

A Review on Breast Cancer Detection for Histopathology Images Using Deep Learning

Eligant Samudharam
Research Scholar, IITLR,
Chennai/Chennai Institute of
Technology
Hyderabad, India
elgant@gmail.com

Dr. Lakshya Gadhani
Professor
Dr. Yashwanth Engineering College
Tatipatla, India
lakshyag@gmail.com

Dr. L. Suresh Babu
Professor
Jawahar Institute Technological
University
Kakinada, India
sureshbabu@jntu.ac.in

Abstract A prevalent and deadly kind of cancer in women is breast cancer. The likelihood of surviving breast cancer over the 5-year period is highest when breast cancer diagnosis and treatment are greatly aided by breast histopathology image analysis. This leads to the development of efficient Deep Learning algorithms in this field, which helps histopathologists achieve successful analytical results. This research presents an overview of methodologies for deep learning-based image analysis of breast histopathology. Histopathology image datasets that are frequently utilized like BreastCancer, MITOS dataset, Camelyon etc. are analyzed. Finally, various performance metrics for assessing the effectiveness of breast cancer prediction algorithms are presented. The purpose is to review current deep learning models for detection and classification of breast cancer using histopathological images.

Keywords Breast cancer detection, Deep learning, histopathology image, feature extraction, classification.

I. INTRODUCTION

Breast cancer is the very frequently diagnosed reason for women deaths due to cancer [1]. In accordance with estimates from the World Health Organization, every year 2.1 million women all around the world identify breast cancer symptoms. Breast cancer is expected to have claimed 445,000 lives in women in 2020, accounting for 18% of various cancer deaths in women [2]. Up to 30% of cases are likely to lead to a diagnosis, making it the most typical kind of cancer women in the US [3]. Breast tumor exists in four different forms or stages, invasive, in-situ, and normal. Benign tumor is a term used to describe a slight change to the breast's structure that is not cancerous and, in most situations, poses no threat to health. The other organs are affected by in-situ cancer. It only affects the mammary duct lobule system. In-situ cancer is curable if detected at the beginning. A malignant cancer behaves as an invasive carcinoma frequently metastasizes to other organs. Breast temperature monitoring[4], ultrasound[5], CT Scan, PET Scan[6], mammography[4], and biopsy are some of the techniques used to identify breast cancer.

The optimal method is usually considered to be pathological diagnosis [7]. To create the histopathology slides from the patient's breast cancer tissues, the lab technicians first stain for cell nuclei and extracellular components with hematoxylin to spotlight the various regions of cellular tubules and duct tissue structures [44], [45]. The microscopic analysis of the stained breast cancer biopsy tissues is then used to create digital histopathology images [46], [47]. Hematoxylin gives the nucleus a deep purple ink, whereas eosin gives other structures a pink color. Fig. 1 shows images of normal breast tissue and diseased breast tissue which are stained with hematoxylin and eosin.

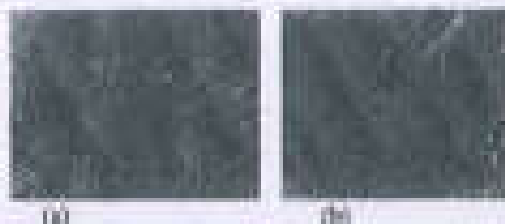


Fig. 1. Fig1. Hematoxylin and eosin stained images of (a) normal breast (b) diseased breast

The slides go under a microscope for examination by a histopathology expert to identify the traits and features of the tissues [10]. The histopathologist traditionally examines the tissue slides with only their eyes, and they primarily assess the visual data using their past medical expertise. The intricacy and variety of histopathological patterns, however, can make this manual analysis time-consuming. The impracticality of this manual analysis procedure is notable. It largely depends on the workload and level of skill of the histopathologist.

The following four components make up the generalized system architecture for finding breast cancer:

- **Image preprocessing:** The subsequent stages of detection may be significantly impacted by the imaging artifacts and consistency brought on by various imaging settings. For better detection performance, it is required to eliminate the reproducibility and artifacts with picture preparation techniques.
- **Region of Interest (ROI) area segmentation:** Before applying detection techniques to an image, the most significant portions must be extracted because we only consider the relevant portions of the entire slide image while doing detection.
- **Feature extraction:** It is challenging to use raw image data directly for categorization since they often have high dimensions. The classification problem might be better served by feature extraction, which converts compressed data into a feature space with significantly smaller dimensions.
- **Classification:** In this phase reviewed features are sent into classifiers, then labeling the attributes of Region of Interest as positively or negatively in doing the detection.

II. LITERATURE REVIEW

The development of medical research gets the advantage from the use of deep learning techniques. These are specifically useful for cancer image identification and categorization [11]. A collection of multiple layer types,

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DATE:12-MARCH-2023-GOOGLEMEET

Google Meet: <https://meet.google.com/brwz-rttq-tdj>

Paper Title: ROLE OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE

Author(s): E. Surya Rahul, G. Parasath, A.Ledarsathi, A.Rajesh

ISSN-12: ITR-2311111111



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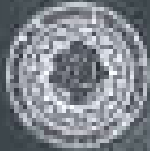
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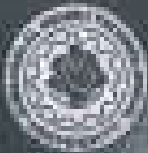


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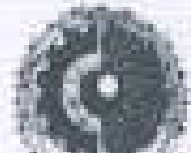


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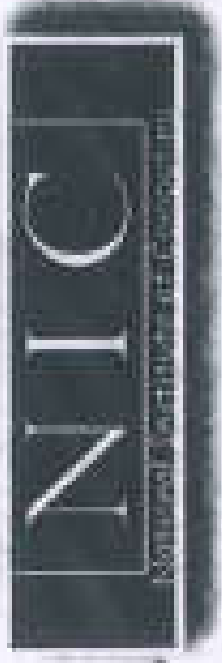
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Abstract



Stress and deflection analysis of trench back-filling dozer blades using FEM

Yeketa Ramadhani ¹, Subbarama Rajulu Saranamani ², A. M. Sridhar Kumar Heterapan ³,
Sofya Rizki Chayra Tazriki ⁴, Dinda Nona Yekyeta Nakeah Solaya ⁵, Iqbal Naveen Tazriyandha ⁶

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The objective of this paper is to improve the dozer's sharp edges in soil refilling



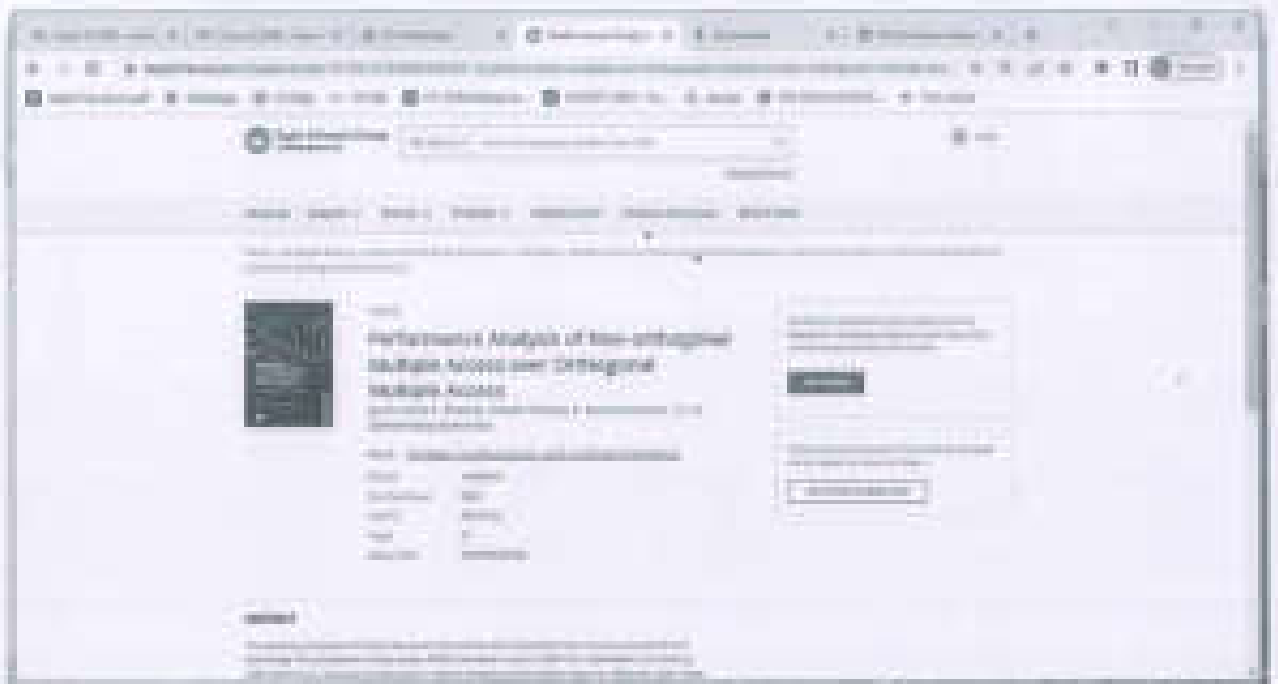
Energy, exergy, economic and environmental (4E) analyses of solar still with paraffin wax as phase change energy storage material

Iskharana Izzati Jannah^{1*}, A. H. Jusdi, Rama Harasan², A. H. Firdaus, Saiful Anwar¹, Sulman, Nurul Fawwaz¹, Akhmal Nurul¹, Maham Md. Farhat, Rosman Lokman²

¹ ST Inceh Engineering College, Telukapilipahan, West Gelang, District, Arau, Perlis, Malaya

² National Institute of Technology Putrajaya, Karong, UT of Putrajaya, Kuala

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Dr. [Name] is an Associate Professor in the Department of Electrical and Computer Engineering. He received his B.S. in Electrical Engineering from the University of Michigan and his M.S. and Ph.D. from the University of Illinois at Urbana-Champaign. He has worked for IBM and is currently a faculty member at the University of Illinois at Chicago. His research interests include power electronics, renewable energy systems, and smart grids.



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IoT Based Unlocking of Home Automation System with Face and Speech Detection using ESP12 and Google Assistant

October 2023  

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2. Literature Review	3
3. Proposed System	4
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Authors

M. Mukeshwar Rao
Faculty of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India

M. Sathish Kumar
Faculty of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India

A. Harvath Sree Sai
Faculty of Electronics and Communication Engineering, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India



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Part of the [Engineering Cyber-Physical Systems and Critical Infrastructures](#) book series (ECPSI, volume 3)

Abstract

In India, Agriculture is remaining as the major occupation among people. Farmers cultivate various crops depending on the type of land and season. Additionally, farmers also irrigate agricultural land while cultivating. However, farmers cannot predict how much water they will use for irrigation. Currently, farmers are supplying water to the field without knowing the moisture content of the soil. If this continues, there will be a scarcity of water, and underground water will also be depleted and may not be available for future generations. Furthermore, the crops are destroyed if more water is supplied than the required amount. This research study has utilized an advanced technology called Internet of Things (IoT) to design and develop agricultural monitoring systems for evaluating soil moisture content and other agricultural parameters. This system includes soil moisture sensors for measuring the soil moisture content. Rain drop sensor, water level sensor, and DHT11 sensor are used for measuring rain, field water level content, temperature and humidity. The outputs from the sensors are sent to the ESP32 module, which then sends it to the motor (used for irrigation and ejection). These values can also be visualized in the ThingSpeak cloud platform.

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GREENZE

Design of CMOS Feed Complementary Split Ring Resonators Loaded Metamorphic Antennas for Brain Tumor Detection

Journal: IJGRIE International Journal of Engineering and Technology

Author: S. Kulkarni, P. S. Shinde, S. S. Shinde, S. S. Shinde, S. S. Shinde

Volume: 10, Issue: 1, Page: 100-105

Abstract: The split ring resonators are used to create a novel and compact metamorphic antenna with Complementary Feed Ring Resonator (CFRR) to identify and detect tumors with the human brain. To improve the feed efficiency, metamorphic feed structure is used in parallel and series. At the antenna resonant frequency, the antenna will be loaded with metamorphic antenna and receive backscattering signal from the injected human head model to improve performance. A complementary split ring resonator with metamorphic structure was created, and a feed structure was incorporated in the antenna ground plane. To improve antenna performance, feeding structure is presented. The FDTD was used to

(3)

(3)

RFID Mutual Authentication Protocol for Security Concerns and Implementation on FPGA

1st V V SATYANARAYANA S

ECE

Sri Vasavi Engineering College

Peddapati, India

vvsatyana1998199@gmail.com

2nd MURALI KRISHNA B

ECE

Sri Vasavi Engineering College

Peddapati, India

murali.aar734@gmail.com

3rd V V SATYANARAYANA P

ECE

Sri Vasavi Engineering College

Peddapati, India

pvs.hemil@gmail.com

4th MOJULELURI VENKATA SUMAN

ECE

Sri Vasavi Engineering College

Peddapati, India

sumojyeevmba@gmail.com

Abstract—Radio Frequency Authentication (RFID) is used to track and identify different objects. Object identification is done by tracking tags using electromagnetic fields. Maintenance of cloud databases and preserving information of worldwide elements with unique code is a prior a challenging issue in recent days. In addition to this, Security concerns is the major problem associated is due to hacking and many malpractice attacks. In this paper, a new bi-directional authentication scheme is developed to improve the security levels in object detection. The scheme utilizes XOR gates with 32-bit length encrypted keys to detect the tags. The total encrypted algorithm is developed using Verilog HDL. The designed encrypted algorithm simulated in Xilinx version 14.5 and simulated using Modelsim. Further, real time implementation on FPGA is evaluated to explore the practical applications.

Index Terms—RFID, authentication, verilog, FPGA.

I. INTRODUCTION

RFID is a well known processing technique to identify a wide range of objects. Electronic Product Code (EPC) which is unique for each different object, allows the RFID to detect the object using the TAG element. EPC class 1 generation 2 (EPC1G2) is the popular authentication scheme that evolved globally to detect RFID tags [1]. Many reviews and literatures has been done earlier regarding RFID technology presented in [2]. Application-oriented vehicle detection using RFID for code GPS technology is developed in [3]. EPC class 1 gen 2 disadvantages and problems lead to an enhanced version of protocol RFID protocol structure defined in [4]. The work in [4] also describes the difference between standard COMA

and Class 1 Gen 2 protocol structure. Flexi tag compatible RFID sensors are developed in order to optimize the efficiency of power and manufacturing cost, proposed in [5]. Security threats and global conserving on data processing methods are illustrated in [6]. Automatic generated protocols and utilization of artificial intelligence to develop human intervention RFID tags were presented in [7]. An optimized universal protocol based to detect RFID tags integration with database across design specifications is presented in [8]. The current work deals with security issues and authentication steps with password keys for both TAG and READER devices. Three stages of evaluation are proposed in this current work where each stage corresponds to user and requirements. The developed protocol verifies the client-server and protocol before revealing the product information. This authentication scheme adds more security when compared with other server-side-developed protocols. READER-TAG, TAG-SERVER, and SERVER-READER are three proposed schemes developed in this work to achieve high-security authentication and optimized second computational network layers.

This paper structure as follows, section II discusses the encrypted protocol algorithm for the proposed scheme. Section III elaborates on FPGA design and issues of protocol structure in real-time. Section IV presents simulation results and practical limitations of RFID intervention. Finally, Section V gives a summary of the encrypted RFID protocol algorithm.

II. PROPOSED SCHEME AND DEVELOPMENT

The mutual authentication scheme between tag and reader for current work is shown in Fig.1. In step 1, a request will be made in TAG from READER to observe whether the TAG element accepted the EPC protocol or not. If the request made from a reader is accepted by the TAG element,

An Improved Power Efficient Clock Pulsed D FlipFlop Using Transmission Gate

S.Syamala¹ and Dr.M.Thamarai²

¹M.Tech student, Electronics and Communication Engineering,

In Vassar Engineering college, AP, India

Email: sssyamala2023@vassar.edu

²Professor, Electronics and Communication Engineering, In Vassar Engineering College, AP, India

Email: thamarai.madhusudhan@vassarcollege.edu

Abstract

Recent digital applications will require highly efficient and high-speed gadgets and it is related to minimum delay and power consumption. The proposed work deals with a low-power clock pulsed D flip-flop using a transmission gate. To accomplish power-efficient pulsed D Flip-Flop, clock gating is proposed. The gated clock reduces the unnecessary switching of the transistors in the circuit and thus reduces the dynamic power consumption. The clock gating approach is employed by using an AND-gate to disrupt the clock input to the circuit as per the control signal called enable. Due to this process, the clock gate turned off to reduce power consumption when there is no change in the output. The proposed transmission gate-based pulsed D flip-flop's performance with clock gating and without clock gating circuit is analyzed. The proposed D flip-flop power consumption is 1.586µw less than the without clock gated flip-flop. Also, we have designed a 1-bit serial in and parallel-out shift register using the proposed D flip-flop and analyzed the performance. Tanner EDA tool is used to simulate all the circuits with 65nm technology.

Keywords: Pulsed D flip flo., clock gating, low power, shift register, Transmission gate

1. INTRODUCTION

The main concern with VLSI circuits is achieving low power and compact battery size with a long life. Area, power, speed, and performance are all critical parameters for VLSI designers to consider while optimizing their designs [1][2][3][4]. Flip flops are the major building blocks of digital circuits and also consumes around 80% of the total power consumption in the circuit. Therefore, reducing the power consumption of flip-flops can significantly reduce the power consumption of the digital systems[5]. Any circuit's overall power consumption will include both static and dynamic power. In VLSI circuits, power gating, clock gating, adiabatic method, and other approaches are utilized to reduce the static and dynamic power consumption. One of the most common strategies for power optimization in CMOS devices is clock gating[6]. Almost 50% of the dynamic power is consumed by clock distribution network in processors and Clock gating can be used at several levels of the hierarchy in VLSI design and Almost 50% of the dynamic power is consumed by clock distribution network in many other circuits. It is feasible to turn off the clock signal that drives a large functional unit, lowering power consumption on both its internal nodes and clock line.

Pulsed Flip-Flops(P-FF) Pulsed flip flops are used in high speed circuits and takes an important role in power reduction. Short duration pulses are generated and used to trigger the Flip-Flops instead of level or edge triggering. P-FF's consists of a single latch structure and a clock pulse generator (PG). If the width of the clock pulse is sufficiently narrow, the P-FF acts like a Master-Slave Flip-Flops (MS- FF) with less timing overhead. Several pulse triggered Flip-Flops architectures are discussed in[5][6].P-FFs can be classified as implicit and explicit type based on the way of pulse

generation. In implicit style, the pulse generation part is built in the latch structure and in explicit it is external to the latch structure. In explicit Pulsed FlipFlops, the pulse generation structure can be common among neighboring flip-flops and across chip area.

Transmission gate: The parallel connection of nmos and pmos forms the transmission gate. The Transmission gate's on or off condition is controlled by the cross and pass gate inputs. The gate is on when source transistor gate gets CK input and pass transistor gate gets CKb input. And the circuit is shown in figure 1.

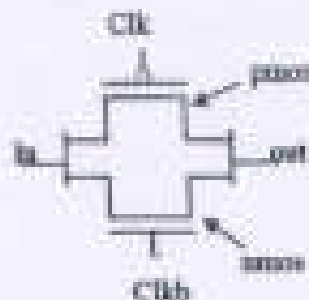


Fig.1 Transmission Gate

TGs are bilateral switches and since the input and output are interchangeable. TGs are used to form D latch and D flipflops in logic circuits. The Positive D latch using transmission gate is shown in figure 2.

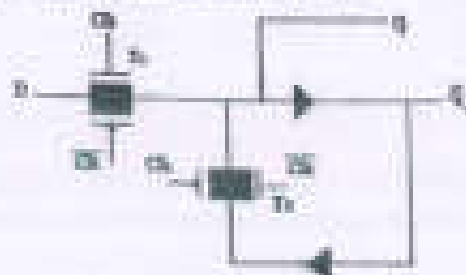


Fig.2 Transmission gate based D Latch

DEEP LEARNINGBASED PREDICTION AND MONITORING OF AIR QUALITY USING IOT

Lalitha Lakshmi

M.Tech Student,

Department of ECE, Sri
Yessu College of Engineering,
Tatyapattanam, 54101, India
lalithalakshmi1999@gmail.com

Dr. JIJITH S. S. Saravanan

Associate Professor,

Department of ECE, Sri
Yessu College of Engineering,
Tatyapattanam, 54101, India
sarasaran@gmail.com

E.N. JIJITH

Associate Professor,

Department of ECE, Sri Yessu
College of Engineering,
Tatyapattanam, 54101, India
enjiyith@gmail.com

Abstract—Air pollution is the contamination of air due to the presence of substances in the surrounding atmosphere that is harmful to the health of all living organisms and causes irreversible damage to the climate. So, now we are going to develop an IoT Node, which is helpful to monitor several dangerous gaseous components and particulate matter pollutants like PM_{2.5} and PM₁₀. This particulate matter (PM) or pollutants cause several global diseases, including Cardiovascular infections and cause many severe respiratory problems. So, we need to develop a system with IoT monitoring capability. The designed IoT node consists of Temperature, Humidity, MQ-135, MQ-7, PM_{2.5}, and PM₁₀ sensors. To provide an extensive central processing brain to track and process all these sensor values, we will use advanced ESP32 microcontroller system. Here this node is responsible for collecting the data from sensors, and it will transmit the data to the cloud, and to make our node intelligent, we will develop a Recurrent Neural Network model that works under Deep Learning. We will create a real-time platform flow to feed the real-time data to our neural model. In this paper, the level of pollutants will be monitored, collected by using sensors, and this system make predictions of future pollutants level based on the past sequences that occur in the atmosphere with high accuracy by using Recurrent Neural Network models (LSTM/GRU Networks). The results of both LSTM and GRU networks are evaluated.

Keywords— Air pollution, forecast, monitoring, prediction, Temperature, Humidity, PM_{2.5}, PM₁₀, MQ-135, MQ-7, Deep Learning, Recurrent Neural Network model, LSTM, GRU.

INTRODUCTION

According to World Health Organization (WHO), 7 million people suffered major health risks due to Air Pollution. Air Pollution is recognized as one of the major disadvantages to human lives [5]. Breathing contaminated air which contains harmful air particles affects the youths, elderly, and lower, middle and rich classes [7]. A person who spends 80% of the time in an indoor environment daily has a direct impact on personal health due to indoor pollutants. Air pollution indoors is one of the prominent environmental health problems [1]. The factors causing air pollution can be divided into two main categories - natural and Man-made. Natural incidents like lightning, destructive effects on the environment or entering harmful substances, examples are forest conflagrations, volcanic eruptions, generating of gases such as SO_x,

NO_x, and CO_x. On the other hand, man-made sources like vehicle smoke, emissions, and fuel combustion, are deemed one of the leading factors of air pollution. Recycled pollutants will contain particulate matter, metal compounds, sulphur, hydrogen, nitrogen, and ozone [2]. Air pollution will also expose short- and long-term diseases as well as decrease the average lifespan of an individual supposed to live. Long-term problems such as diabetes, lung cancer, heart disease, chronic respiratory diseases, lung infections, and other health problems. Short-term problems are symptoms of asthma and cause increases in various respiratory health-related hospitalizations [4].

