uncivilized practices, still followed in the society in the name of traditions that are detrimental to women.

**Keywords:** Women’s Emancipation, Eccentric practices in Religion, Women’s sufferings, Women’s subjugation or subjection.

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## Religion – A Double-Edged Sword in Women’s Empowerment

1Venkata Ramana Manipatruni, 2Srinivasa Rao Gundu, 3Venkata Rama Rao Karibandi  
1Assistant Professor of English, 2Assistant Professor of English, 3Assistant Professor of English  
1Sri Vasavi Engineering College (Autonomous),  
2Sri Vasavi Engineering College (Autonomous),  
3Sri Vasavi Engineering College (Autonomous)

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# THE EFFICACY OF EDTECH TOOLS IN HIGHER EDUCATION ONLINE FOR THE PROVISION OF QUALITY EDUCATION IN INDIA DURING COVID-19 PANDEMIC

**Venkata Ramana Manipatruni<sup>1</sup>, Dr. Nannapaneni Siva Kumar<sup>2</sup>**

<sup>1</sup>Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh

<sup>2</sup>Associate Professor, Department of English, K L University, Vaddeswaram, Andhra Pradesh,

## ABSTRACT

*With an uninvited and unexpected intrusion of COVID-19 into the world of education, online teaching and learning suddenly came as a massive shock for many teachers and learners and as a result quality education was at stake. This crisis-hit situation compelled educators to have thought of alternatives to the traditional classroom. Setting a hospitable classroom environment to keep learners engaged online became a herculean task for the teachers, after the pandemic had shut down educational institutions. At this juncture, the intervention of tools of Educational Technology indubitably complemented online teaching and learning and assured the learners of the quality education which many learners might have been afraid of losing. Though the realm of education has known the Edtech tools very well even earlier, this pandemic broadened access to the use of these Edtech tools in higher education in India and multiplied the opportunities to explore them big time. It cannot be hyperbole when we say that the reliability of edtech tools to ensure quality education in higher educational institutions just went uphill during this pandemic. Our Paper discusses how various Edtech tools such as Kahoot, Padlet, Edpuzzle and Flipgrid helped ensure quality education in higher education in India and how well these Edtech tools keep learners engaged in learning online during this COVID-19 pandemic.*

**KEYWORDS:** *Efficacy of Edtech tools, Higher Education, COVID-19, quality education.*

Teaching was a cakewalk for many teachers and learning was not brain surgery for many learners prior to the pandemic COVID-19. It was all evident in the traditional classroom with all the resources for teaching and learning fully optimized for the purpose wanted. Everything was going on its way and the focus of both knowledge implementers and knowledge producers was just to impart knowledge to the learners with all the sources available. It was all just past history. It is the intrusion of COVID-19 that challenged the world of education in such a way that the quality education everywhere became simply questionable and the takeaways of education were at stake, as educational institutions were unwittingly shut down and there was not even anyone's consent required for this accident. Naturally the ability of a country's economy is more or less proportional to considerable growth in educational institutions, provision of quality education and subsequent employment. As the economy drastically dwindled in the country due to this pandemic, it would certainly affect more on

education as well. At this juncture, the intrusion of various Edtech tools such as Kahoot, Padlet, Edpuzzle and Flipgrid into higher education is worth considering. This paper discusses how these Edtech tools keep learners engaged and entertained online and thus ensure quality education in higher education in India.

## LITERATURE REVIEW

Kahoot is a play-based response system. It enhances students' performance and motivation. It enables students to acquire cooperative winning philosophy. (Bicen & Kocakoyun[4], 2017). Kahoot eliminates the need for handheld clickers. Teachers can create online quizzes or surveys on the big screen of Kahoot. (Cutri & Marim[6], 2016).

Kahoot is an online quiz platform that comprises an instant feedback system for the teachers to create a fun competitive-gaming environment. (Kuo [10], 2018).

Kahoot will help teachers focus on the progress of each student in terms of their learning goals, recognizing strengths

**CULTURAL INFLUENCE IN ENGLISH LANGUAGE TEACHING AND LEARNING**E. R. Kumar<sup>1</sup>, P. Revathi<sup>2</sup>, K. V. Rama Rao<sup>3</sup>, A. R. Bonthu<sup>4</sup> and N. Sankara Babu<sup>5</sup><sup>1</sup>Avanthi Institute of Engineering and Technology, Tagarapuvalasa, AP,<sup>2</sup>Raghu Engineering college,<sup>3</sup>Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh,<sup>4</sup>Government Degree College, Palakonda,

drranjitphd@gmail.com, sairishi2@gmail.com, ramarao.karibandi@gmail.com,

banandarao1972@gmail.com, bhagyasankar7@gmail.com

**ABSTRACT**

English plays an essential and significant role in our daily work and life. English teaching is a big and popular project in China, with the further development of China's reform and opening-up. There is a natural relationship between culture and language. Whenever we teach English, we transmit western cultures to our students unavoidably. When taking in the essence of western culture, students may learn English quickly and well. This thesis focuses on the relationship between Culture and language and difficulties and challenge on how to teach English effectively considering the cultural impact.

**Keywords:** Culture introduction, Cultural Teaching, English teach

**Introduction**

With the development of modernization, as we all know the world itself is becoming a "global village". Opportunities for Indian to contact with westerners are growing more and more. Due to the differences in history, geography, development level, culture, Misunderstandings often occur in English teaching and learning process. For people with different cultures, the same words or expressions may not mean the same. A serious question may cause amusement or laughter due to cultural differences; speakers may get blank faces or stony silence. After several years of English study, even English majored college students still find it's difficult to deal with English speakers, especially for some slang or buzz words. Teaching should focus on culture study and learn the skills of communication.

This paper includes five parts. The first part is about the differences between language and culture. The second part is about the differences between Indian and English teaching. The next part is a brief introduction on difficulties in teaching English aroused by culture differences. The third part is about the importance of Cultural Background Knowledge in Language Teaching. The last part concerns some advice on English with culture. It is about suggesting teaching methods in cultural learning and teaching.

**Language-culture relationship**

What is culture? Different people may have their own answer. It can be approached from different perspectives and therefore defined in very different approaches. Most of us agree that culture refers to a country or group's customs and beliefs, art, way of life and social organization. It's fictitious, actually, but leads one's thought, way, work and life. Culture broadly means a nation's or person's way of life, including customs, customs, objects, institutions, techniques and languages that characterize the lives of the human community. Culture, in a narrow sense, can refer to local practices, beliefs or customs, mainly found in folk culture, corporate culture, food culture and so on. Culture is an inclusive complicated system, and can be broadly divided into material culture and spiritual culture. Material culture refers to all the concrete and substantial cultural aspects of human society. Spiritual culture, on the contrary, refers to abstract and implicit cultural aspects of human society, including ideology, patterns of thought, values, beliefs, conventions, traditions, social norms and customs, assumptions, interpersonal relationships, etc.

Through mentioned above, we can have a brief understanding of culture. So what is the connection between language and culture? Who can reply to that question? All we can say at least is that language and culture have a

close and intimate connection. Nobody would dispute the relationship between language and culture. Language unconsciously expresses cultural connotations, reflects people's thoughts, beliefs, views of life, world views

Culture is strongly linked to language. Each nation's specific culture can be reflected in a variety of ways, but there is nothing else that shows as much content as its language of its culture. From a language and social culture

## THE ESSENCE OF GOTHIC ROMANTICISM: FIRST OF ITS KIND IN ANN RADCLIFFE'S "THE MYSTERIES OF UDOLPHO"

**D. V. Raghuvamsi<sup>1</sup>, P. C. Viswanath<sup>2</sup>, A. N. Rao<sup>3</sup>, G Rajababu<sup>4</sup>, G. S. Rao<sup>5</sup>**

<sup>1</sup>Department of English & Humanities, MVGR College Of Engineering (Autonomous), Vizianagaram.

<sup>2</sup>Department of English, Pragati Engineering College (A) Surampalem, East Godavari, Andhra Pradesh, India

<sup>3</sup>B.V.C. Engineering College (A), Odalarevu, Andhra Pradesh

<sup>4</sup>ZPHS School, Velanka

<sup>5</sup>BS & H Department, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem W.G District, Andhra Pradesh

<sup>1</sup>raghuvamsi.greenvalley@gmail.com, <sup>3</sup>anrbvc@gmail.com, <sup>4</sup>rajugummid1981@gmail.com,

<sup>5</sup>srinivasgundu72@gmail.com

### ABSTRACT

*The present research paper explores Gothic Romanticism: First of Its kind in Ann Radcliffe's "The Mysteries of Udolpho." The days of Ann Radcliffe's writings were the days when 'sentimental novels' reigned throughout Europe. It was then that Wall Pole laid the groundwork for a Gothic novel depicting horror. Ann Radcliffe goes one step further and adds sentiment. Combining this horror, a brand new Gothic romance breathed new life into the novel. With The Mysteries of Udolpho, Ann Radcliffe raised the Gothic romance to a new level and inspired many imitators. Portraying her heroine's inner life, creating a thick atmosphere of fear, and providing a gripping plot that continues to thrill readers today, The Mysteries of Udolpho is the story of orphan Emily St. Aubert, who finds herself separated from the man she loves and confined within the medieval castle of her aunt's new husband, Montoni. Inside the castle, she must cope with an unwanted suitor, Montoni's threats, and the wild imaginings and terrors that threaten to overwhelm her.*

**Keywords:** Gothic, Romance, Horror, portraying, sentiment, medieval.

### Introduction

Terrible wilderness. Miles upon miles of barrenness. The dilapidated palace in the middle. There are secret gates; Terraces; screeching of doors; How many uncut stairs; Rooms far from light. Strange Sounds from the house, from the forest. Soft songs. The lights are on and off; Disappearance of men In the midst of all this—a young woman of fearless disorientation. But new in the 18th century. Although Mary Shelley (Frankenstein) is best known as the author of horror novels in English, her predecessor was Ann Radcliffe. The first horror novel was written in 1794 by Ann Radcliffe. Before her, Horace Walpole became the first British horror novelist in 1764 with *The Castle of Ontario*. This is what was written after him. Usually, the first author to remember horror stories is the American Edgar Allen Poe. He is primarily known for his depiction of the terrifying atmosphere in stories. An author who made such an image of the weather before him. She did not even have Allen Poe's birth to *The Mysteries of Udolpho* (1794).

Allen Poe (Born in 1809.) is widely regarded as the forerunner of the superhuman

superpower, and later detective works. However, he admitted to himself - that Ann Radcliffe's novels had influenced him. Ann was born in 1764 and died in 1823. She wrote five novels during her lifetime. The last three of them are extraordinarily popular. However, there is no record of him enjoying any success. Because she, after the completion of the last novel, spent 28 years in complete anonymity. He stopped writing after the age of 31. Life was so crowded that no one even knew where it was. There were reports that she was unconscious and was in a psychiatric clinic. Another story is that there was no such thing, that her married life was comfortable, that she had no children and that she felt comfortable with her husband William Radcliffe and lived comfortably in his friendship. However, her husband, a journalist, spent much time in the office, and she did not expect that his writings would make history in European literature and be praised by great writers. Many modern biographers who wanted to know about her could not find much information. Her novels *The Castles of Athlin and Dunbayne* (1789), *A Sicilian Romance* (1790) were published posthumously. However, she is best known for her three surviving novels: *The Romance of the*



## Elements of Fire (anger) and Caste in Girish Karnad's "The Fire and the Rain".

1. B Ananda Rao M.A. M.Phil. (Ph.D)

2. Aparanjami Uppe M. A., (Ph.D)

Assistant Professors of English

Sri Vasavi Engineering College, Tadepalligudem

### Abstract

"The Fire and the Rain" is one of the plays written by Girish Karnad. The play opens with a seven year fire sacrifice being conducted to appease Indra, the God of rains, so that the land can be redeemed and people can be happy again with prosperity and richness. The Fire and the Rain is commonly viewed as a myth retold from a modern perspective. Karnad makes a very intelligent use of the Yavaki story and the Indra-Vritra story from the Mahabharata. The play is relevant even today in the modern world. In spite of wisdom and knowledge, people turn against one another with hatred and jealousy. Among the many tales that we have Girish Karnad finds a fit subject for the plot of the play "The Fire and the Rain". The rancorous killings that overpower human relationships as the conflict between Paravasu Arvasu and their cousin Yavakri expand into a conflict for knowledge, superiority and power.

Key words: innumerable, narrative, mythical, sacrifice, drought, evil, redeem, famine, archetypal.

Among the many numerous tales that fill the *Mahabharata*, Girish Karnad finds a fit subject for the plot of his play '*The Fire and the Rain*' in the narrative of Paravasu, Arvasu and Yavakri. Karnad's play dramatizes the conventional fratricidal fight between Indra and his brothers Viswarupa and Vritra as recounted in the *Rig Veda*. The narrative describes the way Indra killed Vritra to defeat the powers of 'drought and

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darkness' and to release heavenly waters and usher in light. The mythical tale from the *Rig Veda* provides the framework for the plot of Karnad's play and similar values set the tone of the action. The revengeful killings that overpower human relationships as the conflict between Paravasu, Arvasu, and their cousin Yavakri expand into a mortal fight for knowledge, superiority and power.

The play opens with a seven-year fire sacrifice being conducted to please Indra, the god of rains, so that the land can be redeemed from famine and drought that has affected it for seven long years, the fire sacrifice nears its completion, the Chief Priest Paravasu warns that all evil powers would try their best to spoil the final oblation that would announce the successful completion of the *yagna*. Around the same time, sage Bharadwaja's son Yavakri returns after acquiring "*Knowledge of the Absolute*."

After his return Yavakri learns that his youthful love Vishakha is married to Paravasu, and that Paravasu has been appointed the Chief Priest for the king's ritual instead of his father. Yavakri takes revenge by seducing Vishakha. Resentful of Paravasu's abandonment of her for seven years to be present at the King's fire sacrifice, Vishakha becomes an easy prey, to Yavakri's mean design.

Some clear messages are conveyed through the play that cannot be overlooked: that Brahmins, in spite of their loud claims about possessing the 'knowledge of the Brahman', have like common men the passions of jealousy, revenge, rape and sexual relation with their, consequent vicious effects; and that the individual attainment of knowledge has no value unless that knowledge is useful with humane concerns. As can be expected, at the end of the sacrificial ritual. It is not Paravasu but the simple-minded Arvasu who experiences



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## Homotopy Analysis to MHD Visco-Elastic Fluid Flow and Heat Transfer over an Exponentially Stretching Sheet

Hymavathi Talla<sup>1,\*</sup>, N.N.V. Sakuntala<sup>2</sup>, W.Sridhar<sup>3</sup>

<sup>1</sup>Department of Applied Mathematics, KRU Dr. MRAR PG centre, Krishna University, Nuzvid, A.P.

<sup>2</sup>Department of Basic Science and Humanities (Mathematics), Sri Vasavi Engineering College, Tadepalligudem, A.P.

<sup>3</sup>Department of Mathematics, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur Dist., A.P., India.

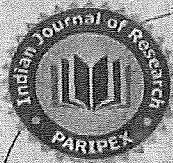
\*Corresponding Author: Hymavathi.T, E-mail:talla.hymavathianur@gmail.com

**ABSTRACT:** In this present study, we analyze the flow and heat transfer of Visco-elastic fluid over an exponentially stretching sheet of the MHD boundary layer. The equations governing the boundary layer are translated into ordinary differential equations by the use of sufficient similarity transformations. To solve such equations, the Homotopy Analysis Method (HAM) is applied. The effects of physical parameters such as Magnetic Parameter, Prandtl number for velocity and temperature are discussed in detail with graphical representation. The results of the solution are in strong agreement with the latest literature studies.

**Key words:** exponentially, HAM, MHD, stretching sheet, Visco-elastic fluid.

### INTRODUCTION:

The flow of a compressible Visco-elastic fluid over a stretching surface in the polymer industry has a wide range of applications in the issue of extruded polymer sheet from a dye. Flow problems with magneto hydrodynamic (MHD) have many applications in the petroleum industry, crude oil purification, plastic sheet and foil production and plastic sheet cold drawing. In the presence of transverse magnetic field, H.I. Anderson [1] analyzes the movement of visco-elastic fluid through a stretching sheet showing that the current magnetic field has the same flow effect as the visco-elasticity. Keller and Magyari [2] described the transfer of heat and mass in the boundary layers over a continuous exponential stretching surface. K.V. Prasad et.al [3] studied the momentum and transfer of heat in visco-elastic fluid flow over an isothermal stretching surface in porous medium. S. Kumar Khan and E. Sanjayanand presented MHD flow of visco-elastic fluid in Porous medium over a quadratic stretching sheet [4]. Then A. Abdallah [7] analyzed heat transfer in MHD flow of visco-elastic fluid by using Homotopy Analysis Method. Besides that, M. Sajid, T. Hayat [8] applied the HAM for MHD viscous flow due to a shrinking sheet. B.Bidin and R.Nazar [9] numerically investigated the boundary flow and heat transfer of viscous fluid over an exponentially stretching sheet with thermal radiation. Hymavathi and Shankar [10] tested quasilinearization technique to MHD visco-elastic fluid flow over a non isothermal stretching sheet. Hymavathi [11] et.al studied the Soret and Dufour effects on a



**ORIGINAL RESEARCH PAPER**

Management

**MODERN RECRUITMENT: SOCIAL MEDIA VIEW**

**KEY WORDS:** LinkedIn, Network, Social life, Profiles

**Dr S Krishnamurthy Naidu** Associate Professor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP

**Dr G V Subba Raju\*** Prbessor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP\*Corresponding Author

**Dr Kalneedi Rambabu** Assistant Professor, Dept of MBASri Vasavi Engg College, Tadepalligudem AP

**P.Sreenivasulu** Assistant Professor, MBA Dept. Santhi Ram Engineering College, Nandyal A.P

**ABSTRACT**

The growth in the use of social media sites became a common situation. Recruiters need to be where candidates are in order to engage them in the recruitment process. This needs engaging with talent across a wide range of social networking platforms. They need to work together. Social media can be fast, efficient and cost effective when used as a recruitment tool and having its own limitations. Social media is increasingly becoming the space where professional life starts. The decision by Facebook to update user profile pages to offer a 'LinkedIn style' professional view, suggests that social media is becoming a medium for work as well as play. Social Networking Sites entered the business landscape, in particular the recruitment landscape leads to a demand for knowledge about recruitment trends regarding Social Networking Sites. The study is concern phenomena of Social Networking Sites in recruitment were explored. One cannot deny that social media has a major effect on a recruitment.

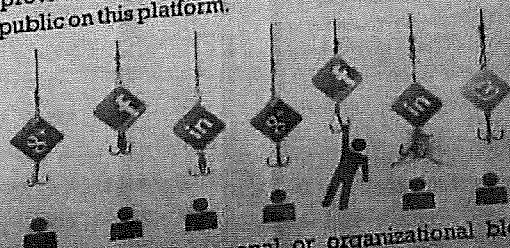
**Introduction:**

The rise in the use of social media websites in recruitment is fascinating. Since 2010, Twitter has grown in use by 9%, Facebook by 11% and LinkedIn by 15%. It has also been found that 7 out of 10 employers have successfully hired a candidate through social media showing a great partnership between recruitment and social media. With such promising results companies yet to explore the benefits of using social media are majorly missing out.

HR magazine reported in October 2012 that 'Integrating social networking sites into the traditional recruitment process is key not only to reaching potential candidates. This means that not only does the company benefit through the initial recruitment process, but jobseekers can get an insight into how a company works. LinkedIn is a great way of networking, and if we go by the saying of 'It's who you know, not what you know' then the social media base is the perfect way of networking.

**Social Networking Sites and Tools.**

Facebook is social media tool where the users can create their profiles and share their posts to selective friends group or to the public. In the Facebook, a group also can be created through which the people with common interest can join in the group for the commonly interested messages. The Facebook also provide messenger to chat and interact with other friends and public on this platform.



**Blog:** Blogs can be personal or organizational blogs. In personal blogs, individual posts some content in the website. Any person who can visit the website can watch the content in the blog. Usually the latest content appears in the blog first and the previously entered posts will appear later.

**LINKEDIN:** LinkedIn is most effective social media networking platform for professionals. LinkedIn provide opportunity for professionals to build and upload their profile and make networking with their peers. This network of professionals can be used for various purposes such as sharing ideas with the peers in the same community, sharing the latest updates in the group, finding jobs for the right candidates ad also various business opportunities.

My Space is online community of users or consumers. In My Space, members of this community share various feedback and user experience to others in the group. This is a great platform for socializing with consumer or user community.

PODCAT is one type of digital media consisting various material and content related to various interested areas. This consists PDF material, Audio and Video presentations on a particular concept or event.

Santhosh Kumar A.V -Social networking websites are effective job search tools, job fairs are finding stiff competition in the social media, evidently been visible that a lot of companies have their own formal pages on the social websites, where job seekers can learn about the organization business, culture, ethics etc. Hence Recruiters have a large pool from this source from which they can search for prospective employees. Essential part of this recruitment through social media is no need to setup an office and various tools for recruitment.

Social networking sites can be used to describe community-based Web sites, online discussions forums, chat rooms and other social spaces online. people looking to connect with other business-associated contacts usually move to sites like LinkedIn, but one need to understand that social media is beyond Twitter, Face book, LinkedIn and Blogs. Social networking sites such as Face book, Twitter and LinkedIn are some of the most powerful tools available to recruiters today. Face book has more than 800 million members and regularly surpasses Google in site visits per day. LinkedIn has increased its number of registered users from roughly 40

**VIRTUAL RECRUITMENT'S PANDEMIC IMPACT ON JOB SEEKERS - THE NEW PARADIGM**

**P BHARATH KUMAR** Asst Professor Department of management studies Sri Vasavi Engineering college (Autonomous) Tadepalligudem : bharathkumar.mba@srivasviengg.ac.in

**B.ARUNA** Assistant professor Department of Management studies Sri vasavi Engineering college, (Autonomous) Tadepalligudem : aruna.mba@srivasviengg.ac.in

**K. VINAY KUMAR** Assistant professor Department of Management studies Sri Vasavi Engineering College (Autonomous) Tadepalligudem : vinnaywarrior@gmail.com

**Abstract:** When a pandemic like COVID-19 sweeps the globe, it becomes even more difficult to discover the most qualified candidate for the post available. In addition to substantially complicating an already complicated situation, the pandemic bears responsibility. However, as a result of the epidemic and the recession, employment possibilities are few. To fill job openings, recruiters should develop an online recruiting system that may take the place of the traditional approach. Carry out two surveys using Google Forms before doing an analysis of the information using a descriptive research design and a basic random sample approach. According to the results of the survey, e-recruitment is a fantastic technique to employ individuals who have the skills and competencies required for the role. This investigation also assisted in identifying the advantages and disadvantages of virtual recruiting. According to this paper, the expenses and dependability of online job searching are investigated. The descriptive study sample consisted of 101 participants out of a total of 125 participants.

**Keywords:** Virtual Recruitment, job seekers, expenses, employment, trustworthiness

**Introduction:** Certain sectors have been more severely affected than others by the outbreak. The recession has had a significant influence on how businesses attract new employees. Job interviews can no longer be handled in person, layoffs have risen, and new employee onboarding must now be completed online or through phone. When faced with a difficult situation, recruiters resort to virtual recruiting. Human resource management's primary function is e-Recruitment. The use of the internet for recruiting has increased tremendously across all sectors. Everyone will be impacted by the internet at some point in their lives. As a result, resource efficiency is critical to the success of any organisation, whether public or private. Every business makes use of the internet. Online job searches have become prevalent in recent years. It is the process of finding, recruiting, and hiring new employees via the use of technology, mostly the Internet. E-Recruitment makes use of technology to reduce time and reach a larger number of candidates. E-recruitment is intended to simplify procedures while also saving money. Online recruiting has the advantage of reaching a wider applicant pool more quickly. These procedures were carried out independently. The approach began with the introduction of a few technical tools for line managers. It is typical corporate practise to reduce the amount of paperwork. People currently spend countless hours on the internet, whether for work or for recreation. In order to save time and energy, people are increasingly turning to the internet. Those seeking for employment Job searchers and employers may communicate with one another over the internet. The rise of internet recruiting has altered the way businesses recruit and job seekers search for opportunities. Job searchers can look for vacancies across India via e-recruitment. The process of matching job seekers and employers becomes straightforward and rapid. To send resumes, they prefer e-recruitment. The Internet saves money and time. The internet helps job hunters.

A global adoption of e-recruitment. With e-recruitment, both employers and job seekers have benefited. Job searchers can look for vacancies across India via e-recruitment. The process of matching job seekers and employers becomes straightforward and rapid. To send resumes, they prefer e-recruitment. The Internet saves money and time. The internet helps job hunters.

**Need for the Study:** E-recruitment tactics will be examined as part of the study. In addition to being familiar with the strategies and methods utilized during the hiring process, it's important to know how



# Impact Of Digital Marketing Practices On Sales Growth And Sustainability Of Msmes

Mr. Neelapala Venkat<sup>1</sup>, Mrs. Devi Pathivada<sup>2</sup>, Mr. Banavathu Chinni<sup>3</sup>, Dr. A. S. Prasad<sup>4</sup>, Mr. Inti Prabhakara Rao<sup>5</sup>, Mr. Ramaswamy Palla<sup>6</sup>

<sup>1</sup>Assistant Professor, Department of Management Science, Sasi Institute of Technology & Engineering, Tadepalligudem, Andhra Pradesh, India-534101. [venkatt2020iittm@gmail.com](mailto:venkatt2020iittm@gmail.com).

<sup>2</sup>Assistant Professor, Department of MBA, Sri Vasavi Engineering College, Peda Tadepalli, Andhra Pradesh, India-534101. [devi.pativada@gmail.com](mailto:devi.pativada@gmail.com).

<sup>3</sup>Department of MBA, Assistant Professor, SRK Institute of Technology, Vijayawada, Andhra Pradesh, India-534101. [chinnivsp@gmail.com](mailto:chinnivsp@gmail.com).

<sup>4</sup>Professor, Department of Management Studies, West Godavari Institute of Science & Engineering, Tadepalligudem, Andhra Pradesh, India-534101. [Prof.satyaprasad@gmail.com](mailto:Prof.satyaprasad@gmail.com).

<sup>5</sup>Assistant Professor, Department of MBA, Dr. CS Rao PG Centre, Sri Y N College, Narsapur-534275.

<sup>6</sup>Assistant Professor, Department of Management Science, Sasi Institute of Technology & Engineering, Tadepalligudem, Andhra Pradesh, India-534101. [Ramaswamy.palla@gmail.com](mailto:Ramaswamy.palla@gmail.com).

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## Abstract

The study's goal is to uncover which aspects of digital advertising have the greatest impact on sales and revenue. The data provided is analysed using quantitative methods, specifically structural equation modelling. Collecting representative data by employing procedures that are simple to implement. The data from an online survey of 150 micro, small, and medium-sized businesses (MSMEs) in the Hyderabad area were analysed. According to the data, digital marketing has a significant positive effect on business outcomes such as revenue growth and company lifespan. 'Digital marketing' refers to promotional efforts spread throughout a wide variety of digital channels, such as the web, social media, and search engines (SEO). Among the most widely used digital platforms for long-term business success, the results suggest that social media is where most MSME owners spend their time.

**Keywords:** Digital marketing, sales performance, and sustainability

## Introduction:

One of the most exciting and innovative areas of business today is marketing. Executives in contemporary marketing firms require a reliable method of monitoring their customers, competitors, and external environment. Online marketing and advertising are what IM is all about. Because of the widespread availability of the Internet and electronic commerce, marketing and advertising products is easier. "Electronic commerce" refers to any market that takes place solely in cyberspace. E-commerce, or electronic commerce, is the process of conducting business activities including buying, selling, and exchanging products and services online. Online marketing is simply one subset of the many activities that make up electronic commerce.

## Literature review

The purpose of digital marketing is to help more firms take advantage of more efficient means of promotion and advertising to reach more potential clients. Using this kind of promotion, companies of all sizes may reach out to potential customers 24/7 via the internet (Agostini & Nosella, 2020; Maduku et al., 2016; Samoilenko & Osei-Bryson, 2018). So, the growth, productivity, and competitiveness of small businesses are all dependent on their use of digital technologies. Small and medium-sized enterprises (SMEs) that use digital and social media marketing have a better chance of expanding their customer bases and retaining them (Taiminen & Karjaluo, 2018).

**SPIRITUAL TOURIST EXPECTATIONS AT SPIRITUAL DESTINATIONS IN POST  
COVID -19 ERA WITH REFERENCE TO TTD, TIRUPATHI, INDIA.**

**NEELAPALA VENKAT**, Research Scholar, Indian Institute of Tourism & Travel Management  
(IITTM), Gwalior, Madhya Pradesh.

**Dr. Adyasha Das**, Associate Professor, Indian Institute of Tourism & Travel Management ( IITTM),  
Bhubaneswar, Odisha.

**Devi Pathivada**, Assistant Professor, Sri Vasavi Engineering college, Pedatadepalli,  
West Godavari, Andhra Pradesh.

**Abstract:**

**Purpose** – The study examines the spiritual tourist expectations in the pandemic situation. It aims at identifying behavioural aspects of the spiritual tourists in the post-covid-19 era.

**Research Design/Methodology**– the data required for the analysis were collected from 205 respondents using the bubble sampling technique. For this purpose, a structured questionnaire was designed highlighting the standard operating procedures using a five-point Likert Scale. The data were analysed using factor analysis to extract the factors.

**Findings** – The findings revealed that sanitisation, social distancing, strict surveillance are the most expected factors for the spiritual tourists, followed by the touching of idols, avoidance of everyday activities.

**Originality**–TTD is one of the most visited temples by the Hindus. The study was undertaken to give impetus to take sufficient safety measures and to instil faith among the spiritual tourists. Grounded on the relevant literature and the study's objectives, a framework was developed to ascertain the expectations of spiritual tourists to the Tirumala Tirupati Devasthanam, Tirupati as the visits to the holy places are gaining importance.

**Managerial Implications:** The study contributes to the body of knowledge on the expectations by the spiritual tourists on the standard operating procedures followed by the spiritual destinations. It helps these organisations to formulate strategies for meeting the expectations of the spiritual tourists.

**Keywords:***Spiritual Tourist, TTD, tourist behaviour, Standard Operating Procedures.*

**INTRODUCTION**

The Tirumala Tirupati Devasthanam (TTD) is one of India's most ancient and prosperous Hindu religious institutions. Tirumala, Lord Venkateshwara's abode, has been one of India's most holy and powerful temples for millennia. Its origins are hidden in antiquity, its mystery has persisted unaltered through the centuries, and its popularity is growing. Offerings to the temple, both in cash and kind, amount to many crores of rupees, making the Tirumala-Tirupati temple complex the wealthiest in India. It was established with the purpose of propagating Hindu dharma and Indian culture, renovating temples, promoting education, establishing welfare programs, and developing industries for the benefit of devotees, in accordance with the temple's and devotees' needs.

Pilgrimage tourism is a rapidly expanding service sector in contemporary India, with the majority of pilgrims being Hindu more than 80% of Indians. Tirumala Tirupati Devasthanam (TTD) is India's largest religious trust. Against this backdrop, this research will shed light on many elements of TTD management control in regard to tourist expectations during the covid pandemic times. Tourist expectations of the temple have skyrocketed in recent days owing to an increase in Covid cases. This draws the author's attention to the tourist expectations for TTD. Hence the need for this study arises. To handle the temple's vast and complicated operations, similar to those of a major business, many departments have been established. Among them are welfare, which is responsible for the well-being of TTD employees, law, vigilance, security, disciplinary investigations, accounts, treasury, jewelry, inventory, temple administration, garden, forest, estate office, engineering, public works, printing press, transportation, marketing, broadcasting, and publications, as well as health services. The horticulture department provides flowers to the temples, while the forest department is in charge of

20-21  
Jones

# Microstrip Metamaterial Bandpass Fiter For 5g Application

S.Prasad Jones Christydass<sup>1\*</sup>, Dr E. Kusuma Kumari<sup>2</sup>, Annaram Sowjanya<sup>3</sup>, P Satheesh Kumar, N Selvam<sup>5</sup>, Murali. K<sup>6</sup>

<sup>1</sup>Assistant Professor, Department Of ECE, K.Ramakrishnan College Of Technology, Trichy, Tamilnadu, India

<sup>2</sup>Professor, Department Of ECE, Sri Vasavi Engineering College, Vijayawada, AP, INDIA

<sup>3</sup>Assistant Professor, Geethanjali College Of Engineering And Technology, Hyderabad

<sup>4</sup>Assistant Professor,, Department Of ECE, Coimbatore Institute Of Technology Coimbatore, Tamilnadu, India

<sup>5</sup>Assistant Professor, Department Of EEE, M.Kumarsamy College Of Engineering, Karur, Tamilnadu, India

<sup>6</sup>Assistant Professor, Department Of ECE, Vijaya Institute Of Technology For Women Vijayawada, AP, INDIA

Corresponding author: [prasadjones.ece@krct.ac.in](mailto:prasadjones.ece@krct.ac.in)

**Abstract**-Bandpass filter is very important part in any wireless communication system. In this paper a novel metamaterial inspired microstrip band pass filter is proposed for 5g application. The proposed fiter has a frequency which covers the frequency from 3.42 GHz to 3.72 GHz and the band is used for 5G application. The microstrip BPF make used of loop metamaterial patches to achieve such frequency performance and the structure is feed by two port tapered feed. The entire structure is simulated using CST software. The total size of the proposed Metamaterial BPF is 12 x 10 x 1.6mm<sup>3</sup> and fabricated on FR4 substrate. The simulated result proves that the proposed antenna has capacity to satisfy the 5G application requirements.

**Index Terms:** Bandpass filter, Compact, Metamaterial, Wireless communication, 5G application.

## I. INTRODUCTION

In the recent trends in communication such as green communication and radar systems, the removal of RF noises becomes the key quality to be taken into care for the better performance of the systems [1]. The planar band pass filters [2] are the major components in the current 5G wireless communication which utilize various spectrum bands such as 700MHz, 3.6 GHz and 26 GHz [3]. Varsity of techniques such as couple line technique, hair pin technique, combine technique, step and stub impedance [6] methods are reported in the literature.

Due to the peculiar EM property of the metamaterial the researches have attracted and various metamaterial structure are developed in order to enhance the electromagnetic

## E- Shaped Array Antenna for WLAN and WIMAX Applications

Keerthana K\*,Rajesh K,Preethi T,Ratna Mukesh K ,Ravindranath B  
Department of Electronics and Communication Engineering, Sri Vasavi Engineering  
College,Tadepalligudem.\*Corresponding author: keerthanareddykarri@gmail.com

### ABSTRACT

This paper presents a successful designing of microstrip patch antenna with slots for WLAN and WIMAX applications. In this slots are used to improve the bandwidth and (1\*2) array is used to improve the gain. In our project we use 2 slots in the microstrip patch and formed E-shaped antenna. It finds applications in WiMax and Indoor and Outdoor WLAN. The proposed antenna generates multiple bands at 5.8GHz, 7.8GHz, 9.7GHz and 11.8GHz. Our resonant frequency is 5.8GHz and this design offer proper impedance matching. This antenna has been simulated at 5.8GHz frequency using HFSS software. This design has shown return loss of -42.22dB and gain of 5.9dB

**Keywords**— WLAN, WIMAX, Gain, Bandwidth, Directivity.

### 1. INTRODUCTION

In recent times, wireless communication technology has been broadly studied and used for many portable devices like smartphone, laptop and other personal terminals. As a wireless device, an antenna plays a key role in transmitting and receiving electromagnetic wave signals. Furthermore, microstrip antennas have seeking more and more attentions in recent decades due to the development of wireless communications and their advantages of low cost, ease of fabrication [1-6]. Wireless local area network (WLAN) and worldwide interoperability for microwave access (WiMAX) based on IEEE 802.11 and 802.16 standards are two most widely studied wireless technologies. Also WIMAX and WLAN have been used in our daily life, and operate at 2.4-2.484 GHz, 5.15-5.35 GHz, 5.725-5.825 GHz and 2.5-2.7 GHz, 3.3-3.69 GHz and 5.25-5.85 GHz. After that, many research articles have been published to make an effort to design WLAN and WiMAX antennas [7-10]. Thus, multi-band design is needed for developing a wireless device by sharing only one antenna, which has an advantage of high efficiency and low cost [11]. Then, many methods have been presented to design an antenna with good multi-band characteristics, including etching slots on the patch or ground [12-13], loading the shorted pins and walls [14], adding stubs to the ground and patch [15], using meta materials [16] and EBG [17], and so on. However, designing an antenna to cover WiMAX, and WLAN bands is still a challenging work today.

### 2. ANTENNA DESIGN

The top view of the proposed antenna structure has been shown in Fig.2.1. A simple rectangular microstrip patch antenna has been taken. Size of the antenna is calculated from the basic patch antenna equations and

appropriate changes have been done to make an shape patch antenna. With a distance of  $\lambda/2$  between the patch 1X2 array

antenna is designed to improve the gain. Microstrip feeding is chosen for the excitation of the proposed antenna. Power is divided equally using the lossless T-junction power divider with three transmission lines connected at a single junction. Each transmission line is at a distance of  $\lambda/4$  from the patch. For better impedance matching each transmission line is again constructed as a combination of  $100\Omega$  and  $50\Omega$  transmission line. so the power is uniformly distributed among the transmission lines. To improve bandwidth in our project we introduced 2 slots in microstrip patch and formed E-shaped antenna.

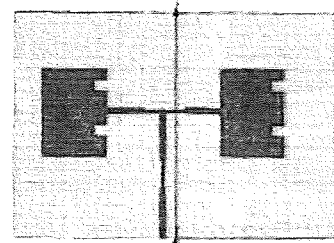


Figure 2.1: Top view of the proposed antenna

In the first step, a ground of (58\*40)mm is constructed. FR4 substrate is created above the ground with a thickness of 1.6mm. E-shaped patch is created above the substrate with the specifications given in the table -1. Another patch is created with a distance of  $\lambda/2$  from the previously created patch to form a 1\*2 array.

Microstrip. feeding is chosen for the excitation of the proposed antenna. Power is divided equally using the lossless T-junction power divider with three transmission lines connected at a single junction. Each transmission line is at a distance of  $\lambda/4$  from the patch.

## RECTANGULAR PATCH MIMO ANTENNA WITH DEFECTED GROUND STRUCTURE FOR 5G APPLICATIONS

S.Murugan<sup>1</sup>, Y.Manasa Vamsi Priya<sup>2</sup>, P.Yamini Satya Siva Mani<sup>2</sup>, K.Sowjanya<sup>2</sup>,  
M.R.K.S.Phanindhar<sup>2</sup>

<sup>1</sup>Professor <sup>2</sup>UG Final year student

Department of ECE, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh -534 101,  
India

**Abstract**—In this paper, a rectangular patch MIMO antenna is designed to operate 3.4-3.6 GHz band for 5G applications. The geometry of antenna incorporates two rectangular patches fed by microstrip line individually. Rectangular slots are incorporated in the rectangular patch to increase the bandwidth of the antenna. The ground plane is defected with periodic square metallic patches, for increasing the bandwidth. FR4 Epoxy material with 1.6mm thickness and dielectric constant 4.4 is used as substrate. The parameters such as  $S_{11}$ (dB), radiation pattern, gain (dB) and radiation efficiency are analyzed. This antenna can be used for 5G applications in the sub 6 GHz band.

**Keywords** - MIMO patch antenna, 5G, Defected Ground structure (DGS) VSWR, Return loss, Radiation pattern.

### 1. INTRODUCTION

Wireless communication advancement has necessitated the advent of new standards in order to satisfy the market demands. Long-term Evolution (LTE) promises high data rates to cater forever increasing application demands. Multiple input Multiple output (MIMO) communication systems are widely considerable to enhance the channel capacity, link reliability, better network coverage and high data rates for mobile wireless networks. MIMO antennas are deployed to exploit multipath fading in a rich scattering environment. The emerging 5G technology is demanding antennas with features like high gain, more bandwidth, and beam steering capability.

A single patch microstrip patch antenna for 5G applications with inset feed was designed to operate at 28GHz [1]. A Compact dual wide-band 4/8 element MIMO antenna is developed for WLAN applications. The antenna designed with dimension  $102 \times 52 \times 1.6 \text{ mm}^3$  [2]. A Circularly polarized patch antenna for future 5G applications was designed in [3]. In [4], Millimeter wave microstrip patch antenna at center frequency 38GHz and 54GHz with dielectric constant 2.2 and standard thickness 0.508mm is discussed. In [5], two practical implementation cases of single patch antenna at 28GHz and 60GHz for 5G Broadband communications was designed. In [6], single patch antenna at 28GHz with a return loss of -31.3275dB and a gain of 2.875dB was designed. In [7], a dual band microstrip patch antenna array with size of  $16 \times 16 \text{ mm}^2$  at 28 and 38 GHz was designed.

In this paper, two input rectangular microstrip antenna fed by microstrip line operating at frequency 3.5GHz is proposed. The paper is organized as follows: Section II

discuss about design methodology. Section III discuss about results and discussion, Section IV concludes the paper.

### II. DESIGN METHODOLOGY

The proposed antenna consists of 2 rectangular patches printed on FR4 epoxy material of  $\epsilon_r=4.4$  with microstrip line feed of length 17.26mm and width 2.95mm. The thickness of substrate used is 1.6 mm. The patches are etched with rectangular slots for enhancement of bandwidth. The ground plane is provided with number of periodic defects which is referred to as Defected Ground Structure (DGS) for enhancement of gain. Figure 1 shows the top view of proposed antenna. Figure 2 shows the bottom view of proposed antenna.

The conventional design equations (1) - (5) of a rectangular microstrip antenna is utilized to get the initial dimensions of the antenna.[8]. The HFSS software is used for optimizing the dimensions. Table 1 shows dimensions after optimization of the performance at 3.5GHz.

Width of rectangular microstrip patch W is

$$W = \frac{\epsilon_r}{2f_r \sqrt{\frac{\epsilon_r + 1}{2}}} \quad (1)$$

Where  $\epsilon_r$  is the dielectric constant of the dielectric material.  
 $c_0 = 3 \times 10^8 \text{ m/s}$

Effective Dielectric constant  $\epsilon_{\text{reff}}$  is given by

$$\epsilon_{\text{reff}} = \left( \frac{\epsilon_r + 1}{2} \right) + \frac{\epsilon_r - 1}{2} \left[ 1 + 12 \frac{h}{W} \right]^{-2} \quad (2)$$

## Real-time Crowd Detection and Counting in Video Sequences Using R-HOG Net

Mr. Rama Satya Balaji Aradani<sup>1</sup>, Dr.M.Thamarai<sup>2</sup> and Mr Santhosh S Kiran K<sup>3</sup>

<sup>1</sup>Sri Vasavi Engineering College (Autonomous)

<sup>2</sup>Sri Vasavi Engineering College (Autonomous)

<sup>3</sup>Sri Vasavi Engineering College (Autonomous)

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### Abstract

Human detection and tracking helps in better law enforcement, video supervision and traffic management. It is a challenging errand because of the substantial impediments, observe variations, frequency of the people and appearance of the body in the video sequences recently proved that the performance of CNN based approaches for crowd counting are stronger compared to the conventional methods. This paper proposes R-HOG Net, a hybrid method that uses ResNet50 and Histogram of Gradient Descriptor to count people in huge gatherings, rallies etc., in a real time as well as from a pre-recorded video. The proposed system detects and tracks the faces and also the shape of human beings in different views. The system automatically updates the crowd count whenever a new face is detected. The performance of the proposed method is tested for various video sequences and found to be appealing by overcoming the limitations of Histogram of Oriented Gradient (HOG) and ResNet50 CNN structure.

**Keywords:** CNN, Crowd count, Face detection, Histogram of oriented Gradient (HOG), Non-Maximum suppression, ResNet

### 1. Introduction

Crowd counting helps in estimating the number of people in an image or a video sequence. Out of the countless use-cases for crowd counting, few are listed below:

- Community Events
- Remote/restricted areas of a manufacturing plant to ensure safety of employees and also to reduce health risks.
- Managing high traffic roads and public spaces.
- Automating resource allotment by constantly monitoring consumer count.
- No. of attendees for a class/ program/ gathering
- Urban Planning
- Surveillance applications

Several techniques have been used to for crowd counting. Forecasting crowd density and density maps was done by adopting basic algorithms that are a subset of computer vision and machine learning like detection, regression, and density-based approaches. But such techniques have limitations similar to occlusions, variations in scale and perspective, non-uniform density etc.,

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<sup>3</sup>Sri Vasavi Engineering College (Autonomous)

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<sup>2</sup>Sri Vasavi Engineering College (Autonomous)

<sup>3</sup>Sri Vasavi Engineering College (Autonomous)

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- Urban Planning
- Surveillance applications

Several techniques have been used to for crowd counting. Forecasting crowd density and density maps was done by adopting basic algorithms that are a subset of computer vision and machine learning like detection, regression, and density-based approaches. But such techniques have limitations similar to occlusions, variations in scale and perspective, non-uniform density etc.,

<sup>1</sup>Corresponding Author





# Breast Cancer Prediction using ResNet50

M.Prasanna<sup>1</sup>, Dr.M.Thamarai<sup>2</sup> and Dr.S.P.Malarvi<sup>3</sup>

Department of ECE, Sri Vasavi Engineering College, Andhrapradesh, India<sup>1</sup>

Department of ECE, Sri Vasavi Engineering College, Andhra Pradesh India<sup>2</sup>

Department of CSE, Sri Vasavi Engineering College, Andhra Pradesh India<sup>3</sup>

Email:thamarai.muthusamy@srivasaviengg.ac.in

**Abstract:** Breast cancer is one of the most feared and frequently occurring cancers in the society especially for women. But the prediction of the cancer in early stages is still challenging. Early diagnosis significantly increases the chances of correct treatment and survival, but this process is tedious and often leads to a disagreement between pathologists. Deep learning (DL) plays a vital role in predicting cancers at earlier stage. This paper uses convolution neural network - ResNet50 to predict breast cancer at the initial stage itself with a few hundreds of sample images. This proposed work is to be carried out in the environment of Google Co-lab. The performance of the proposed method is analyzed by using different optimizers with different dropout rates. The maximum accuracy and AUC obtained are 0.986 and 0.98 respectively for the Adam optimizer with the dropout rate of 0.4

**Keywords:** Breast cancer diagnosis, Deep Learning, Convolution Neural Network, ResNet50, Transfer learning, Histological analysis, Fine Needle Aspiration.

## I. INTRODUCTION

Cancers have become one of the major public health issues. According to statistics by the IARC (International Agency for Research on Cancer) from the WHO (World Health Organization), and GBD (Global Burden of Disease Cancer Collaboration), cancer cases increased by 28% between 2006 and 2016, and there will be 2.7 million new cancer cases emerging in 2030 [1]. Among the various types of cancer, breast cancer is one of the most common and deadly in women. Approximately 1 in 8 women (13%) will be diagnosed with invasive breast cancer in their lifetime and 1 in 39 women (3%) will die from breast cancer [2].

Therefore, the diagnosis of breast cancer has become very important. Although the diagnosis of breast cancers have been performed for more than 40 years using X-ray, MRI (Magnetic Resonance Imaging), ultrasound etc. now a days breast tissue biopsies allow the pathologists to histologically assess the microscopic structure and elements of the tissue

using Computer aided diagnosis for cancer prediction.

The Breast Cancer cells mainly are of two types Benign and Malignant. The non cancerous cells are called benign cells and they do not disturb nearby cells or spread to other cells. They look like hard (tumor). A benign tumor is not making problem unless it is pressing on nearby tissues, nerves or blood vessels and causing damage. The cancerous cells are called malignant cells. These cells spread the cancer to nearby cells easily. Some cancer cells can move into the bloodstream or lymph nodes, where they can spread to other tissues within the body.

First, we give an overview of the tissue preparation and staining processes of histological slides after taking the biopsy from the patient. First the suspected breast tumor excisions or biopsies are performed in the operating room as shown in Fig.1. using Fine needle aspiration (FNA).

# Compact MIMO Shorted Microstrip Antenna for 5G Applications

S.Murugan<sup>1\*</sup>

<sup>1</sup> Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, India  
Email: murugans1976@gmail.com

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**Abstract:** The objective of the work is to design a compact MIMO antenna at 3.5 GHz suitable for 5G applications. MIMO antenna is suitable choice for increasing the signal to noise ratio of mobile communication systems. The channel capacity can be increased by improving signal to noise ratio. At the same time, high isolation between the elements should be maintained. Planar inverted F antenna (PIFA) is used as a unit element for MIMO antenna in this work. The unit element dimensions are  $9.5 \times 7 \text{ mm}^2$ . Two shorting pins are used for getting better impedance matching. Four elements are arranged in the FR4 substrate with dielectric constant 4.4 and thickness of 1.6 mm. The performance of 4 element Multiple Input Multiple Output (MIMO) antenna is optimized using HFSS software. The results show that the better impedance matching at desired frequency band and a gain of 4.2 dB in the bore-sight axis is obtained for the four elements. The gain of four element antenna is improved from -0.52 dB to 4.2 dB than two element antenna. The isolation between the elements is obtained below -15 dB. The overall volume of the antenna is  $25.3 \times 26.8 \times 1.6 \text{ mm}^3$ , which ensures compactness suitable for mobiles.

**Index Terms:** Shorting pin, Coaxial feed, 5G application, MIMO

## 1. Introduction

The future mobile communication requires high data rate and more bandwidth to accommodate more number of users. In multipath environment, the signal gets attenuated rapidly, hence achieving better Signal to Noise ratio (SNR) is difficult job. The gain of the antenna could be increased further for getting better SNR value. The gain of the antenna is directly proportional to effective aperture area of the antenna. So, a single antenna with larger aperture area is required for realizing more gain. To overcome this limitation, a Multiple Input Multiple Output (MIMO) antenna can be used for increasing gain and SNR in multipath environment. The space diversity scheme employed in MIMO antenna significantly increases the received power and gain, even in multipath environment. At the same time, the isolation between the antennas should be high in case of MIMO antenna. The 5G communication has the features like high data rate, low latency and enormous bandwidth. The frequency bands in 5G are divided into two types, (i) below 6 GHz band and, (ii) above 20 GHz and upto 80 GHz at several bands. The sub 6 GHz can be utilized immediately due to utilization of existing infrastructure of wireless communication. The sub 6 GHz frequency band is from 3.4 to 3.6 GHz for 5G communication.

Planar inverted F antenna is the most popular antenna in mobile handsets. Loading of shorting pin and slot in the conventional MSA decreases/increases its electrical length respectively. This change in the electrical length changes the resonant frequency of MSA, useful in designing compact MSA, dual frequency MSA and multi-frequency MSA. The length of rectangular MSA is approximately equal to  $\lambda/2$ , hence, voltage at the radiating edges of the patch are 180 degree out of phase with each other. The current is maximum at the centre of the patch, implies impedance is zero exactly at the centre of the patch. When the shorting pin is inserted at the centre of the patch, there is no change in the performance of antenna but at the same time, electrical length of the patch is reduced to half i.e.,  $\lambda/4$  compared to conventional rectangular MSA. Hence, Planar Inverted F antenna is used for mobile handsets. The frequency bands used in 2G mobile communication are 900MHz and 1800 MHz GSM band. As the frequency increases, the length of the patch is reduced. The length of patch for 3500 MHz band is small than 900 MHz patch antenna. So, MIMO antenna with PIFA as unit element can be accommodated in small space. It is the main objective and motivation of proposed antenna design in this paper.

The paper is organized as follows: section 2 discusses about the literature review, sections 3 discuss about design methodology, followed by results and discussion in section 4 and section 5 concludes the paper.

**An Autonomous Playground Cleaning System using Arduino**  
Anusha Kurasala<sup>1</sup> Dr.M.Thamarai<sup>2</sup>

<sup>1</sup>IV year ECE student, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.  
email:anushakurasala@gmail.com

<sup>2</sup>Professor, ECE, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.  
email:thamarai.muthusamy@srivasaviengg.ac.in

**Abstract:** The waste materials like empty bottles, polythene bags, papers etc. present in the playgrounds /workplaces can be a big problem in cleaning and maintenance. The proposed system clean and removes unwanted things in the playground or stadium. In the proposed system, an Ultrasonic sensor is used to find waste materials and robot arm structure is used to clean the waste things in the ground area with the help of a moving platform. The system is fully automatic and controlled by the Arduino processor. The collected waste materials are kept in the tray which is placed in the system. Thus proposed autonomous cleaning system keeps the ground clean and minimizes the manual cleaning.

**Keywords:**

Arduino controller, ultrasonic sensor, waste collector, robotic system, playground cleaning system

**I Introduction:**

The need for new devices increases along with the growth of new technology. In this new era, people are very busy and they want to save their time in cleaning and also in Artificial intelligence makes things automatic and easy to handle. The present methods for garbage collection have so far been ineffective and researchers are trying to overcome the problem in developing smart devices for cleaning and waste management.

Manual garbage pickup and cleaning is a tedious, boring, and repetitive task and the autonomous robot can be a potential candidate for this application. The autonomous floor-cleaning, aquatic cleaning, wall-cleaning, and rubbish collecting robots have been developed for years, while autonomous cleaning robot for large work areas like playgrounds and all is still a challenging task.

Playground cleaning and garbage collection in the ground is so far done by manually. It is a time-consuming process and more manpower is required for this task if the size of the stadium is large. Robots play an important role in our lives and can perform the tasks which cannot be done by humans in terms of speed accuracy and difficulty. The paper is organized as follows. Section II discusses previous related work in the autonomous cleaning system, section III describes the proposed autonomous playground cleaning system. The implementation of the system is described in section IV and conclusion is discussed in section

**II PREVIOUS WORK**

A lot of research works are going on in designing intelligent systems based on the latest technologies like Machine Learning and Deep Learning. Jinqiang Bai et.al [1] discussed about the deep learning based robot for automatically picking up garbage on the grass. Along with the ultrasonic sensor, a camera is used to identify the object and deep neural networks is used to segment and classify the recognize the object. This makes the system functioning as easy and smooth.