Since air pollution causes many hazardous effects on human lives it should be continuously monitored so that it will be controlled effectively. Air pollution can be controlled by knowing its source, origin, and its intensity. Generally, it was monitored by the respective state government's environment ministry [4]. An IoT-based Air quality monitor and prediction system will be developed which helps to improve the comfort level of individual life. This system not only helps to capture the sensing data, but also monitors, analyzes, and evaluates various changes related to the atmospheric conditions.

These Air quality monitoring and prediction systems will measure the gases such as Carbon dioxide Gas (CO-CO₂), nitrogen oxides NO_x (NO-NO₂), sulphur dioxide Gas (SO₂, SO₃), SO_x, Atmospheric Particulate Matter PM_{2.5} (of diameter less than or equal to 2.5 μm) and PM₁₀ (of diameter less than or equal to 10 μm) and predict the future changes in the atmosphere using Deep learning algorithms. This paper described DL algorithms linked with Air quality prediction and monitoring based on urban environments and provided various methodologies given by different authors discussed by getting the overall decision for using these algorithms. The utilization of DL algorithms such as CNN, RNN Networks has actively enhanced and began which are credited by the research in this field. Here Recurrent Neural Networks (RNNs) based LSTM and GRU algorithms are used for the prediction and evaluates its performance.

The organization of this paper is as follows: Section 2 describes literature survey based on AQMPs, Section 3 will give the hardware description of AQMPs Section 4 describes AQMPs methodology and prediction using DL algorithm. Section 5 discusses the results of air quality prediction and monitoring and prediction system and Section 6 ends with conclusion.

LITERATURE SURVEY

HOME AUTOMATION USING CoAP PROTOCOL

Dr. Jyoti¹

M. Tush Babbar

VLSI & Embedded Systems

ECE Department

Dr. Yashwanth Engineering

College (Autonomous)

belgaolal@yeshwanthengg.ac.in

Dr. K. H. H. Reddy²

Associate professor

ECE Department

Dr. Yashwanth Engineering College

(Autonomous)

belgaolal@yeshwanthengg.ac.in

Dr. T. D. N. S. Saravanan

Prof³

Associate professor

ECE Department

Dr. Yashwanth Engineering

College (Autonomous)

belgaolal@yeshwanthengg.ac.in

Abstract—Now a days with increasing smart devices in digital domain such as IoT based smart home automation system that aims to control all the devices of home and makes life easier and better access. For effective control of home appliances an effective interface is necessary for smart homes. For this the use of Constrained Application Protocol (CoAP) for transferring data securely in between devices that are in same network is used. The transfer of messages in CoAP is binary form among embedded devices by utilizing various web services in an effective way. Also the use of different sensors at home to interact with one other make data transmission and control of various applications using CoAP. The CoAP is used for constrained devices with limited resources and a smaller header size than HTTP. In this project, home automation is developed using such nodes as an embedded device connected to home devices and the complete system remains several nodes. Data flow of nodes is transmitted to the gateway and is finally updated to the cloud via the gateway. At Gateway, the translation protocol between CoAP and HTTP is supported. The user can access data from the cloud using a remote system and processor to the nodes.

Keywords—Home Automation, Constrained Application protocol, REST Architecture, WiFi, Raspberry pi.

I. INTRODUCTION

Constrained Application Protocol (CoAP) [1] is an upcoming internet application protocol for devices running on restricted networks (such as low networks and / or low-power networks). It is very similar to the standard REST procedures. Unlike Web, that uses the more standard HTTP protocol, a single protocol is used not only as a IoT for all its needs. For this numerous testing protocols are used for various IoT needs. Several protocols, like MQTT and CoAP, are created to deal with applications that need data collection (for example, sensor updates) on a virtual network. Alternative designs for dealing with online programmes via an internet connection, including the HTTP protocol and CoAP, are available. [1]. The IETF CoRE (Constrained RESTful Environments) Working Group's CoAP is a simple MSM protocol, supports independent publishing and subscription properties for push service and view (request and response) attributes. [2] Improved HTTP and RESTful Web interaction with the use of straightforward substitution. CoAP uses the Uniform

Resource Identifier (URI) rather than titles, in contrast to MQTT [3]. In accordance with the URI's specifications, the publisher publishes the data as the URI, and the subscriber reveals themselves of the service. A notification of the new value as proposed by the URI will be sent to all subscribers if novel data is published in the URI. CoAP is a binary programme that typically requires a fixed 4-byte header and a tiny payload message with a variable payload size based on the web server or existing technology. Therefore efficient datagram connections between clients and servers are less dependable.

Since CoAP includes constant negotiation to convey the device's preferred representation, it offers greater capability than MQTT. This enables the client and server to verify independently and add new presentations without interrupting. Both CoAP and MQTT can be utilized with 8-bit controllers and 100s of memory bytes and are suitable for low bandwidth and well-equipped devices. According to numerous research, CoAP conserves time and resources under comparable circumstances [4].

CoAP uses IPsec (Internet Protocol Security) for two-way authentication, integrity, and encryption, along with DTLS (Datagram Transport Layer Security), of these legacy principles. With one set of highly effective Internet Protocol (IP) device communication protocols, in terms of small package sizes, high delays, high packet loss ratios and potentially small bandwidth, of CoAP is except for its needs of the value [5].

II. RELATED WORK

Millions of tasks are expected to be employed in various product areas in the near future as a result of the removal of the CoAP requirements. Intelligent grid intelligent electricity, intelligent lighting, industrial control systems, smart tracking, and environmental monitoring are just a few of these applications. The preferred protocol for supporting IoT applications and enabling device-to-device communication is CoAP.

In this, we will look at the various studies in which CoAP is implemented and implemented. In the study by H Nam[6], the comparison of four popular messaging protocols namely MQTT, CoAP, HTTP and AMQP was

Underwater Image Enhancement using MIRNet

Dr.M.Thanasevi

Sri Vasavi Engineering College,
Puduchepalli, Andhra Pradesh-524101
mthanasevi2014@gmail.com

Mr.Kamesh Sanki

Sri Vasavi Engineering College,
Puduchepalli, Andhra Pradesh-524101
kamesh.sanki@gmail.com

Mr.P.Sudhakar Chakravarthi

Sri Vasavi Engineering College,
Puduchepalli, Andhra Pradesh-524101
sudhakar170@gmail.com

Abstract – In recent years, enhancement of underwater images is a challenging task which is gaining priority since human eye cannot perceive images under water. The significant details underwater are not clearly captured using the conventional image acquisition techniques, and also they are expensive. Hence, the quality of the image processing algorithms can be enhanced in the absence of costly and reliable acquisition techniques. Traditional algorithms have certain limitations in the case of these images with varying degrees of haziness and color deviation. In our proposed model, we used deep learning model for underwater image enhancement. First, the original image is pre-processed by the white balance algorithm for colour correction and the contrast of the image is improved using contrast enhancement technique. Next, the pre-processed image is given to the MIRNet for enhancement. MIRNet is a deep learning framework which can be used to enhance the low light level images. The enhanced image quality is measured using peak signal-to-noise ratio (PSNR), root mean square error (RMSE), and structural similarity index (SSIM) parameters.

Index Terms – Underwater, Deep learning, MIRNet, peak signal-to-noise ratio, structural similarity index.

I. INTRODUCTION

Image processing can be used to perform some operations on an image to extract some useful information. In fact, it is one branch of signal processing where the input is a 2-D signal (image) and output may be image or an attribute associated with it. Now a day, image processing is growing rapidly in the core research area within engineering, medicine and other disciplines too [1].

In image processing, underwater image enhancement plays a crucial role and vision applications over the past few years. The images taken underwater are affected by various lighting and environmental conditions, hence the quality of the image is degraded. The underwater image suffers with degradation due to scattering and absorption. The scattering and absorption process of light in water which influences the overall performance of the system under water [2]. Forward scattering leads to blurring of the image features, and backward scattering limits the contrast of the image. Similar to the color fading issue, whereby colors like red and yellow almost disappear with increasing depths, which is the reason for domination of either the blue or the green color. The underwater images are specified by their poor visibility since

light is exponentially attenuated as it travels in water and the images come poorly illuminated and hazy as shown in Fig. 1. Hence, it is necessary to enhance the underwater images by analyzing its quality, and to prepare the image for further processing [3].

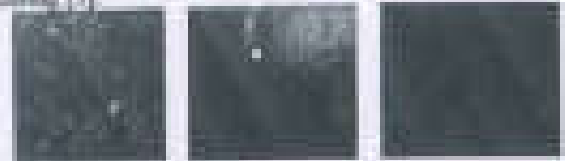


Fig. 1. Sample underwater images

The rest of the paper is organized as follows. Section II reviews the literature of the image processing under water. Section III presents a new method for enhancing the quality of underwater image. Section IV discusses the simulation results obtained by using our model and comprehensive analysis of the model by evaluating various metrics. Finally, section V describes the conclusion of the work.

II. LITERATURE SURVEY

Schmitt et al. [4] reviews the enhancement and restoration methods for the underwater image processing. They discussed about the light propagation in water, image color correction, lighting problems, and various quality assessment models.

Bashir et al. [5] proposed a method for pre-processing and fish localization in underwater images by using mean-shift algorithm for image segmentation and Pruned-CNN feature algorithm for noise reduction, and tested their model under different underwater conditions.

Awant et al. [6] performed fusion of two images (color compressed and white balance version) and then transferred the edges and color contrast to the output images.

Dewey et al. [7] performed underwater image enhancement by changing the color content in the image from RGB to YCbCr space. They used Rayleigh distribution along with integrated color model and calculated no-reference-image quality metrics.

Li et al. [8] created underwater image enhancement benchmark with 950 raw images, 800 reference images, and 60 challenging images. They also provided an underwater image enhancement network named Water-Net and made the dataset publicly.

Han et al. [9] proposed a convolutional neural network (CNN) based method by combining raw-RGB method and theme of grey method for detecting the underwater objects.



Z-Based Home Automation System Using IoT

V.V.S.Manjuna¹
 ECE Department
 Sri Vasavi Engineering College
 Tadipatri-514101
 Manjuna.vvscet@svce.ac.in
 vgg.ac.in

V.Rudra²
 ECE Department
 Sri Vasavi Engineering College
 Tadipatri-514101
 rudra.vvscet@svce.ac.in
 vgg.ac.in

H.Srinivas Reddy³
 ECE Department
 Sri Vasavi Engineering College
 Tadipatri-514101
 hsrinivasreddy.vvscet@svce.ac.in
 vgg.ac.in

M.V.Suman⁴
 ECE Department
 Sri Vasavi Engineering College
 Tadipatri-514101
 suman.vvscet@svce.ac.in
 vgg.ac.in

Abstract - In the busy world everyone wants to lead a comfortable irrespective of their location in different circumstances. Nowadays the majority of the people living in a conjugal family with the employee couple. So home management like controlling appliances, gardening, baby care, health monitoring for confined to bed people, becomes difficult in their asymmetrical working hours. Home automation is the best solution for home management from remote locations. The main objective of this paper is to build an architecture for smart home by implementing a cost effective, highly reliable, interoperable, more secure, low power home automation system for controlling the home appliances using Z-wave protocol under IoT. To overcome the drawback of Zigbee based home automation system, Z-based smart home is designed. Interoperability, Z-wave is a short range, low power consuming protocol which will connect hundreds of nodes. Home Node MCU is used as a primary controller, Arduino Uno is used as node or slave, Blynk cloud is used for user interface and to store commands came from user and appliances data.
Keywords: Node MCU, Arduino Uno, Z-Wave, Blynk app, NBFWA, IoT

Introduction:

Nowadays, people are adopting emerging technologies to improve their life style. From the last decade, numerous home automation systems got popularity which improves comfort and quality of life[15]. Smart home automation means connecting all the devices from motor to air conditioner through a wireless sensor network.[4] Not only for accomplish our needs and also provides a luxurious life with security.

For example maintain your room temperature according to the surrounding temperature by the time you returned to the home. And gives the alerts about your water tank level, reminds you about the things (vegetables, milk etc) present in smart

refrigerator. It also provides efficient power management for the home appliance by controlling their power consumption.

IoT is the backbone for designing home automation. By using IoT all the appliances are connected through internet and upload the data into cloud for giving the alerts to the user. at the same time appliances follow the commands of user from remote location. The appliances will alert the owner and follow their commands from remote location. An IoT system consists of microcontrollers with different sensors for collecting/uploading the data into Cloud.[2]

Home Automation Basic Architecture[15]:

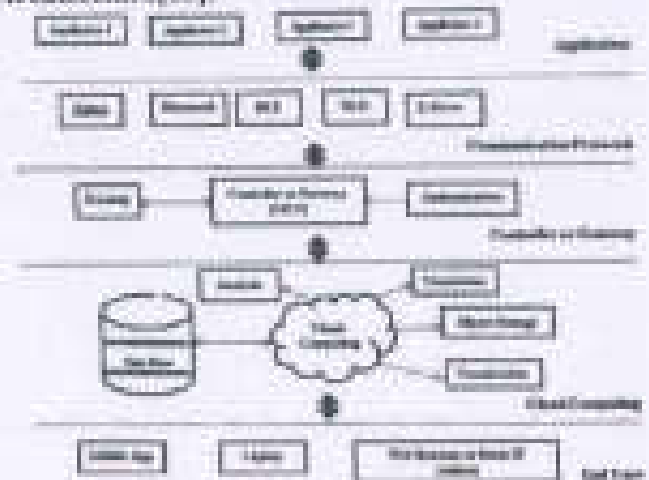


Fig.1 Basic Architecture of Home Automation

The basic Architecture of home automation as shown in Fig.1

End User:

For controlling appliances, a mobile app or GUI is designed to give the commands by the end user. They may use smart phone or laptop or web browser as a platform to interact with appliances using this API.

DESIGN OF ANNULAR RING BASED 3D HEXAGONAL MIMO ANTENNA WITH IMPROVED ISOLATION TECHNIQUES

Dr. Kavayee Kulkarni
 Professor
 Department of ECE
 Sri Vasavi Engineering
 College
 Andhra Pradesh, INDIA
 kvk_@svce.ac.in

Harish Vinnu
 Assistant Professor
 Department of ECE
 Sri Vasavi Engineering
 College
 Andhra Pradesh, INDIA
 hvinnu@svce.ac.in

Dr. Praveen K. Sharma
 Professor
 Department of ECE
 Sri Vasavi Engineering
 College
 Andhra Pradesh, INDIA
 praveen.ksharma@svce.ac.in

Uma Sree Mallikarjun R
 Assistant Professor
 Department of ECE
 Yelagonda-
 Ramanathapuram
 Siddhartha Engineering
 College
 Andhra Pradesh, INDIA

Abstract—The use of ultra-wideband (UWB) multiple antennas can address the issue of limited bandwidth and power gain present in conventional narrowband antennas. The primary issue with wireless communication is multipath fading, which results from electromagnetic signals being reflected, diffracted, and scattered. Diversity approaches can be used to address this multipath interference issue. Diversity strategies greatly increase the system's communication capacity without increasing the system's transmitted power or bandwidth. When compared to single antenna systems, the notion of spatial diversity or multiple-input multiple-output (MIMO) is highly helpful in reducing the impact of multipath fading and obtaining high data rates, range, and dependability. Additionally, MIMO systems that include UWB technology effectively handle the short range and increased channel capacity issues with UWB. A wireless local area network (WLAN) based omnidirectional (UWB) multiple-input multiple-output (MIMO) diversity antenna that is supplied by a non-planar coplanar waveguide (CPW) is proposed. To achieve spatial diversity, the antenna components will be positioned in a circular manner all around the polycycliclole line. A reflector will also be positioned between the two sides of the circular antenna to improve isolation between adjacent antenna elements. Another method for achieving isolation is Inducted Ground Structure (IGS).

INTRODUCTION

MIMO communication, an abbreviation for Multiple-In, Multiple-Out, distributes the same data as multiple signals concurrently across multiple antennas while still using a single radio channel. An RF link's signal quality and strength are increased using various antennas in this instance of antenna diversity. At the transmission point, the data is divided into several data streams that are then recombined by a second MIMO radio set up with the same number of antennas on the receiving side. The receiver is built to accommodate for any additional noise or interference, lost signals, and even the little lag in timing between each signal's receipt. The MIMO radio adds redundancy to data transmission that traditional single antenna setups (SISO: Single In, Single Out) cannot by delivering the same data on several streams. Due to this, MIMO systems provide a number of benefits over standard SISO arrangements.

Traditional single antenna setups (SISO: Single In, Single Out) cannot by delivering the same data on several streams. Due to this, MIMO systems provide a number of benefits over standard SISO arrangements.

In everyday lives, wireless communication has grown in importance. We now rely heavily on our papers, cell phones, satellite dishes, radios, and other devices. An antenna is a component that all of these wireless systems share, whether they transmit or receive. The antenna is in charge of converting the RF energy from the guided transmission-line feed to free space and back. Antennas are employed in a variety of technologies, including radar, wireless LAN, point-to-point radio transmission, radio and television broadcasting, and space exploration.

MIMO ANTENNAS

MIMO communication, an abbreviation for Multiple-In, Multiple-Out, distributes the same data as multiple signals concurrently across multiple antennas while still using a single radio channel. An RF link's signal quality and strength are increased using various antennas in this instance of antenna diversity. At the transmission point, the data is divided into several data streams that are then recombined by a second MIMO radio set up with the same number of antennas on the receiving side. The receiver is built to accommodate for any additional noise or interference, lost signals, and even the little lag in timing between each signal's receipt. The MIMO radio adds redundancy to data transmission that traditional single antenna setups (SISO: Single In, Single Out) cannot by delivering the same data on several streams. Due to this, MIMO systems provide a number of benefits over standard SISO arrangements.

1. MIMO radio may use bounced and reflected RF broadcasts (known as multipath propagation) to boost signal strength even when

Underwater Image Enhancement using CNN and Image Formation Model

¹Tharun M, ²Yama Naga Divya B, ³Karthika A, ⁴Venu Sandeep G,

⁵Pavan Indro Kalyan B, ⁶Sriya Kiran J

^{1,2,3,4,5,6}Professors, Department of ECE, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India.
¹ntharunm2014@gmail.com

Abstract—For remote sensing, marine biological exploration, tracking of underwater objects, ecological research, and other reasons, high-quality underwater images are essential. In this research, a new underwater image enhancement method utilizing CNN and an image formation model are proposed. The essence of our study demonstrates the benefits of doing so, including the advantages of restoring color, enhancing details, and achieving higher PSNR ratings. Direct transmission and backscatter estimation are the two modules we employ. Using a proposed CNN design, these two modules are developed.

Keywords—underwater image, image enhancement, CNN, image formation model.

I. INTRODUCTION

Light propagation in water medium must also be taken into account when dealing with underwater image enhancement in scientific endeavors like the observation of marine life and biological ecosystems, the quality of the underwater images is crucial. Color changes occur due to light attenuation for different wavelengths. The underwater images are bluish or greenish in color and are having low contrast and brightness.

The physical image formation model for underwater and fogged images is very similar [1]. In traditional techniques, underwater image color correction is done by applying the physical image formation model of fogged images to underwater images. But unlike in the atmosphere, light does not travel as quickly in water. Research on underwater image enhancing techniques is crucial for this reason.

Section II of the paper describes the literature survey and in section III the proposed work is explained, section IV explains the results with evaluation measurements and section V concludes the paper.

II. EXISTING WORK

The transmission of light is affected by the air or water particles scattering, which causes the light entering the camera to be different from the light reflected from the object itself, thus degrading the captured images. Through the direct application of the physical image generation model of fogged images to underwater

images, researchers have presented a number of methods [2-3] for underwater image color correction. However, compared to the atmosphere, water has a distinct medium for the propagation of light. The differences between the scattering effects of light with different wavelengths are not taken into account by the current models of image formation. The physical image formation concept of underwater images has been further expanded in the most recent publication by Akkaynak et al. [4]. Through a large number of real underwater experiments, the coefficient for attenuation for the existing model was modified, and a modified underwater image formation model was suggested. Deep learning has recently produced excellent outcomes on computer vision tasks like picture identification, image segmentation, and object detection.

More and more researchers begin to apply deep learning to underwater image enhancement tasks. Li et al. [5] proposed an underwater image color correction method based on CycleGAN, Skinner et al. [6] proposed a two-stage neural network structure for image depth estimation and color correction respectively, and Fu et al. [7] proposed a neural network consisting of global and local information for underwater image enhancement. The above methods based on physical imaging models are often only applicable to specific images and are not generalized, and most of the existing methods are based on approximate image formation models. Some of the deep learning-based methods ignore the image formation model, which leads to a complex model structure and makes training process more difficult. Some other deep learning-based methods incorporate the image formation model but simplify it, which can lead to insignificant image enhancement effects.

III. PROPOSED WORK

A new technique for underwater image enhancement is suggested in this paper by improving the existing deep learning-based image enhancement method by combining the recently proposed revised image formation model [4]. The proposed work have a backscatter estimation module and a direct-transmission estimation module, both of which are implemented using convolution neural networks. The two modules together with their outputs and the input image are fed into a reconstruction module to get the enhanced underwater image. Experiments on URB dataset validate the accuracy of the suggested method.

FBMC Signal Detection Using Autocorrelation

M. Subbarao
 Asst. Professor,
 Dept. of ECE,
 Sri Vasavi Engineering
 College,
 Tadipatri, AP, India

V. V. N. L. Aravind
 Asst. Professor,
 Dept. of ECE,
 Sri Vasavi Engineering
 College,
 Tadipatri, AP, India

Parvathi K. Sharmila
 Professor,
 Dept. of ECE,
 Sri Vasavi Engineering
 College,
 Tadipatri, AP, India

K. Ratana Kumari
 Professor,
 Dept. of ECE,
 Sri Vasavi Engineering
 College,
 Tadipatri, AP, India

Abstract— In cognitive radio, spectrum sensing plays an important role. In this paper, a feature detector for filter bank multi carrier (FBMC) signals was used as filter samples are uncorrelated. If the FBMC signal is processed using our suggested method, the autocorrelation function of the FBMC signal becomes nonzero at the delay equal to the number of subcarriers. To, the additive white Gaussian noise samples remain uncorrelated with the same suggested procedure. This feature is used to detect FBMC signal in noise using an autocorrelation-based feature detector. The key benefit of the suggested detector is that, in contrast to blind detectors, it can tell the difference between the FBMC signal and the noise. The Neyman-Pearson detector's threshold can be selected to maintain a consistent false alarm rate while optimizing detection chance when the performance of the proposed detector's test statistic is determined in a noisy environment. The suggested detector's efficiency is demonstrated by simulation results. All tests developed in our project are help of MATLAB software.

Index Terms—FBMC, auto correlation, PU, Cognitive Radio.

I. INTRODUCTION

The filter bank multicarrier (FBMC) is a potential replacement for OFDM for 5G and cognitive radio. The use of a carefully thought-out bank of filters with little out-of-band radiation and no CP leads to a notable increase in spectral efficiency [1]. One of the most critical jobs in cognitive radio is spectrum sensing. The key challenge with traditional cognitive radio standards has been detecting the presence of a primary (licensed or heritage) user using incumbent geolocation database and spectrum sensing techniques. Sensing and differentiating FBMC signals is a critical topic because FBMC is one of the few most promising candidates for 5G waveforms. As a result, the primary goal of this study is to propose a spectrum sensing strategy for FBMC signals.