R.Senthil Kumar et.al[2] discussed the remote controlled autonomous floor cleaning robot. Floor cleaning is mainly of two types- Dry cleaning, which mainly involves removal of dust and particulate matter and wet cleaning, which involves cleaning of the surface with the use of water and other floor disinfectants to clean the floor of liquid waste. Hereby using the mops, motor driver, vacuum cleaner, arduino and Bluetooth module the system cleans the floor. This remote controlled autonomous cleaning robot is operated by a set of commands given from a smart phone using Bluetooth signals given through a Bluetooth module.



## Analysis of breast cancer visuals implemented by beamformer & composites on fabric antenna testbeds

Sreelatha P<sup>a</sup>, S. Karthika<sup>b</sup>, G.N. Naveen Kumar<sup>c</sup>, Kusmakumari E<sup>d</sup>, SakthiSudhan Karuppanan<sup>e,\*</sup>

<sup>a</sup> Department of Biomedical Engineering, KPR Institute of Engineering and Technology, Coimbatore - 641 407, India

<sup>b</sup> Department of Electronics and Communication Engineering, Sri Krishna College of Engineering and Technology Coimbatore, Tamil Nadu - 641 008, India

<sup>c</sup> Department of Electronics and Communication Engineering, CMR Institute of Technology Bengaluru, 560 037, India

<sup>d</sup> Department of Electronics and Communication Engg., Sri Vasavi Engineering College, Andhra Pradesh, Tadepalligudem 534 101, India

<sup>e</sup> Department of Electronics and Communication Engg., Dr. N.G.P. Institute of Technology, Coimbatore 641 048, India

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### ABSTRACT

A clinical analysis of pictorial image has been developed by Minimum Variance Distortion-less Response (MVDR) Algorithm. The ultimate aim of proposed research development of diagnosed image and implemented in Ultra Wideband based on Microwave Imaging system. The proposed test bed is followed by the existing Debye test bed. It consists of pair of  $E_z$  shaped wideband antennas and composition of phantom model, which has been generated the microwave signals by Microwave Analyzer (Agilent N99917A). These antennas have been located in the array pattern and facilitated spatial signal processing approach. The received port has been gathered the Received Signal Strength (RSS) from desired angle of direction. Hence, these angle of arrival of received signals and its strength have been required for estimated the Power Spectral Density (PSD). Therefore, these two dimensional PSD images have been extracted the buried lines from cancerous phantom model on the different kinds of cancer resolution stages discussed. It has confirmed the validity of the research work, simulation results have been presented.

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### 1. Introduction

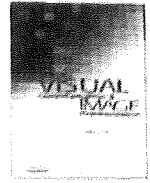
Due to the anti-interference capabilities and superior resolutions, adaptive arrays were used in variety of emerging communication fields. The MVDR beamforming algorithm is one of the thrust area for determining their adaptive weights [1]. If the 2nd order statistical parameters of the delivered data vector and desired signal of steering vector, are faithfully identified values, a MVDR beamformer can be removed their interferers without any distortion losses in desired signal reception. In realistic circumstances such as with the finite sample effect, the inverse coupling effect, the directional vector uncertainty, etc. furthermore, the performance of a beamformer could be affected. In the past decades, a number of robust strategies have been analysed and evaluated to alleviate the effects due to some errors on adaptive arrays. Highly noticeable are methods based on space, spatial smoothing technique, beamformer based signal blocking and techniques for diag-

onals loading. The beamformer is an antenna array system that facilitates spatial signal processing with the array of transmitter or receiver Microstrip Patch Antenna (MPAs). The received signals are collected in that array pattern which improves the signal strength from the transmitters to the receivers of the desired angle of direction. The signals are received from or to the desired directions are collected in a destructive manner, resulting in reduces signal degradation to or from undesired angle of directions. This phenomenon is used in broadcast transmission of data, TV, satellite and mobile communications, and offers direction of sensitivity with static transmitter or receivers. A beamformer system provides the wave propagation on principle and phase component relationships. The MPAs are lower amplitude wave created using phenomena of superimpose waves. Therefore, in this phenomena used to detect the coverage of the tumor dimensions which are located in the equivalent dielectric breast model and to be determined the tumor dimensionalities in the signal processing approaches' using estimate power spectral density of beamformer algorithm. Therefore, this phenomenon is used to detect the coverage of tumor dimensions analysed which are located in the dielectric

\* Corresponding author.  
E-mail address: [drkssec@gmail.com](mailto:drkssec@gmail.com) (S. Karuppanan).

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## An efficient copy move forgery detection using adaptive watershed segmentation with AGSO and hybrid feature extraction<sup>\*</sup>

Sreenivasu Tinnathi<sup>a</sup>, G. Sudhavani<sup>b</sup>

<sup>a</sup> Research Scholar, Department of ECE, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India

<sup>b</sup> Professor, Department of ECE, R.V.R & J.C College of Engineering, Guntur, Andhra Pradesh, India

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### ABSTRACT

Copy-move forgery detection (CMFD) is the process of determining the presence of copied areas in an image. CMFD approaches are mainly classified into two groups: keypoint-based and block-based techniques. In this paper, a new CMFD approach is proposed on the basis of both block and keypoint based approaches. Initially, the forged image is partitioned into non overlapped segments utilizing adaptive watershed segmentation, wherein adaptive H-minima transform is used for extracting the markers. Also, an Adaptive Galactic Swarm Optimization (AGSO) algorithm is used to select optimal gap parameter while selecting the markers for reducing the undesired regional minima, which can increase the segmentation performance. After that, the features from every segment are extracted as segment features (SF) using Hybrid Wavelet Hadamard Transform (HWHT). Then, feature matching is performed using adaptive thresholding. The false matches or outliers can be removed with the help of Random Sample Consensus (RANSAC) algorithm. Finally, the Forgery Region Extraction Algorithm (FREA) is utilized for detecting the copied portion from the host image. Experimental results indicate that the proposed scheme find out image forgery region with Precision = 92.45%; Recall = 93.67% and F1 = 92.75% on MICC-F600 dataset and Precision = 94.52%; Recall = 95.32% and F1 = 93.56% on Bench mark dataset at pixel level. Also, it outperforms the existing approaches when the image undergone certain geometrical transformation and image degradation.

### 1. Introduction

The digital images are considered as a major source for information exchange as it may carry various information. At the same time, these digital images are largely applied as a proof in various real-world events, media, experimental proofs, legal matters, etc., [1]. The advancement of high-speed internet access and mobile devices increase the popularity of digital images abruptly. In recent days, several software is developed to edit the digital images e.g. Photoshop and Corel Photo, but now this software is intensively used for image forgery [2,3]. The humans find it difficult to detect the forged images through their naked eyes due to the advancement in technology [4]. The forged images are developed as same as the original image, so various processes are performed in this original image to restore the trust in forged image. Now-a-days, various forensic methods like compositing detection and retouching are developed to extract the forged image from original image [5,6]. The techniques that are involved to detect image forgery are mainly required for copyright protection and forgery prevention [3]. The most important

method in forensic science is digital image authentication [7].

The two methods that are included in this authentication solution are active and blind (passive) approaches [8,9]. The actual digital image contents are not applied in the active approach, rather than it mainly focus on implementing some measures same as that of actual content to check its authenticity. The most important approach of this active process is digital watermarking. The passive image forensic estimates the condition of the digital image without considering the prior information like embedded signatures or watermarks. Finally, the passive approach takes blind decision regarding images forgery. Almost all the passive techniques depend on supervised learning to separate the original image from forged image [10,11].

The three tampering approaches applied in digital images are image splicing, image resampling, and copy-move forgery. The image splicing method, splice some particular areas from various images to generate the forged images [12]. The geometric transformation methods like rotation, flipping, scaling, skewing, and stretching are included to perform the image resampling [1]. The CMF is the most commonly

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<sup>\*</sup> Corresponding author.

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## Real Time Email Alert For Visitor Monitoring System For Surveillance Applications

Sunitha L.

Dept. of E&CE

The Oxford College of Engineering,  
Bangalore, Karnataka, India

*sunirjbhairava@gmail.com*

Dr. Harish H M

Dept. of E&CE

Government College of Engineering,  
Haveri, Karnataka, India

*hmharish@gmail.com*

Dr. Yedukondalu U

Dept. of E&CE

SVEC, Tadepalligudem  
Andhra Pradesh, India

*drykudalata@gmail.com*

### Abstract

The design and implementation of the Visitor Monitoring and Email Alert System (VMES) for Surveillance Applications is the focus of this paper. This framework is primarily focused on achieving a cost-effective VMES in public locations such as railway stations, bus stations, government offices, schools, universities, and other similar locations, with the aim of improving current visitor tracking in log book registers through security personnel and information management practices. In a variety of commercial and non-commercial contexts, people are observed and visitors are welcomed. The number of people entering or leaving stores, the occupancy of office buildings, and the passenger count of commuter trains all provide valuable data to shop keepers and advertisers, police officers, and train operators. In particular, VMES eliminates the need for security personnel to manually record visitor details during visitor registration by using a log book register. The VMES allows for the retrieval of visitor information from the device, which is then used to verify their identification as they reach campus premises. According to this report, the percentage of improvement achieved by using VMES is 30 to 60% higher than that achieved by manual recording, while the percentage of improvement achieved by using VMES for a current visitor scheme is 80 to 90%. This study's additional analysis includes the use of email alert authentication methods such as images and video clips to replace the existing manual recording process with a faster reading speed, as well as a notification mechanism to notify the visitor's arrival to the visiting person.

**Keywords:** Raspberry Pi, Monitoring, Visitor, Pi Camera, Sensor

### 1. Introduction

Visitor Monitoring and email alert system, typically refer as a structure to keep tracking visitor's activities in organization or public building. It can provide necessary output and information to the users and record the incoming visitors within the shortest time and also keeps the count of the visitors. Nevertheless, VMES also capable to make more efficient way of monitoring process and provide an authentic and integrated data of the visitors. [1] Generally, there are many government buildings or public premises are still using the conventional paper log or guest book to record the access of the visitors. This manual method consumes longer time when the number of visitors is exceeded the limit. Meanwhile, an increasing number of visitors indicates that the security issues should be concern in the government buildings or public premises. [2] This is mainly because the operators are lack of time to verify the identification of each visitor when they are tons of guest entering the building. [3] Moreover, paper log is inadequate to offer greater

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## Near-zero computing using NCFET for IoT applications

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Kishore Sanapala\*

Department of ECE,  
Marri Laxman Reddy Institute of Technology and Management,  
Hyderabad, India  
Email: kishore.technova@gmail.com  
\*Corresponding author

S.V.V. Satyanarayana

Department of ECE,  
Sri Vasavi Engineering College,  
Tadepalligudem, India  
Email: svvsatyanarayana8589@gmail.com

R. Sakthivel

School of Electronics Engineering,  
Vellore Institute of Technology,  
Vellore, India  
Email: rsakthivel@vit.ac.in

**Abstract:** The energy consumption of the devices or circuits built on the IoT's is becoming a significant concern with the complementary metal oxide semiconductor (CMOS) technology scaling. To reduce energy consumption, supply voltage ( $V_{DD}$ ) scaling has proved to be an effective technique with near-threshold/subthreshold computations depicting the endpoint of voltage scaling. This paper discusses how the near-zero computing (NZC) is achieved by scaling the  $V_{DD}$  beyond the subthreshold regime using the negative capacitance FET (NCFET) to enable IoT with beyond CMOS features. After characterising the NCFET for near zero operation, the basic computational circuits: logic gates and 1-bitfull adder circuit are designed and simulated using NCFET at near-zero  $V_{DD}$  of 0.1 V. In comparison with the CMOS counterparts, the NCFET logic designs have achieved significant improvements and it is found that the NCFET logic results in more than 54%, 68%, 85%, and 95% savings in power, delay, energy, and EDP respectively.

**Keywords:** complementary metal oxide semiconductor; CMOS; energy; internet of thing; IoT; NCFET; near-zero computing; NZC.

**Reference** to this paper should be made as follows: Sanapala, K., Satyanarayana, S.V.V. and Sakthivel, R. (xxxx) 'Near-zero computing using NCFET for IoT applications', *Int. J. Intelligent Enterprise*, Vol. X, No. Y, pp.xxx-xxx.

## Wideband Antenna Array For C Band Applications

Nelapati Ananda Rao<sup>1</sup>, Kishore Kumar M<sup>2</sup>, V Subrahmanyam Grandhi<sup>3</sup>, Tota Sreenivas<sup>4</sup>

<sup>1</sup>Assistant Professor, Vignan's Foundation for Science Technology and Research, Guntur, Andhra Pradesh India

<sup>2</sup>Associate Professor, Aditya College of Engineering, Surampalem, East Godavari, Andhra Pradesh, India

<sup>3</sup>Assistant Professor, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh, India

<sup>4</sup>Associate Professor, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh, India

**Abstract**— A Wideband antenna array is proposed for the C-band applications. Proposed antenna is a eight element corporate feed antenna with a coax feed. The radiating element is a diagonally truncated rectangular patch with two symmetric slots on either side of the patch. The symmetric slots are used to get the necessary bandwidth and the diagonal truncations are used to get right hand circular polarization. The simulation results show that the proposed antenna is radiating at 5.72 GHz with a return loss of  $-20.62$  dB and a band width of 132 MHz ranging from 5.630 GHz to 5.762 GHz. The gain of the antenna is 14.81 dB with a beam width of  $40^\circ$  and a side lobe level of 13 dB. From the obtained simulation results it is evident that the proposed antenna is best suited for the C-band applications.

**Keywords**— Circular Polarisatio; C-band; symmetric slots

### 1. Introduction

C-Band which covers the frequency range from 4GHz to 8 GHz have two major applications. One is the satellite communication and the other is the Weather radar. Antenna is an important component for any communication system, though microstrip antennas have low gain and bandwidth they are highly desired with some of their unique characteristics of low profile and ease of fabrication. To over come the above said disadvantages researchers have proposed many techniques. To enhance gain one of the best followed technique is forming antenna array and to enhance the band width one of the techniques is to place symmetric slots in the patch [1]-[3]. For both the C-band applications, needs an antenna with high gain and wide band width. The c band frequency allow radar to create small beamwidth with a small antenna. The c-band signal attenuates easily and so been used for the weather observation in short range. The antenna size is smaller because of the frequency and wavelength and this is useful for the radars for TV stations. Circular polarisation when compared to linear polarization reduces the effect of adverse climatic conditions on signal and the signal attenuation is reduced by using circular polarization [4].



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## Dual bit control low power dynamic content addressable memory design for IoT applications

V V Satyanarayana SATTI<sup>1,2</sup>, Sridevi SRIADIBHATLA<sup>1,\*</sup>

<sup>1</sup> Department of Micro and Nanoelectronics, Vellore Institute of Technology, Vellore, India

<sup>2</sup> Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

ORCID iD: <https://orcid.org/0000-0002-7899-9059>

ORCID iD: <https://orcid.org/0000-0002-6318-3145>

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### Abstract:

The Internet of Things (IoT) is an emerging area in the semiconductor industry for low power and high-speed applications. Many search engines of IoT applications require low power consumption and high-speed content addressable memory (CAM) devices for the transmission of data packets between servers and end-devices. CAM is a hardware device used for transfer of packets in a network router with high speed at the cost of power consumption. In this paper, a new dual bit control precharge free (PF) dynamic content addressable memory (DCAM) has been introduced. The proposed design uses new charge control circuitry, which is used to control the dual DCAM cell to get the match line (ML) output for match/miss. Elimination of the pre-charge phase before the evaluation phase, allows the proposed design to perform more search operations within the evaluation time. The proposed 64-bit PF-DCAM design is implemented using CMOS 45nm technology node and Monte Carlo (MC) simulations are performed for power and search delay validation. The simulation results show that the proposed design reduces power and search delay when compared to conventional DCAM designs.

**Key words:** Dynamic content addressable memory, IoT, Low Power, Match line, Search delay

### 1. Introduction

The primary function of any memory system is writing and reading the lookup data. Random access memory (RAM) is a volatile memory. It searches lookup table data randomly in the memory array, and it requires more clock cycles to search the data. Thus, for large capacity memory, RAM is not suitable for high-speed search. The memory system suitable for high speed application is content addressable memory (CAM). CAM is an associative memory which is an assemblage of storage elements. CAM is also called as data-addressed memory, parallel search file, multiple instantaneous file and catalog memory. When compared to RAM, CAM consumes more power and expensive due to the presence of comparison circuitry and parallel search operation. Parallel accessing in CAM keeps the search time significantly lesser than that of RAM for the same search request. CAM is reverse of RAM from the functionality point of view. In CAM lookup, data are accessed in memory based on content rather than the address in RAM, is shown in Figure 1. CAMs are extensively used today in many applications such as Huffman-coding [1], Image processing [2], IP-routing [3], Gray coding [4].

\*Correspondence: [sridevi@vit.ac.in](mailto:sridevi@vit.ac.in)

Dr. V. Vijayasri Bollisetty, Dr. Udara Yedukondalu, Dr. Srinivasarao Udara

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## Analysis of Inter Carrier Interference for Optimized Data Allocation

**Dr V Vijayasri Bollisetty**

Associate Professor Aditya College of Engineering & Technology Surampalem – 533437AP, India  
vasudha.tweety@gmail.com

**Dr Udara Yedukondalu**

Associate Professor Sri Vasavi Engineering College (A) Tadepalligudem-534101, A. P. India  
drykudara@gmail.com.

**Dr Srinivasarao Udara**

Professor Department of ECE S T J Institute of Technology Ranebennur  
Karnataka. drsrudara@gmail.com  
drsrudara@gmail.com

### ABSTRACT

Symmetric symbol repeat (SSR) intercarrier interference (ICI) self cancellation scheme has proved to be a simple and convenient technique to reduce ICI caused by frequency offsets. It utilizes data allocation and combining of (1,-1) on two symmetrically placed subcarriers to mitigate the effect of ICI. However, the data allocation factors (1,-1) are not an optimum. In this paper, an optimum data allocation and Combining scheme is proposed to maximize CIR performance for an estimated normalized frequency offset. But, this requires continuous CFO estimation and feedback circuitry. A sub-optimal scheme utilizing sub-optimal pair (so, so) is also proposed to completely eliminate the requirement of CFO estimation. Simulation results confirm the outperformance of the proposed optimal scheme over conventional SSR ICI self cancellation scheme. Sub-optimal scheme can be applied for the any range of and a sub optimum value can be calculated using proposed sub-optimal scheme. The CIR of SSR ICI self cancellation scheme using the proposed sub-optimal approach is also found to be better than conventional SSR ICI self cancellation.

### 1. INTRODUCTION

Orthogonal Frequency Division Multiplexing (OFDM) is being used for high data rate wireless applications. It is a multicarrier modulation technique which incorporates orthogonal subcarriers [1]. High Peak to Average Power ratio and Inter carrier Interference (ICI) are two main disadvantages of the OFDM systems. Techniques for OFDM frequency division multiplexing have been shown in [2]. In OFDM systems ICI occurs due to frequency offset in between the transmitter and receiver carrier frequencies or Doppler Effect. Many techniques have been developed to reduce the effect of ICI; ICI cancellation is a simple and convenient technique. ICI self cancellation scheme proposed by Zhao [3] utilizes data allocation and combining of (1,-1) on two adjacent subcarriers i.e. same data is modulated at the sub carriers using (1,-1) as data allocation and are combined at the receiver with weights 1 and -1. It is one of the most promising techniques to reduce ICI; however, its performance degrades at higher frequency offsets. Another technique known as conjugate cancellation had been proposed by Yeh, Chang and Hassibi [4]. In this scheme, OFDM symbol and its conjugate are

## An Image Denoising Analysis with Iterative Histogram Specification

Dr V Vijayasri Bollsetty, Dr Udara Vedukondalu, Dr Srinivasaran Udara

Associate Professor, Dept of ECE, Aditya College of Engineering & Technology, Surampalem -  
AP, India

Associate Professor Department of ECE Sri Vasavi Engineering College (A) Tadepalligudem, A.  
P, India

Professor, Department of ECE S T J Institute of Technology Ranebennur Karnataka.

[vasudha.twectv@gmail.com](mailto:vasudha.twectv@gmail.com), [drykudara@gmail.com](mailto:drykudara@gmail.com), [drsrudara@gmail.com](mailto:drsrudara@gmail.com)

**Abstract:** In any application image denoising is a challenging task because noise removal will increase the digital quality of an image and will improve the perceptual visual quality. In spite of the great success of many denoising algorithms, they tend to smooth the fine scale image textures when removing noise, degrading the image visual quality. To address this problem, in this paper we propose a texture enhanced image denoising method by enforcing the gradient histogram of the denoised image to be close to a reference gradient histogram of the original image. Given the reference gradient histogram, a novel gradient histogram preservation (GHP) algorithm is developed to enhance the texture structures while removing noise. Simulation results show that the proposed method has given the better performance when compared to the existing algorithms in terms of peak signal to noise ratio (PSNR) and mean square error (MSE). To deal with this crisis, on this paper, we endorse a texture more desirable picture denoising process through implementing the gradient histogram of the denoised image to be just about a reference gradient histogram of the long-established snapshot. Given the reference gradient histogram, a novel gradient histogram renovation (GHP) algorithm is developed to enhance the texture buildings while casting off noise. Two neighborhood-founded editions of GHP are proposed for the denoising of pictures including areas with one-of-a-kind textures. An algorithm is also developed to conveniently estimate the reference gradient histogram from the noisy remark of the unknown snapshot. Our experimental outcome display that the proposed GHP algorithm can good retain the feel looks within the denoised graphics, making them appear more normal.

### 1. INTRODUCTION

Snapshot denoising, which targets to estimate the latent clean photo  $x$  from its noisy observation  $y$ , is a classical but nonetheless energetic matter in picture processing and low stage vision. One widely used data observation mannequin [4], [7] is

$$y = x + v,$$

the place  $v$  is additive white Gaussian noise (AWGN). One general procedure to photograph denoising is the variational approach, where an vigor useful is minimized to go looking the



# Low Pull-in-Voltage RF-MEMS Shunt Switch for 5G Millimeter Wave Applications

P. Ashok Kumar<sup>1,6</sup> · K. Srinivasa Rao<sup>1</sup> · B. Balaji<sup>1</sup> · M. Aditya<sup>1</sup> · N. P. Maity<sup>2</sup> · Reshmi Maity<sup>2</sup> · Santanu Maity<sup>3</sup> · Ameen El Sinawi<sup>4</sup> · Koushik Guha<sup>5</sup> · K. Girija Sravani<sup>1,5</sup>

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## Abstract

RF MEMS switches have been employed in many commercial and defense applications due to their high potentiality at microwave and millimeter wave frequencies. In this paper, an RF MEMS shunt switch is designed with perforations and without perforations and simulated using iterative meanders for millimeter wave 5G applications. The proposed iterative meander offers a low spring-constant of 0.68 N/m and reduces the pull-in-voltage upto 1.8 V. The proposed perforated switch design is more reliable which operates with less transition time of 11.2  $\mu$ s with a quality factor of 1.69. The switch possesses high capacitance ratio of 63. During ON condition, the switch shows low insertion loss of  $-0.24$  dB at 41 GHz and high isolation of  $-46.7$  dB at 38 GHz. The performance of the switch is analyzed by simulating it using COMSOL Multiphysics 5.2v (FEM tool). The obtained simulation results shows close approximation with the theoretical results and the switch is efficiently used for 5G millimeter wave applications.

**Keywords** Iterative meander · Millimeterwave · 5G applications · Low pull-in-voltage

## 1 Introduction

Recent advancements in the wireless communication systems utilizes miniaturized devices based on Micro-Electro-Mechanical System technology which are the best alternatives to become a part of present and future 5G wireless

applications. Now a days, RF devices are utilizing the frequencies upto 30 GHz and a huge traffic in propagation occurs which leads to the slow data rate. In other hand, there is a huge spectrum available in the millimetre wave frequency range of 30–300 GHz. The millimetre wave spectrum is attractive for development of smart systems based on 5G technology [1].

Transmitters, receivers, antennas, filters and phase shifters are extensively using these RF MEMS switches for better performance and excellent reconfigurable characteristics [2]. Among various mechanism, electrostatic actuation is a suitable mechanism for high reliability (100 million to 60 billion cycles) at high frequency range of 0.1–100 GHz [3]. High isolation, low insertion loss, high capacitance ratio, negligible leakage currents and the possibility for monolithic integration made these MEMS switches as an alternative for semiconductor switches like PIN diode, FET and varactors [4]. Besides these advantages, they require high operating voltage and possess slow switching time. While minimizing these effects, a significant trade-off arises between electro-mechanical and RF characteristics [5]. The spring-constant of the RF MEMS switches involves in the estimation of these performance characteristics. Guha et al. stated that "Low Pull-in-Voltage RF MEMS switches are developed

✉ P. Ashok Kumar  
ashok09411@gmail.com

✉ K. Srinivasa Rao  
srinivasakarumuri@gmail.com

<sup>1</sup> MEMS Research Center, Department of Electronics and Communication Engineering, KL University, Green Fields, Vaddeswaram, Guntur 522502, India

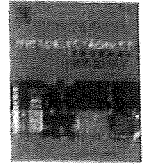
<sup>2</sup> Department of ECE, Mizoram University, Aizwal, India

<sup>3</sup> Department of ECE, Indian Institute of Engineering Science and Technology, Howrah, West Bengal, India

<sup>4</sup> Department of Engineering, American University of Iraq-Sulaimani, Sulaymaniyah, Iraq

<sup>5</sup> Department of ECE, National MEMS Designing Center, National Institute of Technology, Silchar, Assam, India

<sup>6</sup> Department of Electronics and Communication Engineering, Sri Vasavi Engineering college, Pedatadepalli, Tadepalligudem, West Godavari 534101, India



## An intensive approach to optimize capacitive type RF MEMS shunt switch

P. Ashok Kumar<sup>a,b</sup>, K. Srinivasa Rao<sup>a,c</sup>, K. Girija Sravani<sup>a,c</sup>, B. Balaji<sup>d</sup>, M. Aditya<sup>a</sup>,  
Koushik Guha<sup>a</sup>, Ameen Elsinawi<sup>d</sup>

<sup>a</sup> MEMS Research Center, Department of Electronics and Communication Engineering, Koneru Lakshmaiah Education Foundation (Deemed to be University, Green Fields, Vaddewaram, Andhra Pradesh, India

<sup>b</sup> Department of ECE, Sri Vasavi College of Engineering, Tadepalli Gudem, West Godavari, Andhra Pradesh, India

<sup>c</sup> National MEMS Design Center, Department of Electronics & Communication Engineering, National Institute of Technology, Silchar, 788010, Assam, India

<sup>d</sup> Department of Mechanical Engineering, Khalifa University, Abu Dhabi, United Arab Emirates

### ARTICLE INFO

**Keywords:**  
RF MEMS  
Pull in voltage  
Isolation  
Insertion loss

### ABSTRACT

Optimization of the RF MEMS switch is essential to enhance its performance characteristics at high frequency millimeterwave applications. Many optimization techniques have been proposed based on design factors and output responses but not confined with the resonant frequency of RF transmission signal. In this paper, a novel optimization technique is proposed using Multiphysics FEM simulations based on electromagnetic and electro-mechanical studies. A novel Capacitive type of RF MEMS shunt switch is designed by using iterative meander technique and optimized at the resonant frequency of 41 GHz which can efficiently used for millimeter wave applications up to 60 GHz. The proposed optimization model which is a novel bottom – up approach consists of intermediate steps for optimization of various layers of switch from substrate to beam. The CPW transmission line with 60/100/60 as G/S/G and having 0.5  $\mu\text{m}$  as thickness is considered to allow the frequencies up to 60 GHz. The width of the suspended Beam of switch is optimized to obtain up-state capacitance of 37 fF which allows the RF signal at 41 GHz. Parametric analysis has been carried out to obtain optimized thickness of each layer. Two types of switches other than Fixed – Fixed beam are designed using meandering technique to reduce pull in voltage. Among these the proposed iterative meander switch shows very low pull in voltage of 1.4 V and also shows good return loss of  $-48.9$  dB at 41 GHz and high isolation of  $-48.42$  dB at 38 GHz. The proposed switches which are optimized at 41 GHz does not contains the perforations and suffers from serious stiction problems at downstate. Hence, perforations are introduced in switch membrane and fabricated using surface micromachining technology. The optimized iterative meander switch shows low pull – in voltage of 1.85 V which is closely approximated to the simulated value.

### 1. Introduction

Over the past decades, the advancement in technology enabled the usage of millimeter waves to overcome the challenges of high-speed and low frequency in modern day communication systems [1]. The development in electronic devices for millimeter wave applications have attracted many of the researchers and academicians to develop RF MEMS switches which are having high linearity, low power consumption and high isolation when compared to the semiconductor switches [2]. Now a days, most of the RF MEMS switches are shunt type capacitive switches rather than series contact type switches due to increase of capacitance coupling effect between parallel plates at higher frequencies [3]. Despite these advantages, MEMS switches also have some disadvantages such as

low speed (3–40  $\mu\text{s}$ ), high or moderate pull in voltage than the semiconductor switches. Hence the optimization of the MEMS switches will create a great impact to overcome these disadvantages to a larger extent [4,5]. RF performance characteristics are also an important factor in designing RF MEMS switches along with electromechanical characteristics [6].

A few literature papers have been demonstrated based on electrostatic actuation where these switches are also shows good RF performance at Millimeterwave frequencies. C.L. Dai et al. proposed a CMOS 0.35  $\mu\text{m}$  technology switch which shows a good insertion loss of 2 dB and low isolation of 15 dB at 50 GHz frequency [7]. A low insertion loss of 0.33 dB and isolation of 13.4 dB is achieved by using comb drive structured RF MEMS switch at 50 GHz [8]. To achieve high isolation, a

\* Corresponding author.

E-mail address: [srinivasakarumuri@gmail.com](mailto:srinivasakarumuri@gmail.com) (K.S. Rao).

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RESEARCH ARTICLE

# A provably secure sharding based blockchain smart contract centric hierarchical group key agreement for large wireless ad-hoc networks

Vankamamidi S. Naresh<sup>1</sup> | V. V. L. Divakar Allavarpu<sup>2</sup> | Sivaranjani Reddi<sup>3</sup> | Pilla Sita Rama Murthy<sup>4</sup> | N. V. S. Lakshmi pathi Raju<sup>5</sup> | R. N. V. Jagan Mohan<sup>6</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>2</sup>FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam, India

<sup>3</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, India

<sup>4</sup>Department of Information Technology, Vishnu Institute of Technology, Bhimavaram, India

<sup>5</sup>Department of Computer Science and Engineering, Gayatri Vidya Parishad College of Engineering (Autonomous), Visakhapatnam, India

<sup>6</sup>Department of Computer Science and Engineering & Information Technology, S.R.K.R. Engineering College, Bhimavaram, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

## Summary

Group key management with privacy preserving and trust still remains a precarious and stimulating issue for securing multicast communications in an energy embarrased large wireless ad-hoc networks (WANETs). To address this, few researchers with the adaption of blockchain technology and practical usage of a privacy-preserving smart contract as group controller made these group key agreements adaptable to WANET. However, proportionate to the increase in the size of the group, the processing load on the smart contract is also increasing, which made the capability of the smart contract could not work beyond a certain group size. Contemporary blockchain schemes suffer from various inherent shortcomings in their latency, scalability, and processing throughput. So, in this direction, we adopted blockchain sharding smart contract-centric processing for making the key agreement adaptable to large WANETs. In this technique, we divide the large network into  $r$  sharded subnetworks with  $G_1, G_2, G_3, \dots, G_r$  as smart contract instances generated by group controller  $G$ , which acts as subgroup controllers to their respective shards using blockchain sharding technique. This protocol is shown secure under the assumptions elliptic curve decision Diffie-Hellman and group-elliptic curve Diffie-Hellman. The performance analysis demonstrates that the proposed protocol is highly proficient than examined protocols for secure communication in large WANETs.

## KEYWORDS

blockchain, group controller, group key agreement, hierarchical, privacy-preserving smart contract, sharding

## 1 | INTRODUCTION

Group key agreement (GKA) is the keystone for ensuring secure group communication. It is used extensively in secure resource sharing, secure multiparty computation, and distributed collaborative computing. The current GKAs entail lightweight computing, reduced communication, decentralized certification, personal privacy protection such as traceability, accountability, and so forth. To address these features, many researchers proposed blockchain-based GKA protocols with smart contract (SC) acts as group controller (GC) to diminish each member's computation and communication burden so that it suites resource-constrained networks.

## RESEARCH ARTICLE

# Lightweight secure communication system based on Message Queuing Transport Telemetry protocol for e-healthcare environments

Vankamamidi S. Naresh<sup>1</sup> | Sivaranjani Reddi<sup>2</sup> | V. V. L. Divakar Allavarpur<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, India

<sup>3</sup>FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem-534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

## Summary

In recent years, with the advent of communication technologies, healthcare sensing and remote monitoring have undergone a significant evolution to addressing almost all current e-health challenges. In view of this, the Internet of medical things (IoMT)-based applications are evolved. However, security and privacy are the primary concern as vast numbers of devices are connected and communicated through the wireless environment. The direct involvement of humans in IoMT-based healthcare applications made robust and secure communication among the sensors, actuators, and patients significant. In this direction, we proposed a novel security framework for Message Queuing Transport Telemetry (MQTT) protocol based on publish/subscribe messages, which is suitable for constrained and small devices in IoMT. In this paper, we proposed a lightweight hyper elliptic curve-multiple shared key algorithm to derive session keys in order to encrypt/decrypt health readings from the sensors connected to the patient body. The comparative analysis of performance shows that the proposed method outperforms different existing techniques in terms of computational time by reducing the computational times of broker and producer/subscriber by 0.084 and 0.0168, respectively, than the best performed existing method (Malina et al.). Finally, the security analysis shows that the proposed framework is secure against physical attacks, key control, machine-in-the-middle (MITM), non-repudiation, replay, and naming based attacks.

## KEYWORDS

healthcare, hyper elliptic curves, internet of things, key exchange operations, MQTT protocol, sensors

## 1 | INTRODUCTION

Internet of things (IoT) is a global web infrastructure that allows physical and virtual objects to be connected through Internet/networking. It offers object identification and connection establishment capability as the basis for developing independent cooperative services and applications. These are characterized by autonomous data capturing, data transfer, network connection, and interactivity with other objects. It enables a wide number of applications and add smartness in functionality, like smart houses,<sup>1-3</sup> smart transportation, and smart health care. For example, smart

## Deep Neural Network Associate Efficient Elephant Herding Optimization for Diagnosing Angiographic Disease Condition

<sup>1</sup>D Jaya Kumari

Professor, Computer Science and Engineering Department,  
Sri Vasavi Engineering College (Autonomous), Pedatadepalli, India  
Email: [phd.jaya@gmail.com](mailto:phd.jaya@gmail.com)

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**Abstract:** The significant intention of the research is to diagnosing the normal and abnormal situations of heart diseases through the Artificial Intelligence (AI) technique. The analysis anticipates employing various AI techniques, amid Deep Neural Network (DNN) performs superior over other methods. Investigating the methodology of DNN, it is evident that weights associated with neurons play a vital role, and changes in weights influence the result. The research aims to identify appropriate weights to associate with neurons, which is time-consuming and complicated through the trial-and-error process. The complication urges incorporating optimization techniques to identify appropriate weights to diagnose heart disease situations. The techniques involved in this process are an evolutionary strategy and swarm intelligence strategy. The result shows an Efficient Elephant Herding Optimization (EEHO) performs better in the three-test case database. EEHO configure weights employed in DNN unveils accuracy of 98.9% in Cleveland database, 98.8% in Hungarian database, and 97.1% in Switzerland database. In general, the result from the three-test case database exhibits proficient performance in most test-case measures.

**Keyword:** Heart diseases diagnosing, Artificial Intelligence (AI), Deep Neural Network (DNN), Efficient Elephant Herding Optimization (EEHO).

### 1. Introduction

The heart failure fundamentally implies that the heart isn't pumping just as it ought to be. Essentially the greater part of the heart failures emerge in view of coronary issues, hypertension and diabetes that harm the heart<sup>1</sup>. World Health Organization (WHO) records cardiovascular disease as one of the uppermost issue to human deaths in the years<sup>2</sup>. Heart disease<sup>3</sup> is a dangerous disease that influences the functionality of the heart, and offers ascend to problems namely the infection of the coronary artery and diminished blood vessel function<sup>4</sup>. Normally, medicinal experts reach at diagnoses dependent on sonography, electrocardiography, angiography, and blood test results. CHD isn't adequately diagnosed among the early disease stage, but for positive treatment, its initial analysis is important<sup>5</sup>. Though, diagnoses are prepared dependent on medical experts' personal experiences and understanding of the disease, which increase the dangers of mistakes, increase treatment times, interruption suitable treatment, and significantly increase costs<sup>6</sup>. In request to deal of these problems, various assessments have been led on clinical decision emotionally support systems employing various techniques, for instance, data mining and machine learning<sup>7,8,9</sup>. Different classification and regression processes have been utilized to distinguish heart disease<sup>10</sup>. A wide range of smart-systems have been advanced to develop community-health, decrease healthcare expenses and encourage excellence of life, among others. Such systems heavily depend on artificial intelligence<sup>11</sup>. Deep Neural Networks (DNNs)<sup>12,13</sup> might be extremely in effect for the cataloguing over highly sized data sets, particularly in the medical field, where the recognition of a particular connected to a disease is significance<sup>14</sup>. Elephant Herding Optimization (EHO) approach is a latest swarm intelligence method and the motivation for this procedure was the herding of the elephants<sup>15</sup>. The uses of EHO algorithm display its outstanding performance in solving optimization issues<sup>16</sup>.

### 2. Literature review

Ivanoe De Falco et al.<sup>17</sup> 2019, had planned the method to discover appropriate model for a DNN utilized for a classification issue regarding accomplishment of the uppermost classification accurateness. The methodology depends on a distributed version of Differential Evolution (DE), a variability of an evolutionary algorithm. To assess the methodology, in that research they research the problem to Obstructive Sleep Apnea (OSA). Also, the technique outperforms in terms of accurateness all the various classifiers examined, as it is prove additionally by statistical analysis.

Haotian Shi et al.<sup>18</sup> 2019, had anticipated to develop the ECG heartbeat classification, the research offers a programmed ordering model. In convolutional neural network (CNN) and long short-term memory (LSTM) network, a deep structure with several input layers was anticipated. The system was estimated by couple of division systems of the MIT-BIH arrhythmia database. The class focused on system attained a general precision



# Provable secure dynamic lightweight group communication in VANETs

Vankamamidi Srinivasa Naresh<sup>1</sup> | Sivaranjani Reddi<sup>2</sup> | VVL Divakar Allavarpu<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, India

<sup>3</sup>FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

## Abstract



The advent of group-oriented communication applications in Vehicular Ad Hoc Networks (VANETs) has triggered research on lightweight privacy-preserving Secure Group Communication (SGC) in VANETs. In view of this, many researchers proposed privacy-preserving, authentication, and key agreements schemes. However, these schemes need to address the dynamic nature, heavier processing loads, massive storage, and higher communication. In this direction, we proposed a framework for lightweight dynamic SGC with privacy-preserving and authentication in VANETs, encompassing (i) A lightweight Elliptic Curve Cryptography (ECC)-based two-party key agreement and its extension to a Dynamic Group Key Agreement, in which fixed Road Side Unit (RSU) acts as Group Controller (GC) with superior computational ability than the On-Board Unit equipped on the vehicles. (ii) An identify-based authentication and privacy-preserving schemes using only two lightweight operations XOR and hashing. (iii) A lightweight encryption and decryption with Exclusive Or (XOR) and hashing only. And (iv) a formal security model for SGC in VANETs. The security analysis shows that the proposed system provides confidentiality of session key, anonymity, secure session key enhancement, and immune to password guessing attack, replay attack, insider attack based on an assumption of the computational G-ECDDH problem. The experimentation is done for authentication, group key agreement, encryption, and decryption times by a varying number of vehicles in the group to 10, 20, 40, 60, 80, and 100 and shown that the proposed technique is taking considerably less computation than other techniques. So the proposed technique is highly desirable in VANETs.

## 1 | INTRODUCTION

A Vehicular Ad Hoc Networks (VANETs) can be considered as a particular case of MANETs consisting of vehicles installed with On-Board Units (OBUs) and the RSUs. These VANETs can be used to provide communication among the objects in it. The communication in VANETs is of two kinds, namely Vehicle-to-Vehicle (V2V) communication and Vehicle-to-Infrastructure (V2I) communication.<sup>1,2</sup> Vehicles that are active in VANETs can produce their vehicle driving state information such as speed, lane changing information, acceleration, and collected information related to traffic like traffic congestion along with the state of the road.

In general, traffic congestions or accidents are because of the driver's inability to anticipate the instantaneous, other vehicle reachability, and variable road conditions. The provisions of communications among the vehicle such as dry,

# Bat optimization algorithm for wrapper-based feature selection and performance improvement of android malware detection

Ravi Kiran Varma P<sup>1</sup>  | S Kumar Reddy Mallidi<sup>2</sup>  | Santosh Jhansi K<sup>1</sup> | Pushpa Latha D<sup>1</sup>

<sup>1</sup>Department of CSE, MVGR College of Engineering, Vizianagaram, AP, India

<sup>2</sup>Department of CSE, Sri Vasavi Engineering College, Tadepalligudem, AP, India

## Correspondence

Ravi Kiran Varma P, Department of CSE, MVGR College of Engineering, Vizianagaram, AP, India.  
Email: ravikiranvarmap@gmail.com

## Abstract

Android malware is a serious threat to the mobile users and their data. The losses incurred are unimaginable, which stretch to the extent of identity theft, financial loss, sensitive information loss, espionage, sabotage, cyber fraud, to mention a few. Android application's permission attributes can be analysed for malware detection using machine learning. However, the high-dimensional permission attributes are the bottleneck in designing optimized malware detection system. Identification of useful permission attributes is an NP-hard problem. Bat Optimization Algorithm for Wrapper-based Feature Selection (BOAWFS) is proposed in this article and evaluated on the CICInve-sAndMal2019 benchmark dataset. The performance of BOAWFS is also compared with that of Cuckoo Search Optimization for Wrapper-based Feature Selection (CSOWFS) and Grey Wolf Optimization for Wrapper-based Feature Selection (GWOWFS). Five classifiers, Random Forest (RF), Support Vector Machines (SVMs), K-Nearest Neighbour (KNN), Decision Tree (DT), and Nearest Centroid (NC) are compared for wrapper feature selection. BOAWFS outperformed consistently with all the five classifiers. With 200 agents and 100 iterations, the BOAWFS-DT outperformed with 93.73% accuracy after reducing the features to 518 from 4115. The considerable contribution of BOAWFS is that a 1.67% improvement in accuracy with 87.41% redundancy removal in features is achieved for the very high-dimensional permission-based android malware dataset.

## 1 | INTRODUCTION

Android Operating System has a share of 74.13% in the worldwide mobile market [1]. Google play store applications (apps) are usually considered as secure and trusted. However, apps that are installed bypassing the Google scan may typically pose a threat. Android malware is a threat vector that can lead to deadly consequences, including theft of credentials from other apps installed in the mobile, credit card data grabbing, password theft, and so forth. Malware is typically relegated as adware, botnets, Trojans, ransomware, scareware, worms, and so forth [2]. Android apps, when installed on our mobile gadget, request for approval of few permissions from the user, using which it can perform certain operations using the hardware or software on the mobile [3]. If the user permits knowingly or unknowingly, the malicious apps get permission to use the mobile's assets such as the SMS system, GPS system, camera sensor, contacts, file

permissions, including deleting, modifying, creating. There is an urge to study the permissions listed in the Android apps to identify if the app is a malware [4]. Malware can be discovered through static analysis or runtime analysis [5,6]. Static analysis involves a study on storage media like files, permissions, application or file headers, and so forth, whereas dynamic malware detection tries to discover the malware by observing the runtime behaviour of the device [7]. Several researchers worked on analysing Android malware using the permission data for static analysis using machine learning classifiers. However, there is one major issue with permission extraction, an exhaustive list of permission attributes that make up the dataset, 'the curse of dimensionality'. The huge dimensionality of permission attributes is the bottleneck in static malware classification using permissions. There is an urge to minimize the permission dimensionality by employing learned feature minimization methods.

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## RESEARCH ARTICLE

# Blockchain-based patient centric health care communication system

Vankamamidi S. Naresh<sup>1</sup> | Sivaranjani Reddi<sup>2</sup> | V.V.L. Divakar Allavarpu<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology and Science, Visakhapatnam, Andhra Pradesh, India

<sup>3</sup>FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam, Andhra Pradesh, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, Andhra Pradesh, India.  
Email: vsnaresh111@gmail.com

## Summary

The rapid increase in health care data breaches with the existing centralized systems emphasizes a decentralized health care system while ensuring reliability, privacy, security, and trust. Further, to ensure trust in the medical community, scientist, and pharmaceutical, it is essential to improve the quality of health care data management. In this direction, we proposed a blockchain-based decentralized privacy-preserving EMR management (DPEM), which can ensure accountability and integrity. We propose a four-layered framework for DPEM consisting of a data preparation layer, access control and security layer, data sharing layer, and data storage layer with the objectives: (i) To provide privacy-preserving in DPEM, we propose a new elliptic curve-based content extraction signature (EC-CES) through which patients can exclude EMR's sensitive information to eradicate leakage of privacy information in the data sharing process. (ii) To provide secure data sharing, blockchain smart contracts are used to define the predefined access permissions of the patients. (iii) To provide secure storage, we use a cloud facility to store actual EMRs, and consortium blockchain is used to store respective indexes of EMRs so that the data leakages of EMRs could be optimized and simultaneously, indexes in consortium blockchain will take care the integrity of EMRs. (iv) To provide access control in data sharing, we adopted ciphertext-policy attribute-based encryption (CP-ABE) access control policy to empower the owners of data to secure the cloud storage and give access to authorized users through the encrypted link to the cloud storage with access control policies blinded. Finally, the security analysis demonstrates that DPEM is an optimized way of achieving EMRs secure data sharing.

## KEYWORDS

blockchain, cloud storage, electronic medical records, elliptic curve Diffie-Hellman, health care, privacy-preserving, security

## 1 | INTRODUCTION

The rapid growth in the importance of the health care sector and exponential growth in technology improves the living standards of patients. Further, the need of health care data for researchers, hospitals, paramedical, and insurance agencies improve the quality life of patients. In this direction, many researchers are working on efficient and secure



# An efficient facial emotion recognition system using novel deep learning neural network-regression activation classifier

Anjani Suputri Devi D<sup>1</sup> · Satyanarayana Ch<sup>1</sup>

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## Abstract

In the computer vision field, FER encompasses a significant place. It is being studied for a long period, and in recent decades, it has attained progress, but all is in vain, since, recognizing facial expression with high accuracy is still hard due to disparate facial expressions. To beat such difficulties, an efficient *Facial Emotion Recognitions* (FER) is proposed by utilizing a novel Deep Learning Neural Network-regression activation (DR) classifier. The proposed method has six phases, namely, pre-processing, facial point extraction, segmentation, feature extraction, feature selection, and classification. Initially the input image has been pre-processed using Gamma-HE technique and then facial points are extracted using Pyramid Histogram of Oriented Gradients (PHOG) based Supervised Descent (SMD) Method. The facial parts are segmented using Viola-Jones Algorithm (VJA) and then Local Tetra Pattern (LTrP), cluster shade, Inverse Divergent Moment (IDM), Local homogeneity, optimum probability, cluster prominence, dissimilarity, autocorrelation, and contrast features have been extracted. Modified Monarch Butterfly Optimization (MMBO) algorithm has been used to select necessary features from the extracted features. From the extracted facial points, the DR classifier classifies the emotions of the particular input image. A '2' datasets were taken for analyzing the proposed system's performance. Centred on the CK+ database, the proposed work attains 0.9885-accuracy, and centred on the JAFFE database, it has 0.9727-accuracy. Also, the investigational results proved that the proposed work trounces the existing systems centred on statistical metrics.

**Keywords** Facial emotion recognition · Gamma-histogram equalization (gamma-HE) · Modified monarch butterfly optimization (MMBO) · And deep learning neural network-regression activation (DR)

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✉ Anjani Suputri Devi D  
anjanihasini@gmail.com

Extended author information available on the last page of the article



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# Shade Binding and Stability for Immersed Strengthen of Image

J.N. Chandra Sekhar

Assistant Professor, Department of CSE, SriVasavi Engineering College(A),Tadepalligudem, AP, India.

**ABSTRACT:** We acquaint a viable strategy with upgrade the pictures caught submerged because of the medium dissipating and ingestion. Our strategy is a lone picture approach that doesn't need particular equipment or information about the submerged conditions or scene structure. It expands on the mixing of two pictures that are straightforwardly gotten from a color compensated also, white-adjusted rendition of the first corrupted picture. The two pictures to combination, just as their related weight maps, are characterized to advance the exchange of edges and shading differentiation to the yield picture. To eliminate that the sharp weight map advances make artifacts in the low recurrence parts of the reproduced picture, we additionally adjust a multiscale combination procedure.

Our broad subjective and quantitative assessment uncovers that our improved pictures and recordings are described by better exposedness of the dim areas, improved worldwide difference, and edges sharpness. Our approval additionally demonstrates that our proposal is sensibly autonomous of the camera settings, and improves the precision of a few picture handling applications, for example, picture division and key point coordinating.

**KEY WORDS:** Immersed, Image binding, white-adjusting.

## I. INTRODUCTION

Submerged climate offers several uncommon attractions, for example, marine creatures and fishes, astonishing scene. Other than submerged photography, submerged imaging has likewise been a significant wellspring of interest in various parts of innovation also, logical exploration, for example, review of submerged foundations and links, discovery of manmade items, control of submerged vehicles, sea life science research, and paleontology.

Not the same as basic pictures, submerged pictures experience the ill effects of helpless deceivability coming about because of the lessening of the engendered light, essentially because of ingestion and dissipating impacts. The assimilation significantly decreases the light energy, while the dispersing causes alters in the light engendering course. They bring about foggy appearance and difference corruption, making far off articles dim. Essentially, in like manner ocean water pictures, the object is in excess of 10 meters are practically unperceivable, and the shadings are blurred on the grounds that their forming frequencies are sliced by the water profundity.

There have been a few endeavors to reestablish and improve the deceivability of such debased pictures. Since the weakening of submerged scenes results from the mix of multiplicative and added substance measures customary improving strategies, for example, gamma remedy, histogram adjustment have all the earmarks of being unequivocally restricted for such an assignment. In the past works that are overviewed, the issue has been handled by customized procurement procedures utilizing various pictures, specific equipment or polarization channels. Notwithstanding of their important accomplishments, these procedures experience the ill effects of various issues that decrease their useful appropriateness.

This paper includes a novel methodology with eliminate the murkiness in submerged pictures dependent on a solitary picture caught with a regular camera.

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# Practical Identity based online/off-line signature scheme for secure communication in Internet of Things

Vankamamidi S. Naresh<sup>1</sup>, Sivaranjani Reddi<sup>2</sup>, Saru Kumari<sup>3</sup>, V V L Divakar Allavarpu<sup>4</sup>,  
Sachin Kumar<sup>5</sup> and Ming-Hour Yang<sup>6</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem-534101, Andhra Pradesh, India, E-mail: vsnaresh111@gmail.com

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, Andhra Pradesh, India, rsivaranjani52008@gmail.com

<sup>3</sup>Department of Mathematics, Chaudhary Charan Singh University, Meerut, Uttar Pradesh, India 250004. Email: saryusiirahi@gmail.com

<sup>4</sup>FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam-530045, Andhra Pradesh, India. Email: divakar.allavarpu@gmail.com

<sup>5</sup>Department of Computer Science and Engineering, Ajay Kumar Garg Engineering College, Ghaziabad, India: 201009. Email: imsachingupta@rediffmail.com

<sup>6</sup>Department of Information and Computer Engineering, Chung Yuan Christian University, Taoyuan City 32023, Taiwan Email: mhyang@cycu.edu.tw

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**ABSTRACT** Contemporary developments in the Internet of Things (IoT) have been made it highly suitable for many applications like smart city, smart healthcare etc. However, security and privacy are the primary concerns in protecting data as it was highly sensitive. This paper is proposing a new Identity based online/off-line signature scheme suitable to provide secure message communication between IoT devices, gateway, and the server. This method is divided into the online and off-line phase, where heavy mathematical computations are carried out in off-line phases and light computations in the online phase. This scheme provides a security solution for integrating Wireless Sensor Networks (WSN) into the IoT. Experimentation was done and finally compared against existing techniques and proved that the proposed mechanism reduces the computation time in online by performing more number of operations in off-line signature phase. Further, it provides indistinguishability against adaptive chosen ciphertext attacks and existential unforgeability against adaptive chosen messages attacks.

**INDEX TERMS** Bilinear pairing, Certificateless signature, HOOSC, Heterogeneous, Identity-based cryptography, Online/off-line Signature.

## I. INTRODUCTION

IoT is a diversified network intended to establish communication among various types of sensors and servers also facilitates the communication between person-to-person, person-to-device, device-to-device, or device-to-devices, and so on [1]. Advancements in communication technology, it is widely used in many real-time applications like military vigilance, healthcare, industrial operations monitoring, etc. Data communication of devices in an open environment may raise the scope to access sensitive data by the intruder, where security is the primary concern.

Security and privacy are always the crucial issues of IoT. In order to protect the security and privacy of the IoT

environment, extensive research on physical layer security, secure access control mechanism (e.g., access control scheme based on attribute base encryption), secure communication, network traffic and data analysis method, and threat detection technology has been carried out.

The IoT system in general is usually deployed in a distributed environment. In which, the IoT entities exchange information dynamically to provide a decentralized and scalable infrastructure, to support billions of devices generating and exchanging large amount of data. Decentralized communication has become a crucial trend of Smart-IoT, such as the researches on block-chain based mechanism and device-to-device (D2D) communication

# Serverless Architecture Solution to Automate Educational Organizations

M. Chilaka Rao<sup>1</sup>, G V L Narayana<sup>2</sup>, G. Ramanjaneya Raju<sup>3</sup>, P. Raju<sup>4</sup>  
Assistant Professor<sup>1-4</sup>, Department of Computer Science and Engineering<sup>1-4</sup>  
Sri Vasavi Engineering College, Affiliated to JNTUK Pedatadepalli, Tadepalligudem<sup>1-3</sup>,  
Shri Vishnu Engineering College for Women, Bhimavaram<sup>4</sup>  
West Godavari District, Pin Code - 534 101, Andhra Pradesh, INDIA,

**Abstract:** Educational Organizations refer to the administration of the education system within which a group individual combine together to supervise, plan strategies, and implement structures to accomplish the services in the education sector. The manual processing of the services included in these sectors would lead to errors and may also cause the loss of the recorded data. So, the main objective of the proposed system is to support and manage the activities held in the Educational Organizations through the modern technology Serverless Architecture solution. So, to achieve this microservices architecture in the cloud-based applications Function-As-A-Service, the concept of serverless computing via serverless architectures is used to build the application. In Serverless Architecture, a backend is provided as a service so that all the traffic handling is done by the vendor itself without any downtime. Through serverless technology, Fault tolerance is more and even the maintenance cost will be very less.

**Keywords:** Automation, Educational Organization, Function-As-A-Service, Microservices, Serverless, Web Application.

## 1. INTRODUCTION

Educational Organizations refers to the administration of the education system in which a group combines human and material resources to supervise, plan, strategies, and implement structures to execute an education system. There are various Educational sectors that maintain the huge data records of individual students and the administration information. The manual processing of these services would lead to errors and may also cause the loss of the recorded data. So, these institutions need a management system to maintain and store the records and data related to their educational organizations. The proposed system provides ease in accessing and maintaining the different services provided by their sectors and through cloud-based management provides all time from anywhere access. Through this system, each service is provided as a microservice which is executed only when a function is invoked and thus decreases the maintenance cost as clients need not maintain any Virtual Machines.

## 2. LITERATURE SURVEY

Joseph M. Hellerstein has proposed a technique of serverless computing in 2019. Its computing offers the potential to

program the cloud in autoscaling, pay-as-you-go manner. They used serverless computing for monitoring educational organizations using Functions-as-a-Service (FaaS), the commonly used and more descriptive name for the core of serverless offerings from the public cloud providers. [1]. model was proposed using Practical Cloud Workloads for Serverless FaaS by Jeongchul Kim et al in 2019. The new serverless applications function at run-time optimization and public service comparison. The advantages of this model are the data is secure as private key-based encryption and decryption are performed. [2]. Kaley Alpernas et al in 2018 developed a model by overcoming the limitations of security of the data in the cloud. The key benefits are elastic scalability, ease of deployment, pay-per-use scale achieved by decoupling application logic from resource management. [3]. C Yallamanda developed a system that deals with cloud computing technology with respect to the business organizations and how effectively it can be used by the developers to make better applications for the organizations in 2019. The merits monitored in this system are Mobility, Analytics, Streamline costs, High accessibility, and availability. [4]. A model of the organization management system (OMS) was implemented by Boris N. Gerasimov et al in. through which the contemporary development of organizations is determined by the necessity to respond to the current challenges and the market trends. They presented a model of the organization management system (OMS), and a model of development of organizational processes management system. The main focus of this system was based on solving existing issues, enabling high competitiveness, innovative proposals, and also reduces organization expenses. [5]. An Intranet-based model using Java and android platform was proposed by Prafulla S. Yevalel in 2016. This system is mainly followed for profile forms, marking attendance, report generation, where the students fill-up the form and sign on the attendance sheets manually; teachers generate various reports by following the manual system. The main aim is to provide information to all the levels of management within the organization. Front-end client-side validation is done through Java and all business logics in .css, javascript, Ajax,JSON. Hibernate resides at Middleware and the third layer is MySQL database, the webserver will be Apache. The objective of this project is to provide technological tools for faculty to perform their jobs in an effective and efficient manner and also provide efficient tools for students and staff as well. Students can also view notice about seminars, activities related to college using the

# Heart Disease Classification using Machine Learning Algorithms

Mr. Pagalla Bhavani Shankar<sup>#1</sup>, Mr. Kondreddi Lakshman<sup>\*2</sup>, Ms. Y. Divya Vani<sup>#3</sup>

<sup>#1,3</sup>Assistant Professor, Department of CSE, Sri Vasavi Engineering College (Autonomous), Tadepalligudem, Andhra Pradesh, India.

<sup>\*2</sup>B.Tech (CSE), Pulidindi, Atreyapuram, East Godavari, Andhra Pradesh, India

*Abstract* — Heart related sicknesses or Cardiovascular Diseases are the fundamental purpose behind an enormous number of deaths on the planet in the course of the most recent couple of many years and has arisen as the most perilous illness, in India as well as in the entire world. Along these lines, there is a need of solid, exact and attainable framework to analyze such illnesses as expected for appropriate treatment. Data based calculations and procedures have been applied to different clinical datasets to computerize the investigation of enormous and complex information. Numerous analysts, as of late, have been utilizing a few AI procedures to help the medical care industry and the experts in the finding of heart related illnesses. This paper presents a study of different models dependent on such calculations and procedures and analyzes their presentation. Models hooked in to managed learning calculations, for instance, K-Nearest Neighbor (KNN), Navie Bayes, Random Forest (RF) and troupe models are discovered mainstream among the specialists.

*Keywords:* Cardiovascular Disease, Dataset, K- Nearest Neighbor, Navie Bayes, Random Forest

## 1. INTRODUCTION

Heart, a critical part, siphons blood to all aspects of our life systems. On the off chance that it neglects to work effectively, at that point the cerebrum and different organs will quit working, and inside couple of moments, the individual will bite the dust. Change in way of life, business related pressure and awful food propensities add to the expansion in pace of a few heart related illnesses. Heart illnesses have arisen as one of the most unmistakable reason for death all around the globe. As indicated by World Health Organization, heart related infections are answerable for the taking 17.7 million lives each year, 31% of every single worldwide passing. In India as well, heart related illnesses have become the main source of mortality. Heart illnesses have executed 1.7 million Indians in 2018, as per the 2018 Global Burden of Disease Report, delivered on September 15, 2018. Heart related infections increment the spending on medical services and furthermore diminish the efficiency of a person. Evaluations made by the World Health Organization (WHO), recommend that India have lost up to \$237 billion, from 2005-2015, because of heart related or Cardiovascular illnesses. Subsequently, plausible and precise expectation of heart related illnesses is significant.

Clinical associations, all around the globe, gather information on different wellbeing related issues. This information can be abused utilizing different AI strategies to pick up valuable experiences. In any case, the information gathered is huge and, numerous multiple times, this information can be extremely boisterous. These datasets, which are excessively overpowering for human personalities to understand, can be handily investigated utilizing different AI methods. Accordingly, these calculations have gotten helpful, lately, to anticipate the presence or nonattendance of heart related infections precisely.

## 2. LITERATURE REVIEW

Heart Disease Detection by Enhancing the Training Phase of Neural Networks using PSO Algorithm (Particle Swarm Optimization) [2] and Heart Disease Detection by Enhancing the Training Phase of Neural Networks using ACO Algorithm (Ant Colony Optimization) [3] gives us a way to considering the data set and explain the prediction analysis of a diseases in generic manner.



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<sup>#1,3</sup>Assistant Professor, Department of CSE, Sri Vasavi Engineering College (Autonomous), Tadepalligudem, Andhra Pradesh, India.

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# Internet of Things in Healthcare: Architecture, Applications, Challenges, and Solutions

Vankamamidi S. Naresh<sup>1,\*</sup>, Suryateja S. Pericherla<sup>2,‡</sup>, Pilla Sita Rama Murty<sup>3,§</sup> and Sivaranjani Reddi<sup>4,¶</sup>

<sup>1</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India

<sup>2</sup> Department of Computer Science and Engineering, Vishnu Institute of Technology, Bhimavaram, Andhra Pradesh 534202, India

<sup>3</sup> Department of Information Technology, Vishnu Institute of Technology, Bhimavaram, Andhra Pradesh 534202, India

<sup>4</sup> Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, Andhra Pradesh, India

Healthcare, the largest global industry, is undergoing significant transformations with the genesis of a new technology known as the Internet of Things (IoT). Many healthcare leaders are investing more money for transforming their services to harness the benefits provided by IoT, thereby paving the way for the Internet of Medical Things (IoMT), an extensive collection of medical sensors and associated infrastructure. IoMT has many benefits like providing remote healthcare by monitoring health vitals of patients at a distant place, providing healthcare services to elderly people, and monitoring a large group of people in a region or country for detection and prevention of epidemics. This paper provides a review of IoT in the healthcare domain by first describing the enabling technologies for delivering smart healthcare, followed by some of the key applications of IoT in healthcare. Next, a fog-based architecture consisting of three layers for IoT-based healthcare applications is proposed. Finally, we focus on some of the open challenges of IoT in healthcare, like fault tolerance, interoperability, latency, energy efficiency, and availability. Existing solutions for these challenges are also discussed.

Keywords: IoT in healthcare, Internet of Things applications in healthcare, IoT challenges in healthcare, fault tolerance in IoT, wearable sensors

## 1. INTRODUCTION

The Internet of Things (IoT) is a modern technology encompassing smart objects, which contain physical components like sensors and actuators for sensing the internal state of the object or the external environment and perform some action based on the collected data. The data generated by sensors in the smart objects can be further processed, and decisions can be made accordingly. These smart objects also contain software embedded in them to control different parts and events generated in those objects. According to a report published by statista [1],

the IoT connected devices are expected to touch 75 billion by 2025. The IoT paradigm combines the advantages of cloud computing, Wireless Body Area Networks (WBANs), edge computing, fog computing, autonomic computing, advances in communication technologies, and sensors to create new avenues and opportunities in different domains. Some of the domains which are impacted by IoT are business/manufacturing, healthcare, retail, and defense/security. There are many applications of IoT, among which smart parking, smart lighting, waste management, forest fire detection, earthquake detection, smart product management, and elderly care through remote monitoring are only a few.

IoT is gradually making its way into the healthcare and wellness sector. According to a recent report by Vodafone [3], 77% of respondents from the healthcare sector said that they were spending more on IoT than one year ago, and the scale of their

\*Corresponding Author

†email: vsnaresh111@gmail.com

‡email: suryateja.pericherla@gmail.com

§email: psramam.1@gmail.com

¶email: rsivaranjani552008@gmail.com

# Multiparty Quantum Key Agreement With Strong Fairness Property

Vankamamidi S. Naresh<sup>1,\*</sup> and Sivaranjani Reddi<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem-534101, Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, Andhra Pradesh, India

Multiparty Key Agreement (MKA) is the backbone for secure multiparty communication. Although numerous efficient MKA-cryptosystems are available in the classical field, their security relies on the assumption that some computational issues are infeasible. To overcome this dependency, a new area, quantum cryptography, evolves to support key agreement among two or more participants securely. In this paper, first, we present a two-part quantum key agreement with Strong Fairness Property (SFP) and extend it to a Multiparty Quantum Key Agreement (MQKA) protocol. In the first round of proposed MQKA, a participant will act as a group controller (GC) and establishes two-party groups with each of the residual participants and agreed on a quantum two-party-style shared key per each of the two-party. In the second round, the GC computes public keys for each of the respective parties by combining these two-party keys using XOR-operation, excluding that party's two-party key. Next, the GC sends separate public keys to the individual participants. After receiving the respective public-key, each of the respective participants computes the multiparty key by joining their public-key with their two-party key using XOR. Finally, GC computes the multiparty key, as the GC knows all the two-party keys, it combines them with XOR and acts as a usual group participant. The proposed protocol has compared with other renowned MQKA protocols in terms of four standards parameters, namely transmission number (TN), qubit measurement number (QM), qubit for channel checking (QCC), and the qubit efficiency (QE) and acceptable results achieved. The security of the proposed MQKA relies on the absolute security of a two-part quantum key agreement with Strong Fairness Property (SFP). Moreover, it is secure against both internal and external attacks.

Keywords: Quantum multiparty key; strong fairness property; quantum summation; key manipulation attacks; quantum information; quantum teleportation.

## 1. INTRODUCTION

With the fast development in present day correspondence, profoundly secure multiparty correspondence is turning into a significant research area in a choice of group ware applications, such as teleconferencing, real-time information services, tele-medicine, distributive interactive simulations, and grid computing. An insightful research was carried out in this area through conventional cryptography by various researchers. However the security of conventional cryptography often relies on unproven computational assumptions. So in this paper we motivated towards “multiparty quantum key agreement with SFP” that promises unconditional security based on the fundamental laws of quantum mechanics.

Quantum key Agreement (QKA) begins with the BB84 [17] protocol in 1984 by Bennett et al. The BB84 protocol used

to generates a two-party shared key using single qubits via a quantum channel. The QKA's security relies on one of the two non-orthogonal or complementary randomly measured qubits. Further, the quantum mechanics principles shield the QKA from eavesdropper who tries to interpret the information. Likewise, any guaranteed prediction of complementary evidence on the same qubit turns out to be random. Besides, the characteristic of superposition and entanglement permits researchers to establish the quantum algorithm (QA) breaking the prominent RSA using quantum parallel computing. Conventional cryptographic algorithms can be easily intimidated by a robust quantum algorithm. Further, it permits researches to establish quantum algorithms based on physical laws in opposition to traditional cryptographic computations to protect from attacks of quantum computers. The QKD [18–21], Quantum Secure Direct Communication (QSDC) [22–25], and Quantum Secret Sharing (QSS) [26–29] are exciting applications like quantum dense teleportation and coding.

\*vsnaresh111@gmail.com.

## RESEARCH ARTICLE

# Blockchain privacy-preserving smart contract centric multiple multiparty key agreement over large WANETs

Vankamamidi Srinivasa Naresh<sup>1</sup> | V. V. L. Divakar Allavarpu<sup>2</sup> | Sivaranjani Reddi<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

<sup>2</sup>Department of Operations, FinTech Academy, GITAM Institute of Management, GITAM (Deemed to be University), Visakhapatnam, India

<sup>3</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology and Science, Visakhapatnam, India

**Correspondence**

Vankamamidi Srinivasa Naresh,  
Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India.  
Email: vsnaresh111@gmail.com

**Abstract**

With the rapid increase in the popularity of groupware applications whose security mainly relied on the key being used, which made multi-party/group secret key agreements significant. However, the brute-force attacks to interpret the group key made group communication vulnerable. The logical solution to overcome this is changing the group key frequently. In this direction, we propose blockchain-based multiple shared keys agreement among a group of participants. As with conventional methods, the proposed protocol does not rely on strong random number generation and/or master key. In this technique, the privacy-preserving smart contract acts as group controller (GC) and forms two parties with each of the other nodes. The GC, while generating these two-party keys in the first round instead of exchanging one public key, it exchanges " $m$ " public keys with each of the other nodes and generates  $m^2$  shared two-party keys with each of the respective nodes. Now in the second round, GC generates  $m^2$  sequential products of two-party shared keys and stores them securely as private data objects in the privacy-preserving smart contract. Next GC computes  $m^2$  sequential public keys to each of the respective nodes by multiplying these products with the inverse of individual members shared keys sequentially of the group nodes in trusted execution environment and shares them with respective group nodes. On receiving respective public keys, each group node computes the multiple multiparty shared keys by multiplying it with their individual shared keys. Furthermore, an upper limit for the number of shared keys obtained in terms of the number of keys exchanged.

## 1 | INTRODUCTION

With the rapid increase in the popularity of remote communication through unsecured channels such as the Internet, the use of cryptographic protocols to secure them increases. Most cryptographic applications involving different network communication protocols utilize key exchange algorithms for deriving unique keys for each session or connection. To overcome the security threats in the World Wide Web for communication in client/server applications running over the Internet are to deploy Internet Engineering Task Force, Internet Protocol Security, Secure Shell, and Transport Layer Security based security protocols which depend on negotiating session keys between clients and servers using expensive asymmetric key cryptography typical key exchange algorithms DH or elliptic curve Diffie-Hellman (ECDH).



# Alcohol Detection System in Vehicle for Human Safety

Addepalli Jaya Varma<sup>1</sup> | A. Vijaya Durga<sup>2</sup> | Pagalla Bhavani Shankar<sup>3</sup>

<sup>1</sup>Department of EIE, Adikavi Nannaya University, Rajahmundry, Andhra Pradesh, India

<sup>2</sup>Assistant Professor, Department of ECE, Adikavi Nannaya University, Rajahmundry, Andhra Pradesh, India

<sup>3</sup>Assistant Professor, Department of CSE, Sri Vasavi Engineering College(Autonomous), Tadepalligudem, Andhra Pradesh, India

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## ABSTRACT

*In this paper the objective is to design a system that detects the state of the driver before he takes the control of the vehicle. Where the system takes driver breath as the input to the MQ3 sensor. With the combination of the Arduino UNO and GPS& GSM Module for the communication purpose to send the alert message and location of the vehicle to the near ones and LCD display to show the present state of the driver and by using ESP 8266 Wi-Fi module to check and communicate the data through web page*

**KEYWORDS:** MQ3 sensor, Arduino UNO, GPS& GSM Module, LCD Display, ESP 8266 Wi-Fi Module

## INTRODUCTION

According to latest data compiled by National Crime Records Bureau (NCRB) 12,256 road accidents occurred in 2019 related to drunk and driving, 12,000 such cases reported in 2018. NCRB says that 2% of road accidents are happen in india are due to drunk and driving.

In this project we have developed a smart system that detects the state of driver with the sensor and after the alcohol sensor senses the drivers breathe in that air the alcohol percentage is taken as input and the concentration or percentage will be calculated and given as output. It will be displayed on the LCD display and give an alarm sound with the help of the buzzer whenever the amount exceeds the peak amount and sends an alert message to their people and warns him about the current situation and it shows the amount of concentration of alcohol percentage which was taken by the driver. This is our system is used for human safety whenever driver was drunk and

driving the car.

This is one of the basic ideas and technique which used to prevent accidents caused by drunk and driving.

## LITERATURE REVIEW

In this paper author describes the alcohol detection system using sensor [1].

In this paper author discuss about the detection process for various modules and kinds of detection methodologies in a particular attribute [4, 6, 8].

In this paper author introduces an emerging technology like blockchain for the future scope of a project [10] and security concern in any module [2].

## EMBEDDED SYSTEM

An Embedded system is the combination of both Hardware and Software.

It has three components:



# Blockchain: The Essential Future of Modern Internet

Pagalla Bhavani Shankar

Department of CSE, Sri Vasavi Engineering College (Autonomous), Tadepalligudem, Andhra Pradesh, India

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## ABSTRACT

*This paper deals with the future of modern internet, named as "Blockchain". Blockchain is renowned as the worlds populating a type of new software platform for all kinds of digital assets. In a form of, forms of blocks data will be stored or recorded in blockchain, and emerged & protected and secured by the conceptual of Cryptography. After release of bitcoin, the "Modern Internet : Blockchain" became a high peak internet protocol , which is transforming the values of data from a node to node in a block and working in a decentralized manner. Blockchain is a state of art technology that is always associated with a great level (layer) of security and privacy In today's tremendous technology innovations, blockchain technology is not only implemented in crypto-currencies , but also in social and corporate segments too, like e-commerce, e-governance, logistics and many others.*

**KEYWORDS:** Blockchain, Digital Assets, Block, Node, Cryptography, Bitcoin, Crypto-currency

## INTRODUCTION

Technology is a boon and gifted to today's generations and futures too. The day ends, technology is risen at every day of our esteemed lives. Today's technology plays a vital role and be as a part with us. It simply states that, Generations are gone up – Innovations are grown up day by day. In today's world encompassing a word "internet". By using internet generations of people will search the data, store the data and retrieving the data in a secure communicative way. Simply it seems that world is stimulated around on "Data", is a collection of information. At this point of scale, securing and protection of data will be a big risky task. To overcome this kind of problems, integrating or associating the data with the language of Cryptography yields the protection and securing the data in specified manner. Storing or sharing the data in the form of interlinked blocks (nodes) associated with Cryptography, is era of


today's modern internet: Blockchain.

## CRYPTOGRAPHY

Cryptography is a Greek word, where as crypto means secure and graphy means writing, simply a secure writing. By using the language of cryptography [2], it converts the readable input text into unreadable output text. Cryptography is protecting the data from various kinds of intruders. Cryptography is a combine process of both encryption and decryption. Encryption is a way, the process of converting readable plain text into unreadable cipher text. Whereas, Decryption is a way, the process of converting unreadable ciphers text into readable plain text.

# Feature Reduction and Optimization of Malware Detection System Using Ant Colony Optimization and Rough Sets

Ravi Kiran Varma Penmatsa, MVGR College of Engineering, India

 <https://orcid.org/0000-0002-4989-1305>

Akhila Kalidindi, MVGR College of Engineering, India

S. Kumar Reddy Mallidi, Sri Vasavi Engineering College, India

## ABSTRACT

Malware is a malicious program that can cause a security breach of a system. Malware detection and classification is one of the burning topics of research in information security. Executable files are the major source of input for static malware detection. Machine learning techniques are very efficient in behavioral-based malware detection and need a dataset of malware with different features. In windows, malware can be detected by analyzing the portable executable (PE) files. This work contributes to identifying the minimum feature set for malware detection employing a rough set dependent feature significance combined with Ant Colony Optimization (ACO) as the heuristic-search technique. A malware dataset named claMP with both integrated features and raw features was considered as the benchmark dataset for this work. The analytical results prove that 97.15% and 92.8% data size optimization has been achieved with a minimum loss of accuracy for claMP integrated and raw datasets, respectively.

## KEYWORDS

Ant Colony Optimization, Feature Optimization, Machine Learning, Malware analysis, Malware classification, Malware detection, Portable Executable (PE) Files, Rough Sets

## INTRODUCTION

For the past three decades, malware has been posing a continuous threat to networks and systems. Malware can be defined as software or malicious code injected into a target system or network to make the system work abnormally (Christodorescu et al., 2005). Virus, Trojans, backdoors, worms, rootkits, spyware, adware etc. are several forms of malware. In general, any malware is commonly termed as a virus, that was first framed by Cohen (1987). Each malware is designed with a common goal of destroying or committing some illegitimate access to the system to retrieve some sensitive information from the system. The type of malware and the anti-malware or malware detection systems depends on the hardware/software platforms and the operating system. The main goal of attackers is to infect or morph malware to evade from the malware detectors.

At present most of the systems are making use of signature-based methods in identifying malicious code. This technique uses a database that contains expressions or sequences that are considered as malware. Malware is detected and an alert is triggered if the signature of the code/program screened

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## A Disguised Framework For Plagiarism Detection: A Jaccard Coefficient Approach To Detect Telugu Text Documents

M. Chilakarao <sup>[1]</sup>, K. Sri Sahitya <sup>[2]</sup>, K. Hari Priya <sup>[3]</sup>

.N. Bala Manikanta <sup>[4]</sup>, M. Deepika <sup>[5]</sup>

Department of CSE, SITE Engg. College, Affiliated to JNTUK

Tadepalligudem, W.G.District, A.P. INDIA,

### ABSTRACT

Literary theft is the demonstration of communicating someone else's perspective, words and work as his own without recognizing the first source. It made numerous issues, particularly for instructive establishments and scientists. There are numerous openly accessible written falsification symptomatic apparatuses that are utilized to defeat these issues, yet those devices for the most part work in explicit dialects, for example, Arabic, English and Urdu. So far there is no such instrument to discover composing telugu writings. So we distinguished this issue and introduced its answer. We have utilized some preprocessing procedures and applied Jaccard Coefficient calculation to recognize level of copyright infringement.

**Keywords:-** Plagiarism detection

### I. INTRODUCTION

Plagiarism arises when a novel suggestion or activity utilizes materials or sources in a transformative way first impression, information or view[1]. Plagiarism can be separated into two major categories like source code plagiarism, written texts[2-5]. Text is segregated into two categories named as cross-lingual and monolingual[3]. Text category comprises many forms of writing namely sentences or Word-ordering, joining sentences[4], copy and paste sentences, modifying the formation of sentences and rephrases[5-9]. IPD technique functions with only single distrustful document and does not need any reference text for comparing with outer source. In contrast, EPD technique needs comparative texts[10], such as suspicious and unscripted original document[11-15]. During this work designed a PD system that make use of Machine Learning (ML) plus Natural Language Processing (NLP) techniques for eliminating unwanted data and to find degree of resemblance among Telugu text papers[16-20].

### II. LITERATURE SURVEY

Writing study is the most significant advance in

programming improvement process. Before building up the device it is important to decide the time factor, economy and friends quality recommended that "By utilizing Agnostic Programming Languages Methodology for Plagiarism Detection in Coding Courses" these days understudies[21-23]. To discover the copyright infringement scores they will utilize choice trees which will be determined dependent on the speed of lines every moment and characters every moment[24-26]. Notwithstanding broad and expressive opportunities we examine three unique levels that are viewed as fundamental, transitional and complex[27]. The Novel Framework for Plagiarism Detection: Methods for Finding Research in Urdu Language. By utilizing NLP (Natural Language preparing) procedures, for example, Tokenization, Trademark Removal, Termination Removal they have recognized dubious content and pieces and afterward split into lumps, after which they utilize a similar measurement for finding similar focuses[28-30]. Here they utilized three unique measurements, for example, the Levenshtien Distance Method (LDM), the Jaccard Overlap (JOM) strategy, the Jaccard Containment Coefficient (JCM) technique, the Dice Method (DM) for coordinating focuses and split whether a record was made[31]. The Discovery of Plagiarism Disguised in



# A Review on Improving Quality of Service in Wireless Sensor Networks

M. Chilakarao

Assistant Professor, Department of Computer Science and Engineering  
Sasi Institute of Technology & Engineering  
Tadepalligudem, Andhrapradesh, India

## ABSTRACT

In the evolving technologies, Wireless Sensor Networks has exposed its immense potential in different fields of modern applications. For the needs of successful protection mechanisms, wireless sensor networks continue to develop. The collection of wireless sensor present in a network consists of thousand and thousand of sensor nodes. A Sensor node has many features such as limited use of resources, capacity of communication, retention capability, sensing capacity etc. These sensor nodes are used for various methods like event detection, recognition, sensing locally, endless sensing, and actuator controlling. Though Wireless sensor networks having adequate potential, it has some drawbacks in terms of hardware and architectural design. We investigate protection attacks in wireless sensor networks in this paper. In recent days, wireless communications and electronics have become so advanced that they are on their way to creating multipurpose, low-power, low-cost, and more significantly, low-power and small-size sensor nodes. These nodes have such properties as to be able to communicate within short distances. When machine vision for healthcare progresses, demand for intelligent control is growing. Automation in recognizing a patient's routine or abnormal workouts can enhance health outcomes, and can also minimize manual monitoring efforts. Computer-vision is the advanced and creative medicinal services sector, and smart monitoring systems are increasingly becoming part of the healthcare system. Mechanization in determining a patient's ordinary or irregular behaviors can enhance the outcomes for well-being and can also minimize manual check-up and tracking efforts.

## I. INTRODUCTION

In harsh environment, a large number of sensor nodes which are dispersed form a Wireless Sensor Network. Like every other network, this network is vulnerable to various security issues. This makes it crucial to recognize the wireless sensor network security issues [1]. There are so many mechanisms that are built to offer sensor network or node protection. One significant question in wireless security network is trust management [2]. Wireless sensor systems are used for safety applications with various functionalities. In the beginning, it checks whether the target is present or not based on that parameters are evaluated. The goal can be tracked to various ends [3]. The attempts to identify, predict, and monitor may or may not be collaborative. The second role is to coordinate and bring information on wireless networking, and it checks outs the various problems which are related to estimation and detection. The networks which are wireless cannot work separately because the wired connection are required to transfer information or data over the network [4].

Most applications on the sensor network today and a range of attacks are possible in WSN, including Hello flood, Wormhole, Sybil, etc. Wireless Sensor Network is a collection of low cost, autonomous sensor nodes [5]. The sensor nodes are equipped with different types of sensors such as environment, optimal, chemical, thermal, acoustic, heat sensors that collect information from different nodes and work together to forward sensed data for further processing to base stations [6]. Wireless Sensor Network are designed to

solves various problems such as localization, clustering, routing, fault detection, and protection due to the complexity each application must have its unique characteristics and specifications [7]. Much research is engaged in developing novel design paradigms to tackle problems in existing network structures that are influenced by the biological system's inherently appealing features [8].

## II. LITERATURE SURVEY

Intrusion is an unwanted active sequence of similar events that refused the services and attempted to cause harm such as failure to respond to the program, and access unauthorized data or manipulate data. In other words, an assault defines intrusions as being the same [9]. Intrusion Detection System (IDS) scrutinizes to retrieve network information and any other mishandlings [10]. Intrusion-detection system (IDS) surveillance networks are used to track (internal or external) cyber-attacks. General IDS concept is about network intrusions but, for WSN, physical harm to sensor devices can be added. Identifying damage to the sensor is critical to server failure [11]. During extensive attacks, distributed denial of service traffic also generates intense congestion on the Internet that disturbs the normal transmission between all Internet users [12]. An analytical model is developed to estimate the health of the forwarding behavior of a node to explain this stealthy attack [13]. The attacker uses a high-powered transmitter to trick a large area

# AN EFFICIENT CLASSIFIER FOR DETECTING MALICIOUS FACEBOOK APPLICATIONS

Vankamamidi S Naresh<sup>1,\*</sup>, O sriNagesh<sup>2</sup> and Prathipati Ratna Kumar<sup>3</sup>  
<sup>1,2</sup>Dept of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India.  
<sup>3</sup>Department of "Computer Science and Engineering", Koneru Lakshmaiah Education Foundation, Hyderabad, Telangana-500075.  
<sup>1,\*</sup>E-mail: vsnaresh111@gmail.com, <sup>2</sup>nagesh.osri@gmail.com and <sup>3</sup>rk30111972@klh.edu.in

Received: 22.04.2020 Revised: 24.05.2020 Accepted: 19.06.2020

**Abstract:** Day by day addictiveness of facebook is rapidly increasing due to third party applications. Taking this is an advantage hackers have realized to spread malicious applications to hack user details. So, our main theme is to build up a tool called as Rigorous Application Evaluator (FRAppE) of facebook to detect facebook applications which are malicious. To classify an application we maintain some characteristics which help us differentiate apps which are benevolent and harmful. As an illustration, if that app is examined which are malicious having names similar, information in app summary and they have less permission sets and same URL's. Based on these features we train our dataset and using SVM classification technique we classify the new application as benign or malicious. FRAppE is a tool which acts like an independent watchdog for classifying an app and warns the users before installing an application.

**Index Terms:** Fb applications, malicious, OSN's, benign

## I. INTRODUCTION

In the present smart technology era, social networks working online are placing the major role in everyone's life. They are connecting the people world wide and maintaining communication between the people. For Eg: Facebook, Instagram, Twitter. On an average everyday there are nearly 400K apps on Facebook [3], and on and nearly 21M install apps are present [1]. Taking this as an advantage third party applications are spreading malicious applications to hack the details of the users and with these third party applications hackers also started spreading malicious applications [4]–[5]. By this hackers are making profitable business. Through this hackers are getting benefit in many ways in facebook

- 1) The social networks is a platform to spread multiple apps contains malicious applications by millions of users and the friends of each user.
- 2) Some malicious applications obtain social network users confidential data or information like password, usernames etc...

Research studies concentrated very little to applications. Most study is related to detect only malicious URL's and posts on facebook but not applications.

We develop FRAppE, an efficient classifier for detecting

malicious apps. To construct FRAppE, and to classify an application here we use a classification technique. This classifier is done through Support Vector Machines (SVM), which is used to classify the blacklist and white list data users in order to retain more accuracy and speed of the process. The classifier classifies the application based on URL's by classifying with our trained dataset. If it is detected as malicious it warns the user before adding to their profile. By using the data set the study of this concept is done. Consideration an URL is malicious and its URL id is directed towards a webpage who is spreading malicious programs, hacks user details, forces to perform a task, fake promises etc. We observe the features of the apps and profile malicious app significantly differ from benign applications. For example in 10 applications nearly 7% of apps share same name.

## II. BACKGROUND

### 1. Facebook Applications

Facebook gives permission to the third party developers to develop different applications to the users in order to increase its popularity. Other than smartphone and desktop applications they do not need any downloading or other processes. The permission from application server will be granted, when a user wants to add an application to his facebook profile: 1) right to retrieve some of the information in user's Facebook profile eg: username, password 2) right to execute some events on behalf of the customer. For eg: skill to place on the user's fence. Facebook generates token and using that token user can add an application.

# AN EFFICIENT CLASSIFIER FOR DETECTING MALICIOUS FACEBOOK APPLICATIONS

Vankamamidi S Naresh<sup>1\*</sup>, O sriNagesh<sup>2</sup> and Prathipati Ratna Kumar<sup>3</sup>

<sup>1,2</sup>Dept of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, India.

<sup>3</sup>Department of "Computer Science and Engineering", Koneru Lakshmaiah Education Foundation, Hyderabad, Telangana-500075.

<sup>1,\*</sup>E-mail: vsnaresh111@gmail.com, <sup>2</sup>nagesh.osri@gmail.com and <sup>3</sup>rk30111972@klh.edu.in

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Article

# Quantum Diffie–Hellman Extended to Dynamic Quantum Group Key Agreement for e-Healthcare Multi-Agent Systems in Smart Cities

Vankamamidi S. Naresh <sup>1</sup>, Moustafa M. Nasralla <sup>2</sup>, Sivaranjan Reddi <sup>3</sup>  
and Iván García-Magariño <sup>4,5,\*</sup>

<sup>1</sup> Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem 534101, India; vsnaresh111@gmail.com

<sup>2</sup> Department of Communications and Networks Engineering, College of Engineering, Prince Sultan University, Riyadh 11586, Saudi Arabia; mnasralla@psu.edu.sa

<sup>3</sup> Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, India; rsivaranjani552008@gmail.com

<sup>4</sup> Department of Software Engineering and Artificial Intelligence, Faculty of Computer Science, Complutense University of Madrid, 28040 Madrid, Spain

<sup>5</sup> Instituto de Tecnología del Conocimiento, UCM, 28040 Madrid, Spain

\* Correspondence: igarciam@ucm.es

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**Abstract:** Multi-Agent Systems can support e-Healthcare applications for improving quality of life of citizens. In this direction, we propose a healthcare system architecture named smart healthcare city. First, we divide a given city into various zones and then we propose a zonal level three-layered system architecture. Further, for effectiveness we introduce a Multi-Agent System (MAS) in this three-layered architecture. Protecting sensitive health information of citizens is a major security concern. Group key agreement (GKA) is the corner stone for securely sharing the healthcare data among the healthcare stakeholders of the city. For establishing GKA, many efficient cryptosystems are available in the classical field. However, they are yet dependent on the supposition that some computational problems are infeasible. In light of quantum mechanics, a new field emerges to share a secret key among two or more members. The unbreakable and highly secure features of key agreement based on fundamental laws of physics allow us to propose a Quantum GKA (QGKA) technique based on renowned Quantum Diffie–Hellman (QDH). In this, a node acts as a Group Controller (GC) and forms 2-party groups with remaining nodes, establishing a QDH-style shared key per each two-party. It then joins these keys into a single group key by means of a XOR-operation, acting as a usual group node. Furthermore, we extend the QGKA to Dynamic QGKA (DQGKA) by adding join and leave protocol. Our protocol performance was compared with existing QGKA protocols in terms of Qubit efficiency (QE), unitary operation (UO), unitary operation efficiency (UOE), key consistency check (KCC), security against participants attack (SAP) and satisfactory results were obtained. The security analysis of the proposed technique is based on unconditional security of QDH. Moreover, it is secured against internal and external attack. In this way, e-healthcare Multi-Agent System can be robust against future quantum-based attacks.

**Keywords:** quantum group key; quantum summation; quantum information; quantum teleportation; participant attacks; sensor; multi-agent system



RESEARCH PAPER

## Secure Dynamic Interactive Blood Bank based on Cognitive Computing

Vankamamidi S Naresh<sup>\*1</sup>, O Sri Nagesh<sup>2</sup> & Sivaranjanireddi<sup>3</sup>

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### ABSTRACT

*Cognitive based (Chatbot) blood bank provides a communication platform among the stakeholders of blood bank. In the past, the blood recipient will have to contact the blood bank and the blood donors individually, which is a time-consuming process. To address this issue, this paper proposes a Secure Dynamic Interactive Blood Bank based on Cognitive Computing, which can fulfill the blood request of the needy with without much difficulty. Hence, the proposed work aims to overcome this problem by requesting the recipient to simply send a message to a chatbot. The motivated individuals who are willing to donate blood can register their name by interacting with the chatbot. If the requested blood group is available at the blood bank/registered donor, then the recipient will get contact details of the blood bank/registered donors available at that instant. Donor data will be maintained in Cloud database. The proposed system is a cognitive chatbot, which acts as a communication platform among the stakeholders such as blood bank, blood donor, and the needy. This system is built using cognitive technology of Google; it makes conversations using chatbots very similar to human conversations, thereby making the proposed system more efficient than the existing ones.*

**KEYWORDS:** *Cognitive computing; Chatbots; Machine learning; Natural language processing; IBM Bluemix; Google's api.ai.*

### 1. Introduction

Blood is a non-replenishable entity, the only source of which is humans. Timely availability of quality blood is a crucial requirement for sustaining healthcare services. Therefore, maintaining the quality of blood and identifying Professional Donors represent a major responsibility of blood banks. NACO (National AIDS Control Organization) and NABH (National Accreditation Board for hospitals and Healthcare Providers) have provided guidelines for ensuring the quality of blood and identifying Professional Donors [1]. Moreover, manually monitoring standards and identifying professional donors is a challenging job. Blood is the most important and critical element in human life. According to the bible, blood refers to life every

year that a nation requires about 4-5 crore units of blood out of which major 40 Lakh units of blood are available. There are several blood banks around the world; however, they are not offering any contact between the donor and the needy, which is often seen as a disadvantage and leads possibly to one's death. This paper aims to beat this communication barrier by providing a blood bank chatbot. This automated application is proposed to bring voluntary blood donors and the needy onto a common platform

According to the recent statistics of a blood bank in India, someone needs blood every two seconds. More than 38,000 blood donations are required every day. A total of 30 million blood components are transfused each year. The average red blood cell transfusion is approximately 3 pints. The blood type most often requested by hospitals is Type O. Sickle cell patients can require frequent blood transfusions throughout their lives. More than 1 million new people are diagnosed with cancer each year. A single car accident victim can require as many as 100 units of blood.

\* Corresponding author: Vankamamidi S Naresh  
vsnaresh111@srivasaviengg.ac.in

1. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.
2. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India
3. Department of CSE, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, Andhra Pradesh, India.



RESEARCH PAPER

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\* Corresponding author: Vankamamidi S Naresh  
vsnaresh111@srivasaviengg.ac.in

1. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.
2. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India
3. Department of CSE, Anil Neerukonda Institute of Technology & Science, Visakhapatnam 530003, Andhra Pradesh, India.

RESEARCH PAPER

## Comparative Analysis of MOD-ECDH Algorithm and Various Algorithms

O Sri Nagesh\*<sup>1</sup> & Vankamamidi S Naresh<sup>2</sup>

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### ABSTRACT

Cryptography has remained a well-known and well-researched topic for ages. It is the first line of defense for any networked system. A lot of algorithms have been developed using symmetric and asymmetric cryptographies. From the security point of view, Asymmetric Cryptography is more popular due to its enhanced security. RSA, DSA, ECS, DES, ECC, and other algorithms have been developed for realizing Asymmetric Cryptosystem. These algorithms are primarily used to ensure a secure and reliable communication. These algorithms play a vital role in establishing a secure line of communication. Elliptic Curve Cryptography (ECC) provides the same level of security with a smaller key size. In the present paper, a developed MOD-ECDH was proposed and, then, it was compared with other various popular algorithms like ECDH, RSA, and ECS. Empirical and simulation results of applying the algorithms of ECDH and MOD-ECDH were described in detail. According to the result analysis, it is evident that the proposed algorithm outperforms other algorithms in terms of processing time and key size.

**KEYWORDS:** Elliptic curve diffie-hellman algorithm (ECDH); Modified elliptic curve diffie-hellman algorithm (Mod-ECDH); Elgamal cryptosystem (ECS); Rivert shamir adelman (RSA); diffie-hellman (DH); Voice over internet protocol (VoIP).

### 1. Introduction

Two keys in asymmetric cryptography are used: one is the public key given to all users and the other is the private key known by the owner only. Public key is generated by the end user using mathematical derivation. An elliptic curve is drawn using ECDH algorithm and, based on the agreed-upon points, both parties will exchange data. By using these parameters, both parties perform encryption and decryption operations during the conversation between sender and receiver.

In the asymmetric key cryptosystem, a secret key is not shared between sender and receiver, which will not make data communication insecure. Symmetric key cryptography is faster than asymmetric cryptography because of generating

two keys. A lot of researchers have developed many algorithms to increase the speed of asymmetric cryptography. Elliptic Curve Cryptography (ECC) [11] has been developed with a smaller key size that enjoys high security. ECC is the best alternative to RSA-based cryptosystem [4]. RSA requires 1024 bits of key size because ECC requires only 160 bits for equal security [2, 3].

Cloud paradigm is used for offering high-quality, fast services to users and it is the best delivery model used globally. Bernstein et al. [5] proposed group operations on Edwards curve. Cloud paradigm is also used as the best Customer Relationship Management (CRM) tool. Cloud paradigm is also useful for IOT and Mobile communication technologies.

Data flows in communication networks and they are always at risk to more vulnerabilities or security breaches. These security threats may include breach of confidentiality, data integrity problems, authenticity problem by impersonation, man-in-the-middle-attack, and insider attacks. In order to overcome these breaches, some algorithms have been developed [9]. These

\* Corresponding author: O Sri Nagesh  
osrinagesh@sriivasaviengg.ac.in

1. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India, Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.  
2. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.



RESEARCH PAPER

## Comparative Analysis of MOD-ECDH Algorithm and Various Algorithms

O Sri Nagesh\*<sup>1</sup> & Vankamamidi S Naresh<sup>2</sup>

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\* Corresponding author: O Sri Nagesh  
osrinagesh@sriivasaviengg.ac.in

1. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India, Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.
2. Department of CSE, Sri Vasavi Engineering College, Tadepalligudem-534101, A.P, India.



# Implementation of Online Recruitment Assistance System by using DJANGO

LeelavathiArepalli, Sr. Asst. Prof.

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK)

Tadepalligudem, AP, INDIA

[leelavathee@gmail.com](mailto:leelavathee@gmail.com)

Rajesh Arepalli, Asst. Prof.

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK)

Tadepalligudem, AP, INDIA

[rajesharepalli@gmail.com](mailto:rajesharepalli@gmail.com)

JampanaSailaja(B.Tech)

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK),

Tadepalligudem ,AP, INDIA

[sailajavarmaj@gmail.com](mailto:sailajavarmaj@gmail.com)

NarayanaBhagyalakshmi (B.Tech)

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK)

Tadepalligudem,AP,INDIA

[abhagyalakshmia698@gmail.com](mailto:abhagyalakshmia698@gmail.com)

Dattikeerthana(B.Tech)

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK)

Tadepalligudem ,AP, INDIA

[keerthanadatti@gmail.com](mailto:keerthanadatti@gmail.com)

Jammu Raviteja (B.Tech)

Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE

(Affiliated by JNTUK)

Tadepalligudem,AP,INDIA

[jammuraviteja1234@gmail.com](mailto:jammuraviteja1234@gmail.com)

**Abstract**— The placement activities play a vital role in student career. At present, all the Placement and Club activities information is being maintained manually. Hence it is prone to errors. It is time consuming process for collecting ,managing and updating the student lists and it depends on the number of students. So we are proposing a computerized automation module to speed up the process.

Django is a python based web Framework. Unlike other frameworks, Django uses MVT model which is a Model-View- Template model because the controller is handled by the framework itself so that it is ease to create complex and database-driven activities.

By using this technology, we are developing an application that helps in simplifying and reducing the work of placement activities and helps in easy retrieval and maintenance of student data.

## 1. INTRODUCTION

The placement activities play a vital role in student career . At present, all the Placement activities information is being maintained manually .If any modification or updates are required in the profile of any student , it has to be done manually. This is tedious and time consuming , lack of security of data , took more man power, consumes large volume of paper and space. This process is so difficult when number of user's increases. By overcoming all the drawbacks in the existing system, we are proposing this new system . The proposed system can overcome all the limitation of the existing system ,such as student's information is maintained in the database, it gives more security to data , ensures data accuracy , reduces paper work and save time. So we can easily retrieve the student details during the placements.

# Implementation of Online Recruitment Assistance System by using DJANGO

LeelavathiArepalli, Sr. Asst. Prof.  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK)  
Tadepalligudem, AP, INDIA  
[leelavathee@gmail.com](mailto:leelavathee@gmail.com)

Rajesh Arepalli, Asst. Prof.  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK)  
Tadepalligudem, AP, INDIA  
[rajsharepalli@gmail.com](mailto:rajsharepalli@gmail.com)

JampanaSailaja(B.Tech)  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK).  
Tadepalligudem .AP, INDIA  
[sailajavarmaj@gmail.com](mailto:sailajavarmaj@gmail.com)

NarayanaBhagyalakshmi (B.Tech)  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK)  
Tadepalligudem,AP,INDIA**bhagya**  
[alakshmia698@gmail.com](mailto:alakshmia698@gmail.com)

Dattikeerthana(B.Tech)  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK)  
Tadepalligudem ,AP, INDIA  
[keerthanadattii@gmail.com](mailto:keerthanadattii@gmail.com)

Jammu Raviteja (B.Tech)  
Dept of Computer Science and Engineering  
SRI VASAVI ENGINEERING COLLEGE  
(Affiliated by JNTUK)  
Tadepalligudem,AP,INDIA**jammuraviteja**  
[1234@gmail.com](mailto:1234@gmail.com)

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# ARCHIVES

## Performance Evaluation of Cascaded Multilevel Inverter Using Neuro Fuzzy Controller

👤 Y. Lalitha Kameswari, D.Sudha Rani

### Abstract

In PWM techniques, APF developments are consistent recurrence, sliding structure, hysteresis, and triangular waveform oversee are worn to control in the APF with event field advance. The significant insufficiency contrive is to, in direct to acquire best grades, similarly high switch frequencies are fundamental, a while later manual for high exchanging sufferers. As of now taking off rush processor possible to diminish computational time in reasonable. It might be event field or event space approach, the moderate APFs are additionally compound and costly in reasonable, while the sum to be constrained fluctuate in excess of a wide extension. From this time an inexorably truly decision is to utilize counterfeit sharp unite plans, for example, fluffly rationale, neural system and so on. The foreseen strategy have the option to annihilate vocal with ideally picking the exchanging points. Vocal creation safeguard be maintain a strategic distance from in staggered inverters with select best possible edges.

📖 Volume 12 | Issue 2

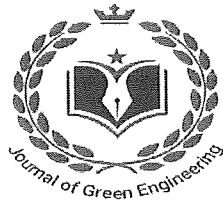
📄 Pages: 355-361

DOI: 10.5373/JARDCS/V12I2/ S20201052 ()

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## Individual Residential Meter-Level Load Forecasting and Load Analysis for Residential Peak Load Management in India

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<sup>1,\*</sup>G.Swathi and <sup>2</sup>Sudha Rani Donepudi

<sup>1,\*</sup>Research Scholar, Department of Electrical and Electronics Engineering, KL University, Vijayawada, India.

<sup>2</sup>Associate Professor, Department of Electrical and Electronics Engineering, Sri Vasavi Engineering College, India.

### Abstract

Meeting the peak demand in India which has a predicted growth of 10 GW every year is a considerable challenge for India's electric sector. The coincidence of customer's demand with system peak demand becomes more expensive for the utility. Hence, control of customer's demand coincident with the peak demand at various levels in the electricity market can yield savings to the supplier and the customer. Residential Energy Consumption (REC) in India has a good contribution towards peak demand and has a great scope for peak demand reduction. Forecasting and Analysis of forecasted REC data at the user-level during peak hours over time can result in great savings through energy efficiency, customer awareness, and conservation measures for both customers and utility. Hence, the main focus of the paper is on forecasting individual home meter-level half-an-hour granular load for Indian residential customers and load data analysis of the predicted data that analyses the customer's demand coinciding with utility demand during peak hours. Support Vector Regression (SVR), a proficient prediction Machine Learning model has been used in this work for forecasting 9 houses individual half-hourly consumption synthetic data that has been created for a year based on customer's consumption patterns and lifestyle.


**Key words:** Individual meter-level load forecasting, Residential load, Support Vector Regression, Peak-load, Load data analysis.

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# ARCHIVES


## Single Phase Multi-Purpose AC/DC Converter for Electric Vehicle External Charging Station

 Swathi Karike, Sudha Rani Donepudi

### Abstract

Even though the Vehicle customers are aware of the environmental issues and willing to maintain non pollutant electric vehicles because of non-vailable charging stations and more charging time still electric vehicles are not prominently used. Much important charging stations are non-profitable for the owners because of its more initial and maintenance costs. Hence a charging station with less installation and maintenance cost with fast charging capabilities is much needed. This paper presents a multi-purpose AC to DC converter with a single-phase bridgeless topology and fast charging. The electric vehicle battery can be either charged through slow charging or fast charging with the same converter. With the proposed bridgeless topology, a secondary DC/DC converter is not necessary to obtain the power conversion which reduces the number of components, component losses, installation and maintenance cost of the charging station significantly. The proposed converter can also access the communication lines of the vehicle through charger cable along with the terminals to charge battery. Depend on the accessed data like State of charge and temperature of the battery, charging strategy will be decided by the proposed converter. The operating switching sequence, conversion topologies, duty ratio calculation, safety functionalities and characteristics of the proposed AC to DC converter are analysed and validated with simulation results for 12-kW AC slow Charging mode and 32-kW Fast-Charging mode

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
## A Novel Optimistic Location of PMU Using PSO Based Intelligent Flowchart for Power System Observability

 Preeti Kabra, D. Sudha Rani

### Abstract

This paper presents the PSO algorithm technique for best location of PMU that makes the power grid completely under observation. Particle Swarm Optimization (PSO) is modern heuristic algorithm for finding optimistic location of PMU. Phasor Measurement Unit (PMU) is an advanced apparatus for wide area on line monitoring of grid which measures magnitude along with angle with universal time synchronization. As PMU is an expensive device it is essential to minimize the number of devices with all buses should be under observation. PSO algorithm provides the minimum number of PMU's for IEEE-14 bus and its location gives better result compared to other optimization algorithms.

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# Design and Analysis of Hexagonal and Octagonal Honey Comb Structures with Various Materials and FEM Analysis.



PenumakaDhananandh, Venkata Ramesh Mamilla, K.Sri Rama Murthy

**Abstract:** The demands for automotive interior and exterior panels in present and future request is an optimal combination of materials and cost-efficient production processes. Mechanical and acoustical requirements of high strength and a weight target result, today often in the selection of a sandwich design with a cost efficient and recyclable core material. Honey comb sandwich structures are used in Airplane wings, Ships, Cars, Civil Constructions, etc. Now a days this technology is being used all-over the automotive fields. These designs are the best way for low material usage and high strength.

In this project the designs of hexagonal and octagonal honey comb structures are to be analysed and compared for the best result in structure. The structures are to be developed by using SolidWorks[1] software. Solidworks flow simulation is to be used to test the effectiveness and limitations of the structures. Thermal and static analysis are to be analysed by using solidworks simulation software with different types of materials like Titanium, Aluminum, and Stainless steel to identify the best material at low cost and high efficient by applying various loads of finite element method analysis.

**Keywords:** Cost-efficient, high strength, low material, SolidWorks, Thermal and static analysis, finite element method.

## I. INTRODUCTION

The geometry of a honeycomb structure minimizes the amount of material used to minimal weight and minimal cost. The geometry of honeycomb structure may vary. In mechanical structures stiffness, strength and weight efficiency are the most important factors. These honeycomb structures are used in satellites, Trains, space craft, Aircraft, boats, trucks etc. Core material is selected on the basis of performance low density. Honeycomb sandwich structures exhibit high stiffness and strength to weight ratios. In the aerospace and transportation industry different types of sandwich core structures are used. Such as foam/solid core type are used in ships and aircrafts, honeycomb types of core are used in aircrafts and satellites, truss core type are used in buildings and bridges and web types of core is manufactured by using a variety of base materials.

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\* Correspondence Author

**PenumakaDhananandh\***, M.Tech student, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

**Dr.Venkata Ramesh Mamilla**, Professor & Head, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

**K.Sri Rama Murthy**, Sr.Assistant Professor, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101. Email: penumakadhananandh@gmail.com

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With the development of aerospace technology, the demand of high-strength-low-density materials is becoming more and more requirement. Severe mechanical environment and aerodynamic coupling are inevitable because of high launch acceleration and high frequency vibration, so the requirements for strength and stiffness of aeronautical structures are extremely high. Moreover, launch costs have strong restrictions on the overall mass of spacecraft, so the mass of aeronautical structures must be minimized as far as possible. Severe contradiction between strength and mass spurs extensive utilization of advanced alloy material and composite material in aerospace applications, such as aluminum alloy, titanium alloy, stainless steel(SS). So that the honeycomb structure are designed in different shapes like triangular, square and hexagonal Structures. So beyond that according to the structures and requirements, we need more efficient and less weighted structure, So in that process of discovering we are hoping that Octagonal structure can be that change of present technology. The octagonal honeycomb core is designed with different materials of Aluminum, Stainless steel and Titanium composites. The results obtained from the experiment compared with the Hexagonal structure results with same composition of materials and dimensions.