The bulk of spectrum sensing detection algorithms have been developed for OFDM transmissions [2] (orthogonal diverse constellations and a taxonomy of TVWS-targeting mechanisms. OFDM is an excellent choice for point-to-point communications since it is simple to implement and delivers very high bandwidth. However, it has various obstacles, including low spectral efficiency and high out-of-band emissions. To address these issues, numerous modulation approaches are being developed, one of which is Filter Bank Multi Carrier (FBMC), because there are fewer side lobes in the FBMC approach, there are less out-of-band emissions. [3] concentrated on the algorithms for local and cooperative spectrum sensing. The detection of main user (PU) broadband based on orthogonal frequency division multiplexing (OFDM) using local sensing technique is described. The described autocorrelation detectors are easy to use and have good computational performance. The algorithms are further developed for the cooperative sensing situation, where multiple secondary users (SUs) collaborate to find a PU broadband [3].

Recent advances of 5G technology have raised the need for waveforms with higher spectral confinement per subcarrier than the established orthogonal frequency division multiplexing (OFDM). This desire can be satisfied by the alternative technique known as filter bank multicarrier (FBMC). Subcarrier waveforms are built based on a prototype filter designed with this emphasis in mind. The research conducted in the University of Utah's wireless laboratory over the previous 12 years is reviewed briefly in this paper. It also establishes a connection between this research and previous studies. It is followed by the theoretical foundation upon which FBMC waveforms are built. Moreover, alternative approaches to creating efficient prototype filters are given. For completeness, pilot phase structures, which are utilized to create FBMC systems in a computationally efficient manner, are introduced. Their complexity is compared to that of OFDM. In particular, the paper will channel equalization,

Survey on FPGA-Based Deep Learning Network Accelerators for Learning and Classification

A. Vinodha Rani¹
Research Scholar, Dept of ICE,
JNT University, Kakinada
vinodha.rani@jntu.ac.in

Dr. M. Thevaraj²
Professor, Dept of ICE,
3rd Year Engineering College, Tadipatri
thevaraj.maharaj@jntu.ac.in

Dr. B. T. Aritha³
Professor, Department of ICE,
JNT University, Kakinada
btharath@gmail.com

ABSTRACT Deep learning is a branch of artificial intelligence that has evolved as a result of recent developments in digital technology and the availability of reliable data. Deep learning has proven to be capable of tackling complicated learning problems that were previously unsolvable. Applications for image recognition and detection have shown the value of convolutional neural networks (CNNs), in particular. However, because they demand high CPU operations and memory bandwidth, conventional CPUs are unable to reach the needed performance levels. The throughput of CNNs has therefore been increased by using hardware accelerators that make use of application-specific integrated circuits (ASIC), field-programmable gate arrays (FPGAs), and graphics processing units (GPU). More specifically, FPGA's ability to maximize parallelism and energy efficiency have lately been employed to speed up the implementation of deep learning networks. The FPGA-based Accelerator design and associated performance measurements are covered in this paper.

INDEX TERMS Deep Learning, DNN, Field Programmable Gate Arrays (FPGA), hardware acceleration, parallel computer architecture, reconfigurable computing.

1. INTRODUCTION

The basis for many recent applications of artificial intelligence (AI) is deep neural networks (DNNs). The number of applications that use DNNs has multiplied since its ground-breaking usage in speech and image recognition. These DNNs are used in a wide range of applications, including playing sophisticated games, self-driving automobiles, and cancer detection. DNNs can now outperform humans in several of these fields in terms of accuracy [1][2]. After utilizing statistical learning over a vast quantity of data to generate an efficient representation of an input space, DNNs' higher performance is due to their capacity to extract high-level features from raw sensory data. In contrast to earlier methods, this one makes use of expertly hand-crafted features or regulations. But DNNs' increased accuracy comes at the expense of their considerable computational complexity. Although many DNN processes have relied heavily on general-purpose computer engines, particularly graphics processing units

(GPUs), there is growing interest in offering more specialized acceleration of the DNN components. By lowering the computing cost of DNNs either completely through improvements in hardware design or justly through hardware design and DNN methodology. A key aspect of DL is that the networks utilize their weights were not constructed by humans.

The deep learning's exceptional capacity for spotting complex structures in high-dimensional data. Character recognition [3], gesture recognition [4], speech recognition [5][6][7], document processing [7][8], natural language processing [9], [10], and video classification are some of the applications DL is active and feature fields.

In addition to being researched in deep learning hardware design research, the lower accuracy has also been applied in more recent commercial platforms for DNN processing. One such example is Google's Tensor Processing Unit (TPU), which was created for 8-bit integer arithmetic and announced in May 2016. Similar to this, the April 2016-announced PASCAL GPU from Nvidia offers 8-bit integer instructions for deep learning inference. The fundamental advantage of employing 8-bit computing on general-purpose platforms like CPUs and GPUs is an increase in throughput since four 8-bit operations can be completed rather than one 32-bit operation within a given clock cycle.

1.1 NEED FOR DEEP LEARNING NETWORKS TO BE HARDWARE ACCELERATED:

In order to give more accurate results and real-time object identification, for example in applications like robotics and self-driving automobiles [1], the convolution neural network's size must be increased by the addition of more neural network layers. However, when more and different kinds of NN layers develop, more complicated CNN structures and high-depth CNN models result. As a result, training and evaluating the resulting large scale CNN requires billions of operations, millions of parameters, and a lot of computational power [11], [12], [14]. A computational problem for general-purpose processors is posed by such requirements (GPP). Hardware accelerators have then been employed to increase the throughput of CNN, including graphics processing units (GPU), application specific integrated circuits (ASIC), and field programmable gate arrays (FPGA).

Design and Development of an Integrated Solar PV Based Water Purification and IoT Based Water Quality Monitoring System

Sudhakar Lakshmi
M.Tech (PSC & AFS) Student
Department of EEE

Sri Vasavi Engineering College and Pharmacy
Tadipatri, Andhra Pradesh, India
sudarshankr@svet.ac.in

Sri Hanish Prasadigan
Sr. Assistant Professor
Department of EEE

Sri Vasavi Engineering College and Pharmacy
Tadipatri, Andhra Pradesh, India
srihanishprasadigan@svet.ac.in

ABSTRACT: Water is the vital natural resource and essential element in our lives. Safe and easily accessible water is critical for public health. Improved water supply and sanitation, as well as better water resource management, can boost a country's economic growth and contribute significantly to poverty reduction. However, global water pollution is on the rise. Consequently, a method has been developed to continuously test the purity of water. In this project, we built a solar-powered water purifier. The fundamental guiding principle behind this project is reverse osmosis. This project makes use of solar energy for water purification and plant activities. The photovoltaic solar system is connected to the power grid. Solar panels, converters, and grid-connected equipment comprise a grid-connected photovoltaic system. The power for the purification unit and the water plant is supplied by the Grid. The water quality monitoring (WQM) also has to be done effectively this can be done by using an advancing technology like Internet of Things (IoT). Water quality can be monitored using Total Hardness (TDS), Potential of Hydrogen (pH), Turbidity, and Dissolved Oxygen (DO) sensors. The raspberry pi receives the sensor output values as input. Following that, the obtained values are shown in a serial monitor attached to the Raspberry Pi. These values are then distinguished from the WHO (World Health Organization) standard values. Finally, all sensor data can be uploaded to the cloud and visualized.

KEYWORDS: Turbidity, TDS, pH, Dissolved Oxygen, Reverse Osmosis, Photovoltaic system, IoT (Internet of Things), Raspberry pi, Cloud.

INTRODUCTION

Drinking water facilities are severely lacking for the growing population. The increased use of chemicals in water purification, the use of pesticides and fertilizers in fields, and the discharge of polluted water and industrial wastes into water bodies all contributed to a reduction in water quality globally. It is a major concern as it affects the health of individuals adversely. The prevalence of several water-borne diseases has increased, which has raised the death rate.

The use of particular sensors to determine water quality characteristics such conductivity and

dissolved oxygen (DO), turbidity, pH, and temperature is covered in this study. The sensor data were measured and computed using the microcontroller. The raspberry pi, the central controller that makes use of the Zigbee protocol, received the processed remote values after that. Finally, all of the sensor data is accessible via cloud computing via any browser [1].

The water quality monitoring system using IoT is done with the help of Arduino Uno and sensors (pH, turbidity, temperature and dissolved). Arduino Uno is an Arduino like board with inbuilt Wi-Fi capabilities to send sensor data over the internet. The overall experimental setup was developed and tested for quality of water data acquisition, online data transfer, monitoring, recording and analysis. It is experimentally observed that system takes less than a minute to update its values [2].

Real-time monitoring of the water quality is done by the water quality monitoring system using a variety of sensors, including (pH, conductivity, temperature, turbidity). The Wi-Fi module in the system transfers data collected by the sensors to the microcontroller, and transfers the data to the smart phone/PC. This system can keep a strict check on the pollution of the water resources and be able to provide an environment for safe drinking of water [3].

To track water quality characteristics, water parameters including pH, turbidity, temperature, dissolved oxygen, and salinity need to be measured. We created a low-cost, long-term IoT-based water quality measurement system for precise water quality monitoring. In this paper, we proposed a smart sensor interface device that can sense water quality parameters and generate data in an online system for displaying real-time water quality parameter measurements. It incorporates various types of sensors for measuring drinking water quality. These sensors are associated with Arduino. We create a serial communication between Arduino and Node MCU to transmit the values, which will display the data on an online system (web interface). Every water source will have a QR code attached to it to make it simple for any user to access. To find out if the water is safe to drink, they can scan the QR code. Using

Three-phase induction motor Protection by relay against various abnormal conditions and monitoring using GSM

G. Jai Shalva, Assistant professor, Department of Electrical and Electronics Engineering, Sri Sairam engineering college, perambalur.	N.Sri Harsh Sr.Assistant Professor, Department of Electrical and Electronics Engineering, Sri Sairam engineeringcollege, perambalur.
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Abstract

This endeavor boost and India's cultural development. Due to frequent power outages and abnormal voltage conditions in India, it is critical to deliver water efficiently to the fields during normal conditions. This is accomplished by sending messages between the user's phone and GSM. This system was created using a Microcontroller that is linked to the GSM and the Induction motor. The microprocessor protects against overcurrent, dry run, and single phasing. It is envisaged that this application will supply water across the motor to a large extent. Here provide an extra feature of ON/OFF motor operation via GSM. The voltage and current values of the motor, as well as any system faults are tracked, and warning messages are displayed on the LED. If an error occurs, the contactor will trip.

Key words : Relay, GSM,LED,OVER CURRENT
INTRODUCTION

Many industrial processes use AC induction motors (IMs) as actuators. Even though IMs are dependable, certain unfavorable stresses are placed on them, which leads to defects. A rapidly developing method for the early failure detection is consisting of an IM. It converts an industrial process from failing without warning. There are two types of monitoring methods: traditional and digital. Traditional three-phase IM monitoring approaches are often provided by a mix of mechanical and electrical monitoring equipment. Electrical defects, such as failed state insulation, cannot be detected by mechanical wear sensing methods.

A fault in an electric power system is an irregular flow of electricity. One fault when current flow exceeds the normal load is a short circuit, for instance. A defect in a three-phase system can affect one or more phases as well as the ground, or it can simply happen between the phases. Current enters the earth when there is a "ground fault" or "earth fault." For power systems, it is possible to compare the potential short circuit current of a defect. To minimize the loss of service caused by a failure, protective devices in power systems monitor fault conditions and activate circuit breakers and other devices. An asynchronous or induction motor is an AC

electric motor in which the electric current required to generate torque in the rotor is obtained by the magnetic field of the stator winding induces electromagnetic induction. For all or some of the energy transported from stator to rotor, an induction motor does not require mechanical commutation, separate excitation, or self-excitation, unlike a universal, DC, or big

synchronous motor. The induction motor can be either self-excitable or motor brush. Due to their durability, dependability, and affordability, three-phase squirrel-cage induction systems are frequently employed in industrial drives. For lower loads like home appliances like fans, single-phase induction motors are frequently employed. As a result, diagnosing issues with induction motors is critical. Generally speaking, rotor and stator defects are two different types of induction motor failures. Such problems can have internal or external causes related to various electrical, environmental, or mechanical factors.

OBJECTIVES

Numerous studies have revealed that up to 90% of faults on the majority of overhead lines are temporary. When one or more circuit breakers trip immediately to isolate a fault, such as an insulator flashover, the fault is declared to be temporary and does not return once the line is reactivated. At lower distribution voltages, faults are typically less transient (around the 80% range), while at higher sub-transmission and transmission voltages, faults are typically more transient (near the 90% range). In this project, flows are found and after they are fixed, the motor automatically turns depending on whether they are temporary or permanent defects. One microcontroller is employed to identify issues such short circuits and over/under voltages, voltage, shut off the motor, and show the message on the LED display. In the event of a short circuit, relays are utilized to operate the supply and shut off the load.

These are the study's stated goals.

- Over current Protection Phase failure detection
- A decrease in the time spent fault-finding.
- If a short circuit exists, the LED will indicate it.
- During the motor's auto start, maintain the

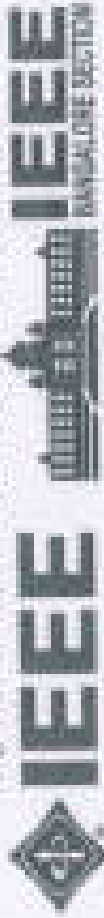


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This is to certify that Dr./ Prof./ Mr./ Ms. Guttikonda Chandra Babu has presented paper entitled **A Novel Way To Detect The Islanding Condition Using PSO and Control The Voltage Current Of DG Using A PI Controller in 2023** 2nd International Conference for Innovation in Technology (INOCON), jointly organised by Departments of CSE, ISE, ECE, CSE (AI & ML), CSE (DS) at Sai Vidya Institute of Technology, Bengaluru, India held during 3rd - 5th March, 2023.

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Dr. Rajesh Kumar
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Dr. Akshay Rathore
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POWER ELECTRONICS, DRIVES AND ENERGY SYSTEMS



Minimization of Power Losses in the Distribution System by Controlling Tap Changing Transformer using the PSO Algorithm

Chakrapan Srinivas
Department of EEE
Dr. Jyoti Engineering College
Tuladurguwa
Srinivas.Chakrapan@gmail.com

Varadachari Prasad Prasad
Department of EEE
Dr. Jyoti Engineering College
Tuladurguwa
Varadachari.p@gmail.com

Pratik Harsh
Department of EEE
Dr. Jyoti Engineering College
Tuladurguwa
Pratik1111@gmail.com

Vallabhanatha Prasad Prasad
Department of EEE
Dr. Jyoti Engineering College
Tuladurguwa
Vallabhanatha1111@gmail.com

Pratik Harsh
Department of EEE
Dr. Jyoti Engineering College
Tuladurguwa
Pratik1111@gmail.com

1. INTRODUCTION

Abstract— Earlier, power consumption was very low, and people were also less aware of electronic devices. Most people prefer manual methods for cooking, washing, grinding, ironing clothes, and other tasks. Recently, the power consumption is increasing as the number of consumers in the distribution system increases. ACs, washing machines, fans, TVs, rice cookers, refrigerators, and other appliances were in high demand. When fans, TVs, cooking, gadgets, and washing machines are used during the day, the load requirement is higher than when they are used at night. As a result of the uncertainty in demand, power losses and low voltage will occur in the radial distribution system. To reduce these losses, the voltage profile must be improved. The primary goal of this research work is to reduce power losses in the distribution system by optimizing the tap settings of the distribution transformer by using the PSO algorithm and also achieve real and reactive power compensation through the placement of DG and capacitor banks, and the results are then analyzed by using MATLAB software. The backward forward sweep technique has been adapted to identify low voltage profile buses in the distribution system, and the proposed approach was then tested on the IEEE 15 bus system.

Keywords—Charging Station, Distributed Generation, Distribution management, Electric Vehicles (EV), Radial Distribution System (RDS), Voltage Profile.

Renewable distributed generation plays a significant role in the power system. A system that transfers power to houses and industries is known as a distribution system [1]. Transferring effective and lossless power to the consumer at distribution ends is a big challenge [2]. The fossil fuels such as coal, hydro, oil, gas, and nuclear are decreasing day by day. Due to the investment in industries and the world population rise [3]. Hence, the ongoing scenario of conventional generation is insufficient to meet the present energy demand. Therefore, to transfer the effective and lossless power to the consumer by the addition of DG in the distribution system [4]. The losses are reduced by the proper location and size of DG. There are different types of DG's are available these are solar power, photovoltaic systems, wind power, and small hydro systems. A convenient expansion between the above types of DG's can diminish the power losses in the distribution system [4]. The proper placement of DG's provides higher power quality; improves voltage profile and reduction in power loss [5]. DG units were installed by the Particle swarm optimization (PSO) method [6]. The proposed algorithm has been tested in the distribution system to establish the work [6].

In [7], [8], power consumption and energy expenditure are diminished by the capacitor locating in RDS with teaching-learning-based optimization (TLBO) & self-adaptive harmony search algorithm (SAHSA). IEEE 33, 66, 85, and 118 bus systems are considered test systems. The optimal outcomes are correlated with the PSO and grey wolf optimization algorithm, and superior outcomes are captured compared with ICA, PSO, DSA, and mixed integer linear

Minimization of Frequency Deviations in Multi-Area Power System with SSSC

H. Madhusudan Reddy
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
redmaha@drjyoti.acad.in

Chaitanya Krishna
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
ckr1999@drjyoti.acad.in

Praveen Pragas Reddy
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
praveenpragas@drjyoti.acad.in

Syamsukh Suresh
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
ssuresh@drjyoti.acad.in

Nandipati Sagar
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
nsagar177@drjyoti.acad.in

Yaji Reddy
Department of EEE,
Dr. Jyoti Engineering College,
Tadipatri, Andhra Pradesh, India
yaji@drjyoti.acad.in

Abstract— Generally, a large power system consists of small interlinked power systems. These small systems are known as single-area systems and the entire large power system is known as a multi-area system. As technology is evolving day by day, the smart loads in power systems have been increasing. Due to this, the sudden addition and rejection of load takes place which causes the deviation of frequency in the system. This scenario leads to a state of uncertainty in the system so there can be reduced by using SSSC (Static Synchronous Series Compensator) device which belongs to the FACTS (Flexible AC Transmission System) devices. The main aim of this research work is to reduce frequency deviations in multi-area systems by using SSSC devices. Hence, the frequency deviation is reduced during load uncertainties. The results are then obtained through MATLAB/SIMULINK.

Keywords— Frequency Deviation, Load Uncertainty, Multi-Area System, Tie-line Power, Settling Time, SSSC Controller.

I. INTRODUCTION

In modern days, there are so many applications for electrical energy such as electrical vehicles, railway traction systems, home appliances, and so on. So, there is a massive demand for electrical energy. Therefore, the load on the power system has been increasing constantly. The load on the power system varies from time to time according to the demand of consumers. The immediate alteration of load causes instability in the power system, which leads to inequality between the load demand and power generation.

This causes the frequency deviation in the power system. Large power systems comprise small power systems; thus large power systems can be called multi-area power systems. Frequency plays a vital role in the power system. Large power systems comprise small power systems. Large power systems can be called multi-area power systems. If the frequency increases above its actual value, there must be a need to reduce power generation or increase the load on the power system. If the frequency deviates below its actual value, it indicates generating an additional amount of power or to reject the load to balance the power system. Otherwise, the system goes to damage due to increased mechanical stresses, losses, and more. The objective of this project is to rectify the frequency deviations in multi-area power systems during the instability of load. The frequency deviations are reduced by using Flexible Alternating Current Transmission System (FACTS) devices. The SSSC devices are very helpful and efficient for diminishing the frequency deviations in the multi-area system. The SSSC devices are static and power electronics-based equipment that is used to reorganize the power system to diminish the frequency instability. The applications of these devices are stability improvement, power flow control, and so on. Improving the stability of the system is one of the best applications of SSSC devices. So, these devices are adopted for minimization of frequency deviations and increasing the system stability. This SSSC device control through power electronics devices. Two types of compensation are involved in these devices; they are series compensation and shunt compensation. By using these compensations the frequency deviations can be minimized in the power system. There is a necessity to maintain the balance between the load demand and power generated in the system. This condition can be fulfilled by using SSSC devices efficiently and reliably. Hence, the factors which are causing the frequency fluctuations can be improved by using these devices, and



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This is to certify that the paper entitled "*An Improved Cascaded H-Bridge Based High Power Factor Converter with Enhanced Power Quality*" authored by *Suresh Katta, Jayaram Nakka, Rajesh J, and Dr. Sukanta Halder* has been presented in the 10th IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES 2022), organized at Malaviya National Institute of Technology Jaipur, Rajasthan, India from 14th to 17th December 2022.