**Honeycomb composites:** Honeycomb composites are manufactured in different shapes which are used for minimizing the weight and minimize the cost of the production. These structures are made of different mixing of materials for gaining good strength. These composites are the most demanded structures in these days.

## II. LITERATURE REVIEW

Tom Bitzer's Honeycomb Technology book [2] deals with honeycomb and honeycomb sandwich construction. After reading this book you will have a good understanding of what honeycomb is, how it is manufactured, and how to use it. You also will have the necessary knowledge to design honeycomb sandwich panels and honeycomb energy absorption systems. The honeycomb manufacturing methods, materials, cell configuration, terminology, and uses are all explained. The basic honeycomb sandwich concepts are discussed, failure modes shown and the standard design formulas are given. The standard honeycomb and sandwich test methods are also reviewed. SrinivasAthreya, Dr. Y.D.Venkatesh [3] Studied application of the taguchi method for optimization of process parameters in improving the surface roughness of lathe facing operation. Taguchi method is a statistical method developed by Taguchi and Konishi.

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## DESIGN AND FABRICATION OF BIODIESEL SETUP AND PRODUCTION OF BIODIESEL FROM JULIFLORA SEED OIL

Dr.Venkata Ramesh Mamilla<sup>1</sup>, K. Nagendra Reddy<sup>2</sup>,G.D. Bhagavantham<sup>3</sup>,  
K.P.V.Hari Hara Kumar<sup>4</sup>,G. Sai Kumar<sup>5</sup>

<sup>1</sup> Professor & Head , <sup>2,3,4,5</sup> UG Students

Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem,  
West Godavari District, Andhra Pradesh,India.

### ABSTRACT

Fossil fuels like petrol, diesel are non renewable fuels and they are exhausted day by day, it causes to global warming, that is why need of bio diesel is increased, but the cost of reactor to produce bio diesel is high and it is difficult to operate and risky. The main objective of this project is to fabricate a reactor with simple working process to produce a quantity of 1 liter of bio diesel from the vegetable oils like juliflora seeds and making blends with diesel with a different percentages of bio diesel and evaluate the properties of produced bio diesel and blends then compare the properties of produced bio diesel and blends with standard bio diesel and standard diesel.

**Keywords:** Fabrication; Juliflora Seed Oil; Transesterification; Biodiesel

### 1.0 INTRODUCTION

Prosopis juliflora is a shrub or small tree in the family Fabaceae, a kind of mesquite. It is native to Mexico, South America and the Caribbean. It has become established as an invasive weed in Africa, Asia, Australia and elsewhere. It is a contributing factor to continuing transmission of malaria, especially during dry periods when sugar sources from native plants are largely unavailable to mosquitoes

Growing to a height of up to 12 metres. Its leaves are deciduous, geminate-pinnate, light green, with 12 to 20 leaflets. Pods are 20 to 30 cm long and contain between 10 and 30 seeds per pod. A mature plant can produce hundreds of thousands of seeds. Seeds remain viable for up to 10 years. The tree reproduces solely by way of seeds, not vegetatively. Seeds are spread by cattle and other animals, which consume the seed pods and spread the seeds in their droppings



Fig.1. Prosopis juliflora tress raw pods

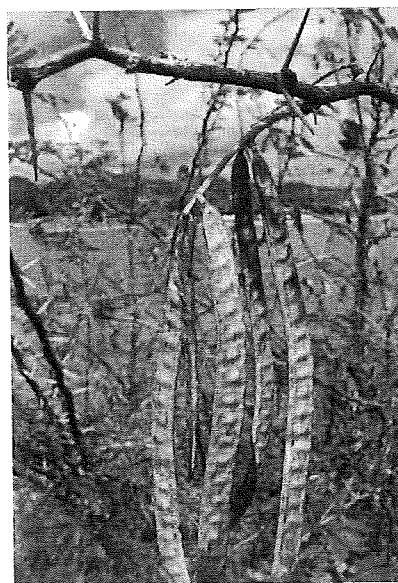


Fig.2. Prosopis juliflora tress dired pods

## Evaluation of Performance and Emission parameters of a CI engine fuelled with Palm Styrene, Sun Flower and Rice Bran Methyl Esters Blends Blended with Diesel

<sup>1</sup> Dr.Venkata Ramesh Mamilla , <sup>2</sup> Siriseti Nagaraju, <sup>3</sup> Valluri Harsha Vardhan, <sup>4</sup> Geddada Jyothsna Sushmitha Devi, <sup>5</sup> Annamenedi Ranadheer

<sup>1</sup> Professor, <sup>2,3,4,5</sup> UG Student  
Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, West Godavari District, Andhra Pradesh, India.

\* Corresponding Author.

**Abstract:** This Paper deals with the study of the potential substitution of Palm Styrene methyl ester, Sun flower methyl ester and Rice bran methyl ester blends for diesel as fuel for automobiles and other industrial purposes. Biodiesel was prepared from the edible Palm Styrene oil , Sun flower oil and Rice bran oil by transesterification of the crude oil with methanol in the presence of NaOH or KOH as catalyst.

The objective of this study is the analysis of the performance and emission characteristics of the Biodiesel that is mixing of equal proportion of three methyl esters are Palm Styrene methyl ester, Sun flower methyl ester and Rice bran methyl ester (PSME+SFME+RBME) Mixture of methyl ester (MME) in equal proportion and comparing with petroleum diesel. The tests were carried out on a 4.4 KW, single cylinder, direct injection, air-cooled diesel engine. Engine tests have been carried out with the aim of obtaining comparative measures of Brake power, specific fuel consumption and emissions such as CO<sub>2</sub>, CO, HC, and NO<sub>x</sub> to evaluate and compute the behavior of the diesel engine.

**Keywords:** Performance, Emission, C.I Engine, Palm Styrene Methyl Ester, Sun Flower Methyl Ester, Rice Bran Methyl Ester, Alternative Fuel, Diesel.

### I. INTRODUCTION

Biodiesel is composed of long chain fatty acids with an alcohol attached, often derived from vegetable oils. It is produced through the reaction of a vegetable oil with methyl alcohol or ethyl alcohol in the presence of a catalyst. Animal fats are another potential source. Commonly used catalyst is potassium hydroxide (KOH) or sodium hydroxide (NaOH). The chemical process is called transesterification which produces biodiesel and glycerine.

Chemically biodiesel is called a methyl ester if the alcohol used is methanol. If ethanol is used, it is called an ethyl ester. They are similar and currently, methyl ester is cheaper due to the lower cost for methanol. Biodiesel can be used in the pure form, or blended in any amount with diesel fuel for use in compression ignition engines.

Bio-diesel is a domestic, renewable fuel for diesel engines and it is refer to a family of CI engines fuels that are produced from natural sources such as oils of sunflower, sesame, palm, neem, cotton seed, and jatropa. It is believed that Biodiesels which may be the oils themselves or their esters are the most likely successors to petroleum derived diesel. It is also more practical that these alternate fuels are

introduced gradually as blends with diesel so that the production facilities are able to grow and markets are able to Biodiesel.

### II. PRODUCTION OF BIODIESEL

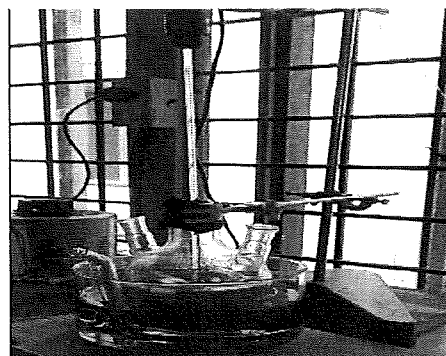


Figure 1: Transesterification

A lot of research work has been carried out to use vegetable oil both in its neat form and modified form. Studies have shown that the usage of vegetable oils in neat form is possible but not preferable. The high viscosity of vegetable oils and the low volatility affects the atomization and spray pattern of fuel, leading to incomplete combustion and severe carbon deposits, injector choking and piston ring sticking. The methods used to reduce the viscosity are

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## WEAR BEHAVIOUR OF ALUMINIUM METAL MATRIX COMPOSITES REINFORCED WITH COPPER AND GRAPHITE

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### ABSTRACT

A low cost system of Al 6063 4%Cu xGr (x = 2, 4 and 6 wt. %) metal matrix composites (MMCs) were fabricated by stir casting technique. These fabricated composites were characterized by using scanning electron microscope. The dry sliding wear behaviour of the prepared composite was investigated by using a Pin on Disc method at applied loads of 50 N. Wear tests were carried out with no lubrication at room temperature (30–36°C). The ageing of the MMCs was done followed by air cooled and water cooled. The results indicate that the wear rate is less for Al4Cu4Gr air cooled.

**KEYWORDS:** Al6063, Stir casting, Graphite, Copper, Metal matrix composites, Wear & Ageing

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### 1. INTRODUCTION

Discontinuous reinforced aluminum metal matrix composites (DRAMMCs) are a class of composite materials with desirable properties, including low density, high specific rigidity, high specific strength, controlled thermal expansion co-efficient, increased fatigue resistance and superior dimensional stability at high temperatures, etc.[1,2]. Such materials have emerged as the essential class of advanced materials that offer the ability for engineers to adapt the material properties to their needs. Such materials fundamentally vary from the typical manufacturing materials from the homogeneity point of view. Controlled application of one or more reinforcement materials in continuous metal matrix process is possible in composites. The vast majority of these composite materials are metallic components reinforced with high strength, high modulus and brittle ceramic phases which can be either continuous in the form of fibre, discontinuous in the form of whiskers,

Platelets or particulate reinforcements embedded in a matrix [3-6]. Over the past two decades, wear performance of DRMMCs

Reinforced with various reinforcements ranging from very soft materials such as graphite, talc etc. to highly hardened ceramic particles such as SiCp, Al<sub>2</sub>O<sub>3</sub> etc., [3 – 6] was reported to be superior to their respective unreinforced alloys. A large number of experiments were done independently on the Al / SiCp [4 – 6] and Al / Graphite [3, 7]. The outer lubricant traditionally plays an important role in wear behaviour. Al alloy wear behavior strengthened with SiCp-Graphite particles has not been newly understood. As a result, the present study used a mixture of high-hardened SiC particles and soft graphite to examine the wear actions of the Al alloy reinforced with SiC particles and graphite. It was observed that wear test volume losses of Al – Mg – Cu alloy continuously decrease to 5%. It has also been found that silicon carbide particles play a significant role in improving the Al – Mg – Cu alloying system's wear resistance. All Al – Mg – Cu alloys and Al – Mg – Cu / SiC composites were found to



## WEAR BEHAVIOUR OF ALUMINIUM METAL MATRIX COMPOSITES REINFORCED WITH COPPER AND GRAPHITE

B. N. V. SRINIVAS<sup>1</sup>, K. DORATHI<sup>2</sup>, Dr. N. TULASI RADHA<sup>3</sup> & G. RAMAPRASAD<sup>4</sup>

<sup>1,2,4</sup>Assistant Professor, Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>3</sup>Scholar, Department of Mechanical Engineering, GITAM University, Visakhapatnam, Andhra Pradesh, India

### ABSTRACT

A low cost system of Al 6063 4%Cu xGr (x = 2, 4 and 6 wt. %) metal matrix composites (MMCs) were fabricated by stir casting technique. These fabricated composites were characterized by using scanning electron microscope. The dry sliding wear behaviour of the prepared composite was investigated by using a Pin on Disc method at applied loads of 50 N. Wear tests were carried out with no lubrication at room temperature (30–36°C). The ageing of the MMCs was done followed by air cooled and water cooled. The results indicate that the wear rate is less for Al4Cu4Gr air cooled.

**KEYWORDS:** Al6063, Stir casting, Graphite, Copper, Metal matrix composites, Wear & Ageing

Received: Jun 10, 2020; Accepted: Jun 30, 2020; Published: Aug 31, 2020; Paper Id.: IJMPERDJUN2020990

### 1. INTRODUCTION

Discontinuous reinforced aluminum metal matrix composites (DRAMMCs) are a class of composite materials with desirable properties, including low density, high specific rigidity, high specific strength, controlled thermal expansion co-efficient, increased fatigue resistance and superior dimensional stability at high temperatures, etc.[1,2]. Such materials have emerged as the essential class of advanced materials that offer the ability for engineers to adapt the material properties to their needs. Such materials fundamentally vary from the typical manufacturing materials from the homogeneity point of view. Controlled application of one or more reinforcement materials in continuous metal matrix process is possible in composites. The vast majority of these composite materials are metallic components reinforced with high strength, high modulus and brittle ceramic phases which can be either continuous in the form of fibre, discontinuous in the form of whiskers,

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# Design and Analysis of Helical Spring for a Four Wheeler

<sup>1</sup>Alagar Krishna Kumar, <sup>2</sup>Dullam Ayyappa

<sup>1</sup>Assistant Professor, <sup>2</sup>Assistant Professor

<sup>1</sup>Mechanical Engineering,

<sup>1</sup>Sri Vasavi Engineering College(SVEC), Tadepalligudem, West Godavari, India

**Abstract :** Suspension system is the word that is a combination of spring systems, shock absorbers and links, these all are connected to the wheels of vehicle. Whenever tire hits a bump, the reaction force will be developed and this reaction force is reduced by using suspension system. The rate how much the reaction force is generated is completely relies on the unsprung weight and these are situated at assembly of each wheel. If the ratio between sprung weight to unsprung weight is larger than the vehicle body and passengers present in the vehicle are affected less by obstructions on the road. In this manuscript helical spring of a car is designed. In suspension crucial part to design is spring. The present paper deals with the helical spring and it is 3D modelled using creo 2.0. Analysis is done using Ansys 14.5. Structural analysis has performed on helical spring by altering material for the spring, Beryllium Copper, Structural Steel, Titanium alloy and Phosphor bronze. This analysis is carried out by the consideration of load acting on the suspension system. Structural analysis has performed on different materials for strength validation and Compared stress values for these materials to know the best suitable material for the spring.

**IndexTerms – Suspension, helical spring, unsprung weight.**

## I. INTRODUCTION

The first shock absorber was called Snubber which was invented by Claude Foster who was the founder of Gabriel company in 1970. The shock absorber of gas type first came in the year 1967 by Gabriel company, from here onwards other markets started duplicating the product. In the initial periods of 20<sup>th</sup> century, the renowned brand is Houdaille brand and it becomes a generalized brand for the shock absorber, but then it vanished from usage. The device that is modelled to flat shock impulse is known shock absorber and it converts kinetic energy to another form of energy. Suspension system is used for double purpose first thing is keeping road holding capacity of car smoothly because of that smooth driving conditions can be achieved and second thing is providing safety to the vehicle body and occupants in the vehicle from vibrations and bumps etc. Non-dependent front suspension systems was used in most of modern vehicles. On comparison with non-dependent suspension front suspension systems, non-dependent rear suspension systems was used in many vehicles. All the wheels present in the non-dependent rear suspension systems are operated independently. Fully non-dependent suspension system consists of non-dependent suspension on each and every wheel. Swing axle non-dependent suspension system were used in early periods. Now Trailing arms, Wishbone suspensions and Macpherson strut suspension systems are used as a non-dependent suspension systems in modern vehicles. Suspension system helps to keep the wheels in firm contact with the roads and also it provides smooth ride.

## II. PROBLEM STATEMENT

In the current project helical spring of a four wheeler is designed. The position of springs in automobile is in between vehicle body and road wheels. Whenever wheel hits the bump, the wheel will be rises and deflection of springs takes place, then spring will stores the energy. While releasing, the spring will rebounds and expends the stored energy due to elasticity of material of the spring. Thus the vibration of spring takes place. Due to internal friction in the materials used for the spring and rubbing at the joints of suspension, amplitude will decreases gradually and vibrations will decreases gradually to zero. To keep the longer time vibrations there is need to choose suitable material for the helical spring.

## III. LITERATURE REVIEW

Achyut P. Banginwar [1] in his project a model of shock absorber be designed and modelled by pro/Engineer. Modal and structural analysis is completed on shock absorber through changing the spring material to Phosphor bronze and structural steel. Structural and modal analysis is finished on the shock absorber to validate the strength and to find out the displacement for diverse frequencies and for different mode numbers. Modal analysis is completed between the two materials to confirm the best suitable material of the two for the design of the spring. By doing this analysis on the spring, for both the materials the author found that structural steel is better material properties than Phosphor bronze.

Mr. Sudarshanamatande [2] the author has designed the shock absorber and modelled it and analyzed it at different loads. In this the analytical values of the stresses are lower than the allowable limit. The stresses are obtained in the finite element analysis for the shock absorber and its components are lower than the allowable limits.

Prince Jerome Christopher J [3] the shock absorber designed and modelled using pro/engineer. This analysis had carried by varying spring coil diameter at different varying loads to validate the spring strength. This analysis is done by considering the mass of the bike and varying the number of persons settled on the bike. The comparison is made by altering the coil diameter of wire to check the best dimensions for helical spring.

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<sup>1</sup>Alagar Krishna Kumar, <sup>2</sup>Dullam Ayyappa

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# Durability Studies on Prestressed Concrete

Addepalli L S K S V D Gupta<sup>1</sup>, I Siva Kishore<sup>2</sup><sup>1</sup>PG student, Civil Engineering Department K L University, Guntur 522502, Andhra Pradesh, India<sup>2</sup>Assistant Professor, Civil Engineering Department K L University, Guntur 522502, Andhra Pradesh, India.

Email: saiaddepalliund@gmail.com

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**Abstract**

Durability studies determines the ability of concrete to resist weathering, chemical intrusions, and other processes of deterioration of structural elements. Durable concrete must retain its original form, quality standards, and its serviceability when it exposes to environment. Design of concrete to higher service life with limited or no maintenance can be achieved by proper design and mix proportions and preparing the concrete as more workable and provide enough curing. The process of deterioration can be originated from the sources of internal and external through various mechanisms such as physical, chemical, and mechanical in nature. Durability assessment involves, find out the mechanism which causes the deterioration process, and identify the influenced parameters for prediction of service life of a structure. Corrosion of reinforcement in both reinforced and prestressed concrete structural members is a global cause. Crack width influences the corrosion rate and mechanism of chemical attack. Normally, corrosion of steel in reinforced concrete gives a prior notice before failure but in prestressed concrete it's not give any symptoms due to the combined action of stress and corrosion on prestressing strands used in concrete. this paper describes the durability studies and crack width calculation with variation of cover. For durability studies, we prepared the concrete samples such as cylinders and cubes of two different grades of M40 and M60 with three different brands of cement i.e. one is ordinary Portland cement and other two are Portland pozzolana cement of 25% fly ash as a binder replacement. We are conducted experimental studies based on various provisions of codes related to durability. The methodology is followed as per available literature studies.

*Keywords: ordinary Portland cement, Portland pozzolana cement, durability, carbonation, Fly ash, permeability.*

**Article History**

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**1. INTRODUCTION:**

Concrete is the second most widely used material after the water, and it is the first construction material used in the world. Durability is one of the important characteristics of concrete which results the service of the structural element. The factors influencing durability and specific mechanism of deterioration must be considered in the ambient environmental conditions to which the material could be subjected. And consideration must be taken on the exposure conditions of structural element.

Deterioration and its severity on a structure depends on the orientation of wind and the temperature. For example, exterior girders of a bridge structure are exposed to aggressive environment compared to interior girders. Corrosion of steel is caused by the following factors such as chloride levels, oxygen, quality of concrete, quality of concrete, ambient temperature, relative humidity, carbon dioxide, severity of exposure, pH value, quality of construction materials, ambient temperature, cover to



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### A Mini Review on Prospects and Challenges of Harnessing Fungi for Concrete-Crack Healing

ROCKTOTPAL KONWARH<sup>1\*</sup>, SURESH BABU PALANISAMY<sup>1</sup>  
and PAVAN KUMAR JOGI<sup>2</sup>

<sup>1</sup>Department of Biotechnology, College of Biological and Chemical Engineering, Addis Ababa Science and Technology University, Akaki Kality, Addis Ababa-16417, Ethiopia.

<sup>2</sup>Department of Civil Engineering, College of Architecture and Civil Engineering, Addis Ababa Science and Technology University, Akaki Kality, Addis Ababa-16417, Ethiopia.

#### Abstract

There has been a continual upsurge on research pertaining to bio-based/microbial healing of cracks in concrete (a pre-requisite component when it comes to construction design). Albeit, the application of bacteria in this realm has been documented widely over the years, howbeit, delving into fungus based self-healing under the deleterious ambience of concrete with oxygen and nutrient limitation, moisture deficit and high alkalinity has captured recent research impetus. In this context, we have tried to mine the current contextual information to gauge whether research on fungal-based self-healing concrete could be worthwhile. Recent systematic screening encompassing the application of genetically engineered strains, attests the profound untapped potential of specific fungal species in assisting sustainable self-healing to ensure resilient infrastructure. Known for their adaptability under a plethora of environmental stress-conditions and architecturally endowed with large surface-active biomass, fungi can display both biomineralization and organomineralization, leading to rapid and profuse precipitation of  $\text{CaCO}_3$  (a befitting concrete-filler) for prospective sealing of cracks, even of large width, plausibly without any negative trade-off with respect to concrete's strength. This article is thus compiled to mirror the various prospects, practical hitches and future direction of research in using fungi for concrete crack healing.



#### Article History

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#### Keywords:

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Organomineralization;  
Precipitation;  
Resilient Infrastructure;  
Self-healing.

**CONTACT** Rocktotpal Konwarh ✉ rock1311@gmail.com 📍 Department of Biotechnology, College of Biological and Chemical Engineering, Addis Ababa Science and Technology University, Akaki Kality, Addis Ababa-16417, Ethiopia.



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TEACHING ENGLISH THROUGH FILMS

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**Dr.T. Sujani<sup>1</sup>**

Associate Professor & Training Head, Sri Vasavi Engineering College, Tadepalligudem,  
West Godavari, Andhra Pradesh

**Dr. R. Naga Dhana Lakshmi<sup>2</sup>**

Associate Professor, St. Ann's College of Engineering & Technology, Chirala, Prakasam,  
Andhra Pradesh.

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**Abstract**

The present paper aims at alleviating the psychological 'anxiety' that exists usually among college students to communicate in English. English motion pictures in ESL instruction may help them overcome the psychological barriers caused due to the dearth of motivation. Lack of motivation among students is claimed as one of the factors that bring about unsuccessful attempts in language acquisition. It is in this scenario that motion pictures in English may help them grasp, learn and comprehend language with ease. Imitation of the characters of the movie becomes a natural phenomenon for the students who mimic.

**Keywords:** English, ESL, psychological, barriers etc

**Introduction**

The most effectual way to instruct English to students is to facilitate them disregards their emotional hindrances to learning. The current study

is, about using English Films as an aid by the teacher to ease the initial fears of the students to speak in English language. As English is a foreign language many students feel tongue tied to communicate in English. It is mainly due to reasons, like lack of motivation among students to speak in English, their inability to cope with teaching methodology in institutions and the large variety of 'English' they encounter. All these culminate in bewilderment and lead to confusion in their minds. In addition, they seem to possess a 'reluctance' to speak in English may be due to the students' fear of looking and feeling foolish when they make a mistake that would make the others mock them or even look down on them. This method proposes to help remove the students' confrontation to learning spoken language by making them forget their impediments to learning.

In a multi lingual India, English plays an important role and is even the Mother tongue for some. As the country globalizes, more people unexposed to English want to learn the language as a means for a better life. The conventional

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# THE LITERARY EVOLUTION

Dr KHANDAPU VENKATA RAO  
Sr. Asst Prof of English

## CHAPTER-I

### Introduction:

Kushwant Singh, one of the outstanding Indian journalists in English, has a significant place among the Indian novelists writing in English. A perusal of his biography, especially of his preoccupations, will reveal his dynamism, his penetrating insight into the psychology of people and his keen observation of men and matters, all of which he uses as material for his writing.

Khushwant Singh, the second son of Sir Sobha and Lady Singh, was born on February 2, 1915 at Hadali in West Punjab (now in Pakistan). He received his early education from St. Stephen's College, Delhi and King's College, London. He was called to the bar in 1937. He married Karlnee Malik, daughter of Sir Teja and Lady Raj Malik on October 30, 1939.

Khushwant Singh commenced his career as a journalist and later on he turned to creative writing with the publication of The Mark of Vishnu in 1950. Singh became a member of the Indian delegation to the Sixth General Conference of the UNESCO in Paris in 1951. During 1952-53, he edited the English periodicals of the Government of India.

He established himself as a creative writer in 1956 with his publication of Mano Majra, (Train To Pakistan), his very first novel, which won him international acclaim along with the Grove India Fiction Prize. His publication of The Voice of God and Other Stories in 1957 confirmed his place among the short story writers in India. Singh's second and exciting

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novel, I Shall Not Hear The Nightingale, which he considered to be the better novel, was published in 1959.

A History of Sikhs, "a testament of national self-expression"<sup>1</sup>, was published in two volumes in 1963 and 1966. It was written to "tell the story of the Sikhs from their inception to the present day."<sup>2</sup> Singh was awarded Rockefeller Foundation grant for extensive travel and research on Sikh history and religion. In 1966, he was offered teaching and research assignment at Princeton. Publishing A Bride for the Sahib and Other Stories in 1967, Singh added another feather to his cap as a writer of short stories. In 1968, he accepted the visiting professorship at Swathmore College, Swathmore, Pennsylvania.





## Transactional Analysis @ Work: An Experience

Dr. S. Krishna Murthy Naidu is Associate Professor, Sri Vasavi Engineering College, Tadepalligudem,

Dr. Balijepalli Ravikanth is Associate Professor, SRKR Engineering College, Bhimavaram.

Dr K Rambabu is Assistant Professor, Dept of MBA, Sri Vasavi Engineering College, Tadepalligudem,

&

Dr GV Subba Raju, Professor, Dept of MBA, Sri Vasavi Engineering College, Tadepalligudem.

### Abstract

A healthy inter-personal relation is the need of the hour today. Our life is surrounded with people, process, technology and systems and within this context, how we manage ourselves and how we can manage others to fulfill our goals is a major challenge a person faces. Managing ourselves is easy as compared to managing others. In managing others we carry the element of risk and uncertainty. As we want to influence others about our opinions, others are also careful that their ego is not hurt while they are being influenced. The paper examines how interactions between two persons might lead to dysfunctional relations and what role a person has to play during the interaction process for a healthy and effective interpersonal relationship. This paper is based on real time interaction during the regular class. This is an experience of one of the authors and then the experience has been conceptualized collectively by all the authors. Hence the paper is presented in the same as it was experienced.

**Key words:** Interpersonal Relations, T.A, Ego States

I once took a Personality Development Session on Leadership for engineering students. During the learning process, I was emphasizing that if a leader were to be successful he should identify the Key Result Areas of the organization and explain the Desirable/Undesirable consequences of Action/In-action (thoughts included) respectively to the workers. I mean, Right Thoughts/Actions lead to Desirable Consequences and Wrong Thoughts/Actions lead to Undesirable Consequences. The consequences (right or wrong/desirable or undesirable) need not be immediate. For example, if a shop-floor worker is producing "nuts & bolts", the operational leader should make the worker understand the consequences of producing the right/quality units. I

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## **Philosophical and Psychological Foundations of Entrepreneurship**

**Dr S Krishnamurthy Naidu**

*Associate Professor, Department of MBA, Sri Vasavi Engineering College, Tadepalligudem, AP*

**Dr K Rambabu**

*Assistant Professor, Department of MBA, Sri Vasavi Engineering College, Tadepalligudem, AP*

**Dr B Ravikanth**

*Associate Professor, SRKR Engineering College, Bhimavaram, AP*

### **Abstract**

It is the time for Indians to realize that we cannot expect Government to completely solve the social inequities and work for social justice. It is the need of the hour for all of us to realize and change our mindset to be a part of societal development in India. Our education system should instill entrepreneurial thinking from the primary stages of education and evolve the student as “problem-solver” to the societal needs rather than train him to be “the best employee in a company”. If we observe the current education system, we are making the students more employable to work in an organization and leaving them less immune for the changes or challenges of work in the long run. I feel that India is a developing country by “Choice”. We are the best in few fields such as Cricket, Shuttle Badminton, IT Services, Space Research etc. Alternatively, we are still haunted by Poverty, Corruption and Redtapism despite India celebrating 70 years of Independence. It is time for the young generations from premium technical schools to change their mindsets, shun their selfish-attitudes and be more responsible for creating indigenous systems, processes or mechanisms for un-educated members of the society and enable them to participate in India Development. For that there is a terrible need for entrepreneurship education in India. However, there are many unanswered questions. Do only a few people with specific inherent traits can enter the field of entrepreneurship? Or can we train people for entrepreneurship opportunities from the primary level? What role do academic institutions play in order to foster entrepreneurship in the campuses? Very few with inherent characteristic features are coming forward to exploit the entrepreneurship opportunities but there



## Transactional Analysis @ Work: An Experience

Dr. S. Krishna Murthy Naidu is Associate Professor, Sri Vasavi Engineering College, Tadepalligudem,

Dr. Balijepalli Ravikanth is Associate Professor, SRKR Engineering College, Bhimavaram.

Dr K Rambabu is Assistant Professor, Dept of MBA, Sri Vasavi Engineering College, Tadepalligudem,

&

Dr GV Subba Raju, Professor, Dept of MBA, Sri Vasavi Engineering College, Tadepalligudem.

### Abstract

A healthy inter-personal relation is the need of the hour today. Our life is surrounded with people, process, technology and systems and within this context, how we manage ourselves and how we can manage others to fulfill our goals is a major challenge a person faces. Managing ourselves is easy as compared to managing others. In managing others we carry the element of risk and uncertainty. As we want to influence others about our opinions, others are also careful that their ego is not hurt while they are being influenced. The paper examines how interactions between two persons might lead to dysfunctional relations and what role a person has to play during the interaction process for a healthy and effective interpersonal relationship. This paper is based on real time interaction during the regular class. This is an experience of one of the authors and then the experience has been conceptualized collectively by all the authors. Hence the paper is presented in the same as it was experienced.

**Key words:** Interpersonal Relations, T.A, Ego States

I once took a Personality Development Session on Leadership for engineering students. During the learning process, I was emphasizing that if a leader were to be successful he should identify the Key Result Areas of the organization and explain the Desirable/Undesirable consequences of Action/In-action (thoughts included) respectively to the workers. I mean, Right Thoughts/Actions lead to Desirable Consequences and Wrong Thoughts/Actions lead to Undesirable Consequences. The consequences (right or wrong/desirable or undesirable) need not be immediate. For example, if a shop-floor worker is producing "nuts & bolts", the operational leader should make the worker understand the consequences of producing the right/quality units. I



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## Dual bit control low power dynamic content addressable memory design for IoT applications

V V Satyanarayana SATTI<sup>1,2</sup>, Sridevi SRIADIBHATLA<sup>1\*</sup>

<sup>1</sup> Department of Micro and Nanoelectronics, Vellore Institute of Technology, Vellore, India

<sup>2</sup> Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, India

ORCID iD: <https://orcid.org/0000-0002-7899-9059>  
ORCID iD: <https://orcid.org/0000-0002-6318-3145>

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### Abstract:

The Internet of Things (IoT) is an emerging area in the semiconductor industry for low power and high-speed applications. Many search engines of IoT applications require low power consumption and high-speed content addressable memory (CAM) devices for the transmission of data packets between servers and end-devices. CAM is a hardware device used for transfer of packets in a network router with high speed at the cost of power consumption. In this paper, a new dual bit control precharge free (PF) dynamic content addressable memory (DCAM) has been introduced. The proposed design uses new charge control circuitry, which is used to control the dual DCAM cell to get the match line (ML) output for match/miss. Elimination of the pre-charge phase before the evaluation phase, allows the proposed design to perform more search operations within the evaluation time. The proposed 64-bit PF-DCAM design is implemented using CMOS 45nm technology node and Monte Carlo (MC) simulations are performed for power and search delay validation. The simulation results show that the proposed design reduces power and search delay when compared to conventional DCAM designs.

**Key words:** Dynamic content addressable memory, IoT, Low Power, Match line, Search delay

### 1. Introduction

The primary function of any memory system is writing and reading the lookup data. Random access memory (RAM) is a volatile memory. It searches lookup table data randomly in the memory array, and it requires more clock cycles to search the data. Thus, for large capacity memory, RAM is not suitable for high-speed search. The memory system suitable for high speed application is content addressable memory (CAM). CAM is an associative memory which as an assemblage of storage elements. CAM is also called as data-addressed memory, parallel search file, multiple instantaneous file and catalog memory. When compared to RAM, CAM consumes more power and expensive due to the presence of comparison circuitry and parallel search operation. Parallel accessing in CAM keeps the search time significantly lesser than that of RAM for the same search request. CAM is reverse of RAM from the functionality point of view. In CAM lookup, data are accessed in memory based on content rather than the address in RAM, is shown in Figure 1. CAMs are extensively used today in many applications such as Huffman-coding [1], Image processing [2], IP-routing [3], Gray coding [4].

\*Correspondence: sridevi@vit.ac.in

# A Triple band Microstrip Antenna with Enhanced Bandwidth for Radar Applications

E. Kusuma Kumari, M. Vinod Kumar

**Abstract**—Here in this paper a triple band microstrip antenna is proposed. The designed antenna is of compact structure with dimensions 96mm x 27mm x 1.6mm including ground plane which is fabricated using Fr-4 substrate with dielectric constant of 4.6. This antenna has three resonant frequencies which are working at 6.6GHz with bandwidth of 1.1 GHz, second band working at 8.3 GHz with bandwidth of 200MHz, and third operating frequency is 9.4GHz with bandwidth of 750MHz. All the band obtained here are providing large bandwidth which have wide range of applications. The other antenna parameters like return loss, directivity, gain, VSWR and current distribution are mentioned in this paper. The main purpose of this antenna was to provide a single antenna for multiple applications and with improved bandwidth for transferring large amount of data. The designed antenna is suitable for industrial applications also as because of its compact structure and its wide range of applications like radar, communication satellites, radiolocation, navigation air traffic control etc.

**Keywords**—multiband antenna, Triple-band antenna, Defective Ground Structure.

## I. INTRODUCTION

The term microwave is employed to explain magnetic attraction waves with wavelengths starting from 1cm to 1m. The corresponding frequency vary is three hundred MHz to 300 gigahertz. This spectrum is restricted and needs to be shared, thus the demand for top performance RF/Microwave circuits is increasing that have high property and constant information measure is bit by bit increasing[1]. In recent years, the shrinking of antennas has become additional and additional necessary thanks to the increasing demand for little antennas because the fast development in wireless communications[2]. The advantages of microstrip antennas build them well-liked in several wireless communication applications like satellite communication measuring instrument, medical applications, aircraft, spacecraft, and missile applications at identical time disadvantages of Microstrip antenna is slender information measure, poor potency [3].

Thus, to improve the performance of microstrip antenna various techniques are used now a days one of which is DGS, in this we introduce some defects in ground plane and depending on the shape and dimensions of the defect, the shielded current distribution in the ground plane is disturbed, resulting a controlled excitation and propagation of the electromagnetic waves through the substrate layer [4].

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Dr. E. Kusuma Kumari, Professor & Head, ECE Department, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh, India.

M. Vinod Kumar, Asst. Professor, Sri Vasavi Engineering College, Tadepalligudem, West Godavari, Andhra Pradesh, India.

Various feeding techniques square measure used for transmission the magnetic attraction energy to a microstrip patch antenna. the task of feeding is incredibly necessary just in case of economical operation of antenna to enhance the antenna input electrical resistance matching [5]. the varied forms of feeding techniques square measure microstrip printing operation, co-axial feed, aperture coupled feed, proximity feed. The feeding used here during this antenna structure is microstrip printing operation during which a conducting strip is connected on to the sting of diverging patch. though many French telephone multiband antenna styles were projected [6],[7] they're either fed by microstrip lines [6],[7] or mini-coaxial cable [8].

This paper works for 3 bands with wide information measure applications below C band and X band. The antenna consists of 2 rectangular ring style of structures, and there a 2 stubs hooked up in it. The resonant frequencies we tend to have gotten as a result of these stubs as by variable their length there'll be variation in operative frequencies. we've additionally introduced the defect in ground plane as victimization this DGS technique the opposite antenna parameters were improved. The bandwidths measured here all follow the -5dB come back loss. The designed antenna is often used for radar, mobile applications, satellite applications, measuring instrument, military, traffic management etc.

This paper is organized in four sections which are as follow. As the section I here give a brief introduction of proposed antenna. Section II, basic design of antenna is described, and fabricated structure is also included in it. In Section III, the simulated and measured results of designed antenna are presented and finally, the paper is concluded in Section IV.

## II. ANTENNA DESIGN

In this section the basic design of proposed antenna is included. It includes both simulated as well as fabricated structure is explained. Figure 1 shows the structure of microstrip antenna both fabricated and simulated. Table I includes the dimensional parameters of antenna. For input two-dimensional conductor variety of feeding is employed. within the structure for every aspect of feeding one rectangular ring is hooked up with that one stub is hooked up within. The antenna structure is intended exploitation Fr-4 substrate that have stuff constant ( $\epsilon_r=4.6$ ). The variation in in operation frequency and in antenna parameters is discovered.



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**Abstract**—Here in this paper a triple band microstrip antenna is proposed. The designed antenna is of compact structure with dimensions  $96\text{mm} \times 27\text{mm} \times 1.6\text{mm}$  including ground plane which is fabricated using Fr-4 substrate with dielectric constant of 4.6. This antenna has three resonant frequencies which are working at 6.6GHz with bandwidth of 1.1 GHz, second band working at 8.3 GHz with bandwidth of 200MHz, and third operating frequency is 9.4GHz with bandwidth of 750MHz. All the band obtained here are providing large bandwidth which have wide range of applications. The other antenna parameters like return loss, directivity, gain, VSWR and current distribution are mentioned in this paper. The main purpose of this antenna was to provide a single antenna for multiple applications and with improved bandwidth for transferring large amount of data. The designed antenna is suitable for industrial applications also as because of its compact structure and its wide range of applications like radar, communication satellites, radiolocation, navigation air traffic control etc.

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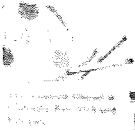
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# International Journal of Scientific Research and Reviews

## Design of Dual Band U-Slots Circular Patch Antenna on Fr4 Substrate

D. Rama Devi<sup>1\*</sup> and E. Kusuma Kumari<sup>2</sup>

<sup>1</sup>Dept. of ECE, MVGR College of Engineering, Vizianagaram, Andhrapradesh, India.

<sup>2</sup>Department of ECE, Sri Vasavi Engineering College, Tadepalligudem, Andhrapradesh, India

### ABSTRACT

This paper presents design and analysis of probe fed dual U-shape slots antenna. The proposed antenna has simple structure consisting two U-shape slot on a circular patch of radius 13.1mm. The patch is designed on circular shape FR4 substrate material of radius 13.2mm, with height of 5mm and whose permittivity is 4.4. By using only single patch a high impedance bandwidth and dual bands are achieved. Simulated results shows that the return loss is - 24.65dB at the center frequency of exactly 7GHz and the simulated impedance bandwidth (VSWR<2) is 24%. The antenna is designed and simulated using HFSS software and theoretical results gives good agreement with simulated results. Return loss, 3D gain, radiation pattern are simulated for the proposed designed antenna was presented.

**KEYWORDS:** U-slot micro strip patch antenna, circular patch, FR4 substrate.

### \*Corresponding author

**Dr. D. Rama Devi**

Professor

Department of Electronics and communications engineering,

MVGR College of Engineering,

Vizianagaram, A.P. INDIA.

Email: rama@mvgrce.edu.in, Mob No - 9440578334

## Prototype of Slotted Microstrip Patch Antenna for Multiband Application

Dr.E. Kusuma Kumari

Professor & Head, ECE Department, Sri Vasavi Engineering College, Tadepalligudem.

Dr.D. Ramadevi

Assoc. Professor, MVGR Engineering College.

---

### Abstract

This paper presented a slotted microstrip patch antenna working for two frequencies 1.42GHz and 2.65GHz respectively. Since a microstrip patch antenna works only on one resonant frequency so converting that into a multiband patch antenna would enhance the bandwidth use and also utilizes the multiple frequencies of operation. This multiband microstrip patch antenna is etched on FR4 lossy dielectric substrate whose dielectric constant is 4.3 and height is 1.6mm. The length and width of patch are taken as 51.16mm and 39.86mm. To convert the conventional microstrip patch antenna into multiband microstrip patch antenna we cut out the slots so that the patch antenna works at multiple frequencies. Simulation of micro strip patch antenna is done by CST software. Simulation and fabrication results show that the designed antenna characteristics are suitable for many applications.

**Keywords:** CST Software, Rectangular Slot, Inset Feed, FR4 Lossy Material, Impedance Matching.

---

### 1. Introduction

In the field of communication systems, the operation and fabrication of antennas plays a vital role. So constructing an antenna which is much conformal to different surfaces and can work in different bands simultaneously is the need for the advancement of this field.

The study of microstrip patch antenna has made progress in recent years. Compared with conventional antennas, microstrip patch antennas have more advantages and better prospects. Microstrip patch antennas are probably the most widely used type of antennas today due to their advantages such as light weight, low volume, low cost, compatibility with integrated circuits and easy to install on the rigid surface[4]. Furthermore, they can be easily designed to operate in dual-band, multi-band application, dual or circular polarization. They are important in many Microwave and wireless applications

However, Patch antennas possessed low gain suitable only for indoor and medical care applications. These applications need low power and low profile so we can use patch antenna in indoor and health application [6].

Another problem associated with patch antenna is narrow bandwidth. For extending the bandwidth many approaches have been utilized such as super substrate, dimensions of antenna, metamaterial, feed network etc [7]. This paper presents a slotted microstrip patch antenna working for two frequencies 1.42GHz and 2.65GHz respectively. The prospect of this design is to obtain a small size, light weight and low cost miniaturized antenna with good antenna characteristics. Another characteristics impedance of antenna is properly matched. Mismatching of impedance degrades antenna performance [4]. CST MW studio software is used for simulating proposed antenna. CST MICROWAVE STUDIO® (CST MWS) is a specialist tool for the 3D EM simulation of high frequency devices such as antennas, filters, couplers, planar and multi-layer structures and SI and EMC effects [8].

Q21 K. Durga Saranya, R. Krishnamurthy, K. N. H. Srinivas, T. D. SSarveswararao and I. S. Amiri\*  
 5 **IoT-Based Health Monitoring System Using  
 BeagleBone Black with Optical Sensor**

<https://doi.org/10.1515/joc-2019-0115>

Received April 26, 2019; accepted June 20, 2019

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 20 optical light sensor is used to check the light condition in  
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## 35 1 Introduction

The IoT generally refers to the communication of things  
 with each other without human intervention using wire-  
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 through IoT-enabled devices which produce an effective  
 transfer of data needed to wide range activities and

\*Corresponding author: I. S. Amiri, Computational Optics Research  
 Group, Advanced Institute of Materials Science, Ton Duc Thang  
 45 University, Ho Chi Minh City, Vietnam; Faculty of Applied Sciences,  
 Ton Duc Thang University, Ho Chi Minh City, Vietnam,  
 E-mail: irajsadeghamiri@tdtu.edu.vn

Q3 K. Durga Saranya, R. Krishnamurthy, K. N. H. Srinivas,  
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operations. Because of this, the application of IOT tech-  
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Electronics technology has entered almost in all fields  
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 require intelligent systems to monitor, diagnose the  
 20 patients easily. Nowadays, people are focusing on their  
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 Today the medical world faces one of the major problems  
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 doctor is not in the vicinity [2]. One of the important things  
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 essary to observe the ECG signal continuously. Therefore  
 we need a smart system that can connect to the Internet to  
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The remote health monitoring system can be used  
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40 The IoT generally refers to the communication of things with each other without human intervention using wireless protocols. In IoT technology, connections are made through IoT-enabled devices which produce an effective transfer of data needed to wide range activities and

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The remote health monitoring system can be used 35 when there is no problem in the interface to sense and without interfering their daily activities [4]. Remote health monitoring provides effective treatment-based on patient health condition and provides services even at 40 remote locations. Various advantages are made in monitoring the patient's health continuously and the development of smart healthcare systems using IoT technology. There are many healthcare systems existing in the literature to monitor the health condition of the patient. The 45 existing systems used Wi-Fi to update the cloud with data. But in this paper, GSM services are used to update the cloud as it extends more coverage area. There are certain challenges still exist in the existing patient monitoring system. The autonomy, intelligence of things and security of data are the challenges in the IoT-based 50

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45 University, Ho Chi Minh City, Vietnam; Faculty of Applied Sciences, Ton Duc Thang University, Ho Chi Minh City, Vietnam,  
Q3 E-mail: irajsadeghamiri@tdtu.edu.vn

K. Durga Saranya, R. Krishnamurthy, K. N. H. Srinivas,  
T. D. SSarveswararao, Department of Electronics and  
50 Communication Engineering, Sri Vasavi Engineering College, Tadepelligudem, Andhra Pradesh, India

operations. Because of this, the application of IOT technologies can be used in different fields, like home automation system health monitoring systems, agriculture field, etc [1]. The Internet has a network of devices  
10 such as smart mobiles, home accessories, vehicles, medical equipment, and industrial systems, people, buildings, animals, which are all connected to communicate and share the information-based on principles in order  
15 to attain tracing, positioning, real-time monitoring, and online upgrade.

Electronics technology has entered almost in all fields of day-to-day life. Medical is one of the fields which require intelligent systems to monitor, diagnose the  
20 patients easily. Nowadays, people are focusing on their health conditions. In medical fields, different equipment is used to check the physiological parameters of a patient. Today the medical world faces one of the major problems which is continuous patient care in the remote areas. In  
25 order to accomplish quality patient care, the above problem has to be solved. Based on developments in technology, it is easy to design the health monitoring system and monitor the health parameters of the patient when the  
30 doctor is not in the vicinity [2]. One of the important things in health care is the electrocardiogram (ECG) signal which provides information about heart [3]. Sometimes, it is necessary to observe the ECG signal continuously. Therefore we need a smart system that can connect to the Internet to  
35 exchange the data if required.

The remote health monitoring system can be used  
35 when there is no problem in the interface to sense and without interfering their daily activities [4]. Remote health monitoring provides effective treatment-based on patient health condition and provides services even at  
40 remote locations. Various advantages are made in monitoring the patient's health continuously and the development of smart healthcare systems using IoT technology. There are many healthcare systems existing in the liter-  
45 ature to monitor the health condition of the patient. The existing systems used Wi-Fi to update the cloud with data. But in this paper, GSM services are used to update the cloud as it extends more coverage area. There are certain challenges still exist in the existing patient monitoring system. The autonomy, intelligence of things and  
50 security of data are the challenges in the IoT-based

19-20  
Journal



# Master Slave Robotic System for Industrial Applications

M.Durga Sravani<sup>1</sup>, Dr.M.Thamarai<sup>2</sup>, Mr.KSS Kiran<sup>3</sup>  
B.Tech student, Sri Vasavai Engineering College, Tadepalligudem, Andhra Pradesh, India<sup>1</sup>  
Professor, Department of ECE, Sri Vasavi Engineering College, Tadepalligudem, AP, India<sup>2</sup>  
Assistant Professor, Department of ECE, Sri Vasavi Engineering College, Tadepalligudem, AP, India<sup>3</sup>

**Abstract:** Robots play a vital role in Industry Automation. In industries, robots are programmed to perform specified tasks like pick and place, packaging, transporting etc. Every robot needs to be programmed individually to accomplish the tasks given. In this proposed work, one master robot is designed and programmed in such a way that can train number of slave robots sequentially to perform multiple tasks at different processing lines of an industry. This reduces the complexity in programming individual robots for different operations and also without programming the slave robot. The proposed system master robot is used to control or train more than one slave robots in sequential manner. This robot arm has freedom of rotation upto 180 degrees. The proposed model comprises of master arm and slave arm connected to a single Arduino Nano development board that controls the entire mechanism, servo motors to achieve rotational motion of the robotic arm and potentiometers to train the slave robot.

**Keywords:** Master Slave robot, Industrial Applications, Servo motor, Arduino Nano, Potentiometers

## I. INTRODUCTION

Robots are used in different fields such as industrial, military, space exploration, and medical applications. These robots could be classified as manipulator robots and cooperate with other parts of automated or semi-automated equipment to achieve tasks such as loading, unloading, spray painting, welding, and assembling. Generally robots are designed, built and controlled via a computer or a controlling device which uses a specific program or algorithm. Programs and robots are designed in a way that when the program changes, the behavior of the robot changes accordingly resulting in a very flexible task achieving robot.

Robotic arm is a mechanical arm to perform the desired task. In today's world there is an increasing need to create artificial arms for different inhuman situations where human interaction is difficult or impossible. The robotic arm is controlled manually by using wired and wireless. The conventional industry

robot for object pick and place is shown in figure 1. The system can do the pick and place operation in different directions and angles. Figure 1 shows the three possible movements of the system for pick and place operation with the freedom movement of 180 degree.

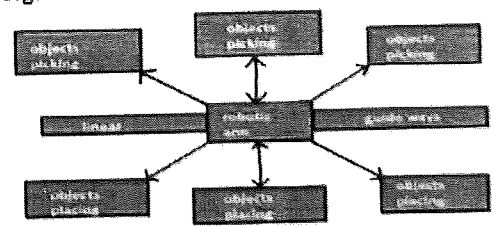


Fig 1. Robotic arm processing for pick and place operation

The paper is organized as follows. Section II describes existing robotic arm system and proposed system is given in section III. Section IV explains the

# FPGA Implementation of Multispectral Image Compression for Satellite Images

S Saranya, M Thamarai, M Subbarao

**Abstract:** Multispectral image compression plays a vital role in remote sensing through satellites. Satellite images are more powerful approach to study the space information and research the geographical nature of the earth. Satellite images contains the huge amount of data and it requires more bandwidth for transmission and more memory for storage. Multispectral image compression reduces the size of the multispectral data and makes it easy for storage and transmission to the earth station from the satellite. The image is compressed by reducing the irrelevant and redundant part of data. This paper presents FPGA implementation of multispectral image compression using Dual Tree Complex Wavelet Transform (DTCWT) and Arithmetic Coding. This compression algorithm is implemented and simulated using MATLAB and XILINX ISE14.5 simulator. The FPGA Spartan -6 architecture is used to implement the algorithm. The proposed method gives better result in PSNR and MSE ratio as compared to DWT.

**Keyword:** Multispectral image, DTCWT, VLSI, Arithmetic coding, compression ratio

## I. INTRODUCTION

Image compression is performed a major role of satellite images, telecommunications, video conferencing, remote sensing [1], medical imaging. Most satellites today measure energy at many wavelengths is called multispectral imaging. Multispectral image is a collection of several images of the same scene, each of them taken with a different sensor. Each image is referred to as one band and it is a 3D image, third dimension is spectral component. Multispectral image can capture the light from the frequency beyond the visible light range, such as infrared. Multispectral image sensors can allow extraction of additional information that the human eyes fails to capture with its Green, Red and Blue receptors.

Remote Sensing Multispectral image compression Encoder requires the low complexity, High performance, High Robust because the encoders usually works on remote sensing satellite where the resources such as Memory, Power, and processing capacity, are limited. Multispectral image compression techniques are developed to reduce the data size and it is must for data transmission and storage and also reduce the cost.

A high efficient technique in digital image processing wavelet Transform which finds its applications in motion estimation, de-noising, data compression, segmentation and classifies the areas. In spite of its limitations such as lack of

directional Selectivity, shift Limitations, Lack of Phase Information. It was not employed in many fields. Dual tree Complex Wavelet transform over comes the limitations. The proposed work will be implemented using Dual tree Complex Wavelet transform [2]. The FS Farres and Dual tree Wavelet filters are used in this work. The algorithm is implemented in VHDL and MATLAB. In this Dual tree Complex Wavelet transform used in 2discrete wavelet transforms. To obtain the higher compression ratio of an image or data by using Dual tree Complex Wavelet transform Technique. It is a one of the Lossy image compression technique, it is widely implemented which reduce the memory space, and increase the quality of image.

## II. LITERATURE SURVEY

The image compression is normally obtained by reducing the irrelevant and redundant part of data. Basically image compression Broadly Classified into 2 categories. There are LOSSY image compression and LOSSLESS image compression. In the previous works, the multispectral image compression is done by using DWT and CCSDC technique. In DWT used in lifting based technique is mainly derived into 3 categories. There are: (1) Decomposition (2) Predict (3) update. The lifting based DWT is a more powerful and high powerful tool, But it has some limitations like shift invariance, poor directional selectivity and absence of phase information. [3]

Lucana Santos was developed A Low Complexity of implementation of the CCSDS123 standard for space applications was proposed [4]. A hardware architecture is designed with the aim of achieving low hardware occupancy and it implemented on board space qualified FPGA from Microsemi RTAX Family. This method have complex mathematical calculations and the construction is derived in very difficult in VHDL. This forced locked for a better implementation computing compression technique for satellite images. In this one implementing the multispectral image compression will be implemented by Dual tree Discrete Wavelet transform (DTCWT) [2]. Giriprasad.M.N et al [5] were implemented FPGA implementation of Combined Compression & Denoising for remote sensing images. The Compression process is carried out using lifting based DWT and denoising is carried out using Kernal based bilateral filtering scheme. The DWT technique implemented in XILINX ISE.Y.B Gandole [6], was developed an image compression technique using 2D dual tree complex wavelet transform and

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S.Saranya, M Tech student, Sri Vasari Engineering College, Andhra Pradesh, India  
Dr.M.Thamarai, Professor, ECE, Sri Vasari Engineering College, Andhra Pradesh, India  
M.Subbarao, Sr Assistant Professor, ECE, Sri Vasari Engineering College Andhra Pradesh, India

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S.Saranya, M.Tech student, Sri Vasari Engineering College, Andhra Pradesh, India

Dr.M.Thamarai, Professor, ECE, Sri Vasari Engineering College, Andhra Pradesh, India

M.Subbarao, Sr. Assistant Professor, ECE, Sri Vasari Engineering College, Andhra Pradesh, India.



# Smart IOT Device for Child Safety and Tracking

M Nandini Priyanka, S Murugan, K N H Srinivas, T D S Sarveswararao, E Kusuma Kumari.

**Abstract:** Child safety and tracking is a major concern as the more number of crimes on children are reported nowadays. With this motivation, a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children. The system is developed using LinkIt ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during emergency. The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same. The above system ensures the safety and tracking of children.

**Index terms-** IoT; Children Safety; GPS; GPRS; Sensors; Serial camera; LinkIt ONE board.

## I. INTRODUCTION

Internet of Things (IoT) plays a major role in every day to day life. The major difference between IoT and embedded system is that a dedicated protocol/software is embedded in the chip in case of embedded system, whereas, IoT devices are smart devices, which are able to take decisions by sensing the environment around the device. The development of sensors technology, availability of internet connected devices; data analysis algorithms make IoT devices to act smart in emergency situations without human interventions. So, IoT devices are applied in different fields such as agriculture, medical, industrial, security and communication applications[1]. IoT systems are useful within a system to do deeper automation, analysis, and integration. IoT contributes to technology by advances in software, hardware and modern tools. It even uses existing and upcoming technology in the fields of sensing, networking and robotics. IoT brings global changes by its advanced elements; in the social, economic, and political impact of the users.

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**M Nandini Priyanka**, M Nandini Priyanka Department of Electronics and communication Engineering, Student at Sri Vasavi Engineering College Tadepalligudem, Jawaharlal Nehru Technological University Kakinada, Andhra Pradesh, India.

**S Murugan**, Dr Murugan S Professor, Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh.

**K N H Srinivas**, K.N.H. Srinivas Associate professor, Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh.

**T D S Sarveswararao**, T D N S S Sarveswara Rao Assistant professor Department of Electronics and Communication Engineering Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh

**E Kusuma Kumari**, Dr. E. Kusuma Kumari Professor, Department of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh

Child and women safety is a challenging problem nowadays due to antisocial elements in the society. The crime rate is day by day increasing. Schools and working places need high surveillance for ensuring the safety among children and women. Smart phones are playing major role in ensuring the safety, where some mobile based applications provide alert systems. During the emergency, mobile form and control room of nearby police station or caretaker of children. The literature shows that location tracking devices are available in the market, but it does not provide complete solution to the problem. The solution to this problem is to design an IoT device, which senses the location and environment and during emergency, it automatically send the alert to the parents automatically.

## II. BACKGROUND

The review of literature for child safety and location tracking devices are discussed below. In [2] the parents can send a message to the GSM module, according to the message information the GSM module reply back with particular details of the children. The location can be seen on the Google map. When a particular child is facing an emergency situation, device button should be pressed so that the device captures the image along with the location information to the enrolled mobile numbers. The help of the child can be saved within no time. In [3], for the emergency point of view GPS, GPRS and GSM are used to monitor the speed and location tracking purpose. The system is fixed on the bus or car or in any vehicle so that the vehicle is going on routine route or not can be identified by the GPS. Also the speed of the bus can also be extracted. Now-a-days digital technology plays a major role for connecting persons via internet. For tracking the children, the android based solution is provided to parents. Internet is the one that connects different components through a single device. The device is connected to server. Parents track their children in real time of the location tracker by GSM and [4] the microcontroller used is ARM-7 LPC2148. In day to day scenario, missing child cases are increasing gradually. Child caring is a major issue. Different types of methods are introduced to find good solutions. There have been many Methods and systems implemented to solve it. In [5] to solve child caring problem global position system based solution with two nodes was proposed. In this two nodes, one node is child node which contains a Bluetooth module and a GPS receiver. The parent node consists of a mobile that supports Bluetooth. The location of the child can be tracked by the GPS technology and can be displayed on the designed



# Smart IOT Device for Child Safety and Tracking

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## II. BACKGROUND

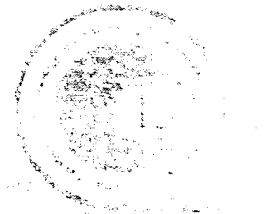
The review of literature for child safety and tracking devices are discussed below. In [2], the parent send a message to the GSM module and through the message information the GSM module send the particular details of the children. The location can be on the Google map. When a particular child is in an emergency situation, device button should be pressed, the device captures the image along with the information to the enrolled mobile numbers. The child can be saved within no time. In [3], the point of view GPS, GPRS and GSM are used for location speed and location tracking purpose. The system is for the bus location or in any vehicle so that the vehicle is on routine route or not can be identified by the GPS. Also the speed of the bus can also be extracted. Non-embed digital technology plays a major role for connecting via internet. For tracking the children, the android solution is provided to parents. Internet is the best way to connect different components through a single device. It is connected to server. Parents track their child's location time or the location tracker by GSM. The microcontroller used is ARM7 LPC 2148. In another scenario, missing child cases are increasing gradually. Child caring is a major issue. Different types of technology introduced to find good solutions. There have been many Methods and systems implemented to solve this problem. solve child caring, accident and other problems. The proposed system with two nodes, node 1 is parent node, node 2 is child node. node 1 consists of GSM module and GPS receiver. The parent node gets the mobile no. that supports Bluetooth. The location of child can be tracked by using GPS technology and can be displayed on the designed

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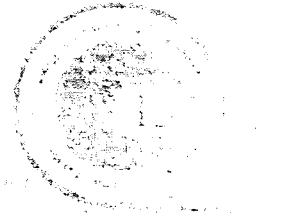
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Serial camera; LinkIt ONE board.



# A FinFET Based Adaptive Filter Design Using Evolutional Algorithm for Noise Suppression

Udara Yedukondalu, V Vijayasri Bollisetty, Udara Srinivasarao

**Abstract:** This paper presents the implementation of an adaptive filter component using FINFET. The proposed is an analog adaptive filter based on CMOS algorithm. The existing CMOS based circuits suffer from short channel effects below 35nm. The proposed circuit reduces the power by reducing the leakage current. A FINFET based op-amp and four quadrants multiplier becomes the part of the adaptive filter. When compared to CMOS the FINFET based op-amp and four quadrants multiplier reduces the power. The evolutionary methodology approach using Artificial Bee Colony and Particle swarm optimization for the optimization of multichannel adaptive filter.

**Index Terms:** CMOS, FINFET, adaptive filter, LMS, four quadrant multiplier, Op-amp.

## I. INTRODUCTION

The advancement in VLSI design have made the electronics products as smaller as possible. This has happened due to the reduction of device size in nanoelectronics. Eventhough CMOS circuits are found to be efficient below 35nm the technology is troublesome. In biomedical and communication systems adaptive filters (Xinwang, 2010) plays a vital role in removal of noise and identification of signals. Evolutionary algorithm based filter design were investigated in past (Julian Miller,1999). Programmable filters have evolved in recent past to replace the conventional chips (Seo, 2018). A new approach to design a adaptive filter using evolutionary algorithm is implemented in FinFET.

For Noise cancellation adaptive filters were used due to its self-learning process. The filter coefficients are updated adaptively with respect to the noise strength. By adjusting the coefficients adaptively the error is minimized. The existing optimization techniques for adaptive filters are based on Least Mean-Square (LMS), gradient-based techniques, and Recursive Least-Square (RLS) method. The algorithms belongs to the gradient based techniques. These LMS and RLS based algorithm plays a vital role in designing digital noise cancellers in various applications like speech processing, extraction (Ravindrakumar and Bomannaraja (2014)) and speech enhancement (Goswami et al, 2014). But in literature several other optimization algorithms are presented. The methods are based on the particle swarm optimization, Artificial Bee Colony (Gao et al, 2013, Karaboga, 2010)), etc. methods. These optimization

techniques were more suitable for adaptive equalization (Cheded et al, 2011). Zhao et al (2013) used the bee colony algorithm to design the digital filter design. The method was suitable for DSP application. Real parameter optimization was done using the ABC algorithm (Akay, B. and Karaboga, D. 2012). The global optimization increases when these optimization is used.

## II. BACKGROUND METHODOLOGY

The block diagram of ANC filter with ABC is shown in Figure 1.

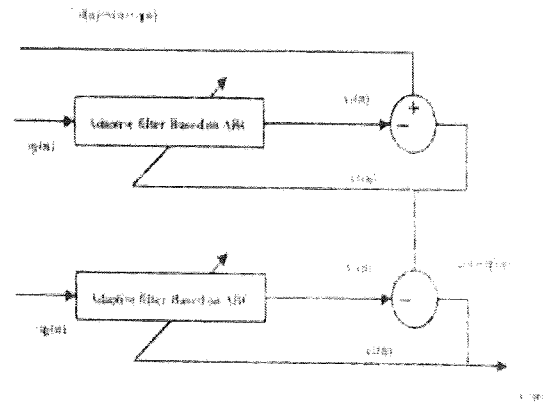


Figure 1. Adaptive filter using ABC.

### 2.1. ABC ALGORITHM

In ABC adaptive algorithm the position the bee position is equavtated to the coefficient of the adaptive filter. The initial random population or the filter co-efficients are generated according to equation below

$$X_{ij} = X_{min,j} + \text{rand}(a) * (X_{max,j} - X_{min,j}) \quad (1)$$

'a' takes the value between -1 to +1, 'i' is the colony size and 'j' is the dimension value in the colony which represent the filter coefficient of the adaptive filter. The probability of optimized position or coefficient value is determined by the equation

$$P_i = \frac{\text{fit}_i}{\sum_{n=1}^N \text{fit}_n} \quad (2)$$

Once new location are generated probability selection process is carried out with the fitness value fit and SN chosen index value.

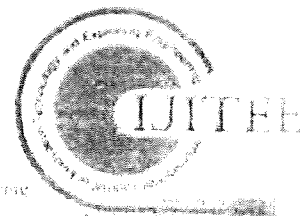
To optimize the coefficient value the ABC algorithm uses a scaling factor (SF) which produces the

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Dr.U.Yedukondalu, ECE Department, Sri Vasavi Engineering College, Tadepalligudem, INDIA.

V Vijayasri Bollisetty, ECE Department, Aditya College of Engineering & Technology, Kakimada, INDIA.

U. Srinivasarao, ECE Department, STIT, Ranabennur, INDIA



# 2:1 MUX Implementation Using NMV-Gate: NON MAJORITY GATE in QCA

D. Ajitha, K. N. V. S. VijayaLakshmi, K. BhagyaLakshmi and M. Mehetaj

**Abstract** Quantum-dot Cellular Automata (QCA) is one of the emerging transistorless nanotechnology implemented utilizing electron tunneling with the given potential. In this paper, we proposed a design for 2:1 multiplexer in QCA using NON MAJORITY GATE. In this work, a new design of NAND and NOR gates are proposed. By using the NAND gate structure, the proposed multiplexer is implemented. The multiplexer functionality is implemented by the design tool QCA Designer © 2005 Version 2.0.3.

**Keywords** Non majority gate (NMV-Gate) · Quantum-dot cellular automata (QCA) ·  $2 \times 1$  multiplexer · Universal gates · Operation cost (O-Cost) · Area utilization factor (AUF)

## 1 Introduction

The tremendous advantage of Quantum-dot Cellular Automata (QCA) device leads the technology without semiconductor devices. Here the area, speed and power consumption are upgraded beyond the semiconductor technologies like CMOS. In MOS-FETs, short channel effects occur, if the scaling of channel length comparable to the depletion layer widths of the source and drain junctions. In QCA the communication between the two adjacent cells is made by the law of Coulomb repulsion is shown in Fig. 1. The repulsion indicates here that the message moves from one side to other.

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D. Ajitha (✉)

Department of E.C.E, Sreenidhi Institute of Science and Technology, Hyderabad, India  
e-mail: ajithavijay1@gmail.com

K. N. V. S. VijayaLakshmi

Department of E.C.E, Sri Vasavi Engineering College, Tadepalligudem, India

K. BhagyaLakshmi

Department of E.C.E, Sasi Institute of Technology & Engineering, Tadepalligudem, India

M. Mehetaj

Department of E.E.E, JNTUA College of Engineering, Kalikiri, India

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557

# A NOVEL POWER EFFICIENT MULTIPLIER USING CNTFET

M. Nikhila Sandhya, PG student, Sri Vasavi Engineering College

Smt Y. Sujatha, Sr. Assistant Professor, Sri Vasavi Engineering College

**ABSTRACT:** For any application the circuit parameters like power, delay and area plays a key role in order to enhance performance. This can be achieved by proper scaling of the MOS technology. But as the scaling of the MOS technology reached to its limited levels, additional scaling results several short channel effects like hot carrier degradation, surface scattering, impact ionization and leakage at the gate oxide. So in the proposed method the multiplier which is the most important block for several applications is designed by using the Carbon nano tube technology by replacing the MOS technology. The comparisons like power and delay are observed between CNT technology and MOS technology by using the tanner EDA tool.

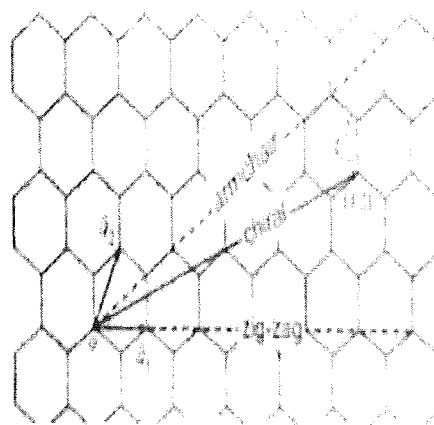
**Keywords -** Carbon Nanotube Field Effect Transistor (CNTFET), Full Adder Cell, Nano electronics, Multiplier.

## I. INTRODUCTION

To meet the demand of compact designs, it became essential to continuously scale down the channel length in Metal-Oxide-Semiconductor Field Effect Transistor (MOSFET) and produce vast numbers of transistors on a single piece of the chip as predicted by Moore's law. After 2006, the channel length of a MOSFET device has come down in the deep submicron Nano range. The feature size started decreasing rapidly from 250nm to 180 nm, 135nm, 90nm, 65nm, 45nm and so on. Since, the physical gate length of device decrease lower, there is an abrupt rise in device parameters and leakage current becomes the most valuable factor of device optimization and hence, extensively affect the V-I characteristics of predictable MOSFET. The aforementioned limitations of MOSFET force the researcher to involve new circuit and specific field of research i.e. Nano devices such as silicon nanowire transistors, Single Electron Transistor (SET), Resonant Tunneling Diode (RTD), Spin Transistor (SPINFET), Quantum-dot Cellular Automata (QCA), Graphene Nanoribbon Transistor (GNRT) and Carbon Nanotube Field Effect Transistor (CNTFET) have begun to replace the conventional bulk-CMOS technology in the near future. Among the introduced novel technologies, CNTFET seems to be more successors for CMOS due to the presence of both n-type and p-type CNTFET, intrinsic relationship of both technologies and remarkable properties of CNTFET. Due to exclusive characteristics of CNTFET device, the existing logic style even with a higher advantage will be able to accommodate with the new technology.

## II. CARBON NANOTUBE FIELD EFFECT TRANSISTORS

Carbon Nanotube (CNT) is Nano-scale tube made up from a rolled sheet of graphite which is rolled up along a wrapping vector. Carbon nanotubes are represented by a vector, called chirality vector that defines the arrangement of carbon atoms along the tube. A chirality vector of a CNT is described by chiral number, i.e. denoted as (n, m).



**Figure 1: Chiral vector representation of SWCNT**

In Fig. 1, chirality vector is given by  $C_n$  and is derived from:  $C_n = n_1 \cdot a_1 + n_2 \cdot a_2$  where lattice unit vectors are  $a_1, a_2$  and  $n_1$  &  $n_2$  are positive integers which specify the tube's structure. These indices determine the arrangement of atoms along the nanotube. We have three different kinds of nanotubes: armchair, chiral and zigzag and the SWCNT have different manners such that if  $n_1 = n_2 = 3k$  ( $k \in Z$ ) then SWCNT is conducting, otherwise SWCNT is semiconducting. Conductive CNT applied as nano wires and semiconducting CNT is used as transistor channel. Identical to the MOSFET, the CNTFET has four terminals. Given in Figure 2, depicted

# Enhanced energy Detection based spectrum sensing for Cognitive Radios

T V N L Aswini, Padma Raju, K. Leela Kumari, B

**Abstract:** Wireless communications play an important role in present days growth of wireless networks which shows the association of mobile systems and internet technologies like IoT in the future which offers various number of services. Different networks with different qualities of networks are available for various areas. In some areas, there will be no connectivity whereas some areas deliver poor connectivity to the network. Hence the spectrum may not be always in use which results in spectral inefficiency. Radio spectrum in the advancement of technology gave an effective solution in terms as Cognitive Radio which manages the spectrum by sensing and sharing effectively. Of all these, sensing plays an important role which detects the vacant band within less time. Energy Detector is one of the sensing methods became more popular because of its low complexity and moderate sensing time. The proposed method is an improvement of Energy Detector with an arbitrary power operation. This reduces the sensing time and improves the recovery performance even at low SNR. The simulation results have proved this for different SNRs ranging from -15db to 5db. The probability of detection was also increased.

**Keywords:** Spectrum Sensing, Cognitive Radio, Threshold, Sensing Gain.

## I. INTRODUCTION

Now a day wireless communications became more important and well known even to a lame man.

### A. Urge of Spectrum

The transmission of data between one to another network that are not linked by any type of cables is called Wireless communication. Radio Waves are mostly used in these wireless technologies. It is used in applications such as mobiles, including two-way radios, personal digital assistants (PDAs) and wireless networking. The optimized use of spectrum is called Spectrum efficiency. By this, the maximum data can be transmitted with few errors in transmission. Increase in spectrum users leads to trouble in spectrum management. The spectrum consists of different frequency bands, each has a specific application. Based on the application characteristics and its users each frequency band is assigned [1]. Some applications uses wider band than others. In addition to these, "guard bands" are required to maintain the interference between applications to a minimum.

Cognitive Radio (CR) is an adaptive, intelligent radio and network technology which detects the available channels

automatically. It also changes transmission parameters like modulation, output power etc., to improve operating behavior of a radio and to run concurrently. In radio receiver and communications technology Cognitive radio (CR) is one of the new developments that is emerging. CR is followed by the Software Defined Radio (SDR) that slowly becoming useful, and it shows a great development in radio communications systems [2]. Communities in rural and under privilege, there is an immediate need to supply broadband Internet services. TV white space (TVWS) is a frequency band used to observed ample quantity of white spaces available and also it is also called as TV band. In order to assure quality services and spectrum availability to authorized users of the spectrum, the unauthorized users who had occupied left out frequency bands have to leave as soon as main users return. The arena of cognitive radio handles this through perception of channels and by geo-location databases which stores the actual information about handiness of channel and its utilization. Cognitive radio is an instrument that is known of its radio environments such as spectrum accessibility, signal capability, channel evaluate methods, transfer of protocols and spectrum principals and is capable of choosing the right parameters at right time to take part in radio communication.

### B. Spectrum sensing

Cognitive Radio is an emerging technology which overcomes the spectrum congestion and low usage of licensed spectrum. It senses the spectrum and takes decision intelligently to allow the secondary user [8],[9]. As depicted in Fig. 1, the unused spectrum or spectrum hole is detected by cognitive radio transceiver, and it will also determine the computing method of it (i.e. power transmission and time of approach) without disturbing the transmission of authorized user's band.

Spectrum sensing determines spectrum status and the activity of authorized users by recognizing the target frequency band time to time [4]. Spectrum management holds the finest accessible frequencies to meet the necessities of users for communication. To meet the parameters like QoS, the CRs select the empty band of total spectrum. So the purpose of spectrum management is significant for the CRs. Spectrum mobility is similar to the distinction of band of operating frequency of CR users. If an authorized user accesses a radio channel which is not free i.e., presently under an unauthorized user, then the idle spectrum can be changed to active spectrum by an unlicensed user. In order to fit the original operating frequency band, a special protocol stacks are aligned during spectrum hand-off. Since the available spectrum holes are used by number of secondary users, cognitive radio transfers data efficiently [3] and also distribute the accessible spectrum with different primary and secondary users.

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\* Correspondence Author

T V N L Aswini\*, ECE Department, Sri Vasavi Engg College, Pedatadepalli, Tadepalligudem, A.P., India.

LeelaKumari B, ECE Department, Jawaharlal Nehru Technological University, Kakinada, India

Padma Raju K, ECE Department, Jawaharlal Nehru Technological University, Kakinada, India



# House Price Prediction Modeling Using Machine Learning

**Dr. M. Thamarai**

Professor, Sri Vasavi Engineering College, Andhra Pradesh, India  
Email: thamarai.nuthusamy@srivasaviengg.ac.in

**Dr. S P. Malarvizhi**

Associate Professor, Sri Vasavi Engineering College, Andhra Pradesh, India  
Email: spmalarvizhi1973@srivasaviengg.ac.in

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**Abstract**—Machine Learning is seeing its growth more rapidly in this decade. Many applications and algorithms evolve in Machine Learning day to day. One such application found in journals is house price prediction. House prices are increasing every year which has necessitated the modeling of house price prediction. These models constructed, help the customers to purchase a house suitable for their need. Proposed work makes use of the attributes or features of the houses such as number of bedrooms available in the house, age of the house, travelling facility from the location, school facility available nearby the houses and Shopping malls available nearby the house location. House availability based on desired features of the house and house price prediction are modeled in the proposed work and the model is constructed for a small town in West Godavari district of Andhrapradesh. The work involves decision tree classification, decision tree regression and multiple linear regression and is implemented using Scikit-Learn Machine Learning Tool.

**Index Terms**—Decision tree, house price prediction, decision tree regression, multiple linear regression.

## I. INTRODUCTION

Data Mining is extracting knowledge or useful pattern from large databases. Classification is one of the data mining functionalities, employed for finding a model for class attribute which is a function of other attribute values [1].

Decision Tree is a tool, which can be employed for Classification and Prediction. It has a tree shape structure, where each and every internal node represents test on an attribute and the branches out of the node denotes the test outcomes.

80% of the known dataset can be used as training set and 20% can be used as test data set. Each record in the dataset denotes X and Y values, where X is a set of attribute values and Y is the class of the record which is the last attribute in the dataset. Using the training set Decision Tree Classifier model is constructed and tested

with test data to identify the accuracy level of the classifier.

Decision Tree formation as shown in fig. 1 employs divide and conquer strategy for splitting the training data into subsets by testing an attribute value. This involves attribute selection measures; the attribute which is to be tested first is the one which is having high information gain. Same splitting process is recursively performed on the subsets derived [2]. The splitting process of a subset ends when all the tuples belong to the same attribute value or when no remaining attributes or instances are left with. Decision Tree formation does not need any basic domain knowledge. It can handle data of high dimensions as well. Decision Tree Classifiers have good accuracy in classification.

Once the Decision Tree is formed, new instances can be classified easily by tracing the tree from root to leaf node. Classification through Decision Tree does not require much computation. Decision Trees are capable of handling both continuous and Categorical type of attributes.

To avoid generation of meaningless and unwanted rules in Decision Trees, tree should not be deeper which results in over fitting. Such a tree with over fitting works more accurate with training data and less accurate with test data. Pre pruning and Post pruning are the techniques used in Decision Tree to reduce the size of the trees and avoid over fitting. In Post Pruning the Decision Tree branches and hence the level (depth) of the tree are reduced after completely building the tree. In Pre Pruning, care is taken to avoid over fitting while building the tree itself.

Decision Trees find its major applications in areas such as medicine, weather, finance, entertainment, sports, etc. Decision Trees can also be used for prediction, data manipulation and handling of missing values. As an example in digital mammography it is used for classifying tumor cells and normal cells [3].

This paper discusses about an application of Decision Tree, for purchasing a house in a city based on attribute values such as transport facilities, number of bed rooms, and availability of schools, shopping facilities and



# IoT Based Patient Health Observation System through SMS using GSM

<sup>1</sup>Dasu Dasari, <sup>2</sup>K.N.V.S.Vijaya Lakshmi, <sup>3</sup>N. Rahul Pal

<sup>1,2,3</sup>Assistant Professor

<sup>1</sup>Department of CSE, <sup>2</sup>Department of ECE

<sup>1,3</sup>Adikavi Nannaya University, Rajamahendravaram, India, <sup>2</sup>Sri Vasavi Engineering College, Tadepalligudem, India

**Abstract :** With the miniaturization in sensors and advanced technologies there are number of procedures to use different fields to enhance the human life. IoT technology becomes a key area in designing of so many applications in health sector area. This paper is an attempt to create a solution for the patients in the society currently facing. The concepts of the Internet of Things (IoT) have been widely used to interconnect available medical resources and provide patients with intelligent, reliable and efficient health services. The main aim of this paper is to implement a system which is continuously monitors the patient health condition by the transferring of patient condition to the doctor mobile through SMS. The IOT-based patient health observation system using the GSM module works primarily to allow physicians or patient relatives to remotely check the health status of patients. The system measures the patient health parameters like heart beat and temperature of the body continuously and sends message to the doctor's registered phone number. If these parameters get worse that is exceed the certain limit then emergency alert will sent to the doctor's to save the condition immediately. To implement this system we used heart rate sensor, temperature sensor and Arduino Uno interfaced with LCD. The IoT based patient health observation system designed with a GSM to send health parameters to the doctor's registered mobile number. The system has also introduced a function through which a doctor can check the patient's condition after a certain period of time by sending a message. This system measures the accurate health parameters of the patient and eliminates the major risk factors by sending these parameters to the doctor.

**Index Terms** - Patient Health observation system, SMS, GSM, Pulse detector, temperature sensor.

## I. INTRODUCTION

The Internet of Things is the network of physical devices, vehicles, appliances and other elements integrated into electronics, software, sensors, actuators and connectivity that enables these objects to connect and exchange data. The Internet of Things is a rapidly expanding technology that is preparing to bring the next revolution in information technology and computing. The IOT system has applications [1] in all industries thanks to its unique flexibility and suitable for any environment. It is an advanced automation and analysis system that harnesses networking, detection, Big Data and artificial intelligence technologies to provide a complete system for a product. The IOT removes repetitive tasks or creates things that simply weren't possible before, allowing more people to do repetitive work.

Telemedicine is a shame that did not start yesterday. There has been a lot of development behind this area. As in all other areas, technology plays a very important role because it reduces the burden on health officials, reduces the cost of treatment, monitoring and diagnosis of patients. Patient monitoring systems are already used in hospitals, among others. However, their costs are prohibitive and hospitals. This means that someone will always have to be there to monitor a patient in the hospital or at home. The proposed IoT based patient health observation system through SMS using GSM would benefit medical practitioners for appropriate and better treatment. It is also beneficial for parents or guardians who have been transferred from the Arduino to hospital health staff or a relative for a patient case at home.

In this paper we create an affordable prototype of heart rate and temperature monitor. It will use Arduino Atmega256, GSM module, LCD screen, temperature sensor and heart rate sensor. The Arduino is programmed to know when there is an anomaly in the parameters and also to send the signals in the form of SMS.

### 1.1 Biomedical Engineering

Recently, wireless sensor networks (WSN) have played a vital role in the technology and research community, which has led to the development of various high performance intelligent detection systems. A lot of new research aims to improve the quality of human life in terms of health by designing and manufacturing sensors that are either in direct contact with the human body (invasive), or indirect (non-invasive) in contact. The development of biomedical engineering is responsible for improving the diagnosis, monitoring and therapy of health care. The new idea of Health line is to provide quality health services to all. The idea is motivated by the vision of a biomedical surveillance system[2] without cables. Body sensors monitor vital parameters (blood pressure, ECG, temperature and heart rate) and transmit the data to the doctor via a wireless communication network. Periodic health monitoring (or preventive care) allows people to discover and treat health problems early, before they have consequences. Particularly for patients at risk and long-term applications, such technology offers more freedom, comfort and opportunities in clinical monitoring.

### 1.2 Use of Vital Signals in health analysis

Chronic disease has a significant influence on health care where the cost of healing chance of attack is common among people. The changing demographic structure and the shortage of health and social protection personnel force us to study new innovations, which could more than relieve these challenges. Elderly people should visit their doctor frequently to measure their vital signals. Regular monitoring of vital signals is essential because they are the main indicators of an individual's physical well-being. These vital signals include the pulse and body temperature. The goal is to develop a low cost, low power, reliable, non-intrusive and



## Improved Recovery in Wideband Spectrum Sensing for Wireless Applications

T.V.N.L. Aswini<sup>1</sup>, Padma Raju, K.<sup>2</sup> and Leela Kumari, B.<sup>3</sup>

<sup>1</sup>Department of Electronics and Communication Engineering, SVEC, Tadepalligudem (Andhra Pradesh), India.

<sup>2,3</sup>Department of Electronics and Communication Engineering, JNTUK, Kakinada (Andhra Pradesh), India.

(Corresponding author: T.V.N.L. Aswini)

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**ABSTRACT:** There is a tremendous growth in wireless networks and services from the last few years to meet various applications which increased the urge of radio spectrum. Organization of the available spectrum over unlimited users becomes the challenging task. This paved way for the new technology named Cognitive Radio (CR) which provides a promising solution for efficient spectrum utilization. Of all the different works of CR, sensing plays a vital role. In this aspect, Compressive sensing, a new paradigm joined hands in further improving the efficiency of CR by sampling the wideband spectrum at sub-Nyquist rates. Modulated wideband converter is one of the sub-Nyquist sampling technique which supervisions CR effectively. In this piece of work, proposed reconstruction algorithm of enhanced simultaneous orthogonal matching pursuit algorithm proved its advantages over normal OMP algorithm by extending the iterations with a run factor choose between 0 and 1. Simulation results justified the increase of detection probability with the proposed algorithm even at low SNR of -10dB.

**Keywords:** MWC, spectrum sensing, Orthogonal matching pursuit, support.

**Abbreviations:** MWC, modulated wideband converter; OMP, orthogonal matching pursuit; CR, cognitive radio; ADC, analog to digital converter; RF, radio frequency; CTF, continuous to finite; SOMP, simultaneous orthogonal matching pursuit; EOMP, enhanced simultaneous orthogonal matching pursuit; MSE, mean square error.

### I. INTRODUCTION

In the current scenario, there is an extraordinary rise for the demand of wireless devices and networks. This sudden increase of demand led to various wireless applications in all the areas. According to IEEE standards, government agencies allotted certain band of frequencies fixed to various wireless services. But all the time, the allotted fixed spectrum (bands) might be in no use. This results in inefficient usage of spectrum. Hence less usage and lack of radio spectrum problem made the wireless users search for the effective solution. Cognitive Radio (CR) is a new technology which senses the available radio spectrum intelligently. It senses the vacant spectrum and allocates intelligently to the secondary users temporarily when it is not being used by primary users, thus utilizing the spectrum efficiently [1]. If at meantime, the primary users are back to use the spectrum, it leaves for the legacy users and mobilizes for other vacant band. Thus CR effectively utilizes the wireless spectrum. Of all the works of CR, sensing plays an important role. The different sensing methods include energy detector, Matched filtering, Cyclostationary, etc., are narrow band sensing techniques [22]. But most of the wireless services appear in wideband, these traditional methods become complex and gives poor detection performance. As the spectrum is wideband, it requires higher sampling rates which cannot be affordable even by today's best ADCs and also requirement of multiple functional blocks still increases the hardware complexity affecting the power consumption and speed. To overcome these problems, efficient sensing methods are required. Donoho (2006) proposed a new framework named Compressive

Aswini et al., International Journal on Emerging Technologies 11(3): 448-453(2020) 448

sensing to sense the wideband spectrum which speed up the acquisition process and reduces the implementation costs [2].

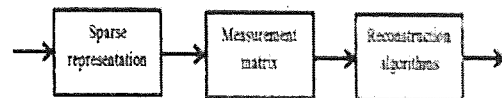


Fig. 1. Compressive sensing architecture.

Traditional approach of sampling is done at Nyquist rates defined by Shannon. As the spectrum is a wide band, the Nyquist sampling is at very high rates which cannot be affordable by normal ADCs and the hardware complexity increases. The compressive sensing [3] mechanism framed a new era by compressing and sensing the signal at a time. In this technique, sampling is done at sub-Nyquist rates. As shown in Fig.1, the signal of interest is a K-sparse signal  $x(t)$  of length  $N \times 1$  is sampled by obtaining the measurement matrix of  $M \times N$  samples, then finding the M measurements gives the compressed samples. Finally, various reconstruction algorithms help to recover the original signal.

The wideband spectrum considered is a multiband signal which spreads at continuous intervals over the spectrum [5]. As wideband signal is sparse, sampling can be achieved through compressive sensing phenomenon. Several techniques are proposed to replace conventional ADCs. Landau (1967) proposed a sensing method done at low rate sampling with exact recovery of the signal [4]. Random demodulator

# Low Power Bidirectional Voltage Level Translator using Power Gating

Smt. Y. Sujatha

**Abstract:** now a day's, the demand for SoC based systems increasing. In SoC environment, multiple supply voltages are required because various subsystems of the system operate with different supply voltages. The communication between these systems is difficult and increases power consumption. The solution to this problem is to use a Voltage level translator/shifter between them. In this paper, a low power voltage level translator using power gating is proposed. By using this translator bidirectional voltage translator is implemented. In bidirectional voltage level translator, the data is translation between core logic and pad drivers and vice versa is possible with reduced power consumption and delay. In this paper, the power consumption reduces from 104 $\mu$ w to 6.25  $\mu$ w at V<sub>dd</sub> 1.8V. Delay is reduced from 19ns to 0.2 ns.

**Keywords:** multiple supply domains, pass transistor logic, voltage level translator, power gating.

## I. INTRODUCTION

A system on chip is an IC that integrates all the modules including core logic, memory and pad drivers etc. on a single chip. Generally core logic operates at low logic levels whereas input/output pad drivers operate at high logic levels. In order to communicate between these modules, it requires an interface called voltage level translator/shifter. A voltage translator/shifter translates the voltage levels from high to low or low to high. Instead of using multiple supply voltages, a voltage level translator saves power consumption. To design systems with increased functionality, designers are facing lot of challenges because there is a requirement for low power consumption, high speed performance and time to market. Various subsystems of a system built with different process technologies. One system may be designed with one process technology works with high supply voltage (ex: 130nmCMOS at v<sub>dd</sub>=3.3v) and the other system designed with another technology works with high supply voltage (TTL with v<sub>dd</sub>=5v). The selection of appropriate voltage translation device is determined by the process technology used for the circuit, power requirement, voltage translation levels and current sourcing capability of the device used. A voltage Level translator is a circuit, translates a signals from one voltage domain to another. To translate from one domain to another, two different supply voltages are used. One supply voltage is used at the input. That means input is of that voltage level. Second supply voltage is used at the output. The output signal is at second supply voltage. Two inverters with cross coupling can be used to achieve full logic swing i.e. 0 to v<sub>dd</sub> at the output.

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Y.Sujatha\*, FCE department, Sri Vasavi Engineering College,  
Tadepalligudem, INDIA. Email: sujatha1523@gmail.com

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DOI: 10.35940/ijitee.G5729.059720

This paper is organized as five sections. In section I, a brief introduction to the voltage level translator is given. In section II, a brief explanation to the conventional voltage translator and its design is given. Section III, covers the design of proposed voltage level translator and bidirectional voltage level translator. Section IV, design of various applications using proposed design and a brief discussion on simulation results. Section V, discuss how the best the proposed voltage level translator like power consumption and delay.

## II. CONVENTIONAL VOLTAGE LEVEL TRANSLATOR

This is the voltage level translator using two power supplies VDD1 and VDD2. VDD1 is used in the input section and VDD2 is used in the output section. This translator translates any signal from one voltage level VDD1 to another voltage level VDD2. Two NMOS transistors driver transistors receive input and complemented input. Two PMOS load transistors are cross coupled to obtain full output voltage swing.

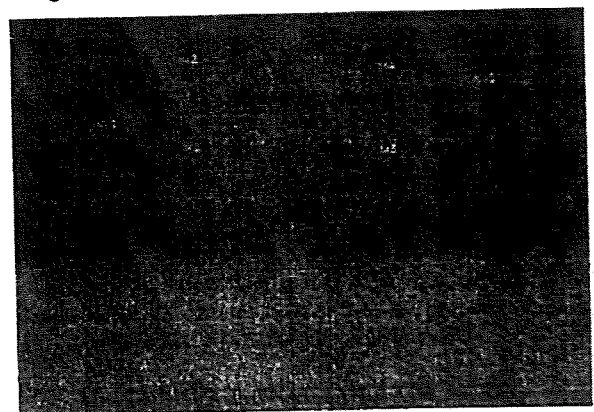


Fig.1: conventional voltage level translator

When VIN is high, the driver transistors M1 and M3 receive '0' and '1' respectively. Then the transistor M3 is ON, and the output node  $\bar{2}$  becomes low. This makes inverter3 output is high with VDD2 (high). So the voltage level translator translates the VIN at VDD1 (low) to VOUT at VDD2 (high) and vice versa.

In this design, PMOS transistors are used as load. When the PMOS transistor is ON, it offers high on resistance. So, it takes more time to produce output. Large delay is the main drawback with this circuit. So to overcome this drawback, the proposed voltage level translator is designed.

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## *Automation of Placement and Club Activities through a Centralized Web Portal by using MEANSTACK Technology*

*Leelavathi Arepalli<sup>1</sup>, Rajesh Arepalli<sup>2</sup>, Ainampudi Lavanya Devi<sup>3</sup>, Katari Sai Joshitha<sup>4</sup>,  
Ch. Sai Abhiram<sup>5</sup>*

*Sr. Assistant Professor<sup>1</sup>, Assistant Professor<sup>2</sup>, Students<sup>3, 4, 5</sup>*

*Department of Computer Science and Engineering*

*Sri Vasavi Engineering College (Affiliated by JNTUK) Tadepalligudem, AP, INDIA*

*Corresponding Author's email id: - leelavathee@gmail.com<sup>1</sup>, rajesharepalli@gmail.com<sup>2</sup>,  
lavanyadevi999@gmail.com<sup>3</sup>, joshitha6669@gmail.com<sup>4</sup>, abhichityala@gmail.com<sup>5</sup>*

*DOI: - <http://doi.org/10.5281/zenodo.3786178>*

### *Abstract*

*The placement activities play a vital role in student career. At present, all the Training, Placement and Club (Technical club, Orators club, Audio Visual club) activities information is being maintained manually. Hence it is prone to errors. It is time consuming process for collecting, managing and updating the student lists and it depends on the number of students. So we are proposing a computerized automation module to speed up the process.*

*Unlike other stacks which use multiple programming languages, such as the old fashioned LAMP stack, the MEAN stack only uses onescrpting language JavaScript. This gives one programmer much more power over the whole workflow than in other systems. Using the same programming language in both the front and back ends of the application has multiple benefits. The main benefit is that it makes data communication between server and client simpler and faster. It makes modifications at either end easier. It also promotes reusing code across the multiple technologies that in turn helps keep the application secure and stable.*

*By using this technology, we are developing an application that helps in simplifying and reducing the work of placement and club activities.*

## *Automation of Placement and Club Activities through a Centralized Web Portal by using MEANSTACK Technology*

*Leelavathi Arepalli<sup>1</sup>, Rajesh Arepalli<sup>2</sup>, Ainampudi Lavanya Devi<sup>3</sup>, Katari Sai Joshitha<sup>4</sup>,  
Ch. Sai Abhiram<sup>5</sup>*

*Sr. Assistant Professor<sup>1</sup>, Assistant Professor<sup>2</sup>, Students<sup>3, 4, 5</sup>*

*Department of Computer Science and Engineering*

*Sri Vasavi Engineering College (Affiliated by JNTUK) Tadepalligudem, AP, INDIA*

*Corresponding Author's email id: - leelavathee@gmail.com<sup>1</sup>, rajesharepalli@gmail.com<sup>2</sup>,  
lavanyadevi999@gmail.com<sup>3</sup>, joshitha6669@gmail.com<sup>4</sup>, abhichityala@gmail.com<sup>5</sup>*

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# House Price Prediction Modeling Using Machine Learning

**Dr. M. Thamarai**

Professor, Sri Vasavi Engineering College, Andhra Pradesh, India  
Email: thamarai.muthusamy@srivasaviengg.ac.in

**Dr. S P. Malarvizhi**

Associate Professor, Sri Vasavi Engineering College, Andhra Pradesh, India  
Email: spmalarvizhi1973@srivasaviengg.ac.in

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**Abstract**—Machine Learning is seeing its growth more rapidly in this decade. Many applications and algorithms evolve in Machine Learning day to day. One such application found in journals is house price prediction. House prices are increasing every year which has necessitated the modeling of house price prediction. These models constructed, help the customers to purchase a house suitable for their need. Proposed work makes use of the attributes or features of the houses such as number of bedrooms available in the house, age of the house, travelling facility from the location, school facility available nearby the houses and Shopping malls available nearby the house location. House availability based on desired features of the house and house price prediction are modeled in the proposed work and the model is constructed for a small town in West Godavari district of Andhrapradesh. The work involves decision tree classification, decision tree regression and multiple linear regression and is implemented using Scikit-Learn Machine Learning Tool.

**Index Terms**—Decision tree, house price prediction, decision tree regression, multiple linear regression.

## I. INTRODUCTION

Data Mining is extracting knowledge or useful pattern from large databases. Classification is one of the data mining functionalities, employed for finding a model for class attribute which is a function of other attribute values [1].

Decision Tree is a tool, which can be employed for Classification and Prediction. It has a tree shape structure, where each and every internal node represents test on an attribute and the branches out of the node denotes the test outcomes.

80% of the known dataset can be used as training set and 20% can be used as test data set. Each record in the dataset denotes X and Y values, where X is a set of attribute values and Y is the class of the record which is the last attribute in the dataset. Using the training set Decision Tree Classifier model is constructed and tested

with test data to identify the accuracy level of the classifier.

Decision Tree formation as shown in fig. 1 employs divide and conquer strategy for splitting the training data into subsets by testing an attribute value. This involves attribute selection measures; the attribute which is to be tested first is the one which is having high information gain. Same splitting process is recursively performed on the subsets derived [2]. The splitting process of a subset ends when all the tuples belong to the same attribute value or when no remaining attributes or instances are left with. Decision Tree formation does not need any basic domain knowledge. It can handle data of high dimensions as well. Decision Tree Classifiers have good accuracy in classification.

Once the Decision Tree is formed, new instances can be classified easily by tracing the tree from root to leaf node. Classification through Decision Tree does not require much computation. Decision Trees are capable of handling both continuous and Categorical type of attributes.

To avoid generation of meaningless and unwanted rules in Decision Trees, tree should not be deeper which results in over fitting. Such a tree with over fitting works more accurate with training data and less accurate with test data. Pre pruning and Post pruning are the techniques used in Decision Tree to reduce the size of the trees and avoid over fitting. In Post Pruning the Decision Tree branches and hence the level (depth) of the tree are reduced after completely building the tree. In Pre Pruning, care is taken to avoid over fitting while building the tree itself.

Decision Trees find its major applications in areas such as medicine, weather, finance, entertainment, sports, etc. Decision Trees can also be used for prediction, data manipulation and handling of missing values. As an example in digital mammography it is used for classifying tumor cells and normal cells [3].

This paper discusses about an application of Decision Tree, for purchasing a house in a city based on attribute values such as transport facilities, number of bed rooms, and availability of schools, shopping facilities and

## Research Article

# Secure Lightweight IoT Integrated RFID Mobile Healthcare System

Vankamamidi S. Naresh <sup>1</sup>, Sivaranjani Reddi,<sup>2</sup> and Nistala V. E. S. Murthy<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, 534101 Andhra Pradesh, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology & Science, Visakhapatnam, 530003 Andhra Pradesh, India

<sup>3</sup>Department of Mathematics, Andhra University, Visakhapatnam, 530003 Andhra Pradesh, India

Correspondence should be addressed to Vankamamidi S. Naresh; [vsnaresh111@gmail.com](mailto:vsnaresh111@gmail.com)

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Patient safety is a global public health concern nowadays, especially in elderly people who need physiological health monitoring systems integrated with a technology which will help to oversee and manage the medical needs. In this direction, we propose a lightweight effective healthcare monitoring system designed by using the Internet of Things (IoT) and Radio Frequency Identification (RFID) tags. In this technique, we use dual-band RFID protocols which are the one working at a high frequency of 13.56 MHz and useful to figure out the individuals, and 2.45 GHz microwave bands are used to monitor corporal information. Sensors are used to monitor and collect patient physiological data; RFID tag is used to recognize the patient. This IoT-based RFID healthcare monitoring system provides acquisition of physiological information of elderly people and patients in hospital. Further, it is aiming to secure patient's health recordings using hyper elliptic curve- (HEC-) based signcryption algorithm while allowing the doctor to access patient health information. Privacy is provided to variable length patient medical records using different genus curves, and the evaluation shows that the proposed algorithm is optimal with respect to healthcare.

## 1. Introduction

Mobile healthcare (M-health) system is a system intended to preserve patient health records remotely, allowing doctors to access them from their location to give medical guidance according to need. This arrangement improves accessibility and efficiency, because both patients and doctors need not meet each other. Therefore, patients from their residence can acquire the medical diagnostic suggestions from doctors directly. In this process, RFID technology plays a vital role in patient personal information identification and medical record access ([16, 17]). RFID tag, reader, and middleware are the components present in the RFID system. Tag is used to store a unique identification number, reader is used to read the number present on tag, and middleware is responsible to store and process the data from readers. The technological advancements in this field, in particular development of chip, are very fast, have low activation power ( $\mu W$ ), and even able

to integrate diverse sensing capabilities. This development opens a challenge of investigating sophisticated applications in IOT paradigm. RFID seems to be the next disruptive modernization in healthcare, which offered several openings for improved safety, functioning effectiveness and economical savings. Even though it promises several benefits in healthcare, the adoption of this technology in healthcare has not been as striking as anticipated and still lags behind compared to other applications due to apprehensions related to security and privacy, radio frequency interference, and inadequacy of industry benchmarks. Hence, security is the major concern in RFID-based healthcare systems. In order to ensure a secured communication, authentication check should happen in tag and reader, encrypting their identification and the patient data to attain confidentiality. Many cryptographic algorithms [2] were suggested to provide security and privacy to message in communication, encryption, and decryption. Table 1 shows the comparative analysis of various cryptographic

# Provable secure lightweight multiple shared key agreement based on hyper elliptic curve Diffie–Hellman for wireless sensor networks

Vankamamidi S. Naresh<sup>a</sup>, Sivaranjani Reddi<sup>b</sup>, and Nistala V.E.S. Murthy<sup>c</sup>

<sup>a</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India; <sup>b</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology Science, Visakhapatnam, Andhra Pradesh, India; <sup>c</sup>Department of Mathematics, Andhra University, Visakhapatnam, Andhra Pradesh, India

## ABSTRACT

In this paper, we propose a new protocol in which  $2^{m^2} - 1$  session keys can be generated when  $m$  public keys are exchanged in a one run of the aforesaid protocol based on the difficulty of the hyper elliptic curve discrete logarithm problem. In this work, we are implementing the proposed protocol using a hyper elliptic curve of genus 2 over a finite field and the results are very encouraging. The main advantages of the proposed protocol are a considerable decrease in keys exchange overhead, a further increase in the safety of the keys and broadening of applicability. A relative study among the proposed and existing protocols is made and acceptable results have been obtained. The proposed protocol is immune to known-key attack, replay attack, key compromise impersonation, forgery attack and key control. Further, an upper limit for the quantity of shared keys is obtained in terms of the number of keys exchanged and, in fact, we find a formula for the minimal required number of keys to be exchanged for a given number shared keys. Further we can easily provide session key authentication for various wireless users/sessions on proposed protocol by integrating lightweight three-factor authentication scheme in the back ground.

## KEYWORDS

Jacobian; hyper elliptic curves; multiple shared keys; key exchange operations; wireless ad-hoc networks

## 1. Introduction

Now-a-days Hyper Elliptic Curve Cryptographic Systems (HECC) (Kumari et al., 2017) is rapidly developing as an alternative to classic public key cryptosystems (Galbraith, 2012) like DH, RSA, ECC, etc. because of its suitability for constrained environments like wireless ad-hoc networks (WAN), which need a smaller amount of computational power, communication bandwidth and memory relative to other cryptosystems with an anticipated level of security with considerably lesser key sizes (as shown in Table 1), which leads to user authentication with signature generation and verification (Nizamuddin & Amin, 2011; Hwang, Lai, & Su, 2005; Zheng & Imai, 1998), faster key exchange, besides smaller key storage needs. The security of HECC naturally depends on the difficulty of solving HEC-discrete logarithm problem (HEC-DLP). Now that there are well-known algorithms of sub exponential time for breaking ECC, DH (Diffie & Hellman, 1976), RSA based on modular arithmetic, the HECC became significant as

mathematicians don't (yet?) have an algorithms of sub exponential time (Adleman, DeMarrais, & Huang, 1994) for breaking it. Hence, it is believed to be secure with lesser key size and with high performance. In a recent work, the authors of this paper proposed HEC-DH (Naresh, Reddi, & Murthy, 2018) and implemented over curves of various genus. We analyzed the performance of HECC over prime field of curves of various genus and showed that for constrained devices genus 2 and 3 are highly recommendable whereas for large scale networks genus 4 and 6 are suggestible. However, the group operation is more difficult. We can't use every hyper elliptic curve for our purpose; we have to choose them paying attention to their genus, the order of the group and their field of definition.

Although there are several proficient cryptosystems presently existing, their trustworthiness relies on the keys being used, as the messages can be translated back when adversaries know the secret key. A logical solution to this problem is to change the cryptographic keys as frequently as possible. Notice that public key





## Data Authorization in Hadoop using Kerberos Authentication System and Transport Layer Security

Yallapragada Ravi Raju<sup>1</sup> and Haritha Donavalli<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Computer Science and Engineering,  
Sri Vasavi Engineering College, Tadepalligudem (A.P.), India

Research Scholar, Department of Computer Science and Engineering,  
Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur (A.P.), India.

<sup>2</sup>Professor, Department of Computer Science and Engineering,  
Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur (A.P.), India.

(Corresponding author: Yallapragada Ravi Raju)

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**ABSTRACT:** In the current scenario, a number of platforms are developed to build big data applications in both proprietary and open-source. One of the popular and easily accessible platform is Hadoop, which is an open source software for big-data processing. The prior version of Hadoop (CVE-2017-3162) did not concentrate on security that lacks in secure authentication, which allows an unauthorized party to access the data. Currently, the authentication systems are utilized for user authentication in the Hadoop Distributed File System (HDFS), which is vulnerable to data-node hacking attacks and replay. In this research paper, Kerberos authentication system along with Transport Layer Security (TLS) encryption was proposed to protect the stored data in HDFS from replay and attacks. The proposed system permits HDFS clients to be authenticated by the data-node using block access token. The experimental result showed the efficiency and effectiveness of the proposed system on the basis of HDFS capacity, alerts across data-nodes, critical events across data-nodes, total bytes written across data-nodes, total blocks read across data-nodes, total blocks written across data-nodes, total transceivers across data-nodes, transceivers across data-nodes, send data packet transfer average time, average disk flush time across data-nodes, and import events and alerts are improved.

**Keywords:** Data authentication, Hadoop system, Hadoop distributed file system, Kerberos authentication system and Transport layer security.

**Abbreviations:** HDFS, Hadoop Distributed File System; TLS, Transport Layer Security; KDC, Key Distribution Center; TGT, Ticket-Granting Ticket; TGS, Ticket Granting Service, TGS; SSL, Secure Sockets Layer.

### I. INTRODUCTION

In current decades, digital data are generated from many sources and the fast evolution of digital technologies increases the growth of big data. It delivers evolutionary break-through in several fields with the collection of large data-sets [1-2]. The main objective of the big-data analysis is to process the high velocity, veracity, volume, and variety of data using several computational and traditional intelligent techniques. Generally, big data refers to the collection of complex and large data-sets, which is hard to process using data processing applications and traditional data-base management tools [3-4]. Though, Hadoop system is developed to provide the solutions for massive datasets in applications like machine learning, real-time analytics, data mining, relational data analytics, and web analytics [5-6]. The Hadoop is an open-source, java-based, and scalable system for distributed large-scale processing. It scales from a single machine to multiple servers to set-up an execution platform with storage, high availability, and local computation [7-8]. Usually, the Hadoop system comprises of two major components; HDFS and MapReduce.

The HDFS contains geo-graphically dispersed data nodes, where the user data resides. Then, MapReduce is a programming model, which comprises of two

essential tasks; map and reduce. Whereas, map converts the data into set of data, where the individual elements are sub-divided into tuples (value/key pairs). Respectively, reduce takes the output of map as an input and joins the data tuples (value/key pairs) into a smaller set of tuples [9]. Generally, the existing security methodologies for protecting virtualized infrastructures are categorized into two types such as, security analytics and malware detection and also the prior techniques are not efficient in attack environment [10]. Usually, malware detection comprises of two steps; monitoring hooks are placed at dissimilar points within the virtualized infrastructure and then update the database, which is used to identify the presence of attacks [11-12]. The origin of Hadoop system is very essential for preserving a basic idea about Hadoop security [13]. In this research paper, Kerberos authentication system was integrated with TLS encryption for protecting the data stored in HDFS from replay and attacks.