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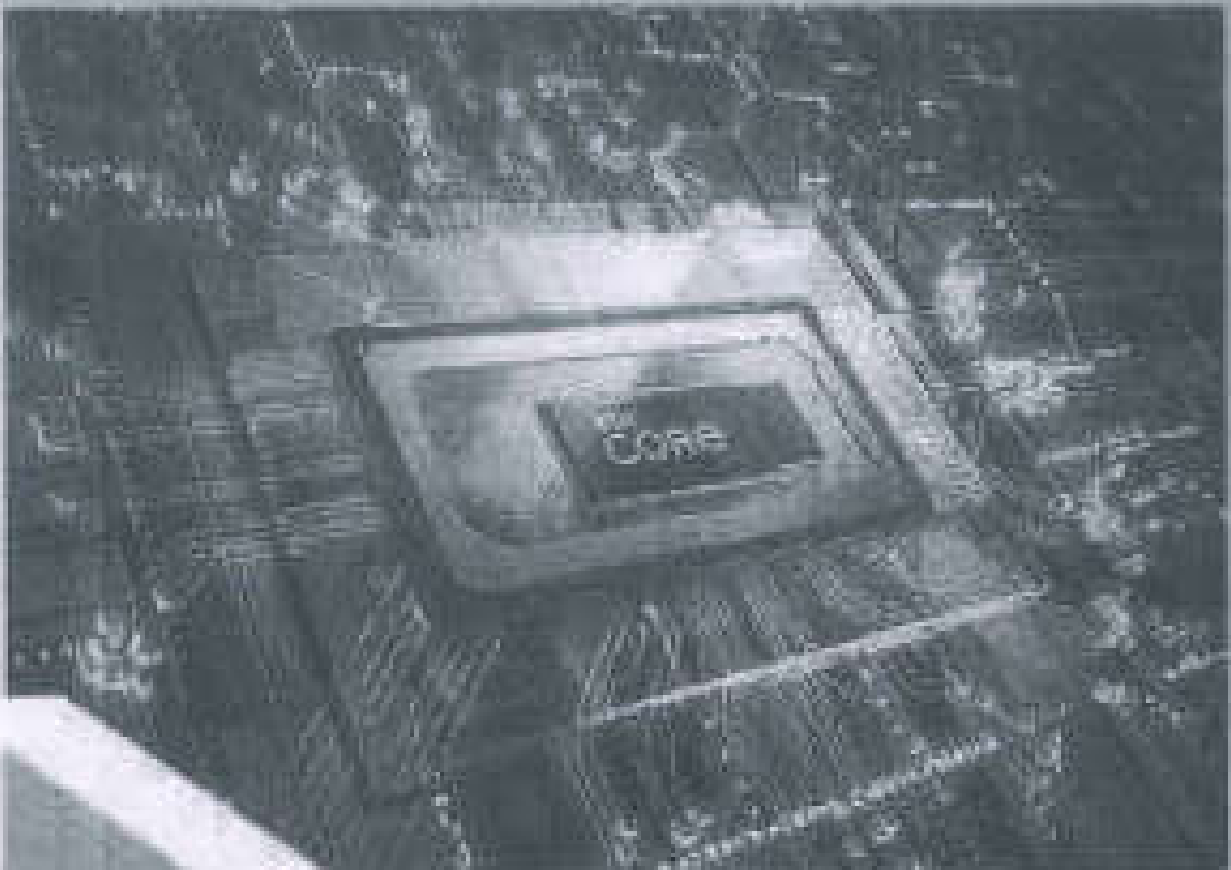
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**EMPLOYEE RELATIONS
AND LABOUR LAW**

Mr. GOURAV KUMAR SHARMA

Dr. S KRISHNAMURTHY NAIDU

Dr. ARTI

Dr. PANKAJ CHOUDHURY



Title of the Book: Employee Relations and Labour Law

Edition: First - 2022

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ISBN: 978-93-5625-565-5

MRP: Rs. 600/-

PUBLISHER & PRINTER: Scientific International Publishing House,
32B, Marudhapan Street, Mannargudi,
Tirunelveli, India.
www.scientificinternationalpublishers.com
scientificinternationalpublishers@gmail.com

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PRINCIPLES AND FOUNDATIONS OF CORPORATE GOVERNANCE



Dr. K. RAMBABU

Dr. P. RAMA KRISHNA

Dr. K. GANGA RAJU

Dr. S. KRISHNAMURTHY NAIDU

C&P

Title of the Book: Principles and Foundations of Corporate Governance

Edition: First - 2022

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ISBN: 978-93-95978-46-0

MRP: Rs. 600/-

PUBLISHER & PRINTER: Alpha International Publications (AIP)

37102, Kammangudi, Adichapuram,

Thiruvannamalai District, Tamil Nadu - 614717, INDIA

Email: alphainternationalpub@gmail.com

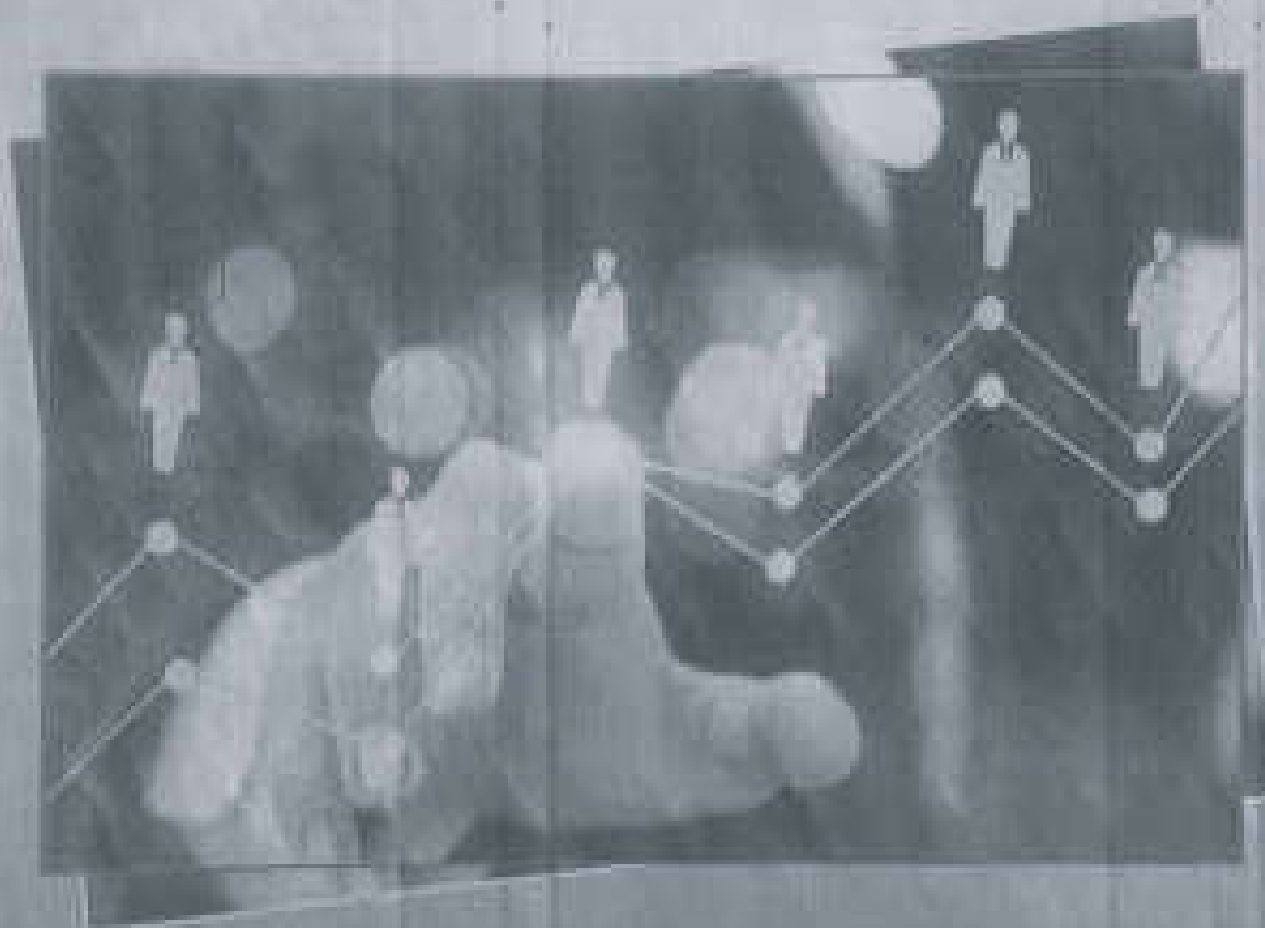
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RECENT TRENDS IN MANAGEMENT



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RECENT TRENDS IN MANAGEMENT

First Edition: 2002

Co-Editors: Dr. S. Rajkumar Menon, Dr. S. Sridhar, Dr. J. Murthy, Dr. MYS Sridharan

ISBN: 81-91-0144-2-2

Price: Rs. 400

Paramount Publishing House:

Plot No. 5/37/1, 1st Floor, 1st Cross, Lane - 1, Aditya Colony, Puttaparthi, Hyderabad, Pin 770002

Sales Office:

Hyderabad:

Plot No. A-31, 2nd Floor, 3rd Cross, Lane - 1, Aditya Colony, Puttaparthi, Hyderabad, Pin 770002

New Delhi:

G-1, SOPT, 20th Cross, Indraprastha Colony, New Delhi 110005, Phone: 011-26112201
www.parampublishing.com | sales@pvh.com

Printed by: Krishna Prasad, Aditya Colony, Puttaparthi, Hyderabad, Pin 770002

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PRINCIPLES AND FOUNDATIONS OF CORPORATE GOVERNANCE

**PRINCIPLES AND FOUNDATIONS
OF CORPORATE GOVERNANCE**



Dr. K. RAMBABU
Dr. P. RAMA KRISHNA
Dr. K. GANGA RAJU
Dr. S. KRISHNAMURTHY NAIDU



Productive Inference of Convolutional Neural Networks Using Filter Pruning Framework



Shirin Sham Koduri and Lashma Guniseti

Abstract Deep neural networks have shown phenomenal performance in many domains including computer vision, speech recognition, and self-driving cars in recent years. Deep learning model's high performance normally comes at the cost of computation time and significant size of the model. These factors ultimately become a bottleneck for the deployment of deep learning models on battery and memory constrained devices, for example embedded systems or mobile phones. Over the past few years network acceleration is a burning topic. To address this task of compressing deep learning models, in the past few years many researchers have come up with compression techniques like pruning. The authors, in this paper, have tried to implement the filter pruning technique on VGG 16 architecture by using a clustering methodology to compress and deploy the model on resource-constrained devices like smartphones. The authors have also aimed at improving the inference time of the model for fast and considerably accurate predictions.

Keywords Deep learning · Deep neural networks · VGG16 · Filter pruning · Convolutional neural network (CNN) · Inference

1 Introduction

Today's world is governed by Machine Learning and Artificial Intelligence (AI). The living standards of the human race have shown exponential growth recently due to the influence of Machine Learning and AI. Artificial Intelligence finds its scope in every field such as medicine, defense, and economy and has also spread its roots in our daily life applications like Netflix suggestions, virtual Chatbots, Google assistant, Alexa, and whatnot. With the help of reinforcement learning, machines

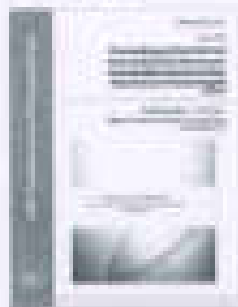
S. B. Koduri (✉) · L. Guniseti
Sri Vasavi Engineering College, Tadepalligudem, India
e-mail: shirin.koduri@svceeevengg.ac.in

L. Guniseti
e-mail: lashma@svceeevengg.ac.in

© The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2023
P. Chatterjee et al. (eds.), *Computational Intelligence for Engineering and Management Applications*, Lecture Notes in Electrical Engineering 984,
https://doi.org/10.1007/978-981-19-8933-8_32

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Volume 24, Issue 1
October 2021



PROCEEDINGS OF THE
2021 14th INTERNATIONAL
CONFERENCE ON
SUSTAINABLE
MANUFACTURING,
MATERIALS AND
TECHNOLOGY (ICSMAT)
11-13 June 2021
Garmisch, India

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Investigation on Al₂O₃-WC & Al₂O₃-Cr particulate reinforced MMCs mechanical behavior under aging

S. S. Ghoshal, S. Ghoshal, S. K. Ghoshal

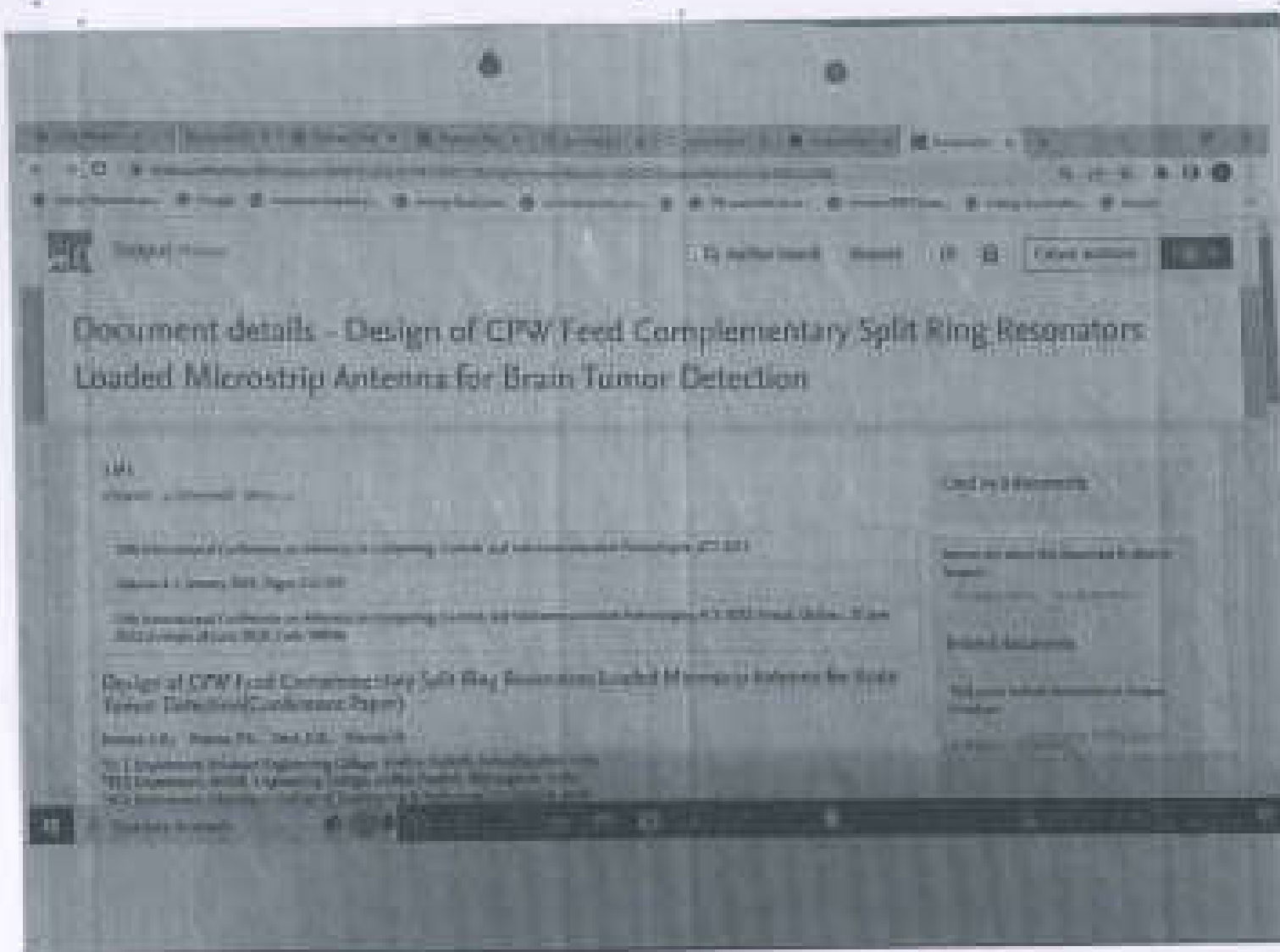
Abstract

Al₂O₃-WC and Al₂O₃-Cr particulate reinforced MMCs were prepared by the stir casting method. The mechanical behavior of MMCs was investigated under aging. The results show that the mechanical properties of MMCs increase with aging.

The mechanical characteristics of Al₂O₃-WC and Al₂O₃-Cr particulate reinforced MMCs were investigated under aging. The stir casting method was used to prepare MMCs. The results show that the mechanical properties of MMCs increase with aging. The mechanical properties of MMCs were investigated under aging. The results show that the mechanical properties of MMCs increase with aging.

Keywords

Al₂O₃-WC, Al₂O₃-Cr, particulate reinforced MMCs, mechanical properties, aging



Document details - Design of CPW Feed Complementary Split Ring Resonators Loaded Microstrip Antenna for Brain Tumor Detection

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

M. S. Ghosh, P. K. Ghosh, S. K. Ghosh, S. K. Ghosh

141-148, 2014, Pages 141-148

141-148, 2014, Pages 141-148

Design of CPW Feed Complementary Split Ring Resonators Loaded Microstrip Antenna for Brain Tumor Detection (Conference Paper)

141-148, 2014, Pages 141-148

141-148, 2014, Pages 141-148

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Microsoft Live Feed Reimagined with Windows Address Book Migration Tools

By [Author Name]

[Date]

Microsoft has announced a new way to manage your contacts. The new Windows Address Book (WAB) is designed to be more flexible and easier to use than the old version. It will allow you to sync your contacts with other devices and services, making it easier to stay connected.

Summary

The new WAB is a significant improvement over the old version. It offers a more intuitive interface and better integration with other Microsoft services. This article explores the features and benefits of the new WAB.

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Pattern Based Glaucoma Classification Approach using Statistical Texture Features

Mr. Karanish Sami

School of Electronic Engineering, VIT-AP University
Andhra Pradesh, India-522237
karanish.sami@gmail.com

Dr. Ravindra Dhall

School of Electronic Engineering, VIT-AP University
Andhra Pradesh, India-522237
ravedhall@gmail.com

Abstract—Glaucoma is the leading eye disorder that may cause irreversible vision loss if not diagnosed quickly. Due to its invisible symptoms, it is very hard to detect glaucoma in the early stage hence increasing its impact and leads to blindness. Due to the limitations with the available medical tests, glaucoma diagnosis is preferred with computer-aided design (CAD) approach. Hence it is necessary to propose a model to diagnose glaucoma with retinal color fundus images. This paper proposed a new methodology based on local directional texture pattern (LDP) descriptor and statistical texture features and classified using various machine learning schemes. The proposed method is validated on Drishti-GS1 and ACRIMA datasets with 92 and 782 images respectively and evaluated performance with 10-fold cross validation and 70:30 split ratio approach and reported results with sufficient performance metrics values. From the obtained results and analysis, we state that our approach achieves good classification performance compared to other existing approaches.

Index Terms—Glaucoma, computer aided design, local directional texture pattern, statistical texture features, Drishti-GS1, ACRIMA.

I. INTRODUCTION

Glaucoma is an eye disorder that occurs due to the internal eye pressure called intraocular pressure (IOP) which causes peripheral loss of vision and leads to blindness by damaging the optic nerve which carries information from eye to brain. [1]. IOP normally is in the range of 15 - 21mmHg (millimeters of Mercury) that can be measured using a tonometry [2]. If it is more than 21mmHg, it may change the optic disc structure that can cause glaucoma as shown in Fig. 1.

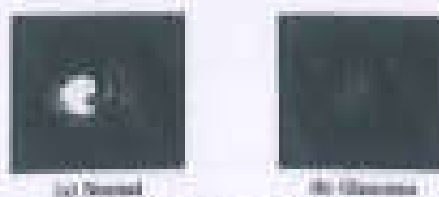


Fig. 1. Retinal optic disc images

As per recent statistics, over than 40 million glaucoma cases around the world are identified and it may reach over 80 million. [3]. In India, glaucoma occupies second place after cataract among eye diseases. Glaucoma has no symptoms in

the early stages. By the time when we identify a problem with our vision, it might be in the advanced stage. Among all the glaucoma cases, almost 50% are identified only at the time of the survey, that's why it can be referred to as a silent thief of sight. [4]. Regular medical eye checks up methods are very expensive and require skilled assistance, that's why computer-aided design (CAD) systems come into existence. Many researchers worked on glaucoma detection by extracting different features and classified using machine learning schemes. [5].

Chatterjee et al. [6] used image-based and representation-based features and implemented on Drishti-GS1 dataset along with a private test set using support vector machines (SVM). Das-Pinto et al. [7] collected a new clinical dataset ACRIMA with 782 images and developed an automatic glaucoma screening using mechanized neural networks (CNN) with 10-fold cross validation (CV). Unlike all, Iwata et al. [8] validated their method with a combination of multiple training and testing datasets with their deep learning models and verified using the public datasets.

Chen et al. [9] reviewed a hybrid feature set from various descriptors and validated on various public datasets with random forest (RF) classifier. Guo et al. [10] extracted pyramid histogram oriented gradient (PHOG) and Gabor filter-based features and then classified using SVM with Drishti-GS1 and high resolution factor (HRF) datasets. Liu et al. [11] developed a deep neural network (DNN) and extracted texture and color features and validated it on a private dataset and ACRIMA dataset.

Pandey et al. [12] used a flexible analytic moment transform (FAMT) and extracted features and reduced dimensionality with linear discriminant analysis (LDA) and classified using least-square SVM. A module app called Yachan is designed by Guo et al. [13] from the U-net model with contracting path (CP) and feature loss function (FL) and validated its functionality with Drishti-GS1 and ORGA datasets using gradient boosting decision tree (GBDT) classifier. Elagovan et al. [14] designed an 18-layer CNN model to classify glaucoma with 70:30 split ratio approach and validated it on the public datasets.

From the literature, we observed that some authors implemented their work on private datasets. Due to unavailability of private dataset, these results cannot be reproduced. They

Regulation of Frequency in Multi-Source Two Area Power System with TCSC

NO VYRANAD PURDALANING
Department of EEE,
Dr. JYRANI College of
Engineering & Technology,
Aditya Nagar, Nagpur University,
Aditya Prastha, India
nv.purdalaning@gmail.com

ANILKANT NARSHIMHARAO
Department of EEE,
Kavit College of Science and
Technology (KCSIT),
Kavit Area, 7th Ring Road, Kavit,
MUMBAI, INDIA

CHANDRAM SRINIVAS
Department of EEE,
Dr. Jyoti Engineering College,
Tadkal, Nagpur,
Aditya Prastha, India
chandra.srinivas@gmail.com

SHYAMU PAVAN KUMAR
Department of EEE,
Dr. Jyoti Engineering College,
Tadkal, Nagpur,
Aditya Prastha, India
shyamupavan@gmail.com

VISHVA RANJAN HARTANA
Department of EEE,
Dr. Jyoti Engineering College,
Tadkal, Nagpur, India
vishvanjan.hartana@gmail.com

YOGA ANJANESWARA
Department of EEE,
Dr. Jyoti Engineering College,
Tadkal, Nagpur, India
yoganjaneshwara@gmail.com

Abstract: Nowadays most people are aware of environmental changes based on greenhouse gases and pollution, the electric vehicle is one of the solutions to reduce the CO₂ in the atmosphere. The electric vehicle needs the charging/pulsating station to charge the battery placed in it. The charging time of the battery depends on the vehicle size, battery capacity and if the vehicles are charged at the peak hours, it leads to impact the frequency collapse. To avoid such collapse the interconnected systems to exchange the power flow and maintain the system remains stable. But sudden and significant load addition it leads to create the frequency deviation in both systems which are the systems inter connected. The primary objective function is to minimization of deviation in frequency (Δf). In addition with frequency regulation under load added condition the secondary objective of the paper is to maintain deviation in the power (ΔP). The paper proposes the FACTS controller based load frequency controller (LFC) scheme. Here in the paper multi-area system is created with the combination of non-renewable, renewable and hybrid types of sources taken into consideration.

Keywords: Automatic frequency, FACTS, Load Frequency Controller, Load module, Electrostatic

I. INTRODUCTION

Generally, the electric load demand is unpredictable; it may vary based on atmospheric conditions and people's work. Various types of conventional and hybrid techniques are used to forecast the load demand based on historical data. Distributed power generation is increased in this era, to avoid transmission line losses. The DG system may operate in either stand-alone or a grid-connected mode according to the planning of the installation. In the grid interconnected systems, the changes in the distribution system loads may affect the system frequency when a large amount of load addition/rejection. Fig. 1 represents the interconnected

systems represented by area 1 & area 2 through a tie-line. A feedback system is employed to balance the system stability is known as load frequency control (LFC). Load frequency control is the representation of the link between the generation and utilization side in the power system network. When a power system undergoes sudden load changes more or less high in size it creates oscillations in the system frequency.



Figure 1: Two-area power system

If the power system has an inter-connected area that in the load changes, the system goes to the-line power disturbance side. Due to these types of frequent oscillations in frequency and tie-line power, the meter high position and the terminal voltage of the generator go to change their normal values and it leads to voltage collapse. Many researchers addressed this problem by different conventional mathematical control-loop proposals and as well as optimization techniques used to tune the controller parameters to reduce the oscillation.