This paper is prearranged as follows. Section II surveys several existing research papers in Hadoop security system. Section III shows problem statement of existing methodologies. Section IV details theoretical explanation and quantitative analysis of the proposed system. Conclusion is made in section V.

# Recent and Frequent Informative Pages from Web Logs by Weighted Association Rule Mining

**Dr. SP. Malarvizhi**

Associate Professor, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India.  
Email: [spmalarvizhi1973@srivasaviengg.ac.in](mailto:spmalarvizhi1973@srivasaviengg.ac.in)

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**Abstract**—Web Usage Mining provides efficient ways of mining the web logs for knowing the user's behavioral patterns. Existing literature have discussed about mining frequent pages of web logs by different means. Instead of mining all the frequently visited pages, if the criterion for mining frequent pages is based on a weighted setting then the compilation time and storage space would reduce. Hence in the proposed work, mining is performed by assigning weights to web pages based on two criteria. One is the time dwelled by a visitor on a particular page and the other is based on recent access of those pages. The proposed Weighted Window Tree (WWT) method performs Weighted Association Rule mining (WARM) for discovering the recently accessed frequent pages from web logs where the user has dwelled for more time and hence proves that these pages are more informative. WARM's significance is in page weight assignment for targeting essential pages which has an advantage of mining lesser quality rules.

**Index Terms**—Web logs, Web Mining, Page Weight Estimation, Weighted Minimum Support, WARM, WWT.

## I. INTRODUCTION

The Literature shows that Data Mining is a field which gains a rapid growth in recent days. Association Rule Mining (ARM) of this field plays a vital role in research [1]. Frequent itemset mining uses ARM algorithms to get the association amongst items based on user defined support and confidence [2]. Existing literature say that from the foremost frequent itemset mining algorithms like Apriori and FP-growth, many algorithms have so far been evolved. ARM gains application in business management and marketing.

In case of WARM, every individual item is assigned a weight based on its importance and hence priority is given for target itemsets for selection rather than occurrence rate [3,4,5,6]. Motive behind WARM is to mine lesser number of quality based rules which are more informative.

Web log mining also known as web usage mining, a category of web mining is the most useful way of mining the textual log of web servers to enhance the website services. These servers carry the user's interactions with the web [7, 8].

This paper provides a method of WARM for mining the more informative pages from web logs by a technique called WWT where weight is assigned based on time dwelled by the visitor on a page and the recent access. Log is divided into  $n$  windows and weights are provided for each window. Last window is the recently accessed one and carries more weight. Along with the window weight the time dwelled on a page also adds to the priority of a target page to be mined.

Rest of the paper is arranged as follows. Section 2 appraises related works of Frequent Patterns and WARM for Web log. Section 3 explains about the proposed system of how to preprocess the web logs, weight assignment techniques, WWT structure and WARM. Section 4 bears the experimental evaluation. Section 5 offers conclusion.

## II. RELATED WORK

To obtain the frequent pages from web logs and to provide worthy information about the users FP-growth algorithm is used [9].

Web site structure and web server's performance can be improved by mining the frequent pages of the web logs to cater the needs of the web users [10].

A measure called  $w$ -support uses link based models to consider the transaction's quality than preassigned weights [6].

ARM does not take the weights of the items into consideration and assumes all items are equally important, whereas WARM reveals the importance of the items to the users by assigning a weight value to each item [11].

An efficient method is used for mining weighted association rules from large datasets in a single scan by means of a data structure called weighted tree [3].

Wei Wang et al [4] proposed an effective method for WARM. In this method a numerical value is assigned for every item and mining is performed on a particular weight domain. F.Tao et al [5] discusses about weighted setting for mining in a transactional dataset and how to discover important binary relationships using WARM.

Frequently visited pages that are recently used shows user's habit and current interest. These pages may be mined by WARM techniques and can be made available in the cache of the server to make the web access speedy [12]. Here the web log is divided into several windows

RESEARCH

Open Access



# A provably secure cluster-based hybrid hierarchical group key agreement for large wireless ad hoc networks

Vankamamidi S. Naresh<sup>1\*</sup>, Sivaranjani Reddi<sup>2</sup> and Nistala V. E. S. Murthy<sup>3</sup>

\*Correspondence:  
res.naresh@gmail.com  
<sup>1</sup> Department of Computer  
Science and Engineering, Sri  
Vasavi Engineering College,  
Tadepalligudem, Andhra  
Pradesh 534101, India  
Full list of author information  
is available at the end of the  
article

## Abstract

Group key agreement protocol permits a set of users to create a common key to make sure security of information exchange among members of the group. It is extensively used in secure multiparty computation, resource security sharing, and distributed collaborative computing etc. For large wireless ad-hoc network, there is no authentication center, the computing power and communication distance of terminals are constrained, and nodes frequently join and exit the network. For these reasons, Group Key Management for securing multicast communications in an energy-constrained large wireless ad-hoc network environment is still remains a critical and challenging issue. In this direction, we propose a cluster-based hybrid hierarchical-group key agreement (CHH-GKA) framework to provide a scalable solution for Secure Group Communication (SGC) in large wireless ad hoc networks (WANETS). This technique is based on splitting a large group into a certain number of clusters in which the last member of each of the clusters is designated as a cluster head (CH) and the last member of the group is designated as the group controller (GC). First we apply on hand Naresh–Murthy-group key agreement (NM-GKA) protocol locally in every cluster in parallel in level-I to generate CKs and then in level-II, the CHs use these CKs and implement NM-GKA protocol again among them to form the complete group key. Finally each CH distributes the group key to all its members through their respective CK encrypted links. In this process, first we survey several cluster-based hierarchical GKA protocols and compare the proposed one with them and show that it provides optimal performance with regard to computation and communication expenses. Further, it also handles dynamic events and is provably secure in formal security model under the cryptographic suppositions.

**Keywords:** Secure Group Communication, Elliptic curve Diffie–Hellman (ECDH), Hierarchical, Clustering, Hybrid, Group key agreement, Wireless ad hoc networks

## Introduction

WANETS provide whenever–wherever networking amenities for communication establishment through the public wireless medium. In this environment, Secure-GKA and proficient group key management are known to be complicated tasks with respect to both computational and algorithmic points of view because of resource constraints in WANET [1]. There is an extensive range of applications for WANET which includes emergency medical services deployed in various environments which can considerably improve the quality of medical care; military applications, rescue missions, collaborative

# Network Based Adaptation of Block Chain Technology

Ch. Rupa, D. Jaya Kumari

**Abstract:** Online transactions are growing up day by day due to globalization factors. Threat victims rate also increasing due to lack of privacy protection and identity theft. The number of technologies have been using for maintaining the communication data like Torrent Technology, Databases, etc. Even though threat agents seeking new trends to attack the data. So a technology is required to do a secure transaction in the enterprise society. Recent technology, which can be played a vital role in data security, is Block chain. Once created a block lack of alter function in the block chain will helps to reduce the information attacks/forgery. This paper addresses block chain technology concepts with internal architecture and its applications along with the data communication over a network with block chain objective. The main strength of this work is simulation results with and it's analysis.

**Index Terms:** Privacy protection, Identity theft, blockchain, security services, Database, Torrent

## I. INTRODUCTION

Currently, privacy protection is becoming a major issue in the society. All kinds of data transactions are suffering from this threat due to new trends are using the threat agents. Like, Spoofing and cloning type of threats are main causes to attacks on Integrity and Authentication security services. Also, it extends towards Phishing Attacks [1]. Day by day security issues is growing up in all the applications with the current systems by rapid growth in the technology utilization by the users. As well as the number of issues facing the users with the current application systems are like over transaction fee, double spending problems, hacking, Net fraud, etc. Now, blockchain technology can able to reduce the threats and problems with the current system by its distributed transaction based and with a high-end secure design system. In this, every individual transaction is verified by cross-checking ledger and uses complex encoding and hashing techniques to overcome double spending problem [2]. A global network of computers uses Blockchain technology is the technique behind of crypto currency (Bitcoin, Ripple, etc). It is a data structure which designed the set of specific complex algorithm to achieve Byzantine fault tolerant state of global transaction ledger [3]. This technology helps to maintain logs transactions across the number of computers that is a distributed and decentralized digital ledger. Blockchain has to be characterized by four elements such as Cryptography, Replicated ledger, Business logic and

Consensus.

Cryptography is for doing ledger integrity, authenticity and privacy of transactions and verifying Identity of the participants. Replicated ledger maintains history of all transactions. Business Logic embedded in the ledger and executed together with transactions. All transactions validate by Consensus which can referred as Decentralized protocol. Generally, It is a method to validate the order of transactions, or requests on a blockchain network.

## II. BLOCKCHAIN METHODOLOGY

Blockchain has built from three technologies as shown in figure 1 which are P2P Network, Cryptography (Confidentiality and Authentication) and its program. The blockchain technology affects on two key costs such as cost of verification and cost of networking. The cost of verification related to validation of the transaction attributes with less cost. The second cost, cost of networking, is without the need for a traditional mediating, bootstrap and operate at marketplace. At regular intervals, blockchain allows a decentralized network of economic agents to agree, about the true state of shared data. This shared data can represent exchanges of currency, intellectual property, equity, information or other types of contracts and digital assets.

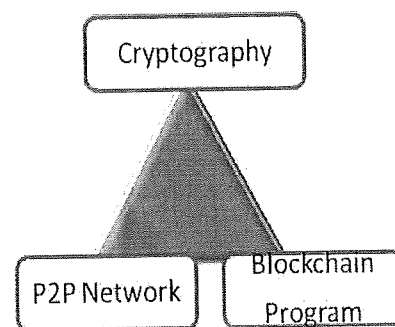


Figure 1. Blockchain Technologies

Blockchain uses private key cryptography (confidentiality) [4] to secure identities of the transaction heads and uses high-end hash functions (authentication) [5] to make the blockchain immutable. Private keys play vital role in the blockchain based distributed transactions. Mechanism doesn't need to be kept secret but the secret key (Private key) does.

The keys are mathematically related to all hash based addresses. To maintain consistency in the distributed ledger, Peer to Peer (P2P) [6] machines on

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Ch. Rupa, Dept. of CSE, V. R. Siddhartha Engineering College (A), Sri Vasavi Engineering College (A) Andhra Pradesh, India

D. Jaya Kumari, Dept. of CSE, V. R. Siddhartha Engineering College (A), Sri Vasavi Engineering College (A) Andhra Pradesh, India

# Prediction and Analysis of Sentiments on Twitter Data using Machine Learning Approach

**Ch Srinivasa Rao**

Research Scholar, Dept of CSE  
Acharya Nagarjuna University, Guntur  
Associate Professor, Dept of CS,  
SVKP & Dr K S RAJU A&Sc College,  
Penugonda, A.P, India  
chiraparapu@gmail.com

**Dr. G Satyanarayana Prasad**

Professor, Dept of CSE,  
Dean, Training & Placements  
RVR & JC College of Engineering  
Chowdavaram, Guntur, A.P, India  
Satyam\_gp@yahoo.com

**Dr.Vedula Venkateswara Rao**

Professor, Dept of CSE,  
Sri Vasavi Engineering College  
Pedatadepalli, Tadepalligudem,  
A.P, India  
Venkatvedula2017@gmail.com

*Abstract*—today, methods for automatic opinion mining on online data are becoming increasingly relevant. Over the past few years, methods have been developed that can successfully and with a great degree of accuracy analyze the sentiment in opinions from digital text. These developments enable research into prediction of sentiment. Sentiment prediction has traditionally been used as a tool for stock prediction. In such scenarios, incoming news is analyzed in real-time and the impact of that news on stock prices is estimated, making automatic stock trading possible. Recent developments in sentiment prediction have seen attempts to predict explicit sentiment of the reactions to blogs, before the blogs are even posted. In this paper, we research the prediction of the general sentiment polarity in reactions to news articles, before the news articles are posted. We use Machine Learning approach to solve the sentiment prediction problem. To automatically label comments from Data Set for sentiment prediction training, we perform automatic domain-knowledge transfer from a classifier trained on Twitter data. In this paper, we propose a new machine learning method, a new feature selection method for text and a new machine learning evaluation metric. We provide a thorough analysis of News data, and manually annotate a high standard from it. Finally, we demonstrate the feasibility of sentiment prediction of the general sentiment polarity in reactions to news articles, before the news articles are posted in limited cases. Ultimately, we provide an analysis of the limitations of our and similar

approaches to sentiment prediction, and make recommendations for future research.

**Keywords-** micro blog, twitter, sentiment analysis, opinion mining, predictions

## I. INTRODUCTION

On a variety of online platforms, such as review sites, blogs, as well as social services such as Twitter, internet users produce vast amounts of opinionated text about a large range of domains, such as movie reviews, travel experiences, product reviews, opinions about news and others. Automatic opinion mining - the ability to process large amounts of opinionated textual information from online sources without human interference - is necessary. The data sources include opinions about products, brands and developments which increasingly drive the decision making in business and government. Automatic opinion mining is divided into two categories; *qualitative* opinion mining, which attempts to extract pieces of literal information from the data, such as sentences describing an experience relevant to the target of the opinion and *quantitative* opinion mining, which attempts to determine quantifiable dimensions of opinion, such as sentiment. Sentiment analysis is utilized in order to determine the polarity of opinions (positive/neutral/negative) or the emotional charge of opinions across a range of possible emotions (love, fear, anger, understanding etc). The field of sentiment analysis has recently witnessed a large amount of interest from the scientific community [1] [2] [3]. Sentiment analysis has traditionally been applied to a single domain at

## Prediction of crop production using adaboost regression method

<sup>1</sup>Dr Shirin Bhanu Koduri, <sup>2</sup>Loshma Guniseti, <sup>3</sup>Ch Raja Ramesh, <sup>4</sup>K V Mutyalu and <sup>5</sup>D. Ganesh

<sup>1,2,3,4,5</sup>CSE Department, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, India

**Abstract:** Territorial evaluations or forecast of yield creation is basic for some applications, for example, agrarian grounds administration, nourishment security cautioning framework, sustenance exchange strategy. Machine learning has risen with enormous information advancements and superior processing to make new open doors for information escalated science in the multi-disciplinary agricultural space. In this paper, we have applied and build a crop production prediction model using Decision Tree Classification and AdaBoost Regression Method. We have used the Indian Agriculture dataset. Performance analysis was done using R-squared Score.

**Keywords—** AdaBoost, agriculture, crop production, regression, R-squared score.

### 1. Introduction

Agriculture is the backbone of Indian economy. Agribusiness area utilizes more than 50 for each penny of the aggregate workforce in India and contributes around 17-18 percent to the nation's Gross Domestic Product GDP. Artificial Intelligence is an area of computer science; it has the capability of machine to reproduce intellectual human behavior. Machine Learning is a subarea of Artificial Intelligence. In machine learning, we do not need to explicitly indicate the steps or conditions as in case of some programming applications. Regression is a technique to find the statistical relationship between two or more attributes associated with, and depends on, a change in one or more independent attributes.

Ensemble is the specialty of consolidating differing set of learners together to improve the balance and model prediction. Ensemble learning is a machine learning approach where numerous learners are prepared to take care of a same problem. Rather than customary machine learning approaches which attempt to take in one hypothesis from data used training, ensemble techniques endeavor to build an arrangement of theories and join them for use.

Boosting is one kind of ensemble procedure which endeavors to distinguish a solid classifier from an arrangement of classifiers which are weak. The different types of boosting algorithms are:

- AdaBoost (Adaptive Boosting)
- Gradient Boosting
- XGBoost
- 



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# Design and Implementation of Controller for Vocal Reduction

Y.Lalitha Kameswari, D.Sudha Rani

*Abstract— This paper gives supporter investigations of 7L MLI electrical converter in quality network for pay of vocals. For power stupendous control a numerical exact the board bountiful as another upper symphonious scale back charge than the standard controllers. Symphonious mutilation is that the chief indispensable quality pleasant impediment blending in electrical battery-controlled battery-fueled convertor, the vocals is likewise expelled through friend perfect need of move point. An amalgam appraisal approach increased gold famous move positions that square measure achieved from the hirsute précis idea gismo what is more as neural system. The purposeful system square measure taking care of be actualized in tangle inquire about lab walking stage and to boot the symphonious evacuation ordinary common by and large execution square measure taking care of be assessed.*

*Keywords— Power quality, Vocals, Switching angles, THD, Multilevel inverter.*

## 1. INTRODUCTION

Retaining a everyday power and stable frequency carry for serious allied lots. Vocals be superfluous contain signals which is perhaps critical of the signals of the deliver tool [1]. Vocals can exist bring with the beneficial aid of non linear a lot which motive imperfect action of the linked parts [2]. By the useful bring of mode of the is strained in a bring voltage [3]. the two types of vocal assets into which non linear hundreds can be classified are vocal now day share out and vocal voltage transport [4]. Standard vocal twist can be dwindle thru means of the power translation system with the abet of the tradition of receiving the yield power in ladder and enchanting the yield meagerly to signal [5]. knowledge of an probable sinusoid power beginning choice of age of dc voltages normally because capacitor power property is the ordinary idea [6].

## II. MULTILEVEL CONVERTERS

Structure electrical converters square measure broadly unique from the standard inverter whereby awesome levels square measure got. The semiconductor devices don't appear to be associated sequential to as a base one singular radical voltage move. during which every get together of contraptions establishment to aster inside the yield voltage wave. the means square measure expanded to understand an about sinusoid wave. the amount of included switches is reached out for addition of every accreditation. structure converters square measure numerous sorts. The statute three

sorts of structure converters are: diode-clasped structure converters, capacitor-clipped structure converters, and fell h-spans structure converters. grant United States to discuss the greatness among "staggered inverter" and "staggered converter". The principal amount "staggered convertor" proposes to the converter itself. The statute thought process of a structure electrical converter is to convey a favored air conditioning yield voltage wave from numerous degrees of dc effort voltages. Folks dc voltages are frequently indistinguishable or probably won't be up to each the other. The air conditioner yield voltages got from persons dc input voltages loom. the standard or 3 territories electrical converter will now not truly get rid of the undesirable vocals inside the yield voltage wave.

The method the number of yield control on the convertor pins is  $2n+1$ , all over  $n$  is that the very dc tie voltage. On topology, each versatile have cleave up dc connect capacitors and accordingly the energy all through the capacitors ability change some of the each cell. each direction way really need one dc input voltage convey. The dc connect electrical condenser immense choice is corresponding to the area voltage levels far reaching determination each h-connect portable may likewise involve zero, unprecedented or disturbing voltages. last air conditioning profitability power is that the aggregate of all h-connect voltages and is offset with respect to unprejudiced issue, in this way the changeability of yield control lpositions is remarkable. structure inverters commonly use blessing switches. those pins have over the top change signals and infrequent square.

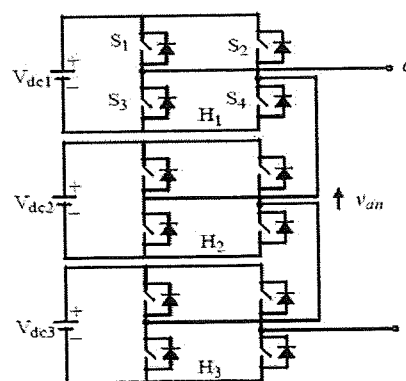


Fig.1. Seven level Inverter

Think about the 7L structure inverter; it requires generally speaking twelve present switches and 3 dc information voltage resources (with the accommodating asset of the

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Y.LalithaKameswari, Research Scholar, Department of EEE, K.L. University, Guntur, A.P, India.(email: ylkeswari@gmail.com)

Dr.D.Sudha Rani, Professor, EEE DEpartment, Sri Vasavi Engineering College, Tadepalligudem, AP, India



# Weight Feedback Adaptive Multi Objective Cooperative Scheduling in Smart Grid Application



D. Chandra Sekhar, P.V. V Rama Rao, V. Ganesh

**Abstract:** Smart grid integration needs a highly accurate power scheduling to minimize the losses and efficiently utilize the power supply to minimize the loss. Scheduling of a smart grid interface is monitored based on single or multiple objectives scheduler, where the smart grids are scheduled based on the measured parameters of power dispatch and the consumption model. Wherein, multi objective scheduling results in prominent result, the system is a linear monitoring model, where no previous observations are considered in making present decision. This constraint the accuracy of scheduling. In this paper, a new feedback scheduling operation based on feedback operation is proposed. the approach significantly feedbacks the past parameter variation and leads to an optimal power supply in smart grid interface. The experimental results obtained signifies a optimal improvement in the decision delay and power compensation.

**Index Terms:** feedback control, weight feedback optimization, smart grid interface, multi objective scheduling.

## I. INTRODUCTION

With the increase in demanded power supply, the conventional modeling of power supply are getting highly constraint in meeting the demand of upcoming consumption. The compensation of such demand is developing through new smart grid (SG) integration, where multiple generation, distribution and storage units are integrated to compensate the demand Smart grid (SG) is designed for dynamically connecting / disconnecting the grid should be in grid-connected or regional mode [1, 2]. In a smart grid, the load dispatch plays a significant role in reducing overall operating costs under practical controls[3, 4]. One of the most typical challenges in SG operation, for the operation, is to fulfill the demand distribution load balance for generation and load [5]. In [6], an energy consumption schedules of various SGs linked to an uncertain load demand is proposed. In network-connected mode, distribution network operators (DNO), Network Smart Grids (NSG) Operation, coordinate

with the side of the loads is outlined in [7]. SG Optimal Scheduling Problem has been analyzed by Multiple approaches in recent past. The available SGMs are interconnected and communicate with the operation of DNO. In [8] Optimization problem is solved by using max-min- cost, depending on the cost aspects of smart grid distribution. In order to achieve optimal solutions, a rapid algorithm based on dual monitoring plans in mixed integrator linear programming (MILP) format working with demand response program is proposed. In [9] a Hybrid method aimed to develop a low complex programming, optimizing the operating costs of the smart grid system. Today, the plug-in hybrid electric vehicles (PHEVs) and storage devices are the main components for smart grids, the most reliable and the smallest energy sectors. On reference to this, [10] Investigate a robust symbolic algorithm for analyzing the commitment of the SG operation considering different charging methods of SG in the uncertainty of the learning network. One of the significant achievements of smart grids is to improve the network's usage by simplifying the interruptions observed during the natural disaster. [11] present a optimized scheduling of a resilience oriented smart grid on a centralized management system. Scheduling Dynamic Programming Algorithm Based on a Distributed Programming Scheduling based on the optimal usage of smart grids, is presented. [12] Investigate the usage of batteries using standard diagrams, which are used as a source in fuel cells. In other perspectives, the SG Users play a critical role in providing important and reliable functionality for future smart distribution grids. In [13] SG owners and consumers benefit from reliable and financial power supply. In [14] Decentralized markovian approach has been introduced in order to reduce the cost of SGs in a better control framework. Participation companies consider multi-agent monitoring for energy management. A practical architecture of self-regulating SGs for natural computing and self-tuning is presented in [15]. Due to the lack of emergence in SG, this framework uses a optimal computing. More than one SG, through multiple agent systems is used to solve the exchange of cost of generation. The monitor focus on the three-stage architecture based on the deployment of the network. The concept of load sharing was done by resolving the load discharge issue in[16]. In the main usage of the smart grid, financial analysis of SGs has given special consideration to researchers [17]. Smart grids offer a better solution to improve the reliability of the distribution network during quick power requirement.

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\* Correspondence Author

D. Chandra Sekhar\*, PhD Research Scholar, JNTUA, Ananthapuramu, A.P, India.

P.V. V Rama Rao, Professor, Department of EEE, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, A.P, INDIA.

V. Ganesh, Professor, JNTUA College of Engineering, Pulivendula, A.P, India.

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# Comparative Studies on Different Laboratory Investigations of Ionic Current Environment of HVDC Lines

G.Ismayel<sup>1</sup>, K. Sairam<sup>2</sup>, V.Sunil Kumar<sup>3</sup>, P. S V N Sudhakar<sup>4</sup>

<sup>1,2,4</sup>Assistant Professor, <sup>3</sup>Associate Professor

<sup>1,2</sup> Department of EEE, Malla Reddy Engineering College & Management Sciences, Hyderabad, India.

<sup>3</sup> Department of EEE, St. Martin's Engineering College, Secunderabad, India.

<sup>4</sup> Department of EEE, Sri Vasavi Engineering College, Tadepalligudem, India.

## Abstract

Corona on HVDC transmission lines generates the ionic current and electric field environment under the transmission lines. The corona generated ionic current are drifts towards the ground causes electric shock to the any living organism which present under the transmission lines. In view of this designing of HVDC transmission lines at EHV/ UHV levels plays a vital role. The magnitude of these ionic current flows under the transmission lines depends on the line design considerations. Therefore, the major factors which affect the magnitudes of ionic currents are applied voltage, conductor diameter, space between lines to ground etc. Not only the design factors, but atmospheric parameters such as atmospheric temperature, pressure, humidity etc. are also have profound influence on generation of ionic current magnitudes under the lines. This authenticates that, need of significant studies on corona generated ionic currents under the HVDC lines before designing the new DC lines at EHV/UHV levels. In view of this authors are conducted different laboratory investigations on corona generated ionic current of HVDC lines at indoor and outdoor climatic conditions. Therefore, this paper presents the different laboratory experiments conducted for different conductor diameter in indoor and outdoor weather conditions. Also, this paper discussed the different observations during the measurements observed at different weather conditions.

**Key words:** HVDC lines, corona, ionic current, electric field environment.

## 1. Introduction

HVDC offer greatly for bulk power transmission over longer distances. Recent advances in the development of terminal equipment have increased the technical and economic feasibility of DC transmission. HVDC overhead lines operating up to  $\pm 600$  kV are in operation or under construction and lines of higher voltages are under consideration. Now in India the construction of a  $\pm 800$  kV with power transfer capability of 6000 MW is under progress. The major effects associated with this corona discharge on the conductors are power loss of the conductor and drifting of space charge density in the inter electrode space surrounding the HVDC transmission line [1] [2]. In addition to corona power loss, it also leads to undesirable effects of generation of electromagnetic interference, audible and radio noise. The major effects influencing corona discharge of the HVDC transmission lines are its conductor surface gradients at given operating voltage levels, corona onset gradients, and ambient weather conditions such as temperature, pressure, wind, humidity, presence of aerosols, ambient electric fields produced by atmospheric electricity etc [3] [4]. In AC transmission lines, during the positive half cycle, the newly generated positive ions by means of corona phenomenon moves away from the line conductor due to repulsion force where as negative ions attracts the line conductor and vice versa. This authenticates that, the space charge ions created by the corona phenomenon is constrained in the vicinity of the line conductors only due to the periodic reversal of the applied voltage. Hence, the evaluation of these effects using corona cage studies was possible due to the reason that the space charge created by corona is

# Water Monitoring System in Aquaculture Using IoT

Dr.M.KoteswaraRao<sup>1</sup>, K.N.HSrinivas<sup>2</sup>, Dr.P.V.V Ramarao<sup>3</sup>, T.D.N.S.S.SarveswaraRao<sup>4</sup>

<sup>1,2,3,4</sup>Sri Vasavi Engineering College, Tadepalligudem

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## Abstract

Water is a natural resource and is becoming a more valuable asset due to scarcities and misuse. Water resource management planning has respect to all the rival demands for water and seek to allocate water on a reasonable source to satisfy all uses, demands. Water monitoring is an important since it helps determine future Irrigation expectations, Industrial needs, drinking and household purpose etc. So for this purpose a new approach IoT based multi-purpose water monitoring system is developed in this project. This system contains sensors which measure quality parameters like pH, temperature sensors, and Dissolved oxygen (DO) Sensor. The data from these Sensors are collected by Beagle Bone Black board development kit. After processing the data, the board will send the data into Cloud using GSM module. The user can access the data at any time from the cloud and also message/alarm is send to the farmer at the Time of crisis. Based on the data, precautions can be taken in time to increase productivity and minimize losses.

**Keywords:** Beagle Bone Black, pH, Temperature, Turbidity, Conductivity, GSM, Cloud.

## INTRODUCTION

India currently stands as a developing nation in aquaculture wing with its own water bodies and produces a huge quantity of aqua foods. In addition to these natural water bodies, most of the farmers in India adopted aquaculture. In aquaculture, water quality is the critical factor. But in India most of the farmers are illiterates and don't have much awareness about the water quality parameters which may result in a damaged yield. Continuous monitoring of water is essential to reduce this damage. So, Water monitoring system with IoT is developed. This IoT system measure Water Parameters like temperature, pH values by using different sensors. These sensors are connected and controlled by a microcontroller Beagle Bone Black (BBB). At this stage, IoT comes into picture which adds intelligence to the system. The Data from the Sensors will be loaded in to cloud using GSM module. This data can be accessed from any remote location. If there are any abnormalities in the values with respect to standard values, preventive

measures can be taken immediately by alerting the farmers.

## INTERNET OF THINGS (IoT)

Today, the demand for Internet application development is too high. IoT is a main technology by which we can produce various valuable internet applications. Mostly IoT is a network in which all physical objects are connected to internet through network routers (or) devices and exchange data between people and things, and between themselves. It controls the objects remotely across the existing network without any human interaction. The devices in the IoT are provided with unique identifiers.

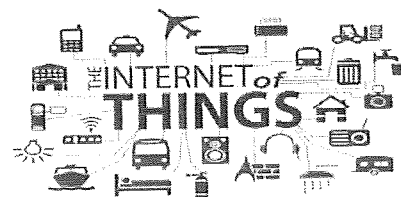


Photo 1. Spectrum of Things. Lighter, Huffington Post

## Fig 1: Internet of Things

## PROPOSED SYSTEM

## Mitigation of Common Mode Voltage Through 11-Switch Inverter Topology For Supplying Two Independent Loads Operating At Different Frequencies Via SVM Technique

Chippada Narayana Bhargav <sup>\*1</sup>, Chunduri Rambabu <sup>2</sup>

<sup>\*1</sup> PG Scholar, Dept of EEE, Sri Vasavi Engineering College (Autonomous), Tadepalligudem, AP, India

<sup>2</sup> Professor, Dept of EEE, Sri Vasavi Engineering College (Autonomous), Tadepalligudem, AP, India

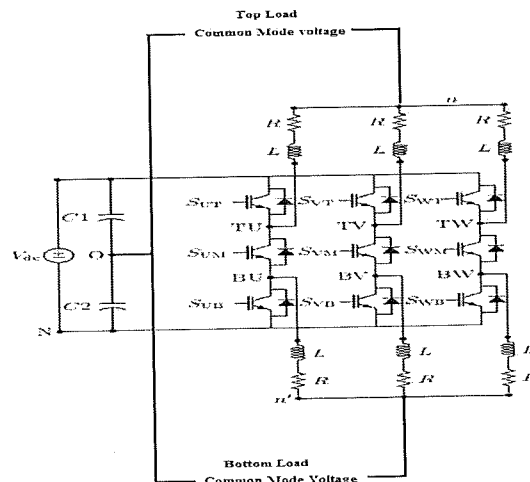
### ABSTRACT

This paper presents the mitigation of common mode voltage in industrial motor bearings. This CMV reduces the life of motor bearings and winding insulation of loads. During zero states the common mode voltage of 9-switch inverter has peak value. In order to reduce the peak value of the common mode voltage, the proposed scheme is 11-switch inverter topology during zero states. In this topology two extra switches are inserted in between the dc-link of 9-switch inverter topology. Control logic is proposed to reduce common mode voltage of both the loads during zero states. The CMV performance of proposed topology is better than the 9-switch inverter topology without affecting the other parameters like line voltage, phase voltage, load current, THD. The feasibility of the technique has been verified through simulation results.

**KEYWORDS:** Common mode voltage, Zero states, 9-switch inverter, 11-switch inverter.

### I. INTRODUCTION

Common mode voltage is the major area of the interest in industrial applications such as electric motor drives. The motor has some parasitic capacitance with small values in the order of pico farads. The common mode voltage of stator winding creates a shaft voltage by capacitance coupling through the motor air gap; therefore electrostatic discharges are generated through the bearing lubricant film. Such currents cause reduction in life time of bearings. These bearing currents induced by the CM voltage can negatively affect the lifetime and reliability of a machine. Common mode voltage may be defined as voltage between neutral point of the load to the midpoint of the dc-link.



**Figure: 1** Common mode voltage existing in 9-switch inverter

# Design and Analysis of Hexagonal and Octagonal Honey Comb Structures with Various Materials and FEM Analysis.



PenumakaDhananandh, Venkata Ramesh Mamilla, K.Sri Rama Murthy

**Abstract:** The demands for automotive interior and exterior panels in present and future request is an optimal combination of materials and cost-efficient production processes. Mechanical and acoustical requirements of high strength and a weight target result, today often in the selection of a sandwich design with a cost efficient and recyclable core material. Honey comb sandwich structures are used in Airplane wings, Ships, Cars, Civil Constructions, etc. Now a days this technology is being used all-over the automotive fields. These designs are the best way for low material usage and high strength.

In this project the designs of hexagonal and octagonal honey comb structures are to be analysed and compared for the best result in structure. The structures are to be developed by using SolidWorks[1] software. Solidworks flow simulation is to be used to test the effectiveness and limitations of the structures. Thermal and static analysis are to be analysed by using solidworks simulation software with different types of materials like Titanium, Aluminum, and Stainless steel to identify the best material at low cost and high efficient by applying various loads of finite element method analysis.

**Keywords:** Cost-efficient, high strength, low material, SolidWorks, Thermal and static analysis, finite element method.

## I. INTRODUCTION

The geometry of a honeycomb structure minimizes the amount of material used to minimal weight and minimal cost. The geometry of honeycomb structure may vary. In mechanical structures stiffness, strength and weight efficiency are the most important factors. These honeycomb structures are used in satellites, Trains, space craft, Aircraft, boats, trucks etc. Core material is selected on the basis of performance low density. Honeycomb sandwich structures exhibit high stiffness and strength to weight ratios. In the aerospace and transportation industry different types of sandwich core structures are used. Such as foam/solid core type are used in ships and aircrafts, honeycomb types of core are used in aircrafts and satellites, truss core type are used in buildings and bridges and web types of core is manufactured by using a variety of base materials.

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\* Correspondence Author

PenumakaDhananandh\*, M.Tech student, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

Dr.Venkata Ramesh Mamilla, Professor & Head, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

K.Sri Rama Murthy, Sr.Assistant Professor, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101. Email: penumakadhananandh@gmail.com

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With the development of aerospace technology, the demand of high-strength-low-density materials is becoming more and more requirement. Severe mechanical environment and aerodynamic coupling are inevitable because of high launch acceleration and high frequency vibration, so the requirements for strength and stiffness of aeronautical structures are extremely high. Moreover, launch costs have strong restrictions on the overall mass of spacecraft, so the mass of aeronautical structures must be minimized as far as possible. Severe contradiction between strength and mass spurs extensive utilization of advanced alloy material and composite material in aerospace applications, such as aluminum alloy, titanium alloy, stainless steel(SS). So that the honeycomb structure are designed in different shapes like triangular, square and hexagonal Structures. So beyond that according to the structures and requirements, we need more efficient and less weighted structure, So in that process of discovering we are hoping that Octagonal structure can be that change of present technology. The octagonal honeycomb core is designed with different materials of Aluminum, Stainless steel and Titanium composites. The results obtained from the experiment compared with the Hexagonal structure results with same composition of materials and dimensions.

**Honeycomb composites:** Honeycomb composites are manufactured in different shapes which are used for minimizing the weight and minimize the cost of the production. These structures are made of different mixing of materials for gaining good strength. These composites are the most demanded structures in these days.

## II. LITERATURE REVIEW

Tom Bitzer's Honeycomb Technology book [2] deals with honeycomb and honeycomb sandwich construction. After reading this book you will have a good understanding of what honeycomb is, how it is manufactured, and how to use it. You also will have the necessary knowledge to design honeycomb sandwich panels and honeycomb energy absorption systems. The honeycomb manufacturing methods, materials, cell configuration, terminology, and uses are all explained. The basic honeycomb sandwich concepts are discussed, failure modes shown and the standard design formulas are given. The standard honeycomb and sandwich test methods are also reviewed. SrinivasAthreya, Dr. Y.D.Venkatesh [3] Studied application of the taguchi method for optimization of process parameters in improving the surface roughness of lathe facing operation. Taguchi method is a statistical method developed by Taguchi and Konishi.

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\* Correspondence Author

PenumakaDhananandh\*, M.Tech student, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

Dr. Venkata Ramesh Mamilla, Professor & Head, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

K.Sri Rama Murthy, Sr. Assistant Professor, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101. Email: penumakadhananandh@gmail.com

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# Design and Analysis of Hexagonal and Octagonal Honey Comb Structures with Various Materials and FEM Analysis.



PenumakaDhananandh, Venkata Ramesh Mamilla, K.Sri Rama Murthy

**Abstract:** The demands for automotive interior and exterior panels in present and future request is an optimal combination of materials and cost-efficient production processes. Mechanical and acoustical requirements of high strength and a weight target result, today often in the selection of a sandwich design with a cost efficient and recyclable core material. Honey comb sandwich structures are used in Airplane wings, Ships, Cars, Civil Constructions, etc. Now a days this technology is being used all-over the automotive fields. These designs are the best way for low material usage and high strength.

In this project the designs of hexagonal and octagonal honey comb structures are to be analysed and compared for the best result in structure. The structures are to be developed by using SolidWorks[1] software. Solidworks flow simulation is to be used to test the effectiveness and limitations of the structures. Thermal and static analysis are to be analysed by using solidworks simulation software with different types of materials like Titanium, Aluminum, and Stainless steel to identify the best material at low cost and high efficient by applying various loads of finite element method analysis.

**Keywords:** Cost-efficient, high strength, low material, SolidWorks, Thermal and static analysis, finite element method.

## I. INTRODUCTION

The geometry of a honeycomb structure minimizes the amount of material used to minimal weight and minimal cost. The geometry of honeycomb structure may vary. In mechanical structures stiffness, strength and weight efficiency are the most important factors. These honeycomb structures are used in satellites, Trains, space craft, Aircraft, boats, trucks etc. Core material is selected on the basis of performance low density. Honeycomb sandwich structures exhibit high stiffness and strength to weight ratios. In the aerospace and transportation industry different types of sandwich core structures are used. Such as foam/solid core type are used in ships and aircrafts, honeycomb types of core are used in aircrafts and satellites, truss core type are used in buildings and bridges and web types of core is manufactured by using a variety of base materials.

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\* Correspondence Author

PenumakaDhananandh\*, M.Tech student, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

Dr.Venkata Ramesh Mamilla, Professor & Head, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101.

K.Sri Rama Murthy, Sr.Assistant Professor, Department of Mechanical Engineering Sri Vasavi Engineering College, Pedatadepalli, Andhra Pradesh, India. 534101. Email: penumakadhananandh@gmail.com

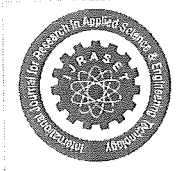
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With the development of aerospace technology, the demand of high-strength-low-density materials is becoming more and more requirement. Severe mechanical environment and aerodynamic coupling are inevitable because of high launch acceleration and high frequency vibration, so the requirements for strength and stiffness of aeronautical structures are extremely high. Moreover, launch costs have strong restrictions on the overall mass of spacecraft, so the mass of aeronautical structures must be minimized as far as possible. Severe contradiction between strength and mass spurs extensive utilization of advanced alloy material and composite material in aerospace applications, such as aluminum alloy, titanium alloy, stainless steel(SS). So that the honeycomb structure are designed in different shapes like triangular, square and hexagonal Structures. So beyond that according to the structures and requirements, we need more efficient and less weighted structure, So in that process of discovering we are hoping that Octagonal structure can be that change of present technology. The octagonal honeycomb core is designed with different materials of Aluminum, Stainless steel and Titanium composites. The results obtained from the experiment compared with the Hexagonal structure results with same composition of materials and dimensions.

**Honeycomb composites:** Honeycomb composites are manufactured in different shapes which are used for minimizing the weight and minimize the cost of the production. These structures are made of different mixing of materials for gaining good strength. These composites are the most demanded structures in these days.

## II. LITERATURE REVIEW

Tom Bitzer's Honeycomb Technology book [2] deals with honeycomb and honeycomb sandwich construction. After reading this book you will have a good understanding of what honeycomb is, how it is manufactured, and how to use it. You also will have the necessary knowledge to design honeycomb sandwich panels and honeycomb energy absorption systems. The honeycomb manufacturing methods, materials, cell configuration, terminology, and uses are all explained. The basic honeycomb sandwich concepts are discussed, failure modes shown and the standard design formulas are given. The standard honeycomb and sandwich test methods are also reviewed. SrinivasAthreya, Dr. Y.D.Venkatesh [3] Studied application of the taguchi method for optimization of process parameters in improving the surface roughness of lathe facing operation. Taguchi method is a statistical method developed by Taguchi and Konishi.



# Synthesis & Characterization of Biodiesel on the Performance & Emission of Diesel Engine

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<sup>1, 4, 5</sup>Assistant Professor, <sup>D<sup>2, 3</sup></sup>Associate Professor, Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem

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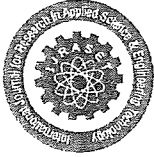
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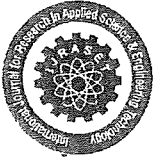
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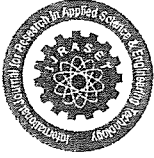
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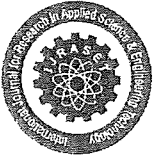
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# Strength Characterization of E-Glass Fiber Reinforced Epoxy Composites with Filler Materials

B.N.V Srinivas, K.Dorathi, N Tulasi Radha

Asst Prof, Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

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**KEYWORDS:** Composites; Fillers; Mechanical; Properties; Strength

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Glass wool, which is one product called "fiberglass" today, was invented in 1932– 1933 by Russell Games Slayter of Owens-Corning, as a material to be used as thermal building insulation. It is marketed under the trade name Fiberglas, which has become a generalized trademark. Glass fiber when used as a thermal insulating material is specially manufactured with a bonding agent to trap many small air cells, resulting in the characteristically air-filled low-density "glass wool" family of products.

Glass fiber has roughly comparable mechanical properties to other fibers such as polymers and carbon fiber. Although not as strong or as rigid as carbon fiber, it is much cheaper and significantly less brittle when used in composites. Glass fibers are therefore used as a reinforcing agent for many polymer products, to form a very strong and relatively lightweight fiber-reinforced polymer (FRP) composite material called glass-reinforced plastic (GRP), also popularly known as "fiberglass". This material contains little or no air or gas, is denser, and is a much poorer thermal insulator than is glass wool.

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Mass production of glass strands was accidentally discovered in 1932 when Games Slayter, a researcher at Owens-Illinois, directed a jet of compressed air at a stream of molten glass and produced fibers. A patent for this method of producing glass wool was first applied for in 1933. Owens joined with the Corning Company in 1935 and the method was adapted by Owens Corning to produce its patented "Fiberglas" (spelled with one "s") in 1936. Originally, Fiberglas



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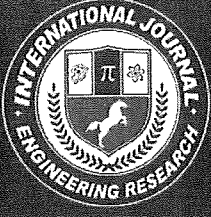
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## MECHANICAL BEHAVIOR OF SUGARCANE POWDER AND CHOPPED STRAND MATT FIBER REINFORCED POLYMER COMPOSITES

K.DORATHI<sup>1</sup>, B.N.V.SRINIVAS<sup>2</sup>, N TULASI RADHA<sup>3</sup>

<sup>1,2</sup>Asst Prof, Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

<sup>3</sup>Research Scholar, Department of Mechanical Engineering, GITAM University, Visakhapatnam, Andhra Pradesh, India

dorathikare@gmail.com, bnvsrinu1@gmail.com

### ABSTRACT

In this present work, an investigation was made on the mechanical properties of E-glass fiber reinforced epoxy composites filled with varying concentrations of Crushed sugar cane powder were fabricated by standard method and the mechanical properties such as ultimate tensile strength, flexural strength, impact strength and hardness of the fabricated composites were studied.

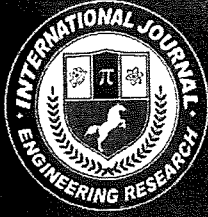
### KEYWORDS

Composites; Fiber glass; Sugarcane powder; Mechanical Properties; Strength.

### 1. INTRODUCTION

Glass fiber is a material consisting of numerous extremely fine fibers of glass. Glassmakers throughout history have experimented with glass fibers, but mass manufacture of glass fiber was only made possible with the invention of finer machine tooling. In 1893, Edward Drummond Libbey exhibited a dress at the World's Columbian Exposition incorporating glass fibers with the diameter and texture of silk fibers. Glass fibers can also occur naturally, as Pele's hair. Glass wool, which is one product called "fiberglass" today, was invented in 1932–1933 by Russell Games Slayter of Owens-Corning, as a material to be used as thermal

building insulation. It is marketed under the trade name Fiberglas, which has become a generalized trademark. Glass fiber when used as a thermal insulating material is specially manufactured with a bonding agent to trap many small air cells, resulting in the characteristically air-filled low-density "glass wool" family of products. Glass fiber has roughly comparable mechanical properties to other fibers such as polymers and carbon fiber. Although not as strong or as rigid as carbon fiber, it is much cheaper and significantly less brittle when used in composites. Glass fibers are therefore used as a reinforcing agent for many polymer



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<sup>1,2</sup>Asst Prof, Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

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# Blast Response of Steel and Cast Iron Circular Pipe Sections Under Explosive Impact using ls - Dyna



P.N.V. Durga Prasad, N. Veerendra Babu, K. Harish Kumar

**Abstract:** *There has been an immense significance of sparing structures like pipe structures which exchange oil and gas, blasts on these pipe lines may intrude on the transmission. In the current decades a lot of research is done to think about the auxiliary reaction under impact loads. Oil and gas companies must do all they can to ensure a steady supply of product to distributors and consumers. An infrastructure of pipes that carry oil and gas across the country and around the world is, therefore, essential. Parts such as piping materials, pipe shoes, and wear pads, must be durable and resilient, so maintenance and repairs do not interrupt the supply of product. Pipes are made of steel in these days as they have corrosive resistance and a strong and reliable material. Cast iron pipe is a pipe which has had historic use as a pressure pipe for transmission of water, gas and sewage, and as a water drainage pipe during the 19th and 20th centuries. The paper depicts the comparison of vonmises stress and pressure of pipes made up of steel and cast iron subjected to different blast loads and the simulation is carried out using LS-Dyna software*

**Keywords:** *Blast, LS-DYNA, Steel pipe, cast-iron pipe, Von misses stress, Pressure.*

## I. INTRODUCTION

This is a Steel circular hollow sections are made up of basic steel that has been used for structure. The hollow sections are light in weight and have significant strength properties to that of regular steel sections. Materials used for transmission of oil and gas are steel and cast-iron. Cast iron pipe is a pipe which had an historic use as a pressure pipe for transmission of water, gas and sewage, and as a water drainage pipe during the 19th and 20th centuries. It comprises predominantly a gray cast iron tube and was frequently used uncoated, although later coatings and linings reduced corrosion and improve hydraulics. Cast iron pipe was superseded by iron pipe, which is a direct development, with most existing manufacturing plants transitioning to the new material during the 1970s and 1980s.

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\* Correspondence Author

P.N.V. Durga Prasad\*, Assistant Professor, Department of Civil Engineering, Sri Vasavi Engineering College, Tadepaligudem, W. G. District, Andhra Pradesh

N. Veerendra Babu, Assistant Professor, Department of Civil Engineering, Srinivasa Institute of Engineering and Technology, Cheyyuru, Amalapuram, Andhra Pradesh

K. Harish Kumar, Assistant Professor, Department of Civil Engineering, Lakireddy Bali Reddy College of Engineering, Mylavaram, Krishna District, Andhra Pradesh

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Pipelines are laid for many purposes like for sewage, water and for energy production natural gas, Bio-fuels and liquid petroleum are pumped from one place to another. These pipelines place a crucial role in our daily life as no machine can run without energy. Pipe lines consists a series of pipes connected to each other for transporting energy sources from one place to another. For example, crude oil is pumped to refineries in order to produce petrol and other byproducts which are essential for running of vehicles. Fuel is needed to run machines and if there is no supply of oil and gas that would affect transportation and industries which in turn affects the growth of country. That is the reason why oil and gas transporting pipelines are given great Importance so that they won't be any blockage or leakage in the supply of these energy sources.

Any interruption in oil and gas transmission may cause severe effects to those industries which depend on them. Oil and Gas are explosive in nature and the pipelines are made with pipes having no flaw. As pipes which having flaws may cause leakages which may lead to explosion when they are subjected to fire.

These explosions not only effects disruptions in transmission but also cause serious damage to human life's as well. These explosions are controlled by using pipe which is having no flaws in it and checking the pipes occasionally. In some cases, explosions occur due to human activities like accidents and terrorist activities. These types of human explosions are seen in many parts of world targeting crucial places and oil and gas pipelines are one of them. Terrorists explode oil and gas pipelines to cause financial and human losses for a nation. These type of explosions can be countered by use of strong and blast resistant pipes in the pipeline distribution. This paper focuses on observing the stresses and pressures caused on pipes of different material and thickness by vehicular blast load situated 2m near to pipe and the simulation is carried out using LS-DYNA software. The critical zones in the pipe section can be seen for cast iron and steel pipes of 10mm, 12.4mm wall thickness.

### A. Blast Analysis

During the past three decades' research is carried out on structural analysis to resist blast loads. Blast loads are a threat caused by extremists, these activities may cause loss of life's and property. Structural elements are designed after undergoing complete study on blast occurrences. There are different kind of blasts can be simulated using LS-Dyna, here we used spherical air blast as the blast load.

# Comparative Study on Flyash GGBS based Geopolymer Concrete using Graphene

T. Yeswanth sai and P.N.V.Durga Prasad

□

**Abstract:** Now a days concrete is the most commonly used material in the construction. This project evaluates the usage of graphene in the geopolymer concrete. The material used is graphene, which is a carbon allotrope and is the basic structural element present in graphite, coal and carbon nanotubes. The graphene has peculiar properties and it is 200 times stronger than steel. Graphene is added in proportion 0.005 to the percentage of geopolymer concrete, in order to study the geopolymer concrete behaviour to graphene content

**Keywords:** Graphene, Fly ash, GGBS, compressive strength and durability

## I. INTRODUCTION

The concrete industry faces challenges to meet the growing demand of Portland cement due to limited reserves of limestone, slow manufacturing growth and increasing carbon taxes. It is reported that the requirement of cement in India is likely to touch 550 million tonnes by 2020 with a shortfall of 230 million tonnes (58%) and the demand for cement has been constantly increasing due to increased infra-structural activities of the country. The geopolymer concrete is the alternative to meet the demands of future as GPC is cement free concrete. Geopolymer concrete.

Geopolymer is considered as the third generation cement after lime and ordinary Portland cement. The term "geopolymer" is generically used to describe a amorphous alkali.

Graphene is an allotrope of carbon in in the form of a two-dimensional, atomic-scale, hexagonal lattice in which one atom forms each vertex. It is the basic structural element of other allotropes, including graphite, charcoal, carbon nanotubes and fullerenes. It can be considered as an indefinitely large aromatic molecule.

Research grade grapheme is used and the details are as follows .

Technical details	
Carbon purity	> 99%.
Bulk density	0.25g/cc.
Number of layers	6
Surface area	150m /g <sup>2</sup>
Tensile strength	>5GPA

## Structural applications of graphene :

- Significant enhancement of the compressive and tensile strengths of concrete.
- Improved durability due to finer pore structure of the composites.
- Addition of graphene improves corrosion resistance of concrete.
- High strength and high ductility concrete that will resist extreme conditions.
- Graphene improves blast/fire and impact resistance of the concrete.

## Objective

The main objective is to study the properties of geopolymer concrete when the graphene of 0.03 percentage of total weight of geopolymer concrete.

To enhance the strength properties of normal geopolymer concrete.

To study the behavior of geopolymer concrete after the addition of graphene by comparing with the normal geopolymer concrete..

## Material Properties

### (a)GGBS:

The ground granulated blast furnace slag (GGBS) is a leftover from steel manufacturing industries. It delays setting time of cement and the compressive and tensile properties of ggbs concrete is more than normal concrete. The ggbs provides pore refinement and GGBS reduces alkali-aggregate reaction when aggregate used in concrete are alkali reactive. production from harvesting to refining they use steel. Steel pipes are seamless welded to improve its strength properties.

**(b)Fly ash:**The fly ash used belongs to class F category. Fly ash is a waste generated by thermal power plants which improves compressive strength of concrete and also decreases permeability and cost. Fly ash in concrete makes it sulphate resistant.

CHEMICAL COMPOSITION		
Parameters (mass)	Class F fly ash	GGBS
Silica	50	37.73
Alumina	25	14.42
Ferrous oxide	10	1.11
Calcium oxide	1	3734

### (c) Alkali activated solution:

Alkaline activator solution mainly consists of soluble alkalis that are usually of sodium or potassium based.

**(d) Sodium hydroxide (NaOH)** in combination with sodium silicate (Na 2SiO 3) is the commonly used in making GPC

**(e) Graphene oxide:** It's available in powder and liquid form and the graphene oxide we used is in powder form.

# An Experimental Investigation on Light Emitting Concrete – Translucent Concrete

Dr. T. Siva Sankar Reddy

*Professor, Department of Civil Engineering,  
Gurunanak Institutions Technical Campus, Hyderabad, Telangana, India*

Dr. C.Venkata Siva Rama Prasad

*Associate Professor, Department of Civil Engineering,  
VignanaBharathi Institute of Technology(Autonomous),  
Aushapur (V), Ghatkesar (M), Medchal (D), Telangana, India*

Mr. Pavan Kumar jogi

*Assistant Professor, Department of Civil Engineering,  
Addis Ababa Science and Technology University,  
Center of Excellence in Construction Quality and Technology, Addis Ababa, Ethiopia.*

**Abstract-** This paper deals with the study of light emitting concrete which has the property of transmitting light from concrete by using optical fibers. Since years concrete has a low impression because of its dirty greyish color, opaqueness and sharp edge but this concept has been changed after the development of light emitting concrete, which gives the increased strength, better looks and light transmitting features. Plastic optical fibers are used because of its total internal reflection as its working principle as it gives maximum efficiency in transmitting light. The percentages of optical fiber added in this experimental study are 5%, 10%, 15%. The moulds are casted in a special type of formwork which has slots to place optical fibers. The moulds are prepared by cement mortar mix and optical fibers embedded in them alternatively. After the casting process it is left for curing. The strength is determined by compression test and compared with the conventional concrete. The maximum strength is obtained at 10% of optical fibers. This paper gives the structure a good aesthetic look without loss of strength parameters and serves as a eco-friendly building material and is also a energy efficient which reduces energy consumption by 30% by allowing the natural light by transmitting light through optical fibers and will also have a good scope in future. This experiment will be a series of initiatives to look closely at new and emerging advanced construction in future.

**Keywords –** Light Emitting Concrete, Optical fiber, Compressive Strength

## I. INTRODUCTION

Concrete has been used for transportation and residential construction since Roman times but its fundamental features have remained the same. The dry mix is made up of three ingredients: coarse aggregate, comprising of larger bits of substance such as stones or gravel; fine aggregate, composed of finer fragments such as sand; and cement, a very fine powder substance that holds the mixture together when applied water. Only a few decades back, concrete was mostly mistaken, despised and caught due to the accelerated urbanization of the 1960s due to its face set. Yet concrete has made tremendous strides since then, not just in terms of engineering but also in terms of aesthetics. With global growth and the advancement of science-technology, more and more large structural engineering systems are being constructed around the world, such as tall towers, underwater towers, and landmark buildings, etc. Although economic development is a kind of extensive development: high production, high consumption, and high pollution, energy-saving technology, particularly in developing countries, is very weak. The visibility of the indoor world is preserved solely by artificial illumination, which has expended a great deal of energy. In fact, structural engineering systems often suffer from adverse environmental impacts, resulting in significant economic damages and injuries if damaged. So now a lot of focus has been paid to designing energy conservation so building efficiency. It's no longer the past's hard, cold and grey material; it's become stunning and vibrant. Newly formulated concrete was produced by science and invention that is more durable, smoother, white or colored etc.

# River: A Boon or a Bane

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Vol-4, Issue-2, March - April 2019

**Author:** K. Radha Madhavi, Harika Done

**Keywords:** River, Boon, Bane.

**Abstract:** Rivers are the back bone of human civilization. History says that various prominent civilizations like the Nile River valley, the Indus River valley, the Yellow River valley etc, formed around rivers. That is why every culture, civilization, folk and literature has a strong bonding to the rivers. In India, rivers are venerated as Goddesses. Indians worship River as a mother. Like a mother, each river has a pleasant (saumya) and an unpleasant (urga) forms. Considerably good amount of literature is available related to rivers explaining its beauty but only hand full of poets have seen the other side of the coin where it is devastating many lives. The objective of this paper is to focus on the two different versions of the river in literature.

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## THE JOY OF LEARNING ENGLISH: TECHNOLOGY ASSISTED LANGUAGE LEARNING

K. Radha Madhavi

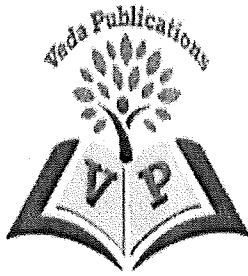
(Assistant Professor of English, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh-534 101. India.)

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### ABSTRACT

Language is dynamic which is constantly growing and evolving. Language communication has changed over the years. English is increasingly becoming a universal language. It is the language of International business and communication, the official language. Learning English is considered the main factor for professional success and criterion for being educated in many fields. Technology has been evolving rapidly over past decades, and as such, some forms of it are beginning to play a role in the classroom. There has been a shift in pedagogy in the teaching of English language. Education and policy makers have also turned to the range of technologies available for use in language learning and teaching. Teachers are not the sole source of information. Blended learning has now taken over which includes the use of digital and online media to teach students. This combination of physical and virtual courses enhances the dissemination of knowledge more than any other time in history. The present article focuses on teaching English through various applications.

**Keywords:** *English, Language, Technology, Blended Learning.*



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THE ROLE OF ENGLISH LANGUAGE AND LSRW SKILLS IN EMPLOYABILITY

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Aparanjani Uppe<sup>1</sup>,

*Research Scholar from Acharya Nagarjuna University, Guntur, A.P., India.*

Dr.M.V.Raghuram<sup>2</sup>,

*Professor of English, VVIT, Nambur, Guntur, A.P., India.*

Dr. B. Madhavi Latha<sup>3</sup>,

*Associate Professor of English, St. Ann's College of Engineering and Technology, Chirala.*

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**Abstract:** Good language and communication skills in English improve social life and provide better job opportunities for the individuals. Starting from job interviews to the actual professional world, communication skills play a vital role. Being proficient in the English Language means being able to communicate clearly and effectively without any misunderstanding. The job interviews are conducted in English, where the interviewer asks the questions in English and expects the candidate to give a proper reply in English only. Being proficient in the language leads to a good impression which increases the chances of getting placed in the job. Thereby, making it essential to master the language and language skills effectively to be successful. This paper aims at seeing the importance and need of mastering the language and language skills namely – LSRW SKILLS for employability.

**Keywords:** communication skills, language skills, LSRW skills, employability, L1, L2

Employers see English as a key Employability skill, with job promotion and higher earnings as the main reasons for learning English. The learners learn English to seek jobs in their countries and seek versus job. English becomes essential for this purpose. Employability skills are the skills and attitudes that enable employers to get along with their colleagues, in decision making, solving problems and thus develop the organization they work for. This is where the role of language plays a major part. With proper English language skills the communication process becomes easy and effective making all the work go smoothly.

Employability skills are general skills employers look for during recruitment and English skills have become a critical employability skill in today's global market. Education and experience may make you eligible to apply for a job, and to be successful in the job position one needs to exhibit a mix of skills known as employability skills.

**IMPORTANCE OF ENGLISH LANGUAGE:**

Employers want graduates with a variety of well-tuned life skills, communication and language skills being a major part of the life skills. You'll need to be able to communicate effectively in different situations like face-to-face, over the phone, online, via email, in reports, with a wide variety of different people in different settings and situation.

English until the Return of Babel, states: The current status of English is unprecedented. Simultaneously, it has a preminent global role in science, commerce, politics, finance, tourism, sport, and screen entertainment and popular music with no challenger comparable to it, it seems almost untouchable; even in China, the only country with a language that has more native speakers, every school child now studies English and India, set to overtake China in population by 2050, is already trading on an expertise in English inherited from the British Empire and studiously preserved and fostered ever since. (Ostler 2010; 267)

Henry Hitchings in his well known work titled "The Language Wars: A History of the Proper English" quotes:



ELSEVIER



## Seasonal variations of sea breeze and its effect on the spectral behaviour of surface layer winds in the coastal zone near Visakhapatnam, India

N.V.P. KiranKumar<sup>a,\*</sup>, K. Jagadeesh<sup>b</sup>, K. Niranjan<sup>c</sup>, K. Rajeev<sup>c</sup>

<sup>a</sup> Space Physics Laboratory, Vikram Sarabhai Space Centre, Thiruvananthapuram, Kerala, 695 022, India

<sup>b</sup> Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, 514 101, India

<sup>c</sup> Department of Physics, Andhra University, Visakhapatnam, Andhra Pradesh, 530 004, India

### ABSTRACT

Seasonal variation of sea breeze (SB) characteristics and its effect on turbulence spectra at Visakhapatnam (17.7°N, 83.3°E) located at east coast of Peninsula India are investigated by considering 244 sea breeze events during December 2012 to March 2014. The delayed onset of backdoor SB during winter occurs due to the southward component of shore-parallel background winds while the prevailing northward component of background wind enable the early onset of corkcrew SB during pre-monsoon and summer monsoon. The turbulence spectral peak of horizontal winds shifts to higher frequency side after SB onset.

### 1. Introduction

The basic feature of local meteorology over a coastal location is the mesoscale sea breeze (SB) circulation, driven by landward atmospheric pressure gradient force arising from differential heating of land and ocean by solar radiation (Stoopson, 1994; Miller et al., 2003). Prominence and characteristics of SB vary with prevailing background circulation, spatial gradient of near-surface level temperature and orography (Miller et al., 2003; Crossman and Horel, 2010). Advection of cool and moist air over warm land surface, associated with sea breeze during the daytime, modifies the vertical structure of coastal atmospheric boundary layer and results in the formation of convective thermal internal boundary layer (Roubikrishnan et al., 1993; Calmet and Mesayer, 2016; Meleco-Vazquez et al., 2019), which is shallower than the daytime convective boundary layer that would have prevailed in its absence. It has a pivotal influence on pollutant dispersal and air quality as the aerosols and pollutant gases are mostly generated near the surface (e.g., Krishna Moudy et al., 2003). The residence period of pollutants can be longer in the sea breeze circulation cell (Egan and Lyons, 1978). The SB can also trigger convection and thunderstorm at the frontal regions or supply moisture for the development of fog (e.g., Silva Dias and Machado, 1997). The urban heat islands in the coastal cities can further increase the land-ocean temperature gradient and accelerate the sea breeze propagation (Hibino et al., 2016).

Coastal environments are among the most heterogeneous and complex regions. Knowledge of sea breeze characteristics under different background circulations, their potential influence on turbulent eddies and vertical structure of atmospheric boundary layer (ABL) are

essential for the overall understanding of ABL dynamics (Kaimal and Finnigan, 1994). The influence of large-scale synoptic winds on the sea breeze flow has been extensively studied through numerical model simulations and field observations (Etouque, 1962; Stoopson et al., 1977; Bechtold et al., 1991; Arritt, 1993; Atkins and Wakimoto, 1997; Gillham et al., 2004; Azorin-Molina and Chen, 2009; Fedrigo et al., 2010; Gahrberg et al., 2010; Acillaga et al., 2016; Gonzalez et al., 2018). The effects of background circulation on the evolution, progression and suppression of sea breeze have also been investigated (Atkinson, 1991; Stull, 1998; Arritt, 1999; Atkins and Wakimoto, 1997; Pielke, 2002; Miller et al., 2003). Coastal cities are being increasingly influenced by heat island and pollution effects due to urbanization, which can affect the coastal circulation (Hibino et al., 2018) and vice versa. Occurrence and onset time of sea breeze are strongly influenced by the prevailing circulation and meteorological conditions. While pure SB is generated during calm wind conditions, an along-shore northward background wind in an east coast location in the northern hemisphere can assist the generation of SB (known as corkcrew sea breeze, marked by backing of winds) even at smaller local pressure gradients and in the presence of strong synoptic scale winds (Miller et al., 2003). In contrast, a southward along-shore background wind in the east coast in the northern hemisphere will inhibit SB and would require a larger local landward pressure gradient force for its onset and progression (known as backdoor sea breeze, which is marked by veering of winds) (Miller et al., 2003). Day-to-day variations of prevailing winds are superposed on significant and systematic seasonal variations in synoptic scale winds, which can significantly modify SB occurrence and its landward progression. This, together with the role of SB on local meteorology and

\* Corresponding author.

E-mail address: [kiran@vsnl.com](mailto:kiran@vsnl.com) (N.V.P. KiranKumar).

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## INVESTIGATION ON MAGNETIC PROPERTIES AND CURIE TEMPERATURE OF SAMARIUM MODIFIED COBALT FERRITE

Sita Rama Raju Padam<sup>a,b</sup> and Madhavaprasad Dasari<sup>c\*</sup>

<sup>a</sup>*Department of BSH-Physics, Sri Vasavi Engineering College,  
Tadepalligudem – 534 102, A.P., India*

<sup>b</sup>*Department of Physics, Rayalaseema University, Kurnool – 518 007, A.P.,  
India*

<sup>c</sup>*Department of Physics, GIS, GITAM (deemed to be) University,  
Visakhapatnam – 530 045, A.P., India*

**Abstract:** Samarium substituted cobalt ferrite  $\text{CoFe}_{2-x}\text{Sm}_x\text{O}_4$  with concentration of  $x = 0, 0.05$  and  $0.15$  were prepared using conventional solid-state ceramic method. Prepared samples first calcined at  $900^\circ\text{C}$  for 4 hours and then sintered at  $1150^\circ\text{C}$  for 4 hours. The X-Ray powder diffraction data analysed to identify the phases present in the crystalline ceramic. An additional phase of Sm-Fe-O was observed for the sample at  $x = 0.15$ . Lattice parameter, strain and saturation magnetization found to be decreasing whereas crystallite size and coercivity found to be vary with samarium content. Decrease of Curie temperature attributed to the decrease of exchange interaction among tetrahedral or octahedral ions due to samarium content.

**Keywords:** Cobalt Ferrite; X-Ray diffraction; Microstructure; Magnetic properties

### Introduction

Rare earth doped cobalt ferrite shows changes in structural, magnetic and other absorption characteristics.<sup>1</sup> Doping rare earth metals with higher ionic radii in spinel cobalt ferrites can cause changes in crystallite sizes and

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\* Madhavaprasad Dasari, e-mail: madhavaprasaddasari@gmail.com



# Big Data - An Innovative Tool for Meeting Business Drivers in the Modern Era

M. Ananda Rao, U. Raghunath, P. Bharath Kumar

*Abstract: Having distinguished intellectual insights of the business over rival firms empowers the organizations to make quick, smart and exceptional decision that gives a competitive advantage in the ever-changing complex business world. It is an arduous task to derive the intellectual insights from the abundant information may require investment of great effort, time and money. Undoubtedly, information is wealth. This paper a brief review study that offer vivid definition of big data application which has distinguished features and also analyzed how organizations create and deliver value from big data. We further made an attempt to propose consolidated characterization of big data, examples of business drivers, risk consideration in big data success.*

*Key words: Big Data, Business Drivers, Business Intelligence, Data science.*

## I. INTRODUCTION

Discovering new facts by using traditional data process techniques is an outdated concept. In today's context of global competitive business world companies are required to respond and adapt the changes as quick as possible to have competitive outperform over the rivalry firms, for this they need fact finding information seems extremely difficult for any organization to gain such information from the abundant unstructured data, however the latest analytical tools and technique of big data made it easy. To have great insights of business patterns and changes which are significant to take-up optimum decision for business success the business firms and even the government agencies and regulatory bodies across the world widely accepted the emerging technique called data analytics and or data science practices to obtain well-organized information from uncountable amorphous raw data.

### Big Data

"Big data is a term that describes large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information." (Tech America Foundation's Federal Big Data Commission., 2012).

Business decision making process mainly depends on the quality information which should be derived from gigantic and lofty diversified information in a cost efficient pioneering method. Gartner IT vocabulary (n.d.).

The survey conducted by IBM in 2012 over 1144 respondents has revealed that big data means multiple terabytes of data. (Schroeck, et al., 2012).

## II. REVIEW OF LITERATURE

In the minds of trade population big data scientific advancement and its application has gained momentous milestone (Chen et al., 2012). The big data can be defined as extensively varied, engendered and stored facts and figures at high speed as such, the deployment of heterogeneous data is an exhausting task without using latest and innovative analytical practices (Constantiou and Kallinikos, 2015). To satisfy customer needs and wants in different way organizations require to offer ingenious and inventive goods and services, for this firms need to adapt sophisticated scientific methods to analyze current state of situation and bring out more relevant pioneer facts from structured less information (Davenport et al., 2012). It is crucial finding new trade opportunities in the era of complex networked business environment, the data science tools helps the firm to discover unforeseen chances that gives an edge and sets apart from competitive firms. (Baensens et al., 2014). The application of modern data processing tools enables the firms to gain more benefits in the diversified fields like: electronic trade, science and technology, health and hospitality etc, (Chen et al., 2015). Many organizations recognized that the robust advanced data processing tools provides value added services in attainment of their strategic objectives and goals (Ghoshal et al., 2014). The organizations must find the factors become hurdle to convert their potential capacities into real time solutions to the market needs (Markus and Topi, 2015). This is an emerging position where the business firms must examine their core strategic plans to create and avail new business opportunities to keep themselves apart from competitive firms.

## III. OBJECTIVES OF THE STUDY

To study what is big data and the evolution process To find out the methods of data process and affect on modern economy To explore how big data applications helps the organizations in meeting their key business drivers

## IV. RESEARCH DESIGN

The explanatory research study was adapted to study the research problem, in the process an extensive literature on the given topic has been covered to find out how the big data applications has helping the organization in meeting the business drivers or objectives.

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Madasala Ananda Rao, Associate Professor, PACE Institute of Technology and Sciences (Autonomous) Ongole, Andhra Pradesh, India.

Udayagiri. Raghunath, Associate Professor, PACE Institute of Technology and Sciences (Autonomous) Ongole, Andhra Pradesh, India.

P. Bharath Kumar, Assistant Professor in PACE Institute of Technology and Sciences (Autonomous) Ongole, Andhra Pradesh, India.

# SOCIO FACTORS IMPACT ON TWO WHEELER PURCHASE BEHAVIOUR IN RURAL HYDERABAD

\*P.SREENIVASULU, \*\*Dr. G.V.SUBBA RAJU , #DR P.VIJAYA KUMAR

\*Research Scholar, SMS, Jawaharlal Nehru Technological University (JNTUK) Kakinada, Andhra Pradesh.

\*\* Professor, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh.

# Professor (Retd.) SMS, Jawaharlal Nehru Technological University (JNTUK) Kakinada, Andhra Pradesh.

## Abstract:

Economic growth, the need for better conveyance, gradually improving road infrastructure coupled with better credit and financing options, have acted as a major catalyst in encouraging the growth and development of the two wheeler segment in India (ACMA 2006). Further, the new and improved features on the two wheelers, their stylish and trendy looks are a rage with the country's youth, who, form a substantial influence in determining the consumer behavior have ensured that the two wheelers remain on top of the automobile industry's agenda in India (Humphrey, 1999). Drive down any of the roads in India, and one would not miss the pulsars, the Hero Hondas, the Bajaj, TVS bikes, Yamaha variants and many others. Two-wheeler segment is one of the most important components of the automobile sector. According to the figures published by SIAM, the share of two-wheelers in automobile sector in terms of units sold was about 76.49 percent during 2018-19. This high figure itself is suggestive of the importance of the sector.

**Keywords:** Performance, Income, Gender, Economy, Mileage

## Introduction:

The present day Indian market for durable consumer goods is masterminded by multinationals and their Indian counterparts. The producers are willing to invest large

fortunes in competitive advertising and product differentiation. India might not yet be on par with the Asian tigers like, Hong Kong, South Korea, Taiwan and Singapore but it is certainly on the way to becoming one.

Economic liberalization in India has opened the doors for a massive expansion in investment and production in the entire spectrum of industry. Along side of this substantial growth depending of the industrial structure, the age of high mass consumption also seems to be a foreseeable prospect. Thus, India was identified as one of the largest markets for consumption goods in Asia, next only to China. The 200 million strong middle class consumers in India have clearly sent a message to the world that their appetite for consumer goods is enormous by any standard ( Rajni Chada 1996).

The rapid rise in consumer spending which is no doubt derived from higher levels of disposable personal income is not a mere quantitative spurt. It represents a significant qualitative change in the people's perceptions of what they want and how they would go about the job of fulfilling their wants. Thus, the growing numbers of companies are increasingly looking towards orienting their business to go beyond customer needs and wants.

## Demand Drivers

The demand for two-wheelers has been influenced by a number of factors over the past five years. The key demand drivers for the growth of the two-wheeler industry are as follows:

- Inadequate public transportation system, especially in the semi-urban and rural areas;
- \* Increased availability of cheap consumer financing in the past 3-4 years;
- Increasing availability of fuel-efficient and low-maintenance models;

Final year  
ECE C  
Section

# A Novel Effective Algorithm for Brain Tumor Detection from MRI Images Using Image Processing Techniques.

Mr. G. ShankaraBhaskara Rao, Associate professor, Department of ECE, SVEC Tadepalligudem  
 Mr. A S S H Kondala Rao, final year B.tech ECE,SVEC Tadepalligudem, India, hemanthssa@gmail.com  
 Miss. P. Rekha , final year B.tech ECE,SVEC Tadepalligudem, India, rekhapitta123@gmail.com  
 Miss. B. Sai Sirisha, final year B.tech ECE,SVEC Tadepalligudem, India, saisirishabatchu@gmail.com  
 Mr. K. Sai Manoj, final year B.tech ECE,SVEC Tadepalligudem, India, manojkankatala21@gmail.com

**Abstract**-Brain tumor segmentation in magnetic resonance imaging (MRI) has become an emergent research area in the field of medical imaging systems. The tumor detection is often a preliminary stage. This paper describes the detection of brain tumor by thresholding. The proposed method can efficiently detect and identify the brain tumor for the MRI image taken for the patients database.

**Keywords** – Grayscale image , Brain tumor ,Morphological operations , Magnetic Resonance Image (MRI) , Edge Detection , Filtering , Thresholding.

## I. INTRODUCTION

Digital image processing deals with manipulation of digital images through a digital computer. A digital image composed of finite number of elements, each of which have a particular value at a particular location. These elements are referred to as picture element, image elements or pixels.

MRI is a non-invasive imaging technology that produces three dimensional anatomical images without the use of damaging radiation. It is based on sophisticated technology that excites and detects the change in the direction of the rotational axis of protons found in the water that makes up living tissues.

The body is made up of many cells which have their own function. Most of the cells in the body grow and divide to form a new cell of the same kind as they are needed for the proper functioning of the human body. When these cells lose control and grow in an uncontrollable way, it gives rise to a mass of unwanted tissue forming a tumor. The occurrence of this tumor is often termed as brain tumor. These brain tumors disable the sensitive functioning of the brain.

The three types of tumors are:

- 1.) Benign
- 2.) Premalignant
- 3.) Malignant

Benign tumors are those which does not invade nearby tissue or spread to other part of the body unlike a cancer. Benign tumor can be serious if they press on vital structures such as blood vessels or nerves. Premalignant tumor is a pre-cancerous stage, if not treated properly it may lead to cancers. If the tumor is malignant then the mass is cancerous. This type of tumor has the ability to multiply uncontrollably and spread to various parts of the body.

## II. METHODOLOGY

The proposed work is mainly based on the thresholding of the images which are processed morphologically to extract the tumor for further analysis. Thresholding technique is the application of 'T' which is a constant over the image. When we apply the threshold constant 'T' over an entire image, the process is called global thresholding where as when the 'T' value is changed over the image , that process is called variable thresholding. This method uses the canny edge detection to detect the edges. The colourmap array is used to highlight the tumor region in the original image.

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 Mr. A S S H Kondala Rao, final year B.tech ECE, SVEC Tadepalligudem, India, hemanthssa@gmail.com  
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## A Novel Power Efficient Pulse Triggered Flip flop

<sup>1</sup>N.BHARGAVI, <sup>2</sup>Y.SUJATHA

<sup>1</sup>M-Tech Student, Sri Vasavi Engineering College, Tadepalligudem.

<sup>2</sup>Associate Professor, Sri Vasavi Engineering College, Tadepalligudem.

### ABSTRACT:

This paper presents the design of a modified Explicit Pulse Triggered Flip-Flop (EPTFF) to overcome the various limitations in the existing explicit type of Pulse Triggered Flip-Flop. The proposed design first abolished the short circuit path which existed from VDD to GND to reduce the static power consumption and clock tree power at higher switching activity. To verify the robustness of the proposed EPTFF, it is scrutinised at different cases. In addition to this, clock gating technique is introduced to the modified EPFF to reduce the power consumption at low data switching activity. This is done by driving the Flip-Flop in to sleep mode. The proposed EPTFF is implemented effectively and it is verified that the power consumption is reduced by 46.6% and its area is reduced by 17.4% compared to the existing explicit type PTF. Finally we are going to design a parallel in parallel out shift register using the proposed pulse triggered D-Flip flop.

**Keywords:** EPTFF, robustness, clock tree, clock gating, switching activity.

### I. INTRODUCTION

For the past few years the high speed (i.e. low delay), low power and easily transportable (i.e. less area) circuits are with high intensification in demand, which causes the density of Integrated Circuit (IC) to increase further. With the furtherance of scaling i.e. the reduction of feature size of transistor achieves more functionality on a single IC. But it leads to the higher power consumption, so efficient cooling systems are required which further increases the overall system cost, makes the device bulky. So there is need to apply optimizing techniques at the level of logic IC design.

Latches and flip flops are the heart of sequential circuits and these are used to store information. Any one of the flip flops, or latches can store one bit of data. The main difference between the latches and flip flops is that, a latch can check input continuously and changes the output immediately whenever there is a change in input data. Whereas flip flop works as a latch in synchronous with clock that

continuously checks input and changes the output when there is active clock. These basic elements play important role of determining the chip area, speed and power. The significant source of active power consumption is due to clock tree which is distributed across the entire chip to activate the Flip-Flop. In similar to this, the performance of an IC is determined by the Flip-Flop performance because it includes set-up time, hold time, clock frequency, D-Q delay and CLK-Q delay. To achieve the high speed computations CLK frequency should be high but in addition to this clock skew and jitter problem arises its significance which causes latency of a Flip-flop plays major role in clock duration. Besides this for better efficient area design the number of transistors required must be reduced. So with the above mentioned considerations care must be taken in designing a Latch/Flip-flop with features like low power dissipation, less number of transistors, less computation delay, process insensitivities variation and race around condition. For a Flip-flop the power consumption is mainly depends upon the switching activity of applied data. By

# AN IMPROVED HIGH PERFORMANCE LOW POWER VALENCY LING ADDER

<sup>1</sup>K.N.V.S. Vijaya Lakshmi, <sup>2</sup>Y. Sujatha, <sup>1</sup>D. Dasu  
<sup>1</sup>Assistant Professor, <sup>2</sup>Sr. Assistant Professor, <sup>1</sup>Assistant Professor  
<sup>1</sup>Electronics and Communication Engineering, <sup>1</sup>Computer Science and Engineering  
<sup>1</sup>Sri Vasavi Engineering College, Tadepalligudem, India  
<sup>1</sup>Adikavi Nannaya University, Rajamahendravaram, India

**Abstract:** In modern data path designs the most widely used arithmetic operation is two-operand binary addition. In VLSI design implementation Parallel-prefix adders offer better solution to the binary addition. In parallel prefix adders, the look and implementation methods are used. By using Ling theory details for such lower complex quick parallel prefix adders can be designed. The family of Ling adder is particularly fast computing adder and it is designed by H. Ling using H. Ling's equation and it is basically implemented in BICMOS. The Parallel prefix adders are designed by using carry look ahead adder and these adders are generally suited for wider word length addition. However Ling design offers a quicker carry computation stage compared to the standard parallel prefix adders. The Ling adder gives the better performance by reducing the complexity and delay of the adder circuit compared with Parallel Prefix Adders.

**IndexTerms -** Parallel prefix adder, Ling Adder, Carry look ahead adder, delay, complexity.

## I. INTRODUCTION

An adder is a digital combinational circuit that performs addition of numbers. In digital systems and some processors adders are used in the arithmetic logic unit (ALU). The Arithmetic logic circuits perform the arithmetic operations like addition, subtraction, multiplication, division, parity calculation. Most of the time, designing these circuits is the same as designing multiplexers, encoders and decoders. In many computers and other kind of processors, adders are other parts of the processor, many computers and other kinds of processors, where they are used to calculate addresses, table and similar. The binary adder is the one type of element in most digital circuit designs including digital signal processors (DSP) and microprocessor data path units. Therefore fast and accurate operation of digital system depends on the performance of adders. Hence improving the performance of adder is the main area of research in VLSI system design.

In Parallel Prefix adders high speed tree structures are used. Because of the rely on the use of simple cells and regular connection the Parallel-prefix adders are suitable for VLSI implementation. Several variants of the carry-look ahead equations, like Ling carries, can be presented that simplify carry computation and can lead to faster structures. Adders form an almost indispensable component of every contemporary integrated circuit. To cope with varying requirements of time and area efficiency, several adder architectures have appeared ranging from the smallest ripple-carry adders which provide the fastest possible length delay up to the Carry Look-Ahead (CLA), conditional sum and parallel-prefix adders which provide the fastest possible implementations at the expense of the largest circuit sizes. Between these two categories lie the carry-skip and carry select architectures, which give a good alternative, since they combine relatively small area and substantially reduced delays. Ling design offers a quicker carry computation stage compared to the standard parallel prefix adders.

## II. PARALLEL PREFIX ADDERS

The Parallel Prefix Adder is like a Carry Look Ahead Adder. The production of the carriers the prefix adders can be designed in many different ways based on the different requirements. To increase the speed of arithmetic operation we use tree structure form. Parallel prefix adders are faster adders and used for high performance arithmetic structures in industries. The parallel prefix addition is done in 3 steps.

- a) Pre-processing stage
- b) Carry generation network
- c) Post processing stage

### a) Pre-processing stage

The first basic cell in parallel prefix adder is the Pre-processing stage. In this stage we compute, the functions generate and propagate signals. These are used to generate carry input of each adder with inputs a and b. These signals are given by the equation (1) & (2) & (3). The Figure 1. shows the implementation of the Basic cell - 1.

$$d_i = a \text{ xor } b \dots\dots\dots (1)$$

$$p_i = a \text{ or } b \dots\dots\dots (2)$$

$$g_i = a \text{ and } b \dots\dots\dots (3)$$

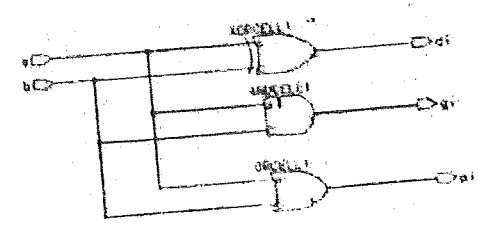


Figure 1: Schematic of Basic cell-1

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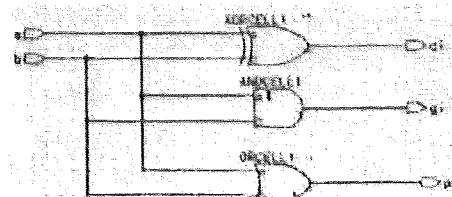
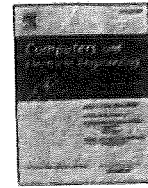


Figure 1: Schematic of Basic cell-1



## Reduction of conducted electromagnetic interference by using filters

M. Satish Kumar<sup>a,\*</sup>, A. Jhansi Rani<sup>b</sup>

<sup>a</sup> Electronics & Communication Engineering, Sri Vasavi Engineering College

<sup>b</sup> Electronics & Communication Engineering, Velagapudi Ramakrishna Siddhartha Engineering College

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Pi-Filter  
Insertion loss  
CM and DM noise voltage

### ABSTRACT

Electromagnetic interference (EMI) is described as the unwanted noise created by electromagnetic (EM) waves. EMI is divided into two forms, that is, conducted and radiated. There exists Common mode (CM) and differential mode (DM) noise in the conducted EMI. Hence, All the electronic wireless equipment must provide the EMI filters (EMIF) to filter the CM and DM noise components within the circuits. In this paper, an inductor filter, choke filter (IF and CF) and Pi-Filter (PF) are designed to eliminate conducted EMI. This system is named as EMIF-CM-DM (i.e., EMI filter for avoiding the common mode and differential mode noise). The IF and CF has low ripple factor at heavy load currents and very good load regulation, respectively. Pi-Filter also gives low ripple factor and high output voltage. This EMIF-CM-DM system improved the CM and DM noise voltages and insertion loss (IL).  
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### 1. Introduction

EMI is generally suppressed by several techniques like grounding, filtering and shielding. From these techniques, the filtering has been chosen as a suitable technique for minimizing the EMI [1]. Shielding against the EMI is done by fabricating the Carbon Nano Fiber (CNF) with cellulose filter and mesh filters based on cost efficient and appropriate dip coating technique and printing technique, respectively [2,3]. The parasitic effects on a CM EMIFs performance are analyzed with various grounding patterns [4]. In military power supply, a hybrid EMIF is introduced and it comprises a cascaded circuit of active impedance multiplication circuit with a benchmark CM inductor [5]. Based on the power loss analysis the CM active EMIF for induction motor drives is developed in the Pulse Width Modulation (PWM) induction motor drives [6]. High frequency (HF) model of CM coupled inductors are introduced in EMI filtering. It is tested with various magnetic materials and also HF model CM chokes are employed in EMIFs [7,8].

Fabrication of super hydrophobic, Carbon Nano Fiber/ PTFE-filled polymer composite coatings are improved with large electrical conductivity [9]. Both the low frequency and high frequency magnetic field coupling are considered while designing the EMIF [10]. EMIF has Single Turn of Flat Copper (STFC) ribbon for characterizing the magnetic hysteresis loop in HF (up to 1 MHz) [11]. The planner EMIF comprises of CM (LC unit) and DM modules, and these modules are developed based on the annular structure. Port impedance is decreased when increasing the frequency of the desired EMIF [12]. Resonance in the CM noise propagation is damped by the impedance mismatching filter. It also neglects the high frequency noise

\* Corresponding author.

E-mail addresses: [maraganisatish@gmail.com](mailto:maraganisatish@gmail.com) (M.S. Kumar), [jhansirani@vrsiddhartha.ac.in](mailto:jhansirani@vrsiddhartha.ac.in) (A.J. Rani).

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# Design of compact wideband unequal wilkinson power divider with improved isolation

V. Ravi<sup>1\*</sup>, Dinesh Sharma<sup>2</sup>, Purnima K<sup>3</sup>, Praveen Vummadisetty, Naidu<sup>4</sup>, A. Ravi Raja<sup>1</sup>, Arvind Kumar<sup>2</sup>,  
Abhaya P. Singh<sup>1</sup>, P. Raveendra<sup>1</sup>

<sup>1</sup>Velloppattur Ramakrishna Siddhartha Engineering College, Vijayawada, India-520007  
<sup>2</sup>KITF, Jaipur, India-302022, <sup>3</sup>Symbiosis International University, Pune, India  
<sup>4</sup>Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India  
<sup>5</sup>Chandigarh College of Engineering & Technology (CCET), Chandigarh-160019 India  
\*Corresponding author E-mail: ravi.vanamudi@gmail.com

## Abstract

In this article, a compact unequal, planar Wilkinson power divider with ultra-wideband operation is proposed. The composed power divider having the size of 11.6 mm × 18.5 mm. It consists of one input and two output branches with individual resistive values. Two isolation resistors are used to provide better isolation between the two output ports. The impedance values of each transmission branch and isolation resistors is varied based on the output power division ratio i.e. (P<sub>2</sub>/P<sub>3</sub>). The ADS package simulated results of the designed unequal WPD satisfy the operating range (S11 < -10 dB) from 2.5 GHz to 18 GHz and isolation are obtained over the entire frequency of operation.

**Keywords:** DB, FB, Applications, Isolation, Bandwidth, Micro strip, Line, Phased Array Antennas, Unequal Wilkinson Power Divider

## 1. Introduction

Recently, many printed antennas [8-18], [21-37] and Phase Array Antennas (PAA) [19-20] have been reported for wireless communication applications. In case of PAA power dividers plays a major role and the essential principle of the power divider or power splitter is to separate the given input signal at the input port into two or more output signals at the respective output ports with equal or unequal power distribution over the operating frequency range. Depending upon the range of operation and splitting ratio of input signal (equal or unequal) various power dividers [1-7] are used in RF Communication devices. A distinct unequal, planar, wideband, ultra-wideband power dividers has been presented in the literature with their own frequency operation and structure [1-7]. A typical Wilkinson power divider is presented and designing discussed in [1]. A specific set of equations are proposed by Ernest J. Wilkinson in 1960 [1]. Two types of commonly used power dividers are discussed in [1], one is corporate feed structure and another one is circularly symmetry connection. A three port microstrip unequal 4:1 Wilkinson power divider presented in [2]. The designed power divider works over the entire frequency range from 1.7 GHz to 1.8 GHz. A 2way (output) planar unequal power divider with division ratio of (5:1) is presented in [3]. It is printed on the substrate of thickness 0.8 mm and relative permittivity 9.6. The simulated and measured results show the operating range starts from 1GHz up to 2.5 GHz at resonant mode of 1.7 GHz. In [4], planar unequal split (10:1) Wilkinson power divider is proposed. The presented power divider designed by using the coupled transmission lines. The simulated and measured result satisfies the isolation and return loss -20 dB and 10% respectively. Wilkinson power divider with dc isolation is proposed in this paper [5]. It is

printed on the Ro4350B substrate of thickness and relative permittivity 1.5 mm and 3.66 respectively. It is operated at the frequency of 2.4 GHz [7].

In this paper, a small in size (11.6 × 18.5 mm<sup>2</sup>) Wilkinson power divider with unequal power splitting is designed on the RT5880 substrate and simulated. The simulated results such as return loss and isolation are obtained 2.5 GHz to 17 GHz and 15 dB respectively.

## 2. Power divider design & analysis

A regular unequal Wilkinson power divider consists of three ports is shown in Fig 1. It illustrates that 1 is input port and 2 and 3 are output ports. It splits the applied input signal power into two unequal output powers, named as P<sub>2</sub> and P<sub>3</sub> i.e. P<sub>2</sub> ≠ P<sub>3</sub>. It accommodates unequal length of quarter wave transmission branches with distinct impedance profiles. These impedance values can be varied depend upon the power division ratio at outputs P<sub>2</sub> P<sub>3</sub>. The isolation resistor R<sub>1</sub> is placed in between the two output branches to provide the better isolation.

The line impedance and isolation resistor values can be calculated by using the design equations shown in below (1) - (5). An additional isolation resistor R<sub>2</sub> is inserted at the end of transmission lines is shown in Fig 2. It provides isolation among the ultra-wideband range.



# Printed Monopole UWB Antenna with Dual Notch Bands

E. Kusuma Kumari, Sekhar M

**Abstract**— A UWB antenna with simple semi circular monopole antenna fed by a microstrip line with a semi circular ground plane is presented in this paper to achieve a operating bandwidth from 3.1GHz to 10.6GHz. Low cost FR4 glass epoxy material with a dimension of 30mm×32mm×1.6mm has been used to design the antenna. Proposed antenna is incorporated with two complimentary rectangular ring slots with discontinuities. The rectangular slots are placed such that the discontinuities face opposite to each other and it will generate a static resonance which is the reason for the dual notch bands covering the frequency ranges of WiMAX and WLAN.

**Keywords**— Monopole, Complimentary slots, partial ground, Dual Notch.

## I. INTRODUCTION

Ultra Wideband Antennas play a key role in the development of the applications in the unlicensed frequency band covering the frequency region of 3.1GHz to 10.6GHz. but care has to be taken in the transmitted circuit design to design filters to eliminate the licensed frequency bands of WiMAX and WLAN which will make the transmitted circuit complex and huge. The best way is to design an antenna which will not receive the signals from these licensed bands instead of filtering them after reception which will cause a lot of problems of interference also[1].

In order to have dual notch band characteristics a radiating patch with slots at the center and a partial V shaped ground plane is presented in [2]. To introduce a dual notch band a rectangular patch with a inverted T slot with a stub in it is proposed in [3] here the ground plane is partial ground with rectangular truncations. A pentagon patch with a pentagon ring slot fed by a coplanar wave guide feeding is proposed in [4]. In [5] a circular patch with a tapered ground plane and slits in the circular patch are considered to achieve the dual notch band characteristics.

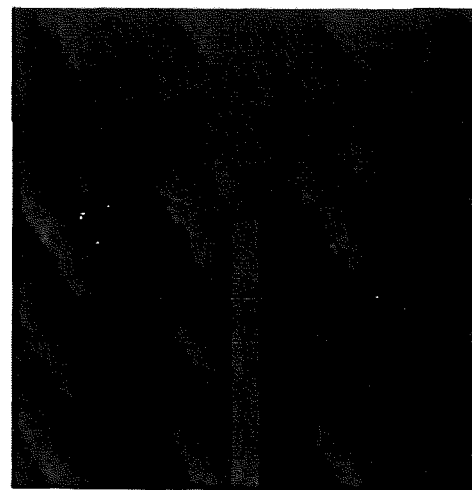
Proposed antenna is a simple semi circular monopole antenna fed by a microstrip line with a semi circular ground plane. Two complimentary rectangular ring slots with discontinuities are etched in the patch to achieve dual notch band characteristics. Different antenna parameters of the proposed antenna were studied and presented in this paper.

## II. DEVELOPMENT OF PROPOSED ANTENNA

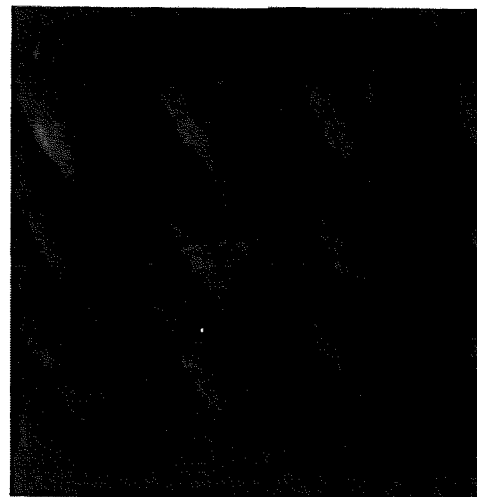
### Antenna Design

A simple semi circular monopole antenna fed by a microstrip line with a semi circular ground plane are been

used to achieve a UWB antenna operating from 3.1GHz to 10.6GHz. Low cost FR4 glass epoxy material with a dimension of 30mm×32mm×1.6mm has been used to design the antenna. Proposed antenna with UWB Characteristics can be seen in the figure 1 below.



(a) Front View



(b) Rare View

Fig. 1. Proposed UWB antenna

The cumulative effect of the semi circular radiating element and the ground plane will give the necessary UWB Characteristics to the antenna. The Radius of the ground plane is considered such that the ground plane ends just at the beginning of the patch on the other side of the substrate

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E. Kusuma Kumari, Professor & Head, ECE Department, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India (kusuma.madhu.ece@gmail.com)

Sekhar M, Assistant Professor, Vignan's Foundation For Science Technology and Research, Guntur, Andhra Pradesh, India (sekhar.srha@gmail.com)

# A Literature Survey On Social Identity Relation via Heterogeneous Behavior Modeling

Dr D Jaya Kumari<sup>1</sup>, Ms Parimi Sireesha<sup>2</sup>

## Abstract:

The study the matter of large-scale social identity linkage across wholly completely different social media platforms, that's of important importance to business intelligence by gaining from social data a deeper understanding and lots of correct identification of users. This paper proposes HYDRA, a solution framework that consists of three key steps: (I) modeling heterogeneous behavior by semi permanent behavior distribution analysis and multi-resolution temporal knowledge matching; (II) constructing structural consistency graph to measure the high-order structure consistency on users' core social structures across wholly completely different platforms; and (III) learning the mapping perform by multi-objective improvement composed of every the supervised learning on pair-wise ID linkage knowledge and additionally the cross platform structure consistency maximization. exhaustive experiments on 10 million users across seven widespread social network platforms demonstrate that HYDRA properly identifies real user linkage across wholly completely different platforms, and outperforms existing state of-the-art algorithms by a minimum of 2 hundredth below wholly completely different settings, and 4 times higher in most settings.

**Index Terms**—Social identity linkage, structured Learning, heterogeneous behavior, multi-resolution temporal information matching

## 1.INTRODUCTION

The recent blossom of social network services of all kinds has revolutionized our social life by providing everyone with the ease and fun of sharing various information like never before (e.g., micro blogs, images, videos, reviews, location check-ins). Meanwhile, probably the biggest and most intriguing question concerning all businesses is how to leverage this big social data for better business intelligence. In particular, people wonder how to gain a deeper and better understanding of each individual user from the vast amount of social data out there. Unfortunately, information of a user from the current social scene is fragmented, inconsistent and disruptive. The key to unleashing the true power of social media analysis is to link up all the data of the same user across different social platforms, offering the following benefits for user profiling.



# Automated cloud service based quality requirement classification for software requirement specification

R Raja Ramesh Merugu<sup>1</sup> · Satyananda Reddy Chinnam<sup>1</sup>

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## Abstract

The scale of software is growing rapidly for organizations begin to deploy their business on internet. It is a need of avoid ambiguity between engineers and users and to avoid mistakes in software requirements. And provide automatic requirement analysis techniques for modeling and analyzing requirements formally and save manpower. In this paper proposed cloud service method for automated detection of quality requirement in software requirement specification. This paper also present novel approach for process of automatic classification of software quality requirements based on supervised machine learning technique applied for the classification of training document and predict target document software quality requirements.

**Keywords** Software requirements · Automated · Cloud service · Quality requirement

## 1 Introduction

The software product has been mainly used for commercial purpose [1]. Liu [2] proposed the every aspect of product development, software engineers have been tasked to solve large and complex tasks in a cost efficient manner but of training document and predict target document software quality requirements is a challenging task. Robert et al. [3] believed lack of better knowledge in the field, software engineers are facing many problems such as late delivery of software, exceeding the development of project budget, poor quality, unsupported user requirements by the software, maintenance difficulty and unreliable software. To avoid ambiguity and mistakes in software requirements there is a need for automatic detection of quality requirements in software requirements specification [4, 5].

Software requirement is represented as software requirement specification, which serve to tie the implementation world of the stakeholder [6]. Rehim et al. [7] believed the limited knowledge about the product related field, there is a possibility to neglect some factors related to business. Generally it is difficult for users to express their demands

accurately and completely without necessary hints [8]. Slankes and Williams [9] software engineering causes software bugs and determinant the significant, it also lack of mature expertise or practices in software engineering. Casamayer et al. [10] there is a need to paid more attention to acquire requirements rapidly and accurately in software requirement engineering by using machine learning techniques especially deep learning techniques.

Software quality requirements for a document are planned in a systematic approach for the evaluation of the quality, software product standards, processes and procedures [11]. Hu et al. [12] and Tumai and Anzai [13] software engineering there is a need to provide high quality software with specific skills and to adopt good and controlled development. And operation practices and there is scope to implement automated cloud service based quality requirement classification for software requirement specification [14]. Zang et al. [15] also there is a need to identify new approaches for creating and operating software and services in the cloud context as the core part of the software engineering is quality requirement specification. In infrastructural software has to guaranty the quality of service and correctness with quality requirement classification [12–14, 16]. This paper present an automated cloud [17–19] service that detects and classifies quality requirements of software requirement specification based on deep learning approach [20].

✉ R Raja Ramesh Merugu  
rajarameshmerugu@gmail.com

<sup>1</sup> Department of Computer Science and Systems Engineering,  
AU College of Engineering, Andhra University,  
Visakhapatnam, Andhra Pradesh, India

## **Performance of Memory Virtualization Using Local Memory Resource Balancing**

**P.V.S.S.Gangadhar 1,**

*1(Scientist-D at NIC & Research Scholar at IT Department, GIT,  
GITAM University, Visakhapatnam, India.*

**Dr. Ashok Kumar Hota 2**

*2(Scientist-F at National Informatics Centre, MEITY, Govt Of India,  
Bhubaneswar, India,*

**Dr. M.Venkateswara Rao 3**

*3(Professor, Dept. of IT, Gitam University, Visakhapatnam, India,*

**Dr. V.Venkateswara Rao 4**

*4(Professor, Dept. of CSE, Sri Vasavi Engg. College, Tadepalligudem, India.*

### **Abstract**

Virtualization has become a universal generalization layer in contemporary data centers. By multiplexing hardware resources into multiple virtual machines and therefore facilitating several operating systems to run on the same physical platform at the same time, it can effectively decrease power consumption and building size or improve security by isolating Virtual Machines. In a virtualized system, memory resource supervision acts as a decisive task in achieving high resource employment and performance. Insufficient memory allocation to a Virtual Machine will degrade its performance radically. On the opposing, over allocation reasons ravage of memory resources. In the meantime, a Virtual Machine's memory stipulates may differ drastically. As a consequence, effective memory resource management calls for a dynamic memory balancer, which, preferably, can alter memory allocation in a timely mode for each Virtual Machine based on their present memory stipulate and therefore realize the preeminent memory utilization and the best possible overall performance. Migrating operating system instances across discrete physical hosts is a helpful tool for administrators of data centers and clusters: It permits a clean separation among



## Fuzzy Clustering Algorithm Efficient Implementation Using Centre of Centres

Chundru Raja Ramesh<sup>1\*</sup>      Komaragiri Raghava Rao<sup>2</sup>      Gunamani Jena<sup>1</sup>

<sup>1</sup>Department of Computer Science & Engineering, K L University, India

<sup>2</sup>Department of Computer Science & Engineering, BVC Engineering College, India

\* Corresponding author's Email: [chrajamesh@gmail.com](mailto:chrajamesh@gmail.com)

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**Abstract:** Clustering is a procedure of finding similar data items (patterns, documents etc.) and then group the similar data together. Items belongs to different clusters are dissimilar data items, generally cluster values are considered as 1 or 0. The clustering process is not appropriate for all the cases sometimes these values are less than one. In practical situations clusters are not crisp, then it is represented as fuzzy. In order to enhance the clustering rate, two appropriate clustering approaches: K-means clustering and Fuzzy C Means (FCM) are considered. These approaches are modified by minimizing the objective function known as squared error function. The experimental research was performed on the publicly available database (i.e. yeast dataset) to validate its clustering performance in terms of accuracy, specificity, sensitivity and execution time. Experimental outcome shows that the proposed technique improves the accuracy in clustering rate up to 1.5-35% compared to the existing methodologies FCM and k-means approaches.

**Keywords:** Clustering, Fuzzy c-means, K-means clustering, Squared error function, Yeast dataset.

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### 1. Introduction

In recent decades, the rate of growth of databases are increased exponentially, as a result, the conventional database analysis techniques are fail to find useful information from the large databases [1, 2]. Data clustering plays an important role in such situations, where there is a need to discover the natural grouping structure of data in an unsupervised manner [3]. Clustering is the procedure of organizing objects into teams, whose members are similar in some way. A cluster is a group of objects that similarity measurement is near to each other and the dissimilarity objects are placed in the different clusters [4]. Currently, there are several clustering approaches are available such as, distribution based clustering schemes, density based clustering schemes and centroid based clustering schemes [5]. In this scenario, centroid based clustering methods: FCM, K-means, Fuzzy k means, FCM with optimization methods, etc. are considered for experimental validation. These type of clustering methodologies are demonstrated by a central vector

and the clustering procedure is generally defined as optimization, which finds the clusters and assign the items to the closest or most similar cluster such that a certain measure is minimized [6, 7].

Among these available methodologies, FCM and K-means approaches are the well-known centroid based clustering partition method [8]. In K-means approach, the objects are classified based on K-groups. In each cluster, the centroid or mean is taken as the cluster representative. If suppose, the data is real-valued data, the arithmetic mean of the attribute vectors for all objects within a cluster provides appropriate cluster representative [9]. On the other hand, FCM is similar to k-means algorithm, initially selects the number of clusters. Then, assign coefficients for each clusters and compute the centroid of each cluster [10, 11]. One of the major drawback in (K-means and FCM approaches) is very difficult to find the K-value in global dataset and also produces tighter clusters, especially if the clusters are globular. In order to overcome this issue, modified FCM and K-means clustering approaches are developed in this research. These approaches are

# An Efficient Approach for Multi-Dimensional Dataset Search Using Keywords

<sup>1</sup>Susmitha Dasari, <sup>2</sup>Loshma Guniseti

<sup>1</sup>Mtech Scholar, <sup>2</sup>Associate Professor

<sup>1</sup>Computer Science and Engineering,

<sup>1</sup>Sri Vasavi Engineering College, Tadepalligudem, India

**Abstract**— Conventional spatial queries, such as range search and nearest neighbor retrieval, involve only conditions on objects' geometric properties. Today, many modern applications call for novel forms of queries that aim to find objects satisfying both a spatial predicate, and a predicate on their associated texts. Currently, the best solution to such queries is based on the IR2 -tree, which, as shown in this paper, has a few deficiencies that seriously impact its efficiency. Motivated by this, we develop a new access method called the spatial inverted index that extends the conventional inverted index to cope with multidimensional data, and comes with algorithms that can answer nearest neighbor queries with keywords in real time. As verified by experiments, the proposed techniques outperform the IR2 -tree in query response time significantly, often by a factor of orders of magnitude.

**Index Terms**— Nearest neighbor search, spatial index, keyword search.

## I. Introduction

A spatial information could be an information that stores multidimensional objects like points, rectangles, and etc. some spatial databases permit representing easy geometric objects like lines, points and polygons. Some spatial databases handle additional advanced structures like 3D objects, topological coverage's, linear networks. Based on totally different choice criteria spatial information provides quick access to 3D objects.

In spatial information real entities are sculptured in geometric manner, as an example location of hotels, hospital, restaurants are described as points on maps, whereas larger space like landscapes, lakes, parks is described as a mix of rectangles. Spatial information system will utilize in geographic information systems, during this vary search may be utilized to seek out all restaurants in a very sure space, whereas nearest neighbor retrieval will notice the building nearer to a given address. Queries about abstraction information became more and more important to recent years with the increasing quality of some services like Google Earth and Yahoo Maps, as well as different geographic applications.

Today, wide used of search engines has created it realistic to put in writing abstraction queries in an exceedingly new means. Historically, queries target objects solely geometric properties, as an example whether or not a point is in parallelogram or however two purposes are shut from every other. Some new application permits users to browse objects based on each of their geometric coordinate and their associated texts. Such sort of queries referred to as abstraction keyword question. For example, if a groundwork engine will be used to find nearest building that provides facilities like pool and internet at identical time. From this question, we have a tendency to might the initial obtain the complete building whose services contain the set of keywords, then notice the closest one from the retrieved restaurant.