II. LITERATURE SURVEY

Modified differential evolution technique is used to tune the fuzzy-based PI controller to maintain the deviation frequency and tie-line power deviation. TCSC based LFC is also developed and tested on the dynamic load change [1]. The effect of electric vehicles' impact on the distribution network is discussed with help of a multi-area power system to address the load frequency control problem. The authors compared various types of PI control

High Step-Up Voltage Gain Boost Chopper-Fed DC-DC Converter for Medium Voltage Applications

DUNIA DEWARAFALLI
Department of EEE,
Faculty Institute of Engineering &
Technology,
Widyadarmas, Andhra Pradesh,
India
dunia.d@vit.ac.in

ABHIJAIL NEDIBOONTYA
Department of EEE,
Kavit College of Science and
Technology (KCSIT),
Hauz Khas, 19, Ring Road, Gurgaon,
India
abhi.jail@vit.ac.in

H MADHUSRIHAN REDDY
Department of EEE,
Jai Hind Engineering College,
Zalapattanam,
Andhra Pradesh,
India
hmadhusrihanreddy@gmail.com

A SRI KUPAL
Department of EEE,
Jai Hind Engineering College,
Zalapattanam,
Andhra Pradesh,
India
srikupal@vit.ac.in

S SABAYANAN
Department of EEE,
J. J. Sree Institute of Technology,
Vijayapur, Telangana,
India
sabayanan@vit.ac.in

G JAI REDDY
Department of EEE,
Jai Hind Engineering College,
Zalapattanam, Andhra Pradesh,
India
gajai@vit.ac.in

ABSTRACT

PV systems have generally low voltage levels, although there are significant losses. The major goal is to increase the voltage gain while maintaining high system efficiency. The system currently has some faults, such as input current not being continuous, significant current ripple, and leakage currents. There is the possibility of boost the voltage gain while using a transformer, but it occupies space, is expensive, and has to be considered every time the transformation ratio, these drawbacks are avoided by utilizing a Z -source DC-DC converter. This paper proposes a high step-up voltage gain boost chopper-fed DC-DC converter for medium voltage applications. The proposed converter helps to improve system voltage gain while reducing voltage stress on capacitor switches and current ripple. The proposed converter topology is examined by comparing with other converter configurations, the proposed topology shows robust performance and better results in terms of high voltage gain, low voltage stress on the energy storage elements, and less harmonic content in the output voltage. Simulation results are verified and compared with other existing configurations.

Keywords: DC-DC converter, High voltage gain, Medium voltage applications, Voltage stress, Z -source.

1. INTRODUCTION

Electrical and electronic engineering combine design creativity with scientific concepts to develop new electrical products, applications, and systems (i.e. in designing new types of electronic materials and integrating them into systems) by advancing technology by developing complex systems by recovering system control population for robust and autonomous.

In electrical power engineering, three aspects play very important roles: they are power generation, transmission, and utilization. We can preserve a vibrant economy and a healthy environment by using power electronics. Fundamentally, solid-state power electronics refers to energy conversion circuits. Any system that has power electronic components, which are used to control and convert energy, will work efficiently. The type of input and output may be divided into the power conversion devices; they are AC-AC converters, DC-DC converters, DC-DC converter, and AC-AC converters. Multi-stage power converters are necessary for several applications. This stage incorporates a huge number of converters, resulting in higher equipment costs. As a result, the system's efficiency and reliability may suffer, as well as increasing losses. To overcome the effects of the foregoing problems, impedance-based converters were developed. They provide excellent single-stage power conversion, increasing efficiency, and reliability while lowering costs. Impedance-based converters are divided into two types: transformer-coupled inductors (TCIB) and non-transformer-coupled inductors (n-TCIB). Non-transformer-coupled inductors have more advantages than transformer-coupled inductors, but they have a lower voltage gain. The n-TCIB is divided into various span Z -source networks that are utilized to boost voltage gain [1].

Maximum power point tracking (MPPT) is one of the strategies for PV systems. There are numerous MPPT techniques available, and when selecting the best MPPT method, it must fulfill the requirements of accurate tracking, constant stability, and steady-state response. The POC methodology was also used to track the maximum power from a PV cell; however, oscillations were a problem. The second method is used to implement the steepest algorithm track;

Solution to Economic Load Dispatch using Ant Colony Search based-Teaching Learning Optimization

*Karthikeyanar Balaji, *V. V. Balarama Krishna Rao, *Malarvannaidu Madappa, *U. Chandu Rao, *Nandakumar Aranganan and *C. V. Appa Rao

Department of EEE, Aditya College of Engineering & Technology, Saranapalle, Andhra Pradesh

Department of EEE, Sree Sai Institute of Technology, Nellore, Andhra Pradesh, India

Department of EEE, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India

Department of EEE, Chaitanya College of Engineering & Technology, Kuvempu, Tirumala, India

Department of EEE, Sri Sai Institute of Technology & Engineering, Tadipatri, Andhra Pradesh

E-mail: karthikeyanar@rediffmail.com, vvdskrishna@rediffmail.com, malarvannaidu@rediffmail.com,

u.chandurao@rediffmail.com, nandakumar@rediffmail.com, apparaganan@rediffmail.com

Abstract– The primary objective of this paper is to minimize power production cost by optimal allocation of generators with an equal constraint of load demand using the proposed ant colony search based-TLBO. The ant colony search based-TLBO algorithm facilitates sophisticated harmony between exploitation and exploration. Economical load dispatch is a non-linear problem. It contains several inequality constraints, and valve point loading are the causes. To meet the optimization techniques if the function is linear several iterative methods are available and for non-linear functions also possible to apply various techniques but the main drawback in the generation cost curve function the curve slope is not fixed due to valve point loading. In this paper, the ant colony search based-TLBO technique is proposed, and to test the stability of the proposed algorithm three different test cases are considered here:

- i) The standard IEEE-30 bus system
- ii) DG-based Industrial Corridor
- iii) Gold-Copper Mine Power System

All these test cases have different numbers of generators as well as load centers. This is a multi-objective function and the proposed algorithm gives the optimal solution with very little time, high convergence rate, and the number of algorithm variables is very low used in it.

Keywords: Ant Colony Search, Economic Load Dispatch (ELD), Equality Constraints, Evolutionary Algorithms, Inequality Constraints, Load Demand, Teaching-Learning Optimization

1. INTRODUCTION

In the real world, the electrical load demand is dynamic because the consumers use the electrical appliances according to their needs and wants. Not only residential consumers, the agricultural, commercial, and industrial loads are also varying the load demand according to seasonal conditions and product development respectively. All these users to estimate, the planning and scheduling of generators very crucial in power generation and management [1-3].

Economical load dispatch and unit commitment play a significant role in power generation. Mainly economic load dispatch is used to find the low-cost power production by optimal allocation of generators in the power plants. Economic load dispatch is a non-linear problem, various equality and inequality constraints are considered in terms of load demand, voltage, real & reactive power flows, shunt capacitance, and transformer tap settings [2]. Traditional linear programming is fit for the economic load dispatch problems due to its non-linear nature in the cost curve characteristics. The non-linear programming & quadratic programs are also addressed constraints due to valve point loading, ramp rate limits are incorporated in the objective function. Various traditional optimization techniques are addressed the economic load dispatch problem and obtained fruitful results by satisfying all the constraints.

The valve point loading, ramp rate limits, and multi-fuel inputs are causes the cost curve to shape not in a regular manner and piecewise nature they conventional methods are given compromised solutions with constraints which are considered in economic load dispatch problems. For competitive satisfactory results, the traditional optimization techniques are addressed the economic load dispatch problem and get satisfactory results. Initially, the classic calculus techniques considered to solve the economic load dispatch problem like lambda method, matrix point method, gradient method, linear programming methods[4] the linear nature of the economic load dispatch. But due to the non-linearity of the above methods not reaching the best solution so it leads to non-linear techniques quadratic programming and dynamic programming [4] to address the non-linearity. Future optimization techniques are used to solve the economic load dispatch problem to avoid the effect of non-linearity. Differential evolution, genetic algorithm, evolutionary programming, simulated annealing, harmony search, artificial immune network, tabu search, ant colony

Mathematical Modelling Of DVR with Two Stage Feedback Controller

IMADAMA VIKAS KIRKAR
Department of Technical Education
Government Polytechnic,
Kothagudem
vikas.imadama@rediffmail.com

PRIYANTHYA THEDA
Department of EEE
Vellore Institute of Technology,
V.ellore,
thedyapriyanta@rediffmail.com

PRYOR SUDHAKAR
Department of EEE
St. Xavier's Engineering College,
Tatyasaiguda
pryor@rediffmail.com

V S ADITYA
Department of EEE
St. Xavier's Engineering College,
Tatyasaiguda
vts@rediffmail.com

P RAMA KRISHNA
Department of EEE
Vellore Institute of Technology A
Engineering, Tatyasaiguda
p.rama.krishna@rediffmail.com

Dr. RISHI SANTHOSH
SINGH THAKUR
Department of EEE
M.V.R. College of Engineering &
Technology, Vijayawada
rishi@rediffmail.com

Abstract

In the last decade significant use of CPDs (Custom Power Devices) utilization is drastically increased due to awareness of PQ (Power Quality) problems and on per basis of power grid and power, the shortage is reduced from 10% to 0.5% in the period 2000-10 to 2019-2020. Now the focus shifted to the most attractive area reliability of power supply. The major hazards in the reliable power supply, power quality issues harmonics, voltage profile variability due to voltage sag, voltage swell, Voltage sag is the most common as well as critical problem in the transmission and distribution systems. After 2012 most grid failure in India shows the failure of the voltage of profile importance and in the last decade and midway above 20 cases of power affected in India. This article deals with mathematical modelling of DVR (Dynamic Voltage Restorer) using a feed forward network (optimal neural networks) and the power quality improvements when it is integrated with the grid system to reduce the impact of issues like voltage sag and swell which are occurred in the grid connected system. The responses of open loop and closed loop DVR voltage profile is also discussed in this paper and all these conditions are tested on the MATLAB platform. **Keywords:** Dynamic Voltage Restorer (DVR), Feed Forward Network, Power Quality Voltage Sag, Voltage Swell, Voltage Profile

1. INTRODUCTION

In [1], the ultra capacitors (UC) are used as the storage systems for DVR, the renewable energy sources are integrated with conventional grid system. The DC bus supported by custom power devices like DVR, to compensate for the voltage swell and sag when fault occurs in the transmission line. The author suggested that the ultra capacitor (UC) is used as a DC link. The major advantage of the proposed topology, the DC doesn't depend on the conventional grid for the compensation of the voltage levels in the faulty situation. In this technology the power quality is

improved but complexity of the control is moderately high because two converters are needed to control [1]. Predictive control strategy is proposed in [2], this strategy utilizes the error values in the injected voltage level in the transmission line and generally the DVR is supported by PI control to generate sufficient amount of voltage required for the compensation custom fault condition. The predictive control and capacitor filter placement improves the power quality and reduces the response harmonic in the injected voltage of less than 1%, because of the filter placement at line side. In general the capacitor filter is always placed at the consumer side only [3], [4]. In [4], the use of CPD is custom protective device for power quality problems. In general, the industries face common problems in the supply line voltage like swell, drop, sag, etc. It may state that to control sensitive & critical equipments which "OH" condition. With the injection of CPD the DVR the severity of the problem can be reduced by injecting the proper amount of voltage injected in-phase with PCC (point of common coupling) and they can generate enough the sufficient amount of reactive power according to load change. In this context, the stability issues are observed in the CPD's like DVR, the author proposes the low rating of DVR to reduce the stability issues and improves the performance of the DVR. The rating of DVR is completely depends on the DC-link, here generally a capacitor is used as a DC-link in the voltage source converter. Many control strategies and structures are proposed to avoid the most common as well as reduce issues like voltage sags, swells, harmonics, etc. The DVR provides the solution with different techniques adopted. In [5], the features of conventional DVR is discussed in detail. Conventional DVR structure contains the storage devices which took financial burden on investment and it also limits the level of compensation using DVR. The

Control Of Generator And Load Side Converters For Stand-Alone Variable Speed Wind Turbine

Chandagan Srinivas

Department of Electrical & Electronics Engineering,
 • Jeeva Institute Of Technology & Engineering,
 Tadepalligudem, Andhra Pradesh,
 e-mail:chandagan@gmail.com

Subrahmanya Aditya Vekada

Department of Electrical & Electronics Engineering,
 Sri Vasavi Engineering College,
 Tadepalligudem, Andhra Pradesh.

Abstract. Primary aim of the paper is to generate the quality of power from the renewable energy resource, the wind energy is considered here. In general the system is operated in two load conditions i.e. constant speed i.e. Grid connected mode. This paper explains the control of a standalone system using two different control schemes namely a generator side control scheme i.e. load side control scheme. Which are helps to regulate output voltage levels and power delivered to load with any disturbance even in the variation caused in the input side. The MATLAB platform is used for the testing control strategy.

KEYWORDS: asynchronous generator, generator side controller, load side control, renewable energy, synchronous generator, wind energy.

I. INTRODUCTION

The electric power generation using wind energy source is attracting extensive consideration, since it is utilized, safe, eco-sustainable and proposed for giving critical sources of energy. Wind power age frameworks are developing quickly in sustainable power source applications [1]-[3]. Two types of wind generation turbines are available named as 1. Fixed speed wind turbine and 2. Variable speed wind turbine. The most widely recognized kind of wind turbine is the constant speed wind turbine with the induction generator straight forwardly associated with the grid. The reactive power and, therefore, the grid voltage level can't be controlled. The majority of the drawbacks of fixed wind turbine are stayed away from when variable-speed wind turbines are utilized. Variable-speed wind turbines have numerous favorable circumstances over fixed speed generator type are expanded viability catch, activity at greatest three point, upgraded productivity, and power quality [4]. The rotor levels are reduced by using variable wind turbines at below rated velocity of the wind. But in variable speed wind turbine power electronics converter is required which makes the variable speed operation infeasible. Essentially, a wind turbine can be outfitted with a three-phase generator such as synchronous generator

and asynchronous generator. The former turbine gets the better rotor stability in the case consisting of any case two rotating edges precisely coupled to an electrical generator which is used to deliver the electrical force. The variable idea of the torque and the change of burden profile lead to fluctuating ranges of the field voltage and occurrence [5].

In Variable Speed wind frameworks, power grid/s converter keep the rotor speed and the network occurrence separated, in factor speed wind turbine matrix inverter not influenced the rotor speed and it goes ahead as free. Thus it is clear that the rotor speed always depends on the variations of input power. The input power is slightly higher when it is compared with output power of the wind turbine and which gives the stability as well as delivered the power to well manner to the grid system. The three issues of these frame-stable frameworks is greatly improved connected with their fixed speed partners. Variable wind speed turbines are operated in large wide speed range by maintaining the tip speed ratio optimum. The primary use of these turbines, it captures the higher energy and the limitation only in control is complex in nature.

II. SYSTEM DESCRIPTION

The power delivered by the rotor is expressed as

$$P_r = 0.5\rho AC_t V_w^3 (1) + C_p V_w^2 - 0.5\rho AC_t V_w^3 \quad (1)$$

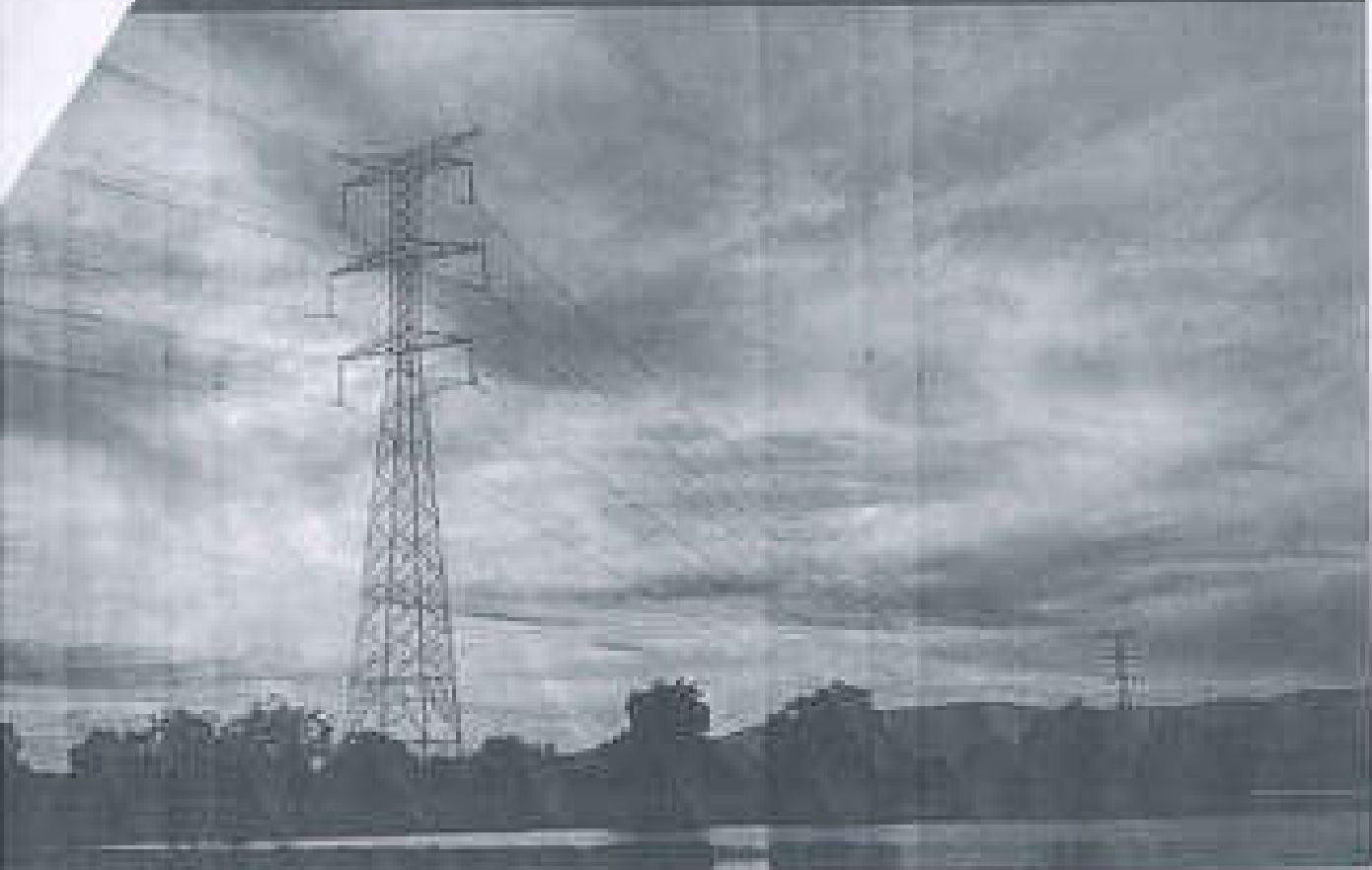
Where ρ is the density of air, V_w is speed of the wind in m/s, A is the swept area of the wind turbine blade, C_t is function of pitch angle & tip speed ratio. Tip speed ratio is expressed as

$$\lambda = \frac{R\omega}{V_w} \quad (2)$$

The optimal power output from the turbine is

$$P_{r,opt} = 0.165AC_t V_w^3 \left(\frac{R\omega_{opt}}{V_w} \right)^5 = K_{opt} (V_w, \omega)^5 \quad (3)$$

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Veera Venkata Rama Rao Pokanati

High Voltage Engineering for Beginners

Principles and fundamentals



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Volume 27(5), Issue 1
4 May 2017



ADVANCES IN
TECHNICAL
CONSTRUCTION
MATERIALS

ISSN 1751-4013 (print)
ISSN 1751-4021 (online)

ARTICLE IN PRESS

Utilization of palm oil fuel ash in concrete

Shahzad Chaudhry, Ahmad Nadeem, Muzaffar Hussain, Farhan Ahmad, Sajid Ahmad, and Sajid

Abstract

Abstract text, partially obscured by a watermark.

The properties of concrete are investigated in this current work by replacing Portland cement of M40 (28 days) with varying amount of palm oil fuel ash (POFA). The primary purpose of this work is to use the burning waste in the cement concrete and also to reduce the use of cement in building industry. By varying amount of POFA, the strength (compressive, splitting tensile, and modulus of rupture) increases by 10% to 20%. Various concrete failures are presented, such as compressive, modulus of rupture, and splitting tensile are presented. It is observed that compressive and modulus of rupture increase by 10% to 20% with the incorporation of 20% POFA as an alternative concrete substitute. Replacing POFA as an alternative material to the cement of all palm oil fuel ash weight and volume based concrete, modulus of rupture increases just as increased the modulus of rupture strength (modulus of rupture) of concrete. It is observed that the use of POFA in concrete increases the modulus of rupture strength (modulus of rupture) of concrete.



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Dr. T. Prabhakaran
Organizing Secretary & Librarian,
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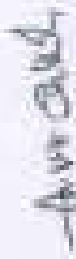
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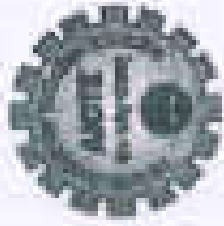

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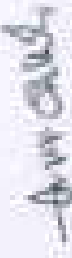
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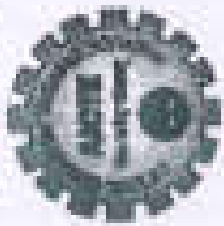

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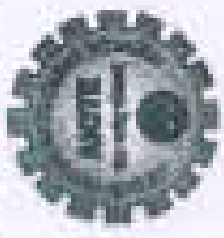
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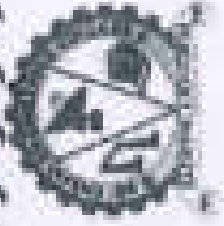
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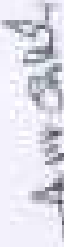
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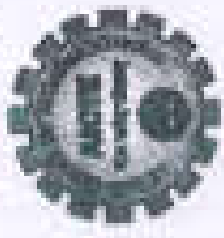
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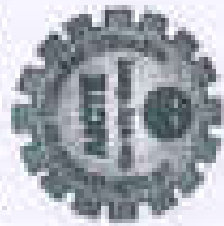
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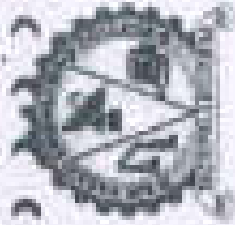

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Conceptual Glance of Genetic Algorithms in the Detection of Heart Diseases

Pagalla Bhavani Shankar and Yarlagadda Divya Vani

Computer Science and Engineering, Sri Vasavi Engineering College(Organizational), Tadipatri,Andhra Pradesh, India
E-mail : pagallebhavani Shankar@gmail.com, divyanalho99@gmail.com

Abstract: – This paper presents the far-reaching versatility of optimization algorithms in the realm of heart disease detection. An optimization algorithm has a range in diversified sorts of various problems. Swarms Optimization algorithms are the greatest contributors algorithms in several medical or therapeutic problems such as heart disease detection. By merge various optimization algorithms for discovery of the complex medical diagnosis are easier in heart disease detection where expertise and knowledge up gradation is difficult in general manner. By addressing the various optimization algorithms, such as Artificial Bee Colony (ABC), Particle Swarm Optimization (PSO), Ant Colony Optimization (ACO) algorithms in a artificial neural networks, the detection of heart disease in details to accurate prediction. The database used for heart disease detection is Cleveland database data set from UCI (User Class Identification) machine learning repository. Cleveland database contains 76 attributes, although a subset of 14 of them, 13 are taken as input parameters and 1 attribute is a predicted output value. Based on the outcome predicted values of ABC, PSO and ACO algorithm, it is clear to note that the best stochastic and optimizable swarm intelligence algorithms.

Keywords: Swarms Optimization; Artificial Bee Colony; Particle Swarm Optimization; Ant Colony Optimization; UCI Cleveland database; Swarms Intelligence

I. INTRODUCTION

Technology is a godsend to the world. Technology has changed its color of wings as per the needs of society. Technology amazed the world as it requires and it also give a various paths to the nature of living styles. Technology is enlighten the world in all fields like engineering and medical. Technology plays a vital role to sustainable way to different medical problems. Heart Disease is the governing noncommunicable disease in present days. As per the census more people were daily attacked by various types of heart diseases. The cost of heart disease attackers are increases by day by day.

Mental stress, physical stress like uncontrolled blood pressure, uncontrolled diabetes, uncontrolled cholesterol, uncontrolled weight, tobacco and alcohol consumption are the various or risk factors of several types of heart diseases. India is the diabetic capital of world. The life style of heart attack in India is at peak level comparatively with other one. 17.3 million Deaths were taken place due

to heart disease in every year and it will be 23.6 million approximately at 2030 census [7].

II. LITERATURE REVIEW

Genetic and swarm optimization algorithms are the best stochastic algorithms and are having a wide range of variant applications in all fields. These various stochastic algorithms were tested and applied in the area of medical diagnosis of heart disease. The working principles, applications and several studies of genetic algorithms were taken place to optimize a best solution in several problems.[1]A Novel clustering approach : Artificial Bee Colony Optimization by Dorvis Karaboga, Cukuk Ozturk, leads the application and strategies of ABC (Artificial Bee Colony) algorithms in a specified manner. [2]Heart Disease Detection by Enhancing the Training Phase of Neural Networks Using PSO (Particle Swarm Optimization) Algorithm by Pagalla Bhavani Shankar, delineate the working principle of the PSO algorithm. [3]Heart Disease Detection by Enhancing the Training Phase of Neural Networks Using ACO Algorithm (Ant Colony Optimization) by Pagalla Bhavani Shankar, delineate the optimization process of ACO algorithm in brief. [4]A Comprehensive Review of Swarms Intelligence Algorithms in the Detection of Heart Diseases by Pagalla Bhavani Shankar, intelligibly illustrates the comparative analysis of ABC and PSO algorithms.

III. GENETIC ALGORITHMS

Genetic Algorithm developed by John Holland in the year 1975. The main inspiration of the genetic algorithm is the evolution theory of Darwin's. Merely, a genetic algorithm is an algorithm for clearing or solving an optimization problem in a generalized manner. Genetic algorithms or swarms optimization algorithms are the working and operating environment of Artificial Intelligence (AI). These are the collective and decentralized organized systems, interacting with one to another in their environments by compiling with the nature and bio – inspired. Genetic and Swarms intelligence algorithms are the amalgamation of nature and bio – inspired algorithms.

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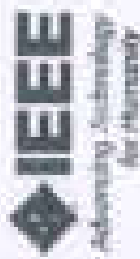
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Patron

Tribocorrosion mechanisms in sliding contacts

M. Venkatesh¹, R. Salazar², A.V. Mohan Rao³
and A.V. Aditya⁴

¹Department of Mechanical Engineering, Sri Sivasubramanian Engineering College,
Tirupattur, Andhra Pradesh, India, ²University of North Texas,
Denton, TX, United States, ³University of Georgia, Georgia, USA,
⁴Center for Nonlinear Materials, Argonne National Laboratory, Lemont,
IL, United States

4.1 Introduction

Mechanisms involved in the degradation of materials under the combined effects of corrosion and wear have been an important area of research. This is primarily due to the increasing practical importance as seen in several engineering applications [1]. Classical electrochemical corrosion experiments such as open circuit potential, potentiodynamic polarization, and electrochemical impedance spectroscopy are typically carried out under static conditions [2]. Tribological performance of engineering materials tested using typical techniques can be broadly classified under two categories under laboratory test conditions [3]. While the electrochemical tests offer in-depth information on the mechanisms involved in corrosion and wear behavior of materials individually, they lack a comprehensive understanding of phenomena occurring at the surface when loading and corrosion conditions occur simultaneously. The study and understanding of tribocorrosion mechanisms have been challenging due to two reasons: first, the difficulty in developing test conditions that can closely replicate the actual application conditions and, second, the

difficulty in isolating and identifying the mechanisms that take place due to the simultaneous action of wear and corrosion. Research directed toward understanding these two aspects have yielded important advancement in the understanding of mechanisms in tribocorrosion during sliding. This chapter is an attempt to summarize these developments and allow the reader a broad view of the mechanisms in tribocorrosion under sliding. Since the operative mechanisms are strongly dependent on materials structure and processing, the chapter is laid out discussing the mechanisms in the same order and concludes with a summary and future scope. Usually, the mechanisms that are operative in the surface degradation of metals during sliding fall in a sequence in the order of surface passive layer breakdown under mechanical sliding, rapid deterioration of the passive layer, secondary surface under the combined action of sliding and corrosive media attack, and regeneration of the surface when sliding ceases. This part may be interpreted by phenomena such as loading-induced secondary phase formation, development of intermetallic compounds like metal oxides and metal chlorides and in some cases, formation of three-body wear, and so on. These phenomena as reported in the literature are summarized and discussed here with.

Among the most frequently studied materials for corrosion and wear and for tribocorrosion are stainless steel, aluminum, titanium, copper, and

Electromagnetic Braking System Fabrication With Chain Drive System

S.K.V. Srinivas
Assistant Professor
Department of Mechanical
Engineering
Jawahar Engineering
College
Tadepalligudem, India
skvsm1@gmail.com

K.S.B.S.V.S. Sastry
Associate Professor
Department of Mechanical
Engineering
Tadepalligudem, India

G.RamPrasad
Assistant Professor
Department of Mechanical
Engineering
Sri Varahi Engineering
College
Tadepalligudem, India

K. Durathi
Assistant Professor
Department of Mechanical
Engineering
Tadepalligudem, India.
durathikare789@gmail.com

Electromagnetic Braking System uses the Magnetic Force but the power required for the braking is manually input. A shaft is fastened to the disk and an armature is mounted on the frame. Due to the current in through the coil, as electricity is being applied to the magnetic force is formed over the armature which pulls the armature to be drawn in the coil. As a consequence, the power is given and gradually the vehicle comes to rest. The aim of using an electromagnetic braking system in the car is stated in this project. It is possible to add these as dual auxiliary brakes in heavy vehicles. Electromagnetic brakes should be used as auxiliary brakes in commercial vehicles. By regulating the supply current to control the magnetic flux, electromagnetic brakes can be used by road vehicles. It could be used in cars in the future to save energy in the brakes.

Keywords—Braking system, magnetic force, chain drive

I. INTRODUCTION

Electromagnetic brakes are electrically operated, torque transfers mechanically. Because of this, they are referred to as electro-mechanical brakes. Over a few years, EM brakes, referring to their performance, became known as electromagnetic. Rapidly, the list of applications and brake designs has increased, but the procedure remains the same. Electromagnetic disc brakes make up approximately 80% of all brake forces that apply power.

II. CHARACTERISTICS OF ELECTROMAGNETIC BRAKES

Electromagnetic brakes have also been found to produce a torque that is almost twice the maximum power output of a conventional engine and at least three times the stopping torque of an exhaust brake. Such electromagnetic brakes are much more attractive compared to other retarders for alternative retardation systems. Before requiring repairs, the brake lining would last longer, and the possible "brake fade" issue could be avoided. It was shown in research conducted by a truck manufacturing company that the electromagnetic brake reduced 80% of the duty of the regular service brake that otherwise have been requested.

In addition, the electromagnetic brake avoids the dangers that may occur beyond its capacity to dissipate heat from the repeated use of brakes. It is most likely that this would happen at high speeds when a vehicle is descending a long gradient. Electromagnetic brakes are electrically functioning, but mechanically transfer torque. Owing to this, they used to be referred to as electro-mechanical braking. EM brakes have been known as electromagnetic over the years, referring to the similarity of uses and brake designs, but the underlying operation remains the same.

Electromagnetic single-face about 80% of the braking are of all brake applications that apply power. These brakes are mainly concentrated in this article. At the end of this article, alternate designs are shown. In addition to the standard friction brakes on heavy vehicles, electromagnetic brakes have been used as supplementary retardation devices. In this section, we outline the basic concepts of normal brakes and some alternative strategies for retardation. The operating theory and features of electromagnetic braking are then stressed.

A. Electromagnetism

One of the four basic interactions in nature is electromagnetism. The other three are the gravitational relationship, the weak relationship and gravitation. The force that induces the interaction between electrically charged particles is electromagnetism; the areas in which this occurs are called electromagnetic fields.

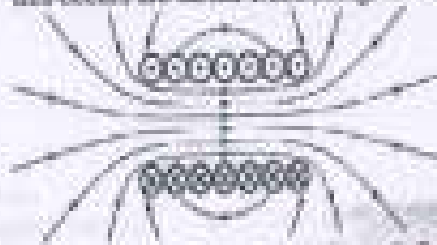


Fig. 1. Electromagnetic field

B. Types of Electromagnetic brakes

- 1) When electrical power is either inadvertently lost or purposely disconnected, power-off brakes stop or hold a load. Some firms have referred to these as "fall safe" brakes in the past. Usually, these brakes are used on cranes as electric motor. Popular applications include hoists, retaining brakes for Z axis ball screws and servomotor brakes. Brakes are available at different voltage

DEVELOPMENT OF HYDROXY GENERATOR FOR GENERATION OF ECOFRIENDLY HHO GAS AND ANALYSIS OF ENGINE PERFORMANCE WITH HHO GAS AS SUPPLEMENT

Dr. Venkata Ramesh Manilla
 Professor & Head
 Mechanical Department
 Sri Vasavi Engineering College
 Tadepalligudem
 kod_mitch@srivasaviengg.ac.in
 Harsha Varadhan Y
 UG Student
 Mechanical Department
 Sri Vasavi Engineering College
 Tadepalligudem
 harshavaradhanharshari@gmail.com

Sri Rama Murthy K
 Senior Assistant Professor
 Mechanical Department
 Sri Vasavi Engineering College
 Tadepalligudem
 Karred5@gmail.com

Uma Sai Veerababu Rao S
 UG Student
 Mechanical Department
 Sri Vasavi Engineering College
 Tadepalligudem
 marthasr.mech@gmail.com

Abstract - This paper deals with the production of HHO gas and then use the hydrogen liberated from it as a additional to increase fuel efficiency in IC engines. The combustion method in IC engine is terribly primitive and then unburnt fuel remains when the combustion method. This is a really difficult downside being faced by today's industry as the unburnt mixture may be a serious air waste. HHO generator may be a terribly economical approach to reduce the fuel penalty by increasing the energy created per mole of fuel throughout the combustion method. As a result the quantity of unburnt fuel within the combustion chamber was reduced. The predictable approach relies on a standard HHO generator. Though individuals use HHO generators to follow a really very little analysis has been distributed in implementing associate is economic system. This paper is mainly focused on drawing a comparison between the various characteristics of IC engine when run with Petrol and Petrol with HHO as supplement and deciding the better system.

Keywords: Performance, IC Engine, HHO Gas, Petrol

1. INTRODUCTION

The most economical alternate fuel of the advanced than listing is chemical element. It has almost the same calorific value as the petrol. Hydrogen is wide phreatic around as within the diversity of water. If we can find an efficient and up process to extract it from water we get ourselves a Whereas extraction of Hydrogen from water is the best way because it produces a mixture of hydrogen

and oxygen also called as 'oxyhydrogen' or 'Brower's Gas'. This is a highly combustible mixture which has more calorific value than hydrogen molecule. Clean energy source as the byproduct of Hydrogen burnt is water again.

About Hydrogen

Atomic Number	1
Appearance	Colorless
Phase(at STP)	Gas
Density(at STP)	0.08988
	g/L
Thermal Conductivity	0.1805 W/mK
Molar Heat Capacity	28.836 J/mol-K
Heat of Vaporization	0.904 KJ/mol
Net Calorific Value	1.21,000 KJ/kg

There are many sources from which Hydrogen can be extracted. It can be take out from Acetylene or from Water.



Fig.1 Hydrogen

A. Extraction of Hydrogen

Hydrogen itself isn't of any use. A mix of H and O is needed for it to chamber as fuel. Extraction of Hydrogen from Acetylene requires chemical process and is more costly. So Hydrogen is favored in this development.

Volume 2027, Issue 1

6 February 2021



**Third International
Conference on Material
Science, Smart Structures
and Applications (ICMSA
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10 - 14 October 2020

Prints: India

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RESEARCH ARTICLE | OPEN ACCESS | 10.21660/2021.1.1001

Experimental investigation on mechanical, wear and corrosive properties of Al6061-TiB₂ in-situ composites produced by K₂TiF₆-K₂F reaction system at optimum holding time

S. Chakrabarti¹, R. S. V. Prasad²

¹ [Research Scientist](#)

² [Senior Research Scientist](#)

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Aluminum matrix composites with TiB₂ ceramic reinforcements are extensively used in an aircraft, automobile, naval and applications due to their low weight to strength ratio, better corrosion properties, excellent wear resistant properties. In-situ composites are manufactured under free stream conditions is designed, easy to fabricate and uniform distribution of ceramic particles. Al6061 is chemically react with liquid salts like K₂TiF₆ and K₂F to form TiB₂ in aluminum matrix because of exothermic reaction first particles of TiB₂ phases are formed at a optimum holding time (100min) of molten composite. Composite is prepared with different weight fractions like 0%, 2.5%, 5%, 7.5% TiB₂ in aluminum matrix. The TiB₂ reinforcement and distribution are examined using SEM, XRD, EDAX analysis. Mechanical, wear properties are studied and analyzed at different reinforcements of TiB₂ particles, as increasing TiB₂ content improves ultimate tensile strength, hardness, and wear resistance with decreasing ductility.



A Compact Multiband CPW feed Micro strip Fractal antenna for X band & Ku Band Satellite Communication applications

Conference

E. Lakshmi Kumar¹, Poojitha K. Shetty², S. Manjunath, D. Rama Devi
1,2,3, ICE Department, Sri Vasavi Engineering College
4, ICE Department, MVGR Engineering College

Abstract: The main objective of this paper is to design a compact multiband antenna using the fractal geometry in three iterations which is fed by Coplanar Waveguide Feeding technique. It is resonating at four different frequencies 12.25GHz, 13.8 GHz, 15.16 GHz and 18.22 GHz and the bandwidths obtained for this Quad band antenna are 540MHz, 690 MHz, 440 MHz, 1710 MHz respectively. In each iteration the performance analysis of the antenna was carried out in terms of return loss, Gain, Bandwidth, Radiation efficiency and comparison of four structures has been done. The proposed antenna consists of rectangular patch with the dimensions of 20mm x 13.8 mm and it was implemented on the substrate FR4 with the size of 27.15mm x 27.15mm x 1.6mm. Reactive loading technique was implemented in each iteration to achieve the multiband operation and hence miniaturization of the antenna size was also achieved with the proposed antenna design without much more compromising its radiation efficiency. Size reduction, multiband function and radiation efficiency combined together realizes a compact and practical antenna used for X band and Ku band Satellite Communication applications.

Keywords: Multi band, Fractal antennas, Reactive Loading, CPW feed, Radiation Efficiency, Satellite Communication

1. INTRODUCTION

Wireless communication has been evolving since the birth of radio wave. Recently the demand of Ultra wideband, multiband, miniaturization of antennas growing rapidly with the satellite and radar communication which became a common practice all around the world. Antenna is essential component for all wireless communication devices. It has the ability to provide a means of radiating or receiving wave signal into open free space from one place to other. Fast growing needs of wireless communications have spurred increasing possibility of including various service applications[3], with different frequency bands, in the same device, and also demand a compact antenna design for the integrated device. This has put tremendous inspiration for antenna engineers to develop miniature[7] printed antennas which can support different communication specifications. As the technology advances every year, demand for low cost, low volume, low profile, planar configuration, and ultra wideband multi frequency planar antennas

has been increased, so more research work is going on compact microstrip patch antennas because it satisfies all the requirements because of its low profile, low cost and printable circuit technology

In satellite communications, for radio waves and radar engineering, the IEEE Standard defined the microwave frequency bands X band and Ku-Band with frequency ranges from 8.0 to 12.0 GHz and 12.0 to 18.0 GHz respectively[1]. Nearly all C-band communication satellites use the band of frequencies from 3.7 to 4.2GHz for their downlinks, and the band of frequencies from 5.925 GHz to 6.425 GHz for their uplinks. For short range tracking, marine, radar airborne intercept and missile guidance the X band is used[4,5,6]. Especially it is used for radar communication ranges roughly from 8.29 GHz to 11.4 GHz. The Ku band is used for high resolution mapping and satellite altimetry. Especially, Ku Band is used for tracking the satellite within the ranges roughly from 12.67 GHz to 14.43 GHz.

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Mitigation of the Environmental Impact of the Construction of a Dam in the Middle West Application

Authors: [\[Name\]](#), [\[Name\]](#), [\[Name\]](#)

Published online: 15 June 2012

Keywords: [\[Keyword\]](#), [\[Keyword\]](#), [\[Keyword\]](#)

Available in: [\[Language\]](#)

Available in: [\[Language\]](#)

Abstract

In this paper, a new way to reduce the environmental impact of the construction of a dam is proposed. The authors propose a new way to reduce the environmental impact of the construction of a dam. The authors propose a new way to reduce the environmental impact of the construction of a dam.

15 June 2012

- 1. Introduction
- 2. Materials and Methods
- 3. Results and Discussion
- 4. Conclusion
- 5. References

Full text available at: [\[Link\]](#)

Available in: [\[Language\]](#)

Design Of Cylindrical Ring Dielectric Resonating Antenna For X Band Applications

Dr. D. Sarathin
Professor
Department of ECE
MUTHU Engineering College
Andhra Pradesh, INDIA
sarithind@gmail.com

Hemal Yerra
Assistant Professor
Department of ECE
MUTHU Engineering College
Andhra Pradesh, INDIA
hemal.yerra@muthuengg.ac.in

Abstract— This paper deals the Design of cylindrical ring dielectric resonating antenna for X band application. ALUO3 Ceramic and Rogers RT Duroid/RO4002CM(eps) material had been used for the design of the Antna. The lowest return loss had observed in the ALUO3 Ceramic material i.e., -24dB. It was observed that the maximum bandwidth is 100MHz and 300MHz. It was found that the maximum Gain is 9dB with ALUO3 Ceramic material. The entire structure had done in HFSS software. **KEYWORDS** ALUO3 Ceramic, Rogers RT Duroid/RO4002CM, Dielectric substrate, HFSS

I INTRODUCTION

A Microstrip antenna consists of very thin metallic patch placed on conducting ground plane, separated by a dielectric substrate [1]. A patch antenna consists of a radiating patch on one side of a dielectric material substrate and ground plane on other side is 2. Microstrip antennas are very popular and thus preferred due to their numerous advantages such as light weight, low profile. They are very versatile when chosen with a particular patch shape in terms of polarization, pattern and resonant frequency [2].

II FEEDING TECHNIQUES

In telecommunications and electronics, an aerial feed refers to the components of an antenna which feed the radio waves, convert them to electric components and transmit them to the receiver [3]. Microstrip patch antenna can be fed by a variety of methods

1. Microstrip line feeding
2. Coaxial feeding
3. Aperture Couple feeding
4. Coplanar Wave Guide feeding

The performance of the antenna of patch antenna depends on shape and size of ground plane as well as shape of feeding technique. One major limitation of the patch antenna is its narrow bandwidth characteristics. To achieve wide bandwidth and dual band characteristics use Coplanar Waveguide

(CPW) feeding and Defected Ground Structure (DGS) [4].



Figure 1- Coplanar Feed Structure

Figure 1 shows, coplanar waveguide consists of a conductor strip at the middle and two ground planes are located on either sides of center conductor. All three lie in the same plane [5]. The effective dielectric constant of CPW is same as of die film. The characteristic impedance of a coplanar waveguide is not affected by thickness and depends on width (W) and space (S).

III DIMENSIONS

The below figure 2 shows the basic view of the designed antenna with the dimensions of the Outer Radius is 18, Inner Radius is 4.5, Height is 22 and Ground Plane is 40x40x1.5.

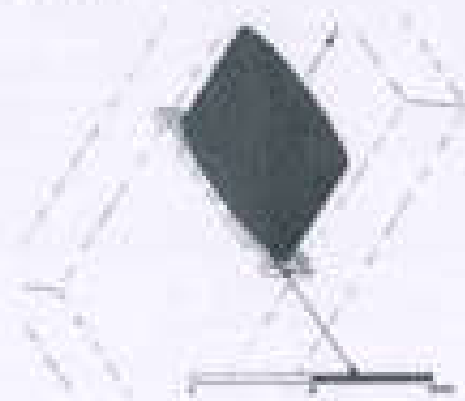


Fig 2- 3D Model for cylindrical ring DRA (Oblique view)

Design Of Cuboidal Dielectric Resonating Antenna For X Band Applications

Dr. H. Kumbhar
Professor
Department of ECE
MPCB Engineering College
Aundh, Prathna, INDIA -
kumbharh@rediffmail.com

Harish Varma
Assistant Professor
Department of ECE
St. Xavier Engineering College
Aundh, Prathna, INDIA
harishvarma@rediffmail.com

Dr. H. Kumbhar Kumbhar
Professor
Department of ECE
St. Xavier Engineering College
Aundh, Prathna, INDIA
kumbharh@rediffmail.com

Abstract— In this paper, the Cuboidal Resonator Antenna (CRA) is designed and fabricated using AL₂O₃ CERAMIC material and studied at various frequencies. The CRA antenna is designed by using ANSYS FREQUENCY STRUCTURE SIMULATOR software. It is one of the tools used for antenna designing in a sophisticated manner. In this design, aperture coupled feed technique is used to describe the characteristics of the antenna. The design uses cuboidal resonator CRA mounted on AL₂O₃ ceramic substrate. The CRA is fed by coaxial and microstrip line feed.

Keywords— CRA, Cuboidal structure, coaxial feed

INTRODUCTION

Antenna plays a vital role in the communication field. An Antenna is a device used to radiate electromagnetic energy into the space efficiently in the specified directions. Antennas act as a path between the space and electromagnetic energy. The direction for the signal can be specified by the antenna in some applications. Many antennas are used for different applications based on the frequency band i.e., if an antenna designed for specific application with specific frequency band is used only for that application. Beyond that frequency the antenna rejects the signal. In those cases that antenna is said to be a band pass filter.

There are many antennas used for microwave frequency applications which use different methods for designing and implementation. One of the microwave frequency applications is DRA (i.e., DIELECTRIC RESONATOR ANTENNA). In this DRA, it consists of a block of resonant material of various shapes, the dielectric resonator, mounted on a metal surface, a ground plane. The main advantages of this type of antenna are low cost, small size and can be easily adjust. The main drawback of these antennas are reduced radiation efficiency and narrower impedance bandwidth which are very important parameters in the antenna designing even though it uses the advanced designing solutions through a wide dielectric resonator or loading layer on dielectric resonator or loading structure but the reason is the effect of heavy structure and substrate materials. The antenna must satisfy all the parameters while designing and the most useful point in this design is that the dielectric

resonator (DRA) will allow the maximum signals at high frequencies mainly in the millimeter range and beyond. The main fact is that DRA doesn't have conduction losses and it can work efficiently with high radiation when it is fed properly. The shape of the DRA can be in various forms like cylindrical, rectangular, spherical, half-sphere cylindrical, disk, hemispherical, and triangular shapes which can be used various applications.