The foremost disadvantage of this approach is that, on the troublesome input they are doing not offer real time answer. For example, from the question purpose the important neighbor lies quite far away, whereas all the nearer neighbors square measure missing a minimum of one of the question keywords. Abstraction keyword queries have not been wide explored. Within the past years, the cluster of people has shown interest in learning keyword searches in relational databases. Recently the eye has preoccupied to flat knowledge [5][6]. The simplest technique for nearest neighbor search with keywords is owing to Felipe et al. [5]. They mix the abstraction index R-tree [7] and signature file [8]. So that they developed a structure referred to as IR2-tree. This tree has the flexibility of each R-tree and signature files. Like R-tree it stores the abstraction proximity of object and like signature file it filters those objects that don't include all question keywords.

## II. Related Work

A study was undertaken by S. Agrawal, S. Chaudhuri, and G. Das [18] Internet search engines have popularized the keyword-based search paradigm. While traditional database management systems offer powerful query languages, they do not allow keyword-based search. In this paper, we discuss DBXplorer, a system that enables keyword-based searches in relational databases. DBXplorer has been implemented using a commercial relational database and Web server and allows users to interact via a browser front-end. We outline the challenges and discuss the implementation of our system, including results of extensive experimental evaluation.

Keyword Searching and Browsing in Databases Using Banks, [2] by this with the growth of the Web, there has been a rapid increase in the number of users who need to access online databases without having a detailed knowledge of the schema or of query languages; even relatively simple query languages designed for non-experts are too complicated for them. We describe BANKS, a system which enables keyword-based search on relational databases, together with data and schema browsing. BANKS enables users to extract information in a simple manner without any knowledge of the schema or any need for writing complex queries. A

## **Mining Frequent Patterns from Big Data Sets using Genetic Algorithm**

**Chandaka Babi**

*Research Scholar, Dept of IT,  
Gitam Institute of Technology, Gitam University,  
Visakhapatnam, India*

**Dr. M. Venkateswara Rao**

*Professor, Dept of IT,  
Gitam University, Visakhapatnam, India.*

**Dr. Vedula Venkateswara Rao**

*Professor, Dept of CSE,  
Sri Vasavi Engineering College, Tadepalligudem, India.*

### **Abstract**

Frequent pattern mining is crucial data mining job, with a goal of determining knowledge in the form of repetitive patterns. Many proficient pattern mining algorithms have been revealed in the last two decades, yet most do not scale to the type of data we are presented with today, the so-called "Big Data". Scalable parallel algorithms hold the key to solving the problem in this context of Big Data. Most of the existing algorithms toward this issue are based on exhausting search methods such as Apriori, and FP-growth. However, when they are applied in the big data applications, those methods will suffer for extreme computational cost in searching association rules. Huge amounts of digital information are stored in the World today and the amount is increasing by quintillion bytes every day. Processing of this information using traditional techniques is becoming increasingly difficult. The challenges include capture, storage, search, transfer, analysis, and visualization of big datasets. 90% of the data stored in the World today have been created in the last two years alone and continue to grow at the same pace. However, these sheer amounts of data bring significant benefits and make it possible to do many things that could not be done previously: predict future behavior of Internet users, diagnose diseases, identify crime suspects, forecast financial trends, etc. Approximate (probabilistic) data mining algorithms are very important to efficiently deal with such amounts of information and to deliver the results in an acceptable





# Provable secure lightweight hyper elliptic curve-based communication system for wireless sensor networks

Vankamamidi S. Naresh<sup>1</sup> | Reddi Sivaranjani<sup>2</sup> | Nistala V.E.S. Murthy<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India

<sup>2</sup>Department of Computer Science and Engineering, Anil Neerukonda Institute of Technology and Sciences, Visakhapatnam, Andhra Pradesh 530003, India

<sup>3</sup>Department of Mathematics, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India

## Correspondence

Vankamamidi S. Naresh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh 534101, India.  
Email: vsnaresh111@gmail.com

## Summary

It is widely believed that hyper elliptic curve cryptosystems (HECCs) are not attractive for wireless sensor network because of their complexity compared with systems based on lower genera, especially elliptic curves. Our contribution shows that for low cost security applications HECCs cryptosystems can outperform elliptic curve cryptosystems. The aim of this paper is to propose a discrete logarithm problem-based lightweight secure communication system using HEC. We propose this for different genus curves over varied prime fields performing a full scale study of their adaptability to various types of constrained networks. Also, we propose to evaluate the performance of the protocol for computational times with respect to different genus for main operations like Jacobian, Divisor identifications, key generation, signature generation/verification, message encryption, and decryption by changing the size of the field. A formal security model was established based on the hardness of HEC-Decision Diffie-Hellman (HEC-DDH). Finally, a comparative analysis with ECC-based cryptosystems was made, and satisfactory results were obtained.

## KEYWORDS

Diffie-Hellman, elliptic curve, genus, hyper elliptic curve, Jacobian, wireless sensor networks

## 1 | INTRODUCTION

In modern world, most of the wireless systems require resource constrained devices such as RFID tags, sensors, smart cards, small processors, PDA's, and smart phones. These devices play a major role in providing security for satellite communication, internet security, e-banking, e-commerce, Internet Of Things (IOT) applications, and embedded systems. Implementing security for wireless communication system using these devices is the most challenging problem. Many cryptographic algorithms were developed to accomplish their requirements for secure data communication in wireless systems. These algorithms have many limitations, which include increased power consumption, communication, and computational complexity with increased processing time. Thus, an efficient cryptographic algorithm that overcomes these limitations is the need of the hour.

Public key cryptography (PKC)<sup>1</sup> offers a solution to the above limitations by using 2 different keys known as the public and private keys. The secret (private) key is chosen by the user and is well known only to him. The public key is computed from the private key by using a reversible mathematical process and is made open to all. Both the keys are interoperable on each other and are used for the decryption and encryption processes. As the private key is never revealed, PKC is highly secured unlike symmetric key cryptography. Based on the arithmetic operations, PKC is broadly

# Prediction and Analysis of Sentiments on Twitter Data using Machine Learning Approach

**Ch Srinivasa Rao**

Research Scholar, Dept of CSE  
Acharya Nagarjuna University, Guntur  
Associate Professor, Dept of CS,  
SVKP & Dr K S RAJU A&Sc College,  
Penugonda, A.P, India  
chiraparapu@gmail.com

**Dr. G Satyanarayana Prasad**

Professor, Dept of CSE,  
Dean, Training & Placements  
RVR & JC College of Engineering  
Chowdavaram, Guntur, A.P, India  
Satyam\_gp@yahoo.com

**Dr.Vedula Venkateswara Rao**

Professor, Dept of CSE,  
Sri Vasavi Engineering College  
Pedatadepalli, Tadepalligudem,  
A.P, India  
Venkatvedula2017@gmail.com

*Abstract*—today, methods for automatic opinion mining on online data are becoming increasingly relevant. Over the past few years, methods have been developed that can successfully and with a great degree of accuracy analyze the sentiment in opinions from digital text. These developments enable research into prediction of sentiment. Sentiment prediction has traditionally been used as a tool for stock prediction. In such scenarios, incoming news is analyzed in real-time and the impact of that news on stock prices is estimated, making automatic stock trading possible. Recent developments in sentiment prediction have seen attempts to predict explicit sentiment of the reactions to blogs, before the blogs are even posted. In this paper, we research the prediction of the general sentiment polarity in reactions to news articles, before the news articles are posted. We use Machine Learning approach to solve the sentiment prediction problem. To automatically label comments from Data Set for sentiment prediction training, we perform automatic domain-knowledge transfer from a classifier trained on Twitter data. In this paper, we propose a new machine learning method, a new feature selection method for text and a new machine learning evaluation metric. We provide a thorough analysis of News data, and manually annotate a high standard from it. Finally, we demonstrate the feasibility of sentiment prediction of the general sentiment polarity in reactions to news articles, before the news articles are posted in limited cases. Ultimately, we provide an analysis of the limitations of our and similar

approaches to sentiment prediction, and make recommendations for future research.

**Keywords-** micro blog, twitter, sentiment analysis, opinion mining, predictions

## I. INTRODUCTION

On a variety of online platforms, such as review sites, blogs, as well as social services such as Twitter, internet users produce vast amounts of opinionated text about a large range of domains, such as movie reviews, travel experiences, product reviews, opinions about news and others. Automatic opinion mining - the ability to process large amounts of opinionated textual information from online sources without human interference - is necessary. The data sources include opinions about products, brands and developments which increasingly drive the decision making in business and government. Automatic opinion mining is divided into two categories; *qualitative* opinion mining, which attempts to extract pieces of literal information from the data, such as sentences describing an experience relevant to the target of the opinion and *quantitative* opinion mining, which attempts to determine quantifiable dimensions of opinion, such as sentiment. Sentiment analysis is utilized in order to determine the polarity of opinions (positive/neutral/negative) or the emotional charge of opinions across a range of possible emotions (love, fear, anger, understanding etc). The field of sentiment analysis has recently witnessed a large amount of interest from the scientific community [1] [2] [3]. Sentiment analysis has traditionally been applied to a single domain at

# Performance of Memory Virtualization Using Hybrid Live Migration of Virtual Machines

Pvss Gangadhar, Ashok Kumar Hota, M. Venkateswara Rao, and V. Venkateswara Rao

**Abstract**—Today, Infrastructure-as-a-service providers are trying to minimize the cost of data center operations, while maintaining the Service Level Agreements. This can be achieved by one of the advanced state-of-the-art services of virtualization - the live migration capability. Live migration is defined as the process of transferring an active virtual machine from one physical machine to another without any disconnection. This is achieved by transferring all of the encapsulated states of the VM from one host to another. It has become an essential tool for efficient management of resources in a data center by enabling server consolidation and load balancing. There are two classical migration techniques, namely - pre-copy and post-copy, which employ different memory transfer mechanism during the offloading of a VM. In this paper, we propose a novel hybrid live migration technique by combining the existing pre-copy and post-copy approaches. Compare to its counterparts, our hybrid technique is a fast, efficient and a reliable migration technique.

**Index Terms**—Cloud computing, IaaS, virtualization, virtual machine, data center, physical memory, load balancing, cluster, resource allocation, writable working set.

## I. INTRODUCTION

Virtualization [1], [2] has become one of the key technologies in the era of Cloud Computing. It is loosely defined as an abstraction of the computing resources that can be achieved by either dividing the resources into multiple computing environments or merging various resource components into one. Various concepts and techniques such as time sharing, hardware and software partitioning, simulation, emulation can be used to apply, the division of the resources. Thus, Virtualization technology has enabled the efficient utilization of hardware resources by abstracting away the underlying resources such as processors, main memory, secondary storage and networking. Today, with the help of Virtualization, the data centers are continuously employing the virtualized architecture to execute multiple applications that are mapped on to the physical machines. This has been enabled with the help of virtual machines that form the software abstraction of a physical machine. This abstraction is achieved by the various virtualization techniques [3], [4]

Manuscript received July 17, 2018; revised September 4, 2018.  
Pvss Gangadhar is with Gitam University, Visakhapatnam, India (e-mail: pvss.gangadhar@nic.in)  
Ashok Kumar Hota is with F, NIC, MEITY, Govt. of India (e-mail: ak.hota@nic.in).

M. Venkateswara Rao is with the Dept. of IT, Gitam University, Visakhapatnam, India (e-mail: mandapti\_venkat@yahoo.com).

V. Venkateswara Rao is with the Dept. of CSE, Sri Vasavi Engineering College, Tadepalligudem, India (e-mail: venkatvedula2017@gmail.com).

such as:

- Full Virtualization: It is defined as the isolated execution of the unmodified guest OS by simulating the hardware resources including full instruction set, input/output operations, interrupts, and memory access.
- Para Virtualization: It is defined as the isolated execution of the guest OS with modified resources in the form of hooks. The para virtualized interface is used to decrease the performance degradation caused by the time spent by the guest in performing certain operations which are substantially more difficult to execute in a virtual environment compared to a non-virtualized environment.
- Hardware Assisted Virtualization: It is defined as the execution of the guest OS with the capabilities provided by the hardware, primarily from the host processor. The resources can be either fully virtualized or para virtualized in this case, Therefore, the cloud providers that are providing the infrastructure resources completely rely on Full Virtualization with hardware assistance. This is because of the client requirements of unmodified guests as a part of the service level agreements (SLAs). Overall, Virtualization helps in enabling agility, dynamism, adaptability [5,6] within a data center. Therefore, VMs form the basic building blocks of the Infrastructure-as-a-Service (IaaS) [6] with benefits such as flexible resource provisioning, monitoring and administration by the system administrators. Resource provisioning allows the provisioning of the infrastructure based resources either at the start or during the life-cycle of a service [7]. At the IaaS level, these resources consist of servers, network, and self-service for the clouds. Server provisioning, a part of resource provisioning, consists of well defined configuration of the servers based on the requirements of the client. It consists of the following two types:
  - 1) Static server provisioning: The configuration of the VMs at the beginning of the life-cycle of a service constitutes the static part of server provisioning. During this process, a physical machine is selected from a pool of physical nodes. Today, a VM is instantiated by using the existing template based provisioning. A physical machine is selected from a pool of physical nodes, during this process, Today, the existing template based provisioning is used to instantiate, a VM [8] before executing other services provisioning depending upon the requirements.
  - 2) Dynamic server provisioning: From both the client's point of view and cloud provider, the dynamic resource provisioning plays an important role in the allocation or

## Prognosticate Breast Cancer by Exerting Fuzzy Precognition Clustering Technique and Collate Technique

Dr. D. Jaya Kumari\*

*Professor, Department of Computer Science & Engineering,  
Sri Vasavi Engineering College, Tadealligudem,  
Andhra Pradesh, India.*

### Abstract

Cancer is one of the most predominant inducements of deaths encompassed in the world by women. In dispersion of cancer diseases, breast cancer is peculiar for women with entanglement. A fatal tumor is a cumulate of cancer cells that might mellowed into adjoining tissues. Most breast cancers are discerned by the patient by screening as a lump in the breast. In order to interpret whether the clump is remediable or malignant, the Physician may exert Exquisite Needle Auspicate (ENA) technique with visual assimilation. ENA technique does not always accord correct results in envisaging cancer in patients. The intent of this Paper is to induce a relatively aspirate system to envisage ENA technique with preciseness.

There are multifarious techniques in envisaging breast cancer with conventional dissimilar techniques such as neural network classification, fuzzy classifications, Detection Algorithm with Decision tree classification, Support Vector Machine Classification, deep belief network classification, ordered weighted averaging operator, mahout naive bays classifier, etc. Sometimes the data to envisage breast cancer can be discrepant and impalpable. If the data is impalpable and discrepant the existing methods cannot predict breast cancer felicitously. So to handle discrepant, impalpable data and missing data, FUZZY precognition clustering is induced. Exquisite needle auspicate technique doesn't always envisage befittingly whether patient is anguished from cancer or not. To envisage breast cancer in multifarious patients at a time by handling missing and discrepant data precognition fuzzy c-means clustering is performed on data collected from fine needle aspirate technique. Sometimes it is predicament to say whether the person is actually suffering from breast cancer or not by using Exquisite Needle Auspicate technique. To overcome this predicament the data collected from ENA technique can be acceded as input for collate approach for reckoning collate factor. By seeing the collate factor we can scrupulously predict breast cancer in a particular patient. This paper elucidates how Fuzzy Precognition method and Collate method are exerted for envisaging breast cancer in patients scrupulously handling discrepant, missing, impalpable data.

**Keywords:** Breast cancer, Mammography, Support Vector Machine Classification, Neural Network Classification, fine needle aspirate, data clustering, Exquisite needle auspicate technique, Fuzzy precognition clustering, collate approach.

### INTRODUCTION

For adult females, breast cancer is the utmost communal cancer, universally and the second leading source of female cancer deaths. For screening breast cancer and can decrease breast cancer mortality, Mammography is the most effective skill. One among the chief early indications on mammograms is the visual aspect of micro calcifications, whose diameter range is between 0.1 to 1 mm<sup>1</sup>. A treacherous variety of tumors initiated from breast tissue is breast cancer and it occurs in 23% of all cancers in adult females. The utmost real technique to perceive breast cancer is via the breast mammogram screening, ultrasound images, and magnetic resonance<sup>2</sup>. The role of breast screening assessments is the initial recognition of cancer in asymptomatic women where no felt lump or intense masses are contemporary. In the initial stages, breast tumors are minor and confined in a chest mass. Occasionally, breast cancer is signaled using an asymmetric or uneven dissemination of the left and right breast tissues<sup>3</sup>. Data mining could be a cherished implement in recognizing resemblances (patterns) in breast cancer cases that can be used for diagnosis, prognosis as well as treatment resolves. These analyses are some instances of investigators that smear data mining to medical fields for extrapolation of diseases<sup>4</sup>. Breast cancer encompasses a heterogeneous lot of tumors that suggestively differ in their replies to treatment, presentation, and biology. For instance, histological alike tumors may have different clinical behavior and rejoinders to treatment<sup>5</sup>. In this numerous kinds of breast cancer are accomplished, at this time the 2 major varieties of breast carcinoma in situ, ductal carcinoma in situ (DCIS) is deliberated a true (non obligatory) cancer predecessor, and its treatment is frequently a like to that for small, lymph node-negative breast cancer; while lobular carcinoma in situ (LCIS) that is also called as lobular neoplasia, is predominantly observed as an indicator of augmented breast cancer peril<sup>6</sup>. The first category is DCIS its well-defined by the occurrence of malignant epithelial cells inside the defined breast ducts. The malignant cells are, by definition, destined using an integral basement membrane without any basal myoepithelial layer incursion. There are numerous architectural sub types of DCIS: solid, comedo, micropapillary, papillary, and cribriform<sup>7</sup>. Though, most women with DCIS of the breast available with an asymptomatic definition on routine screening mammography, population-based studies establish an extensive range of treatments. Systemic therapy choices comprise adjuvant tamoxifen for hormone receptor-positive DCIS tumors<sup>8</sup>. In an

\* Email: [phd.jaya@gmail.com](mailto:phd.jaya@gmail.com)

# Activity Based Quality Assessment Technique for Software Requirement Specification

M.R Raja Ramesh, Ch.Satyananda Reddy

**Abstract :** Most software problems will arise based on the deficiencies that occur in software requirements specification development. It is essential to develop a quality requirement specification development, to achieve success for developing any software product because this software requirement specification information will be used entirely in all project development stages. The current work is focused on assessment of software requirement specification based on the activities of software product. The proposed work is evaluated with an example and is compared with other group namely case based reasoning and machine learning algorithms of quality assessment techniques. The results had shown the effectiveness of the proposed technique.

**Key words:** Quality Models, Software Requirements Specification Development, Quality Requirement Specification Development, Activity Based Assessment.

## I. INTRODUCTION

In software requirement specification, quality requirement models are part of the functional requirement and non-functional requirements of a system, in non-functional requirements which are important for making a product more attractive and it is usable and it also specifies properties of system which is not primary functionality. Although quality requirements are an important factor in the success of a system, but it can be neglected in the software requirements engineering process. The problem is focused on quality assessment, it is a complex and flexible idea. The first and primary requirement of software specification often struggle with specifying software quality requirement specification on a level of abstraction that is suitable for the later phases. The high level abstraction of software requirement specification as “The software system shall be maintainable”.

The second requirement of software specification is elicitation phase, it process the demands for implicit domain knowledge. One often needs to consider a variety of domain-specific standards and guidelines, whereas it often remains unclear whether, to which extent, and how the contents have to be transformed into useful and appropriate software requirements [1]. In this paper, we evaluate activity based assessment to get quality software requirement specification document that can be inferred from domain specific standards and guidelines. We examine a comparative case study at Siemens the existing specification of a Marketing system which can be compare it to a new

software requirements specification produced using the proposed approach. We measure our approach supports the software requirements specification of traceable and measurable requirements in direct comparison to the approach.

Requirements Engineering (RE) is a major part of software engineering which discovers the purpose by identifying stakeholders and their needs, and documenting them for their future analysis and implementation [2]. In general, software quality attributes for a software requirement specification are part of a software quality model which can be used to assess the quality of a requirements document contained in software requirement specification [3]. Thus, each attribute might be related to the entire software requirement specification or to each requirement defined in it which is due to many attributes attained by the software requirement specification that can be achieved for each requirement defined in it. Related to this, many of the authors proposing the same property coincide in their considerations, some issues regarding particularities in the analysis deserve to be pointed out. The various quality properties that used to achieve the quality of the SRS is and its influence in shown in the Fig 1.

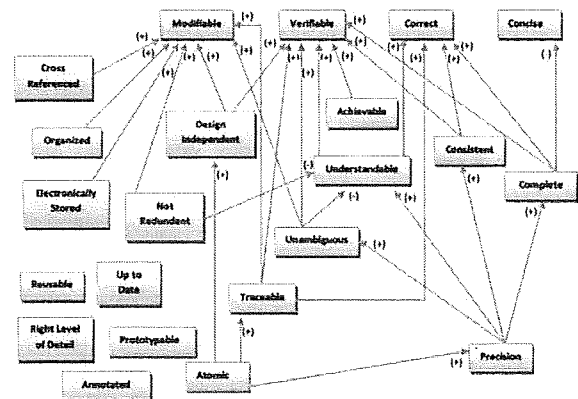


Fig 1: Influence between quality properties [4].

In this paper focused on the software quality models of software requirement specification development based on the various activities that carried out for development of the software product. The paper is structured as follows, section 2 organised related works and section 3 demonstrate the proposed research work. Section 4 evaluates the results and discussion and finally the paper ends with section 5 conclusion and presented future work of this paper.

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M.R Raja Ramesh, Department of Computer Science and Engineering, Sri Vasavi Engineering College, Pedatadepalli, Tadepalligudem, Andhra Pradesh, India

Prof. Ch.Satyananda Reddy, Department of Computer Science and Systems Engineering, A.U College of Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India.



# A Comparison of Seven-Level Inverter Topologies with Minimum Number of Switches for Induction Motor Drive

G. MadhuSagarBabu<sup>1</sup>, V. Rama Narayana<sup>2</sup>, N. Devi Priya<sup>3</sup>

Assistant Professor<sup>1, 2, 3</sup>

Department of EEE

Sri Vasavi Engineering College, Tadepalligudem, A.P India

## Abstract:

Multilevel inverter is used in applications that need high voltage and high current. However the main drawback of MLI is their increased number of power devices, passive components, complex pulse width modulation control and balancing of capacitive voltages. In this paper two popular topologies such as Reversing Voltage Multi-Level Inverter and Cascaded Multi-Level Inverter based on Developed H-Bridge inverter are discussed. When compared with existing inverters, fewer components (particularly in higher levels) are sufficient and require fewer carrier signals and gate drives. The operating principle of each topology and the analysis of the two MLI are included. Simulation study of these topologies considered is carried out on MATLAB/SIMULINK platform for Induction Motor drive.

**Keywords:** Multi Level Inverters, Cascaded multilevel inverter, developed H-bridge, RVMLI, THD, IPD PWM.

## I. INTRODUCTION

A multilevel inverter not only achieves high power ratings, but also enables the use of renewable energy. In recent years, there has been a substantial increase in interest to multilevel power conversion. The term multilevel began with the three-level converter. The advantages of three-level Inverter topology over conventional two-level topology are:

1. The voltage across the switches is only one half of the DC source voltage;
2. The switching frequency can be reduced for the same switching losses;
3. The higher output current harmonics are reduced by the same switching frequency.

Recent research has involved the introduction of novel converter topologies and unique modulation strategies. However, the most recently used inverter topologies, which are mainly addressed as applicable multilevel inverters, are cascade converter, neutral-point clamped(NPC) inverter, and flying capacitor inverter. There are also some combinations of the mentioned topologies as series combination of a two-level converter with a three-level NPC converter which is named cascade 3/2 multilevel inverter[3]. There is also a series combination of a three-level cascade converter with a five-level NPC converter which is named cascade 5/3 multilevel inverter [4]. The proposed topology is a symmetrical topology since all the values of all voltage sources are equal. However, there are asymmetrical topologies [5] which require different voltage sources. This criterion needs to arrange dc power supplies according to a specific relation between the supplies. Difference in ratings of the switches in the topology is also a major drawback of the topology. This problem also happens in similar topologies [6]–[8], while some of the high-frequency switches should approximately withstand the maximum overall voltage which makes its application limited for high-voltage products. In practical implementation, reducing the number of switches and gate driver circuits is very important. Reversing Voltage Multi-Level Inverter (RVMLI) and Cascaded Multi-Level Inverter based on Developed H-Bridge (CMLIDHB)

inverter will obtain a nearly sinusoidal voltage with a lower switch count [1][14]. Single phase AC supply obtained from this topology is given to single phase Induction Motor and is the most common domestic appliance due to their rugged construction and lower cost. Also this topology can be easily implemented for three phase system due to less number of switches and hence less complexity of controlling them.

## II. CIRCUIT TOPOLOGY

### a) Reversing Voltage Multi-Level Inverter

The power circuit of the inverter consists of the power semiconductor switches which are combined to produce high-frequency wave form in positive and negative polarities. However, there is no need to utilize all the switches for generating bipolar levels. This idea has been put into practice by the new topology[1]. This topology is a hybrid multilevel topology which separates the output voltage into two parts. One part is named *level generation* part and is responsible for level generating in positive polarity. This part requires high frequency switches to generate the required levels. The switches in this part should have high-switching-frequency capability. The other part is called *polarity generation* part and is responsible for generating the polarity of the output voltage which is the low-frequency part operating at line frequency. The topology combines the two parts (high frequency and low frequency) to generate the multilevel voltage output. In order to generate a complete multilevel output, the positive levels are generated by the high-frequency part (level generation), and then, this part is fed to a full-bridge inverter (polarity generation), which will generate the required polarity for the output. This will eliminate many of the semiconductor switches which were responsible to generate the output voltage levels in positive and negative polarities. The RV topology in seven levels is shown in Fig. 1. As can be seen, it requires ten switches and three isolated sources. The principal idea of this topology as a multilevel inverter is that the left stage in Fig. 1 generates the required output levels (without polarity) and the



# A Comparison of Seven-Level Inverter Topologies with Minimum Number of Switches for Induction Motor Drive

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# Implementation of Fuzzy Logic Controller for Multilevel Inverter Topology

Y.Lalitha Kameswari  
Research Scholar

Department of EEE, K.L. University, Guntur, A.P, India.  
Email: [ylkeswari@gmail.com](mailto:ylkeswari@gmail.com)

Dr.D.Sudha Rani  
Professor, EEE DEpartment  
Sri Vasavi Engineering College  
Tadepalligudem, AP, India

**Abstract**— This paper presents an investigation of seven level cascaded H-bridge (CHB) inverter in power system for compensation of harmonics. For power quality control a Fuzzy Logic Control (FLC) giving comparatively better harmonic reduction than the conventional controllers. Harmonic distortion is the most important power quality problem stirring in multilevel inverter, the harmonics can be eliminated by an optimal selection of switching angles. A hybrid evaluation technique evaluates the obtained optimal switching angles that are attained from the fuzzy inference system as well as neural network. The proposed method will be implemented in MATLAB working platform and the harmonic elimination performance will be evaluated.

**Keywords**— Power quality, Harmonics, Switching angles, THD, Multilevel inverter

## I. INTRODUCTION

Current harmonics were introduced by power electronic equipments. Due to these current harmonics problems such as a low power factor, low efficiency, power system voltage fluctuations and communications interference takes place. Irrespective of variations in the input source or load condition, maintaining a constant voltage and constant frequency supply for critical connected loads. Harmonics are undesirable voltages or currents that have frequencies which are integral multiples of the frequencies of the supply system [1]. Harmonics can be introduced by non linear loads which cause faulty operation of the connected equipments [2]. By the non linear loads current is drawn in a non sinusoidal manner that are connected to the sinusoidal supply voltage [3]. The two types of harmonic sources into which non linear loads can be categorized are harmonic current source and harmonic voltage source [4]. Total harmonic distortion (THD) can be diminished by the power conversion approach by getting the output voltage in steps and taking the output nearer to sinusoidal wave [5]. Generation of an estimated sinusoid voltage from number of stages of dc voltages usually from capacitor voltage sources is the general concept of multilevel inverters [6].

In previous number of APF designs, PWM based techniques such as constant frequency control, hysteresis control, and triangular waveform control, sliding mode control are used to control the number of switches in the APF with the help of time domain approach. The main shortcome of this method is that, in order to obtain optimal results, relative high switching frequencies are needed, which consequently leads to high switching losses. Frequency domain methods includes encoded harmonic injection and PWM based techniques such as adaptive frequency control and optimized injection method and are proposed as substitute to time domain approach. The switching frequencies for time domain schemes can be much higher than frequency domain methods, resulting in more lower switching losses. The main disadvantage of frequency domain method is longer computational time than normal time domain methods. Nowadays high speed processors were available to reduce computational time. Whether it may be frequency domain approach or time domain approach, the conventional APFs are too composite and costly in practical, when the quantity to be controlled varies over a long range. Hence an increased alternative is to use artificial intelligent (AI) techniques such as embedded system, fuzzy logic, neural network etc.

The proposed hybrid technique reduces the harmonics in the powersystem by combining the techniques of fuzzy logic and the neural network. This technique can eliminate the harmonics selectively by optimal selection



# Design And Analysis Of Kinematic Cage Wheel

Sundarapalli Eswari<sup>1</sup>, K.Kiran Kumar<sup>2</sup> Dr.Venkata Ramesh Mamilla<sup>3</sup>

<sup>1</sup>M.Tech Student , <sup>2</sup>Associate Professor, <sup>3</sup>Professor & Head, <sup>1,2,3</sup>Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh, India

**Abstract** - Agro-Technology is the process of applying the technology, innovation occurring in daily life and applying that to the agriculture sector which improves the efficiency of the crop produced and also to develop a better mechanical machine to help the agriculture field which reduces the amount and time of work spent on crop. Hence in this work of project we decided to design better mechanical equipment which is helpful for the farmers. This project consists of the better and modified design of the machine which can be used specifically for rice, wheat. Developed agriculture needs to find new ways to improve efficiency. One approach is to utilize available information in the form of better yielding machines for more effective usage of power than in the past. We can now move towards a new generation of equipment. The advent of autonomous system architecture gives us the opportunity to develop a complete new range of agricultural equipment based that can do the right thing, in the right place, at the right time in the right way.

The present study deals with the new design for cage wheels. In present study the structural conventional cage wheel is replaced by a newly Designed CageWheel having a double piston single cylinder mechanism. But its dimensions, specifications are made by sticking to the dimensions of conventional cage wheel. This project describes design and analysis of our newly designed cagewheel mechanism. The dimensions of an existing conventional cage wheels and Mahindra 475 are taken for reference and evaluation of results.

The numerical analysis is carried via finite element analysis using SolidWorks software. Stresses, deflection and strain energy results for both conventional and designed cage wheels were obtained. Result shows that, the designed cage wheels have sufficient strength to withstand fluctuating loads. Unlike conventional cage wheels, it is safe to travel with, even on high ways.

**Keywords** – Cage Wheel, structural, load, travel, kinetic.

## I. INTRODUCTION

Agriculture is a critical sector of the Indian economy. In India around 70% of the population earns its livelihood from agriculture. It still provides livelihood to the people in our country. It fulfills the basic need of human beings and animals. It is an important source of raw material for many agro based industries. India's geographical condition is unique for agriculture because it provides many favorable conditions. There are plain areas, fertile soil, long growing season and wide variation in climatic condition etc. Apart from unique geographical conditions, India has been consistently making innovative efforts by using science and technology to increase production India has three distinct agricultural/cropping seasons. You might have heard about *kharif*, *rabi* and *zaid*. In India there are specific crops grown in these three seasons. For example rice is a *kharif* crop whereas wheat is a *rabi* crop.

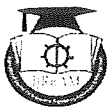
(i) **Rice:** Rice is the most important food crop of India. It is predominantly a **Kharif** or summer crop. It covers about

one third of total cultivated area of the country and provides food to more than half of the Indian population. Maximum population of India is of rice consumers.

**Soil:** Rice is grown in varied soil conditions but deep clay and loamy soil provides the ideal conditions. Rice is primarily grown in plain areas. It is also grown below sea level at Kuttinad (Kerala), hill terraces of north eastern part of India and valleys of Kashmir.

**Wheat:** Wheat is the second most important food crop of India next to rice. It is a **Rabi** or winter crop. It is sown in the beginning of winter and harvested in the beginning of summer. Normally (in north India) the sowing of wheat begins in the month of October-November and harvesting is done in the month of March-April. This is the staple food of millions of people particularly in the northern and north-western regions of India. Unlike rice, wheat is grown mostly as a rabi or winter crop.

**Soil:** Although wheat can be grown in a variety of soils but well drained fertile loamy and clayey loamy soil is best



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## APPLICATION OF ARTIFICIAL NEURAL NETWORKS IN THE FIELD OF BIODIESEL

Dr.VenkataRameh Mamillal<sup>1</sup> , Dr.M.V.Mallikarjuna <sup>2</sup>

Dr.G.Lakshmi Narayana Rao<sup>2</sup>

<sup>1</sup>Professor & HOD, <sup>2,3</sup>Professor & Principal

<sup>1</sup>Department of Mechanical Engineering,  
Sri Vasavi Engineering College, Tadepalligudem,  
West Godavari District, Andhra Pradesh, India.

<sup>2</sup>Department of Mechanical Engineering ,  
Navodaya Institute of Technology, Raichur, Karnataka, India.

<sup>3</sup>Department of Mechanical Engineering ,  
Jyothismathi Institute of Technology and Science,  
Karimnagar Telangana, India.

maa\_ram@yahoo.co.in, mvmsharma@yahoo.co.in,

glnrao\_68@yahoo.o.in,

Phone:9885183268, 9441887405

April 27, 2018

### Abstract

Neural networks, with their remarkable ability to solve complicated and complex data otherwise it is too difficult to solve either humans or other computer techniques. Neural networks take a different approach to problem solving than that of conventional computers. Conventional computers use an algorithmic approach i.e. the computer follows a set of instructions in order to solve a problem. Unless the specific steps that the computer needs to follow are known the



## Production of Brownâ€™s Gas using Hydroxy Generator

### AUTHORS

Dr. Venkata Ramesh Mamilla

K. Sri Rama Murthy

M. M.Vamsi Krishna

T. S.S.S ManikanthaSwamy

A. S.S.S ManikanthaSwamy

A. Ramesh

M. Uday Krishna

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**Keywords:** Production, Brownâ€™s Gas, Hydroxy Generator.

### ABSTRACT

This paper deals with the designing of hydroxyl (HHO) generator and thus use the Brownâ€™s Gas liberated from it as a supplement to increase fuel efficiency in IC engines. The combustion process in IC engines is very primitive and hence unburnt fuel remains after the combustion process. This is a very challenging problem being faced by todayâ€™s automobile industry as this unburnt mixture is a serious air pollutant. The proposed approach is based on an ordinary HHO generator. Although people use HHO generators in practice a very little research has been carried out in implementing an efficient system. This project is mainly focused on finding an efficient configuration of an ordinary HHO generator that is efficient than an ordinary system. Here the generator was tested under several conditions in order to determine a convenient design for an efficient HHO generator.

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## Production of Brownâ€™s Gas using Hydroxy Generator

### AUTHORS

Dr. Venkata Ramesh Mamilla

K. Sri Rama Murthy

M. M.Vamsi Krishna

T. S.S.S ManikanthaSwamy

A. S.S.S ManikanthaSwamy

A. Ramesh

M. Uday Krishna

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### ABSTRACT

This paper deals with the designing of hydroxyl (HHO) generator and thus use the Brownâ€™s Gas liberated from it as a supplement to increase fuel efficiency in IC engines. The combustion process in IC engines is very primitive and hence unburnt fuel remains after the combustion process. This is a very challenging problem being faced by todayâ€™s automobile industry as this unburnt mixture is a serious air pollutant. The proposed approach is based on an ordinary HHO generator. Although people use HHO generators in practice a very little research has been carried out in implementing an efficient system. This project is mainly focused on finding an efficient configuration of an ordinary HHO generator that is efficient than an ordinary system. Here the generator was tested under several conditions in order to determine a convenient design for an efficient HHO generator.

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**V. Sarath Teja<sup>1</sup>, Dr.Venkata Ramesh Mamilla<sup>2</sup>, K.Sri Rama Murthy<sup>3</sup>**

Assistant Professor<sup>1</sup>, Professor & Head<sup>2</sup>, Senior Assistant Professor<sup>3</sup>

Department of Mechanical Engineering

Sri Vasavi Engineering College, Tadepalligudem, A.P. India

**Correspondence Authors Email:** maa\_ram@yahoo.co.in

### Abstract

In the present work, an experimental setup has been designed facilitating the performance appraisal of an automobile radiator at different process parameters like inlet fluid temperature and fluid flow rates. A theoretical model for determination of overall heat transfer coefficient for automobile radiator has been developed. Based on the model, the effect of hot fluid (water) inlet temperatures and flow rates on overall heat transfer coefficient has been predicted. Results indicated that, best overall heat transfer coefficient for the radiator is obtained at a hot fluid inlet temperature of 70°C and a flow rate of 0.075 kg/s.

**Keywords:** - Optimization; Performance Evaluation; Automobile Radiator;

### INTRODUCTION

Automobile Radiators are typical heat exchangers used to cool the engine jacket water.

To cool down the engine, a coolant is passed through the engine block, where it absorbs heat from the engine. The hot coolant is then fed into the inlet tank of the radiator (located either on the top of the radiator, or along one side), from which it

is distributed across the radiator core through tubes to another tank on the opposite end of the radiator. As the coolant passes through the radiator tubes on its way to the opposite tank, it transfers much of its heat to the tubes which, in turn, transfer the heat to the fins that are lodged between each row of tubes.

The fins then release the heat to the air. Fins are used to greatly increase the contact

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# Performance, Combustion and Emissions of sunflower methyl esters / diesel blends in Air cooled diesel engine

Dr.Venkata Ramesh Mamilla<sup>1</sup>, Dr.R.Satya Meher<sup>2</sup>

<sup>1</sup>Professor & Head , Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem, West Godavari District, Andhra Pradesh, India.

<sup>2</sup>Professor , Department of Mechanical Engineering, Sree Vidyanikethan Engineering College, Sree Sainath Nagar, Tirupati, A.Rangampet, Andhra Pradesh, India.

## Abstract

In the present circumstance of fossil fuel crisis, the significance of alternative fuel investigates for diesel engines desires no emphasis. sunflower methyl esters can be used as alternative fuels to diesel since their properties are very close to diesel fuel, they are also renewable. In the present work, experiments have been carried out to assess the suitability of sunflower methyl esters as fuels in a diesel engine. In the present investigation tests were carried out on a 4.4 KW, single cylinder, direct injection, Air-cooled diesel engine.

Sunflower methyl esters used in the present investigation is mixed with diesel with different proportions (B00, B20, B40, B60, B80 and B100) as fuel in the diesel engine. The optimum results were found out from the above investigations and the performance , emissions and combustion analysis are carried out. Different graphs plotted are BP vs SFC, efficiencies, cylinder pressure vs crank angle(p- $\theta$  diagram) based on the combustion, emissions and performance analysis suitable conclusions are drawn and these results are presented as a paper.

**Keywords:** Diesel Engine, Performance, Combustion, Emissions, Alternative fuel.

## 1. INTRODUCTION

Petroleum based fuels are fuels stored in earth. There are limited reserves of these stored fuels & they are not renewable. With increasing power consumption and an increase in number of transport vehicles the coal pits are going to empty within short period. The world at present heavily depends upon petroleum fuels for transportation and for operating agriculture machinery. Diesel engines dominate the field of transportation and agriculture machinery on account of its superior fuel efficiency. The consumption of diesel in India is several times higher than that of petrol consumption. Roughly estimate of petrol and diesel consumption is 30% and 70%, respectively. Reserves appear to grow arithmetically while consumption is growing geometrically. Under this situation world will be leading to an industrial disaster [8].

The diesel engine is a major contributor to air pollution especially within cities and along urban traffic routes. In addition to air pollution that causes ground level ozone and smog in the atmosphere, diesel exhaust also contains particulate and hydrocarbon toxic air contaminants (TAC). Now society has become more aware of harmful effects of the various exhaust emission coming out of the engines and there is tremendous pressure on researchers to reduce exhaust emissions. Various harmful effects of exhaust emission are already established and known to today's society. Carbon monoxide, if inhaled, enters the blood stream and causes hypoxia, which leads to further health problems. Hydrocarbon emissions are irritant and odorants and some of them carcinogenic. Oxides of nitrogen are found to be responsible for many of the pulmonary diseases [1].

## 2. TRANSESTERIFICATION

Use of vegetable oils in diesel engines leads to slightly inferior performance and higher smoke emissions due to their higher viscosity and carbon residue. Filter plugging and cold starting along with higher specific consumption are observed while using vegetable oil due to their higher viscosity and lower calorific value [6] . The performance of vegetable oil can be improved by modifying vegetable oil by transesterification process. The process of converting the

# Design and Development of Facial Expressions for a Humanoid Robot

<sup>1</sup>Chandbadshah S B V J, <sup>\*2</sup>Ramesh Reddy K, <sup>#2</sup>Rakesh R, <sup>\*3</sup>Arun K, <sup>#3</sup>Prakash PC

<sup>1</sup>Assistant Professor, <sup>\*2</sup>Associate Professor, <sup>#2</sup>Assistant Professor, <sup>\*3</sup>Assistant Professor, <sup>#3</sup>Assistant Professor,

<sup>1,\*2,#2,\*3,\*3,#3</sup>Department of mechanical engineering,

<sup>1,#2,#3</sup> AITS, Tirupati -517520, INDIA.

<sup>\*3</sup>SVCE, Tirupati-517501, INDIA.

<sup>\*2</sup> SVEC, Tadepalligudem-534101, INDIA.

**Abstract:** Facial Expression identification is a quickly spreading and excellent research field in the area of Computer Vision, Automation and Artificial Intelligent. There are many uses which use Facial Expression to predict human opinion, judgment, nature and feelings. An assistant robot having an adjacent interaction with human being should be able to identify human facial expression. Facial moment's identification is a non-trivial problem because each independent has his own way to disclose his emotion and the facial expressions of two dissimilar persons may not be completely identical. Hence the Facial Expressions have been generated and applied to a robot to provide better and informative interactions between human-robot disclosures which lead to an effective communication between human-robot.

**Index Terms – Robot, Humanoid, Facial, Design, Expressions, Interaction**

## I. INTRODUCTION

FEER-HRI system was used in the robots to identify human emotions and also to develop facial expression for accommodating to human emotions [1]. Surprise expressions were studied and real human like movements generated while speech in android robots [2] which have humanoid appearance. By using forward and inverse kinematics model a learning method was proposed based on automatic facial expression [3]. A mascot-type facial robot was developed to [4] improve favourable human feelings. Character robot face (CRF) was described by using parametric normalization scheme which generates [5] facial expressions of robot face models with high identification rates. Robot was designed with mood transition system to generate autonomous emotional interaction with human beings [6]. A learning model was developed [7] for presenting and solving facial expression recognition tasks. New approach for expression recognition was presented based on cognition and mapped binary patterns [8]. To improve human – robot interaction [9] autonomous facial expression recognition was greatly improved.

## II. METHODOLOGIES

Assembly of piece parts are done manually by clamping and fixing with nut and bolts. Installing of 13 servos into the appropriate position with the help of screws. There are 13 servos in the advanced version that are driven by an Arduino microcontroller. This module will communicate to the Arduino to set each of those servos based on variables within program. Coding is given to the Arduino based on timing required. The servo mechanism is drawn into this for the provision of facial movements such as movement of eye balls, eye lids, etc. This is done through links which converts the movement of rotary motion to linear and angular motion. The motions such as closing and opening of eye lids and movement of eye balls. And we have added the forward, backward and sideways movements of robot with the help of wheels powered by 10 rpm motors. Design of overall project is undergone through Solid Works some of the basic design has been implemented from the designer of XYZBOT. Hence the design is then converted to 3D for laser cutting of piece parts. Design of the facial movements for a robot head is totally worked on the Solid Works software. The software used in the design of the face part has been done by using Solid Works. All the piece parts of the face modelling are designed by Solid Works.

### 2.1 Individual Part Design

#### 2.1.1 Face Parts

The parts of the model are classified into different groups such as Face parts, Neck parts, Eye parts, Base parts. The basic face plate is fitted to the overall model (Fig.1A). This plate is then fixed with eye brows on the top of it. On these, horns are attached for the lip arrangement. The frame of the face contains all the servos of eye brows, lips are attached and all the parts of eye frame and jaw are fixed (Fig.1B). The skull box mandible connects the face frame and all the skull box parts (Fig.1C). This skull box mandible left is also a support for face frame and comprises of a servo for jaw movement (Fig.1D). Skull box nose panel is a support of the base plate and it comprises of servos for the movements of Eye lids (Fig.1E). The side part of skull acts as a support for the skull box (Fig.1F). Skull box back is used to cover the back part of the skull in which all the parts are mounted (Fig.1G). The bottom of skull contains servos of eye balls are mounted (Fig.1H). Firewall between the face frame plate and back of skull (Fig.1I).

## CHARACTERIZATION OF Cu-SiC-Gr HYBRID METAL MATRIX COMPOSITE

V. Sarath Teja<sup>[1]</sup>, Assistant Professor,  
 K.S.B.S.V.S. Sastry<sup>[2]</sup>, Associate Professor,  
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**Abstract**— In Copper-Silicon Carbide-Graphite metal matrix composites, copper possesses excellent thermal and electrical conductivities, Silicon carbide possesses high strength and hardness, and Graphite has solid lubricating and low thermal expansion coefficient. Copper matrix containing Silicon Carbide and Graphite are widely used as brushes, and bearing materials in many applications due to the excellent thermal and electrical conductivities, and the favorable self-lubricating performance. The addition of solid lubricant particles into a metal matrix improves not only the anti-friction properties, but also wear and friction properties.

In this context, Copper-Silicon Carbide-Graphite MMCs are fabricated by mixing wt. % of 5, 7.5 and 10 Silicon Carbide and Graphite powder into copper powder followed by powder metallurgy. The composite powder mixture was cold compacted by Hydraulic press and then sintered in tubular furnace using argon gas. The MMCs are characterized by scanning electron microscopy (SEM)

**Keywords**—component; formatting; style; styling; insert (key words)

### I. INTRODUCTION

The concept of composites is not a human invention. Composite materials are extending the horizons of designers in all branches of engineering. Composites are heterogeneous in nature, created by the assembly of two or more components i.e. with a matrix and reinforcement materials, enable us to make better use of their virtues while minimizing to some extent the effects of their deficiencies. This process of optimization can release a designer from the constraints associated with the selection and manufacture of conventional materials. Composites are one of the most advanced and adaptable engineering materials known to mankind. Progress in the field of materials science and technology has given birth to these fascinating and wonderful materials. The matrix may be metallic, ceramic or polymeric in origin. The type gives the composites their shape, surface appearance, environmental tolerance and overall durability while the fibrous reinforcement carries most of the structural loads thus giving macroscopic stiffness and strength. A composite material can provide superior and unique mechanical and physical properties because it combines the most desirable properties of its constituents while suppressing their least desirable properties.

Understanding the relationships among the processing structure and properties of metal or ceramic interfaces is becoming increasingly important as performance requirements

demand the use of metal-ceramic composites in applications ranging from electronic devices to high temperature aircraft structures. So in metal-ceramic composites the overall composite properties depend critically on the properties of metal-ceramic interface. The particulates reinforced metal matrix composite (MMC) is one of the new structural materials, and a rapid development that can be seen in recent years because of excellent properties like specific strength, specific stiffness, wear resistance, corrosion resistance and elastic modulus etc. and wide application prospects in the near future. For several years research on fabrication methods and material property estimations for particulates reinforced metal matrix composites has been one of the focuses in composite fields, and many excellent research results have been obtained. A metal matrix composite system is generally designated simply by the metal alloy designation of the matrix and the material type, volume or weight fraction and form of the ceramic reinforcement. Various Metal Matrix Materials have been combined with each other and give intended properties that are different from their base materials. But, neither matrix nor reinforcement can't be alone, but only MMC can be able to fulfill the requirement. MMCs are exciting materials which find increasing applications in aerospace, defense, transportation, communication, power, electronics, recreation, sporting, and numerous other commercial and consumer products. Rapid advancements in the science of the fibers, matrix materials, processing interface structure, bonding and the effect of their characteristics on the final properties of the composite have taken place in the recent years. MMC's differ from other composite materials in several ways.

### II. LITERATURE REVIEW

Zhan and Zhang suggested that both graphite and silicon carbide particles can act as hybrid reinforcements and effectively improve the mechanical as well as tribological properties of copper based hybrid composites. They also reported that addition of graphite is an important precondition for the formation of a graphite-rich mechanical mixed layer, which restricts the wear of such hybrid composites. [1].

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demand the use of metal-ceramic composites in applications ranging from electronic devices to high temperature aircraft structures. So in metal-ceramic composites the overall composite properties depend critically on the properties of metal-ceramic interface. The particulates reinforced metal matrix composite (MMC) is one of the new structural materials, and a rapid development that can be seen in recent years because of excellent properties like specific strength, specific stiffness, wear resistance, corrosion resistance and elastic modulus etc. and wide application prospects in the near future. For several years research on fabrication methods and material property estimations for particulates reinforced metal matrix composites has been one of the focuses in composite fields, and many excellent research results have been obtained. A metal matrix composite system is generally designated simply by the metal alloy designation of the matrix and the material type, volume or weight fraction and form of the ceramic reinforcement. Various Metal Matrix Materials have been combined with each other and give intended properties that are different from their base materials. But, neither matrix nor reinforcement can't be alone, but only MMC can be able to fulfill the requirement. MMCs are exciting materials which find increasing applications in aerospace, defense, transportation, communication, power, electronics, recreation, sporting, and numerous other commercial and consumer products. Rapid advancements in the science of the fibers, matrix materials, processing interface structure, bonding and the effect of their characteristics on the final properties of the composite have taken place in the recent years. MMC's differ from other composite materials in several ways.

### II. LITERATURE REVIEW

Zhan and Zhang suggested that both graphite and silicon carbide particles can act as hybrid reinforcements and effectively improve the mechanical as well as tribological properties of copper based hybrid composites. They also reported that addition of graphite is an important precondition for the formation of a graphite-rich mechanical mixed layer, which restricts the wear of such hybrid composites. [1].

G.Arslana and R.Janseen suggested that the localization of frictional heat on the sliding surface may cause thermally induced micro-cracking and concomitant reduction in the wear resistance and fracture toughness. So, to withstand the high interface temperatures, brake materials should possess

# OPTIMIZATION OF MILLING PARAMETERS ON ALUMINIUM HYBRID METAL MATRIX COMPOSITE USING TAGUCHI METHOD

S.Chandrasekhar<sup>1</sup>, Sk.Surjan<sup>2</sup> and M.S.S.Prasanth Chowdary<sup>3</sup>

<sup>1</sup>Assistant Professor Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem ,A.P, India

<sup>2</sup>Assistant Professor Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem ,A.P, India

<sup>3</sup>UG Student Department of Mechanical Engineering, Sri Vasavi Engineering College, Tadepalligudem ,A.P, India

## ABSTRACT

*Metal Matrix Composites are widely used in aerospace, automobile, structural, marine industries because of good corrosive resistance and better strength to weight ratio. In this paper an attempt has been made to optimize the milling machine process parameters of hybrid Aluminium Metal Matrix Composite prepared by stir casting method. In this process pure Aluminium is metal matrix and hybridizing with Silicon carbide and Tungsten Carbide. The microstructure of hybrid matrix is associated with scanning electron microscope. Scanning electron microscope analysis conforms the distribution of Silicon carbide, Tungsten Carbide in Aluminium matrix. To optimize the process parameters such as cutting speed, feed, depth of cut of Aluminium hybrid Metal Matrix Composite in CNC milling by using Taguchi method. L27 orthogonal layout used for experimental work is used to find out the contribution of process parameters on responses.*

**Keywords:** Stir casting method, Taguchi method, Surface roughness, Material removal rate, ANOVA

## 1. INTRODUCTION

According to D.M. skibo et al., the cost of stir casting of producing composite material is about one third of the other competitive methods and for high volume production the cost is reduced to one tenth [1]. K.Umanath et al., the base metal is melted at a temperature of 998K by stirring forcefully with Alumina coated stainless steel stirrer was used to stir at 600rpm for 20 minutes and then it is degassed with the help of nitrogen gas. The preheated particulates were introduced in to the molten material and it is poured into a mold which was preheated to 523K to manufacture specimen after casting. They concluded that the particulates silicon carbide and aluminium oxide are distributed homogeneously in the AL6061 matrix material [2]. V.Agarwala et al., States that the heat treatment of the particles before dispersion into the melt aids their transfer by causing elution of adsorbed gases from the particle surface. Heating silicon carbide particles to 1173K assists in removing surface impurities, desorption of gases, and alter the surface composition by forming an oxide layer on the surface [3]. According to D.M.Stefanesfu et al., rapidly solidified structures gives better distribution of the particles due to finer dendrite size and limited settling of the particles resulting in reducing time during the composites are in molten state [4]. Himanshu Kala et al., talk about a two-step mixed method, which involves heating of the matrix material above liquids temperature and then the melt is cooled down to a temperature of a semi-solid state. At this point the preheated particulates are added and again the matter is heated to above liquidus temperature and mixed thoroughly. By this method the gas layer around the particles gets breaks and promotes wetting between matrix melt and particulates [5]. According to Arokiadas R et al., metal matrix composites can be fabricated through various techniques depending up on the types of material involved, strength required, shape of the end product and the size of the reinforced particle, these techniques are classified into solid-state, semisolid-state, and liquid state. Solid-state technique gives best mechanical properties, liquid state techniques are economical and nearer net shape process keeps them still in the area of composite fabrication [6]. Ting-Cheng Chang et al., says that Taguchi method is most frequently used method for optimization in design of experiments (DOE) methods

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