The physical view of a CUBOIDAL DRA consists of three edges. On comparing these edges, the second and third edges are equal in length. The first edge is having constant edge and first and second surfaces of the cuboid is formed by first edge. The main use of the first surface is for transmitting. The second surface is covered on the circuit board. The conducting material is coated on the first and second surfaces.

PARAMETRIC ANALYSIS

The following are the parameters which influence the parametric analysis for Rectangular DRA.

- Length
- Width
- Height
- Ground Plane

plays a key role in antenna designing. First step is of selecting the dimensional values for the antenna to be designed. In most common conditions some parameters like material properties, source excitations, boundary, shapes remain unchanged. Some parameters like Voltage standing wave ratio (VSWR), S-parameter, gain, radiation efficiency varies based on the dimensions. So it is very important to be accurate in the dimensions.

The operation in this DRA is that radio waves are injected into the resonating material from the transmitter and they bounce back between the resonator walls which forms standing waves. These walls are partially transparent which is used to let radio power to radiate into space. One

Smart Temperature Measurement System Using Raspberry-PI

E.N.Y.A.S. Madhava¹, Dr.H. Theerth², Mr. K.S.S. Kumar³, Dr. Parvathi K. Srinivas⁴

¹M. Tech student, Sri Yasevi Engineering College, Tadipatri, AP, India

²Professor, M. Tech, Ph.D. Department of ICE, Sri Yasevi Engineering College, Tadipatri, AP, India

³Assistant Professor, M. Tech, (Ph.D.) Department of ICE, Sri Yasevi Engineering College, Tadipatri, AP, India

⁴Associate Professor, M. Tech, Ph.D., Department of ICE, Sri Yasevi Engineering College, Tadipatri, AP, India

Abstract: From the last few years, several developments are being made in the area of automatic temperature prediction, including wearable sensor technologies (WST), infrared thermography (IRT). The development of infrared temperature measurement is useful to measure moving and high-temperature objects without interaction, easily and accurately. Under the premise of high measurement precision and low cost, an infrared thermometer can be utilized for high-temperature objects. For an object, a simple and precise measurement of the surface temperature was performed. A new IoT approach to measure, detect the temperature and collect the data, and test Web compatibility for data access. A device that uses sensor module MLX90614 integrated with a Raspberry pi development board and offers object, ambient temperature monitoring. If the temperature exceeds beyond the threshold value the system sends an alert message through Email.

Keywords: wearable sensor technologies (WST), infrared thermography (IRT), MLX90614, Raspberry pi.

I. INTRODUCTION

These days health monitoring become a greatest challenge in people's life. If the immunity mechanism rises, the body temperature rise to combat with infection, so the body temperature is assumed as an important parameter since ancient times to Understand the reaction of your body to an infection. For this reason, one of the few clinical measurements is body temperature. The usual temperature of the body varies between 36.5°C and 37.5°C. The individual body temperature depends on various factors, i.e., age, exercise, infection, and the posture of the body at which the measurement is made.

Indoor living environments include different types of rooms, and places where individual works as a group in a place such as offices, hospitals,

classrooms, libraries, recreational spaces, public service centers or even vehicle cabins. Schools, in particular, are an important location for temperature surveillance.

Using touch and contact techniques, the temperature can be determined. To have an accurate touch measurement, the sensor must be in perfect alignment with test object, which can lead to longer response times and reading inaccuracies effect by ambient temperature. In addition, infrared radiation non-contact measurement provide quick and reliable set of temperature data without requiring repeated data. One of the major needs of the coronavirus thermometer is this pandemic: Le COVID-19 where body temperature is the first parameter to check.

MLX90614 infrared thermometer is a non-contact temperature sensor module for Embedded compatible devices. An infrared thermometer works to measure the object's temperature by infrared radiation in the form of an electromagnetic wave through the light emitted on the object. The Methodology of a portable infrared sensing device with an ultra-low noise amplifier, which uses non-contact temperature sensing to collect temperature information without touching any object surface. This achieves high precision and resolution measurement. It has been calibrated with a factory digital system management bus (SMBus) via temperature ranges: -80 ° C to 125 ° C for most temperature and -70 ° C to 380 ° C for most temperature. object with a standard efficiency of ± 0.5 ° C around ambient temperature. An accuracy of ± 0.2 ° C in a limited temperature range around the human body temperature has been offered a special edition for medical applications.

II. LITERATURE SURVEY

[1] An advanced compact method was designed for the continuous monitoring of heart rate and body temperature. With the use of Arduino Uno, the system provides information on our heart rate and body temperature on the portable device in real

Double sided Split Ring Resonator Based Probe feed Patch Antenna with Enhanced Bandwidth for 5G & Ku Band Applications

Abstract: This paper discusses the Enhancement of Bandwidth in Coaxial Probe feed antenna achieved with Double sided Complementary Split Ring resonator (CSRR). The Split Ring Resonator Loaded antenna is designed on an RT Duroid 5880 dielectric substrate with the relative permittivity of 2.2 and the thickness of 1.6mm. The length and width of the Substrate and antenna are 200 mm X 180mm and 40mm X 30mm respectively. The Dimensions of SRR were chosen to achieve the Maximum bandwidth. To demonstrate the features expansion, a conventional antenna without CSRR is also designed using the same dielectric substrate to operate at the same resonant frequency 2.4 GHz. Antenna Structures like Simple Probe Feed, Single sided SRR Loaded on substrate and Double sided SRR structures were designed and Characteristics of all structures are compared each other in terms of, return loss, VSWR, gain, and radiation pattern. From the result, it is shown that the implementation of Double sided Split Ring Resonators on Substrate and Ground can achieve the bandwidth enhancement was achieved compared to conventional simple probe feed antenna from 30 MHz to 11 GHz.

Key Words: UWB Antennas, SRR, Millimeter wave, 5G Communications, Metamaterials.

I. INTRODUCTION:

Microstrip Antennas(MSAAs) have been widely used in high performance Millimeter Wave, 5G, Satellite and Wireless Communication applications with their unique features such as low cost, low profile, light weight, ease of fabrication and compatibility to integrate with circuit technology. Compactness, high efficiency and wide frequency bandwidth are the essential requirements for such antennas. However, the latter wide frequency bandwidth is still an inherent problem and a point of challenge in design of these type of antennas[1]. Increasing the substrate height, stacked patches or adding parasitic and direct coupled patch elements[2] strip four inverted patch can improve the bandwidth but they waste the low profile benefit of the antenna. Further, broad bandwidth can be reported from other designs such as embedding U-shaped and multi U-shaped slots and arc-shaped slots E-Shaped patch using air as the substrate.

With the recent developments in wireless telecommunications, devices are becoming smaller and supporting multiple operations. Some portable devices such as smart phones are designed with built in applications to handle numerous voice and data

services. Therefore, to satisfy the growing need of wireless telecommunication demands broadband antennas with good radiation characteristics are needed. The concept of metamaterial (MTM) has been widely used to improve the characteristics of antennas [3, 4]. Based on the Design requirements, the resonant and non-resonant approaches are used to design the MTM, [5-7]. The split ring resonators (SRRs), complementary SRRs (CSRRs), electric-field coupled-LC, etc. are comes under the resonant approach to design the left handed material [9]. Because of the excellent properties of the resonant inclusions, the antenna performances can be improved with MTMs [10]. However it is worth noting that, the resonant inclusions are narrow band naturally therefore, they should be properly integrated with some existing design techniques for improving the performances [11,12]. In the past decade, the metamaterial-based applications were widely investigated and presented due to their exciting unusual, and attractive features[12]. Electrically small antenna designs have been realized with the well known split ring resonators(SRRs) and their coequal, complementary split ring resonators(CSRRs).



RT-Gate: Concept of Micro Level Polarization In QCA

K. Bhagya Lakshmi¹, D. Ajitha² and K.N.V.S. Vijaya Lakshmi³

¹Department of E.C.E, Jssai Institute of Technology and Engineering, Tadepalligudem, India.

²Department of E.C.E, Sreevidya Institute of Science and Technology, Hyderabad, India.

³Department of E.C.E, Sri Vasavi Engineering College, Tadepalligudem, India.

bhagya@jssai.com, ajitha@jssai.com and v@jssai.com

ABSTRACT

QCA (Quantum-dot Cellular Automata) is the transistor free evaluation paradigm and viable candidate for replacing the CMOS based technology. QCA is one of the promising nanotechnology devices with the aim to replace the CMOS technology. QCA is implemented by utilizing the tunneling of the electrons with the given potential within the quantum cell. We suggested a multiplier architecture in QCA using micro-level polarization in this paper. The proposed multiplier design saved 66.67% of effective area compared to the best design reported so far. In this work, a new design of universal gates is proposed. The new design of these NOR and NAND gates require less number of cells and area compared to the conventional majority gate based designs. By using these micro-level polarized gates, the multiplier which is proposed in this paper is implemented. The multiplier is implemented and its functionality is verified by QCA Designer © 2005 Version 2.0.1.

KEYWORDS

Quantum-dot Cellular Automata (QCA), RT-Gate (Rising T-Gate), Inhibitory gates, Universal gates, Operator cost (O-Cost), Area Utilization factor (AUF).

1. INTRODUCTION

Quantum-dot Cellular Automata is a proposed improvement on CMOS technology. Moore's law states that the count of transistors present in an integrated circuit doubles about every eighteen months. But in the recent era, the size of the MOSFET is very minute. To satisfy the Moore's law, the size of the MOSFET must be very much shortened by reducing the length of its channel. By reducing the length of MOSFET's channel beyond certain limits, short channel effects occur in existence. There comes the QCA technology which gives transistor less designs. The area, speed and power consumption of QCA devices are upgraded beyond the technologies of semiconductor like CMOS to overcome the short channel effects. In Fig. 1, the Coulomb repulsion rule indicates the interaction between the two neighbor cells in QCA. Based on the adjacent cell's electron repulsion, the position of electrons will be set in the quantum cells. This way, the message will be transferred from input side to output side. The different combinations of the quantum cells give rise to different devices.

In QCA technology, the wire is in the form of an array, a mixture of quantum cells. There are four corners of each quantum cell that contain four quantum dots. The electrons will occupy diagonal positions due to the Coulomb repulsion force. These states are identified with respect to the polarization corresponding to the electrons placed on the upper diagonal. The polarization $P = +1$ is defined when one of the electrons is positioned at left lower and the other electron is positioned at the right upper. In opposite case, it is defined as $P = -1$. These representations are shown in Fig. 2. Polarization of a quantum cell is given by $P = (P1+P3)-(P2+P4) / (P1+P2+P3+P4)$ [1]. If two electrons reside in the opposite quantum dots of a quantum cell, then the polarization exits which defines logic 1 and logic 0. According to this, in Fig. 2, the first quantum cell polarization is $P = -1$ and $P = +1$ for the second quantum cell. In this paper, new designs of universal gates are proposed by changing the fixed polarization levels. The basic gates and the existing T-gate structure are discussed in the subsequent section. The proposed universal gates structure and the multiplier implementation are discussed in section 4 followed by the conclusion in section 5.

SPEECH BASED HOME AUTOMATION USING BLUETOOTH AND GSM

Yashraj P. M. Kulkarni¹, P. Balasubramanian², Subhakar M. Datta³

¹Department of electronics and communication engineering,

JYEC, Akurdi, Pune, India

²Associate Professor, Department of electronics and communication engineering,

JYEC, Akurdi, Pune, India

³Professor, Department of electronics and communication engineering,

Chhatrapati Institute of Technology, Ghatge, Pune, India

⁴Department of electronics and communication engineering,

JYEC, Akurdi, Pune, India

Abstract

Home automation is building automation for a home, called a smart home or smart houses. A home automation will control lighting, climate, entertainment systems and appliances. It may also include control and alarm systems. Researchers are mainly implementing this for the use of old people and differently-abled people at home or to lessen the work of the people at home. For implementing this project we are using two modules, they are Bluetooth and GSM. The first module is used when the user is in the range of Bluetooth and the second module is used when the user is away from the home. Here we are using Raspberry Pi 3 model B as a microcontroller. For connecting to the on board Bluetooth of Raspberry Pi, we are using a application called Pi Bluetooth manager.

Keywords

Home Automation, Raspberry Pi 3 model B, GSM module, On-board Bluetooth, Pi Bluetooth manager

1. INTRODUCTION

Home Automation refers to the automatic and electronic control of household features, activity and appliances. The control knobs located at different positions in the house will make it difficult for the members of the family to operate them. Hence the automation of the appliances will make the way easy, especially for the golden-age and crippled persons.

In the present day world, mobile has become an integrated part in our daily life. Now-a-days smart phones are being used by everyone. With the advancement in the technology many applications that support android are developed. Because of

The energy consumption is another factor that comes into account in smart homes. With the

automation of homes, we can on or off the devices when they are not in use or the user is away from the home. By this the energy consumption can be reduced and in some cases it can be saved. By this the cost of living of an individual can be reduced.

Controlling of devices through voice is a thought that can be told no more. The principal PCs in the modern day world have undergone so much changes and thus tell by voice changes just a machine, the understand that we'll. So numerous advances in the field, really utilizing a voice interface gadget, we have specification in the present world of technology where people are going behind the technologies to make life easier, the control over appliances through voice is a kind of IoT.

A. System overview

Here, in this project we are going to use two modules. They are Bluetooth and GSM. Here we are using Bluetooth when the user is at a distance that is in the range of Bluetooth and we are using GSM when we are out of the range of Bluetooth. [1]

A. Block diagram

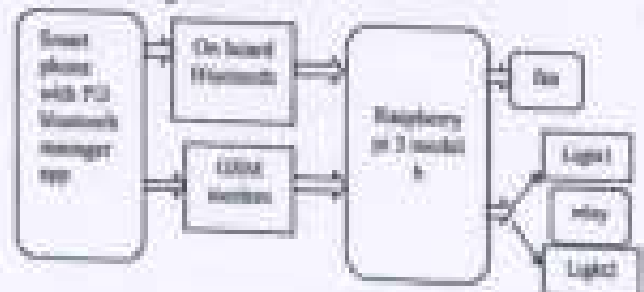


Figure 1.1 Block Diagram

The above block diagram consists of three parts mainly they are the transmitter app i.e. the smart phone with the android application and the



Rectangular Patch MIMO Antenna with Defected Ground structure for 5G Applications

S.Maruga¹, Y.Manasa Varasi Priya², P.Yamini Sarya Siva Mani¹, K.Sowjanya⁴,
M.R.K.S.Prasanna²

¹Professor, ^{2,3,4,5}Final year students

Department of ECE, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh -534 001, India

Abstract

In this paper, a rectangular patch MIMO antenna is designed to operate 1.4-3.6 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)/PSWR, Return loss, Radiation pattern.

*Corresponding Author

E-mail Address: maruga1976@gmail.com

Analysis of Brain Tumor Classification using CNN Transfer Learning

Dr.M. Thamarai¹ and Dhivya S.P²

¹Professor, ECE Department, Sri Vasavi Engineering College, Tadepalligudem, Andhra Pradesh
Email:mtthamarai2014@gmail.com

²Associate Professor DDC Technology, Hyderabad
Email:spdhivya@gmail.com

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 of 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 its computation time of the process. The top layers of benchmark CNN architectures like VGG16, ResNet 50 and InceptionV3 are fine-tuned and utilized for the tumor detection. The performance of the CNN structures are analyzed in terms of performance metrics such as Accuracy, specificity, sensitivity and various losses.

Key Words: Brain tumor detection, magnetic resonance imaging, convolutional neural network and Transfer learning

*corresponding author
E-mail address: mtthamarai2014@gmail.com

Implementation of ANN Trained Voltage Control Scheme for Grid Islanded DG System

Choudagan Srinivas¹, V V Balaraman Krishna Rao², S Saravanan³, K Karanmatti⁴,
Barkh Sarabesh Singh⁵

¹Department of EEE, Sri Vasavi Engineering College, Tadipatri/Siddipet, Andhra Pradesh, India.

²Department of EEE, Sree Sai Institute of Technology, Nellore/Siddipet, Tadipatri, India.

³Department of EEE, B V Raju Institute of Technology, Hanamkonda, Tadipatri, India.

⁴Department of EEE, Vei Tech Rangajpet/Siddipet/Siddipet B and D Institute of Science and Technology,
Chennai, India.

⁵Department of EEE, M V R College of Engineering & Technology, Vijayawada, Andhra Pradesh, India.

srinivas.choudagan@gmail.com

Abstract. Distributed generation plays a significant role in power generation, but the standalone system has some limitations like excess power generation and voltage increased by load. Grid interconnected DG system mitigates all this type of problems but some different questions arise in this interconnection. How to synchronize the DG system with the grid? If any change in voltage or frequency they lead to disconnect the grid from DG system. But due to sudden loss of grid supply, the phase angle is changed in other terminal voltage and loads cause change in load voltage because when the grid is connected the load receives power from both DG and grid. In grid-connected system current controller is generally used, to maintain the constant current in load side, so in islanding conditions, the voltage profile will get damage and power factor is also dropped. This paper proposes a strategy of two controllers for both grid-connected and intentional islanding modes. PI controller based constant current regulator for grid-connected mode, while ANN based VC controller for intentional islanding mode. These two controllers are operated according to changes occurred at Point of Common Coupling (PCC).

Keywords: ANN Based VC Controller, Current Controller, Distributed Generation, Intentional Islanding, Grid-Connected DG System, Point of Common Coupling.

1. Introduction

The DG is very useful in the case of "blackout", due to different reasons like voltage, frequency dropouts. The DG is defined as the generation centre is located at the load centre for power supply. Generally, buildings are the most example the top of the buildings PV panels are placed the generated power is utilized by the consumers on the building. The excess power is connected to the grid. The anti-islanding circuits are provided for the continuous operation. In the proposition, intentional islanding is done for the constant voltage maintenance in the load centre. The intentional islanding test is very useful for DG system because the grid line is suddenly cut-off from the tie-line (P.C.C.). The most effective advantage of the PV connected grid system increases the effective utilization of power because the storage system is not required when there are no storage limit. A standalone system is not suitable for dynamic load changes so it needs without any fluctuation in output response as primary option is connecting a battery system to solar system but it is very costly, so if the right conditions are possible the distributed generation system is connected to grid in the case

Optimal Solution of Economic Load Dispatch using Teaching Learning Algorithm

CHIDAMBAM SRINIVAS

Department of EEE
Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India.
srinivas.chidambam@gmail.com

J KRANTHI KUMAR

Department of EEE
S.V.S.R. Engineering College, Muzumuru, Andhra Pradesh, India.
kranthi.kranti@gmail.com

A. SENTHILKUMAR

Department of EEE
Chaitanya College of Engineering & Technology, Kona, Tadipatri, India.
senthilkarthika@gmail.com

T.V. Babarasa Kiranba Reddy

Department of EEE
Sri Sai Institute of Technology, Tadipatri, Andhra Pradesh, India.
babarasa.kiranba@gmail.com

ABSTRACT

In modern power system the economic load dispatch is considered as a non-linear problem. Many conventional and modern optimization algorithms are proposed to obtain a solution for the economic load dispatch among them, Teacher and learner based optimization is considered as one of the modern searching algorithms. This paper aims to solve the non-linear problem that occur in economic load dispatch using TLBO. Generally, the non-linear problem of economic load dispatch deals with the number of constraints inequality available in nature.

The constraints are mainly the voltage, real and reactive power, shaft capacities, transformer tapping etc. TLBO converges an optimal solution to the non-linear problem with a good convergence rate.

Keywords: Differential evolution, Economic load dispatch, Multi objective optimization, PSO.

1. INTRODUCTION

All the thermal power plants are scheduled for a long time operation. The major problem in the thermal power plants is scheduling the generators and priority of generators for power generation [1]. Economic load dispatch mainly deals with the relationship between generators and load demand. Generally, the load demand is dynamic in nature and it varies continuously according to consumer needs. The generators will always have minimum and maximum output levels by their operation [2]. The generators are not completely shut down because if the load demand increases suddenly, it is not possible to generate the power immediately from the shutdown generators, and it takes some time, so all the generators are working at least working to the loading state.

The fuel cost characteristics curve gives the total cost of power generation consumed by each generator. By

using economic load dispatch, the generators operating range will be selected based on the following factors:

- 1) To satisfy the load demand.
- 2) Minimizing all the constraints within limits.

The economic load dispatch is solved by using PSO, GA methods conventionally.

Several optimization techniques are also used to solve the ELD and produce better results previously.

The necessity of modern optimization techniques is the convergence rate. Many conventional methods based solution like linear, non-linear programming but the sometimes the constraints are not satisfied. Gradient programming is used to find the optimal solution, but the size of the problem affects the convergence rate and it is high. In modern era the PSO, GA, ANN techniques are applied to solve the benchmark functions and found better results with good convergence rate [3], [4]. TLBO is also considered as one of the most popular searching algorithms in recent times. ELD search space is non-linear and the constraints operation within the specified limits are difficult. The TLBO is applied to the standard ELD function in this paper and TLBO is evaluated with other searching algorithm [1], [2], [4].

II. PROBLEM DEFINITION

Here the non-linear problem with inequality is shown below with two variables x, y and the main aim to obtain the minimum value and it is represented as

$$\text{Min } f(x, y) \quad (1)$$

Subject to

$$h_1(x, y) = 0 \quad (2)$$

$$f_{\text{min}} \leq f(x, y) \leq f_{\text{max}} \quad (3)$$

The equation (1) shows the primary objective i.e., minimization of cost, the equation (2) shows how to minimize the constraint function and the equation (3)

A Nine-Level Inverter Topology with Equal Source Utilization

Adhikar Chappal
Department of Electrical Eng
IIT Bhubaneswar
Bhubaneswar, India, 751013
adhikar.chappal@iitbbs.ac.in

Shubhanshu Mishra
Department of Electrical Eng
IIT Bhubaneswar
Bhubaneswar, India, 751013
shubhanshu.mishra@iitbbs.ac.in

Julia Kumar Saha
Department of Electrical Eng
IIT Bhubaneswar
Bhubaneswar, India, 751013
juliasaha@iitbbs.ac.in

Arindam Kumar Dey
Department of Electrical &
Instrumentation Eng
Technological Institute of Engineering &
Technology, Patna, Patna, India
101, arindam@iitpatna.ac.in

Abstract— The maximum amount of load demand is supplied through inverter instead of a PV array for renewable applications in rural areas. This demands proper and equal source source utilization for multilevel inverter (MLI) with multiple sources for maintaining a better life of the battery. In this paper, a nine-level cascaded MLI topology with the characteristics of equal source utilization is proposed. The number of voltage levels further increases either by increasing the number of switches or cascaded connection of the cell for improving the quality of the waveform. The proposed topology has the capability of equal voltage source utilization, which increases the balance in the charge of batteries by providing a new switching method for generating gate pulses. The effectiveness and robustness of the developed topology are verified and some various operating conditions in its simulated environment. Finally, an experimental test bench of the developed topology is built and the measured experimental results confirm the simulation results.

Keywords— Multilevel inverter, equal source utilization, multi-cell, gate pulse modulation

1. Introduction

With the scarcity of fossil fuels and increasing concern for the greenhouse effect, the market for renewable energy sources is increasing [1]. Researchers have started utilizing renewable energy of solar and wind energy sources, because of abundant technologies in power electronics [2]. Most of the electrical appliances operate on AC power, however, which requires the inverting conversion and involving heating and converting the grid voltage to A.C [3, 4]. Previously use of three-level conventional inverter are utilized for this purpose, however, they suffer from their requirements and low output voltage resolution quality. The recent developments introduced multilevel inverters to overcome these limitations. MLI offers several key benefits like less THD, reduced voltage stress of the switches, lower electromagnetic interference, higher efficiency and smaller filter as compare to two-level conventional inverter [5-7].

In general, the multilevel MLI are categorized into FC (Flying Capacitor) [8], NPC (Neutral Point Clamped) [9] and OEB (Cascaded H-Bridge) [10], among these topologies, due to its benefits like simplicity in structure and simplicity, OEB has caught the attention by industries. The major limitation of the OEB architecture is a requirement of a higher number of DC sources. However, most of these topologies are not developed as their structure are greatly affected by

various factors like applications, control schemes, device cost, cost and complexity. If the device count is large enough then the entire system becomes large and complex. As a result, the cost of the system will increase and reduce the conversion efficiency and reliability. Moreover, when used for renewable applications in rural areas, the maximum amount of load demand is supplied through battery instead of PV array [11]. This demands proper and equal battery source utilization for MLI with multiple sources for maintaining a better life of the battery. It has been observed from the past decade that a large number of inverter topologies are derived with reduced device count. Even though, it has shown less attention in the field of energy sharing.

In [12], MLI with current controlled switches with eight number of DC sources for producing 9-level voltage is proposed. Hardware implementation of the proposed topology is difficult because of containing a higher number of components. An MLI with four DC sources along with current injection feature are implemented considered for generating a 9-level waveform is proposed in [13]. On the other side, an MLI with four sources and positive inductor has been proposed in [14]. As compared to topology [13], it requires less number of semiconductor switches. A generalized inverter topology with one DC source is proposed in [15]. However, it requires a higher quantity of capacitor to generate a higher number of levels and it is difficult to maintain the balanced capacitor voltage. The voltage of capacitor balancing is difficult in cascaded MLI with four DC sources, its solution along with three cells diodes is proposed in [16]. However, the topology presented in [12-16] requires a higher number of DC sources and it is difficult to share the total energy of the sources. An inverter with nine-level is developed by connecting the five-level ANPC to FCBB in [17]. An inverter with nine-levels is developed by connecting the two 5-level ANPC but been developed in [18]. A topology with H-bridge type has been developed in [19]. However, it requires higher DC sources to synthesize the higher number of levels in the total inverter.

Most of the literature has paid attention to deriving new topologies with reduced device count and sources and the attention has focused on the equal energy utilization of the sources, which has a direct impact on the overall system applications. Also, the proposed topologies [12-16] in the literature have more independent source and less source number of interest in source. In this regard, this paper presents an MLI

Fault Diagnosis of Cascaded H-bridge Multilevel Inverter by DWPT Multi resolution and ANN

Arshad Hussain
Department of Electrical Eng
National Institute of Tech
Delapur-411004, India
arshad.hussain@nitdelapur.ac.in

Shashank Gupta
Department of Electrical Eng
National Institute of Tech
Delapur-411004, India
shashank.gupta@nitdelapur.ac.in

Leela Kumar Saha
Department of Electrical Eng
National Institute of Tech
Delapur-411004, India
leela.k@nitdelapur.ac.in

Kishore Kumar Gupta
Department of Electrical &
Instrumentation Eng
Delapur Institute of Engineering &
Technology, Patoda, Patoda, Maharashtra

Abstract - Fault diagnosis of multilevel inverter (MLI) is quite complex in the industry to avoid one to improve the reliability of system. In this regard, a new stage fault diagnosis of multilevel fault is cascaded H-bridge multilevel inverter (CHB-MLI) with phase shift pulse width modulation has been implemented in this paper. In the first stage discrete wavelet packet transform (DWPT) multi resolution extracts the features of fault voltage. It decomposes approximation as well as detail coefficients of the signal to extract features like fundamental peak, zero, and standard deviation (STD) for feature recognition. It gives better frequency resolution over other techniques by effectively decomposing coefficients in the later stage. An feature extracted from DWPT from the ANN. This trained ANN is used for feature recognition during normal and fault condition. Fault voltage gradient based propagation method is used in ANN training. This trained ANN classifies the various fault accurately. The method efficiently diagnoses the various faults under different fault condition. Performance of fault diagnosis method is tested using MATLAB simulation.

Index Terms - Multilevel inverter, Discrete Wavelet Packet Transform, Artificial Neural Network.

1. INTRODUCTION

Multilevel inverter (MLI) have drawn more attention of industrial over traditional two-level inverters, because of their advantages like stress on power semiconductor switches are less, less harmonics distortion on load voltage wave form, less electromagnetic interference, less switching losses and high quality output voltage [1]. Compared to traditional two-level inverter, MLI's have high number of power semiconductor switches resulting in increased probability of faults, demanding fault diagnosis for various applications [2]. It was reported that 80% of faults in industrial drives are due to failure of power electronic switches [3]. The faults in power semiconductor switches can be classified into short circuit (SC) and open circuit (OC) switch failures [4]. The SC fault causes over current in the circuit, resulting in immediate shutdown of the system [5]. Causes for OC fault include failure of gate-drive, disconnection of digital control line, failure of switching components, power failure, etc. OC fault even though is not as serious as SC fault, leads to secondary disturbance in the converter [6]. The conventional practice of maintenance from SC to OC faults using the existing laws are highly complex [7], hence the motive is to diagnose the OC fault. Many researchers have proposed fault diagnosis by extracting features from current or voltage signal. The principal component of switching

frequency of the voltage harmonics has been used to detect SC faults [8]. In this, threshold value of switching frequency component has been used to detect the fault which involves complex calculations. In [9], three-phase five-level static converter MLI various fault has been detected using wavelet decomposition. DC bus current wave value. Wavelet decomposition DC bus current multiresolution analysis have been used to detect the DC fault [10]. The detection method using current as fault detection parameter, because of its high dependent nature is not preferred for an efficient fault detection system. DC fault diagnosis of MLI has been proposed using output voltage multiresolution moment features [11], using PWM's carrier transformation [12], and the output voltage and current profiles [13].

Transient conditions produced during fault is switching, results in harmonics in the system. To extract features of harmonic versus transformation techniques namely Short Time Fourier Transform (STFT), Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT), Discrete Wavelet Transform (DWT) and DWPT are used. Fault diagnosis of MLI using FFT for feature extraction and Artificial Neural Network (ANN) for classification has been presented in [14-15]. FFT is a frequency-domain based extraction method, and is not suitable to extract the features for non-stationary signals or transient characteristics. However, FFT gives frequency components of the signal requiring time localization of signal [16]. Fault diagnosis using STFT for voltage current converter multilevel DC system has been presented [17]. However, STFT converts time domain signal into time-frequency representation with fixed finite length window size, resulting in poor frequency resolution. DWT effectively overcomes these limitations. Fault diagnosis in direct torque control induction motor drive using DWT has been presented in [18]. Fault diagnosis of inverter fault in DTM motor drive using DWPT has been presented in [19]. Absence of phase information and decomposition of only approximate sub-bands are the major limitations of DWT to overcome these limitations using DWPT are used. Feature recognition helps to improve fault diagnosis efficiency. Feature recognition helps to classify the fault accurately and automatically. The different methods used for this are knowledge based and artificial intelligence [20] based [20]. Knowledge based methods like fuzzy logic, Markov model method and signal processing have been implemented in [21-25]. However, to improve the knowledge based method expertise in the field is demanded. Also, they are expensive, and

Chapter - 2
ANFS and SCLEIC Based Battery Charging
Controllers for PHEV

Authors

Narendra Kumar Ch

Associate Professor, Department of EEE, Malla Reddy
Engineering College (Autonomous), Hyderabad, Telangana,
India

K. Manu Kumar Reddy

Associate Professor, Department of EEE, Aditya College of
Engineering, Suryapet, Andhra Pradesh, India

V. Ganesh Kumar

Associate Professor, Department of EEE, Malla Reddy
Engineering College (Autonomous), Hyderabad, Telangana,
India

Chandra Bas Undrajivrasga

Associate Professor, Department of EEE, Sri Viswa
Engineering College (Autonomous), Peddapati,
Andhra Pradesh, India

Pentatope Based Elliptic Curve Encryption for Privacy and Protection of Multimedia Data



B. Jayaramani, Ch. Rupa, and V. Nikhila

Abstract Now-a-days information security plays a vital role in the digitalized world. Data breaching is the most serious threat in the current world due to the lack of proper security measures. In order to overcome such security issues, several cryptographic algorithms are developed. Most of these existing algorithms concentrate just on encrypting and decrypting process but not on the key size used and the computation time. To overcome this problem, a methodology was introduced by making use of the pentatope number in the elliptic curve cryptography, which tends to reduce the shared secrecy between sender and the receiver. It is used to provide security for multimedia data files such as text and image data present in various formats. In this ECC is used because it is the better alternative for the public key encryption compared to various encryption algorithms like RSA which offers a good level of security. The proposed methodology provides better security to the user in order to share their information in an easy manner.

Keywords Elliptic curve cryptography · Pentatope number · Information security · Multimedia files

1 Introduction

As the world became digitalized, the data can be transferred by a means of communication channel from anyone and from anywhere. The organizations located in different places in the world will share their multimedia data. They do their business by sharing their sensitive information through online [1]. Such information must be

B. Jayaramani (✉)
St. Xavier's Engineering College (A), Tadipatri, Guntur, Tadipatri, India
e-mail: jaya_s10@yahoo.com

Ch. Rupa
V.R. Siddhartha Engineering College, Vijayawada, India

V. Nikhila
TCS, Hyderabad, India

© Springer Nature Singapore Pte Ltd. 2021
Y. Kameshwar et al. (eds.), Advances in Automation, Signal Processing, Instrumentation, and Control, Lecture Notes in Electrical Engineering 738,
https://doi.org/10.1007/978-981-13-8221-9_28

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(AUTONOMOUS)

Chinna arinam - Bhimavaram, Andhra Pradesh, India, 534 204

National Conference on
PRODUCTIVITY, QUALITY, RELIABILITY,
OPTIMIZATION AND COMPUTATIONAL MODELING



This is to certify that Mr. Mrs. Ms. Dr. Prof. D. Sri Meghsh
of Sri Vasavi Engineering College

Participated / Presented / (Invited / Oral / Poster) A Paper entitled Comparative Analysis of Mod-Eadh Migration with Van 2007
Algorithm

in the AICTE sponsored National Conference on **PRODUCTIVITY, QUALITY, RELIABILITY, OPTIMIZATION AND**
COMPUTATIONAL MODELING organized by Department of Computer Science Engineering and Information
Technology held on 18th to 20th December 2019 at Sri Rama Krishna Raju Engineering College (Autonomous),
Bhimavaram, Andhra Pradesh.


Dean R&D


HOD of IT


HOD of CSE


Principal



SRI RAMA KRISHNAM RAJU ENGINEERING COLLEGE
[AUTONOMOUS]

Chinna amiram - Elimavaram, Andhra Pradesh, India, 534 204



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PRODUCTIVITY, QUALITY, RELIABILITY,
OPTIMIZATION AND COMPUTATIONAL MODELING



This is to certify that Mr./Mrs./Ms./Dr./Prof. V.S. Mareeth
of Sri Vasavi Engineering College

Participated / Presented / Invited / Oral / Poster) A Paper entitled Secure Dynamic Inter-subnet Flood Bank based on Cognitive Computing
in the AICTE sponsored National Conference on **PRODUCTIVITY, QUALITY, RELIABILITY, OPTIMIZATION AND COMPUTATIONAL MODELING** organized by Department of Computer Science Engineering and Information Technology held on 18th to 20th December 2019 at Sri Rama Krishnam Raju Engineering College (Autonomous), Elimavaram, Andhra Pradesh.


Registrar


HOD of CSE


HOD of IT


Dean RAOJ

Principal



Secure Dynamic Interactive Blood Bank based on Cognitive Computing

Yankamandil S Naresh^{1*}, O Sri Nagesh² & Sivaranjanireddi³

Received 14 April 2020; Revised 24 April 2020; Accepted 1 May 2020; Published online 16 June 2020
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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 human. Timely availability of quality blood is a crucial requirement for maintaining 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, mutually 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

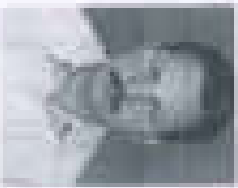
year that a nation requires about 4-5 crore units of blood out of which major 40 Lakh units of blood are available. There are several blood banks around the world; however, they are not offering any contact between the donor and the needy, which is often seen as a disadvantage and leads possibly to one's 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 36 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.

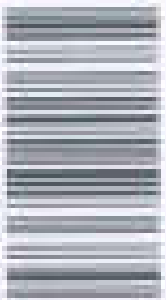
*Corresponding author: Yankamandil S Naresh
yankam41@gmail.com

1. Department of CSE, Sri Sairam Engineering College, Paduripalugudem-547184, A.P. India.
2. Department of CSE, Sri Sairam Engineering College, Paduripalugudem-547184, A.P. India.
3. Department of CSE, JNTU Hyderabad Institute of Technology & Science, Paduripalugudem-500011, Andhra Pradesh, India.

In the Cloud environment, Cloud storage is considered to be an extended version of the network. They have more the being network data, rather and can be seen to manage the data or provide more and storage via the network. Administrators and administrators must be provided with the right training, they must be familiar with the network and the security. The information used by the user, such as data, can be developed in the storage areas and any other device. So Cloud Server that is take control of these issues.



Dr. D. Sri Rajesh working as an Associate Professor at Sri Venkateswara College, Tirupathi. Email: dr.d.sri.rajesh@svcol.ac.in



978-830-2-52358-4

Rajesh, Sri Venkateswara

Public Auditing Technique for Securing Privacy in Cloud Storage

Cloud Server Security

Dr. Sri Rajesh
Associate Professor



**Sri Nagesh
Vankamamidi Srinivasa naresh**

**Public Auditing Technique for
Securing Privacy in Cloud Storage**

Cloud Server Security

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Publishers & Distributors

14th March, 2011

Dr. Ch. Rajaraman
Flat No. 422, Manasa Krishna Nagar, Madhavaram
Kodambakkam, Chennai-600 042
www.rajaraman.com
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Subject: Data Conversion and Algorithms (2011) (ISBN: 9788193000110) by
Prof. A. V. Lakshy, Prof. Ramesh Kumar, Prof. Ch. Rajaraman

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Intelligent Traffic signal Control Using RF Technology for Emergency Vehicles

¹S.Deeshitha, ²T.Sri Ganesh, ³S.N.M.Vamsi Kumar, ⁴Shaik Moulali

^{1,2,3,4}Assistant Professor

^{1,2,3,4}SVKM's Institute of Vastu Engineering College, Tadepalligudem, West Godavari Dist, Andhra Pradesh, India.

Abstract:

The transportation system in our nation has been greatly impacted by the problem of traffic congestion. This leads to a number of complications or problems, especially when there are emergencies in the heavily trafficked lanes at traffic lights. To address these challenges, a traffic light management system is built in. Based on an RFID module, this system was designed to operate when it received a signal from an emergency vehicle. The Programmable Arduino nano micro-controller was used to regulate the LEDs used in the traffic signals. The system's use of LEDs makes it easier for emergency vehicles to maneuver through traffic. As a result, the project's analysis and implementation of the traffic signal control system for emergency vehicles were successful.

Keywords:

RFID, LED, Arduino nano, traffic light management system.





Secure Multiparty Key Agreement: Theory and Practice

Edited by
S. M. J. H. van Tilburg



Physico-Chemical Characterization of some (11R) and (14R) Oils

Abstract: The physico-chemical characterization of some (11R) and (14R) oils was carried out. The results showed that the oils were characterized by high acid values and low saponification values. The oils were also characterized by high iodine values and low peroxide values. The oils were also characterized by high free fatty acid content and low moisture content.

Introduction

The oils were characterized by high acid values and low saponification values. The oils were also characterized by high iodine values and low peroxide values. The oils were also characterized by high free fatty acid content and low moisture content.

Parameter	Value
Acid Value	15.5
Saponification Value	185.2
Iodine Value	145.8
Peroxide Value	0.5
Free Fatty Acid	12.5
Moisture	0.2

Design and Analysis of 2 X 4 Array Antenna With Single Slot For UWB Applications

3

Vijay Kumar Reddy
ECE Dept
SV Vastu Engineering college
Tatipatigudem,
Andhra Pradesh

Ramesh Kumar
ECE Dept
SV Vastu Engineering college
Tatipatigudem,
Andhra Pradesh

Prasanna K. Sharma
ECE Dept
SV Vastu Engineering college
Tatipatigudem,
Andhra Pradesh

R. S. R. Lakshmi Devi
ECE Dept
SV Vastu Engineering college
Tatipatigudem,
Andhra Pradesh

Abstract

This paper presents designing of the 2x4 array antenna with the ultra-wide band for the X, C, and S bands respectively. The proposed antenna can be designed by using the eight rectangular patches by placing as a 2x4 array by using a FR4 material as a substrate. It was observed that the designed antenna has ultra-wide band i.e., 10.26 GHz and improved gain 9.2dB. It was found that the designed antenna can have a return loss of -11.4dB. The simulation can be done in the HFSS software.

Keywords: array ultra-wide band, HFSS, Antenna loss

I. INTRODUCTION

An Array antenna has become more popular than the last decade due to its compact size with the larger bandwidth and improved Gain over the normal antenna [1]. Array antenna can be defined as a group of antennas in a rectangular structure to form a single antenna so that the radiation can be directed in a particular direction & eliminated in unwanted direction [2].

Now-a-days increasing patch antennas have convenient great purpose due to their several advantages such as a compact size, low profile and low simulation cost.[3].

In the earlier design they found that for a 2x4 patch antenna the gain is 9.2dB but the impedance bandwidth is very low i.e., 800 MHz [4]. For 2x3 antenna array of rectangular topology has the bandwidth is 1GHz and Gain is 7.2dB [5]. An author had investigated that S-shaped patch array antenna the bandwidth was 1.5GHz and also they observed that their antenna has VSWR is 1.32 [6]. For the 2x4 antenna they found that the antenna can be operated in the multiband.

II. Methodology:

It was observed that the radiation will be low for the single patch antenna and also the efficiency, Gain, Bandwidth is also low. Mainly for the single patch antenna SWR is also low and minor lobes effect is also high. The while for designing for array antenna size of the patch should also constrained, because all the factors will be depend on the size of the patch as well as the substrate.

An antenna array can be defined as a group of antennas in a rectangular shape in a single antenna so that the

radiation can be directed into single direction and also the side lobe radiation can be suppressed. In this paper the proposed antenna can be designed by 2x4 array by using a with the 4, 4.4. The size of the each patch of the is 12.35x17mm. The designed antenna can be made by using a fine feeding technique.

III. Antenna Parameters

This paper mainly focuses on to design a rectangular shaped patch array antenna to attain the UWB. The compact impedance of the proposed array is 117x136x1mm. The height of the substrate is 1.6mm. The size of the each patch in the proposed antenna is 12.35x17mm. The Geometrical view of the proposed antenna is show in below figure 1.



Fig 1. Final view of a proposed array antenna

In the above figure 1 a slot had introduced on one of the patch in order to enhance the bandwidth of the proposed antenna. The Fig 1 is a fourth iteration of the proposed antenna. The Fig 2, Fig 3, Fig 4 shows the 1st, 2nd, 3rd iterations of the proposed antenna.

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Supriya
Joshi

A Triple band Microstrip Antenna with Enhanced Bandwidth for Radar Applications

E. Kavana Kassar, M. Vinod Kumar

Abstract—Here in this paper a triple band microstrip antenna is proposed. The designed antenna is of compact structure with dimensions $15\text{mm} \times 15\text{mm} \times 1.6\text{mm}$ including ground plane which is fabricated using FR-4 substrate with dielectric constant of 4.4. The antenna has three resonant frequencies which are working at 4.4GHz with bandwidth of 1.1 GHz second band working at 1.1 GHz with bandwidth of 200MHz, and third operating frequency is 1.6GHz with bandwidth of 700MHz. All the band obtained here are providing large bandwidth which have wide range of applications. The other antenna parameters like return loss, directivity, gain, SWR and current distribution are mentioned in this paper. The main purpose of this antenna was to make a single antenna for multiple applications and with good bandwidth for handling 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 satellite, telecommunication, navigation or traffic control etc.

Keywords—multiband antenna, triple-band antenna, cylindrical ground structure.

1. INTRODUCTION

The term microstrip is employed to explain magnetic structure waves with wavelengths starting from cent to cm. The corresponding frequency vary in three hundred MHz to 300 gigahertz. This spectrum is extensive and needs to be shared, thus the demand for top performance MMIC/microstrip circuits is increasing that have high property and control information measure is bit by bit increasing[1]. In recent years, the shrinking of antennas has become additional and additional necessary due to the increasing demand for their antennas because the fast development in wireless communication[2]. The advantages of microstrip antennas found there well-listed in several wireless communication applications like satellite communication, wireless, microwave, medical applications, aircraft, spacecraft, and mobile applications as against the disadvantages of Microstrip antenna is slender information measure, poor pattern [2].

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 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].

Various feeding techniques such as coaxial feed for transmission the magnetic structure energy in 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 [3]. The varied forms of feeding techniques such as coaxial 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 strip of diverging patch, though many French telephone multiband antenna styles were proposed [5,6,7] they're either fed by coaxial lines [8,9,10] or coax-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 slots hooked up to it. The resonant frequencies we need to have gotten as a result of these slots as by variable their length there[] by variation in operating frequencies, we've additionally introduced the defect in ground plane as virtualization this DGS technique for opposite antenna parameters were improved. The bandwidth measured here all follow the -3dB curve back loss. The designed antenna is also used for radar, mobile applications, satellite applications, measuring instrument, military, traffic management etc.

This paper is organized in four sections which are as follows. In 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 simulated and simulated. Table I contains 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 slot is hooked up within. The antenna structure is etched explanation FR-4 substrate that have steel constant ($\epsilon_r=4.4$). The variation in its operating frequency and its antenna parameters is discussed

Received 17th June 2019; Revised on 24 September, 2019.
Dr. E. Kavana Kassar, Professor & Head, ICE Department, Sri Yashwanth Engineering College, Tadipatri, West Godavari, Andhra Pradesh, India.

M. Vinod Kumar, Asst. Professor, Sri Yashwanth Engineering College, Tadipatri, West Godavari, Andhra Pradesh, India.



Wideband MIMO Antenna with Diverse Polarization and Radiation Pattern for 5G Applications

Dhresh Sharma and E. Kusuma Kumari

1 Introduction

With the advent of the 5G communications, the need for the communication systems with high data transfer rate will be essential and to serve the need of the high data rates of future wireless communication systems, the need for antennas with wide bandwidth has become a necessity. Any frequency in the range of 400–90 GHz can be used for the 5G applications but for the initial commercial purpose, frequency band less than 6 GHz is been given priority all over the world, especially, the frequency of 3.5 GHz [1]. This particular frequency has got keen interest as the present-day communication systems available with the current service providers can support this frequency with some minor modifications and is useful for the implementation of the 5G services in the early stages.

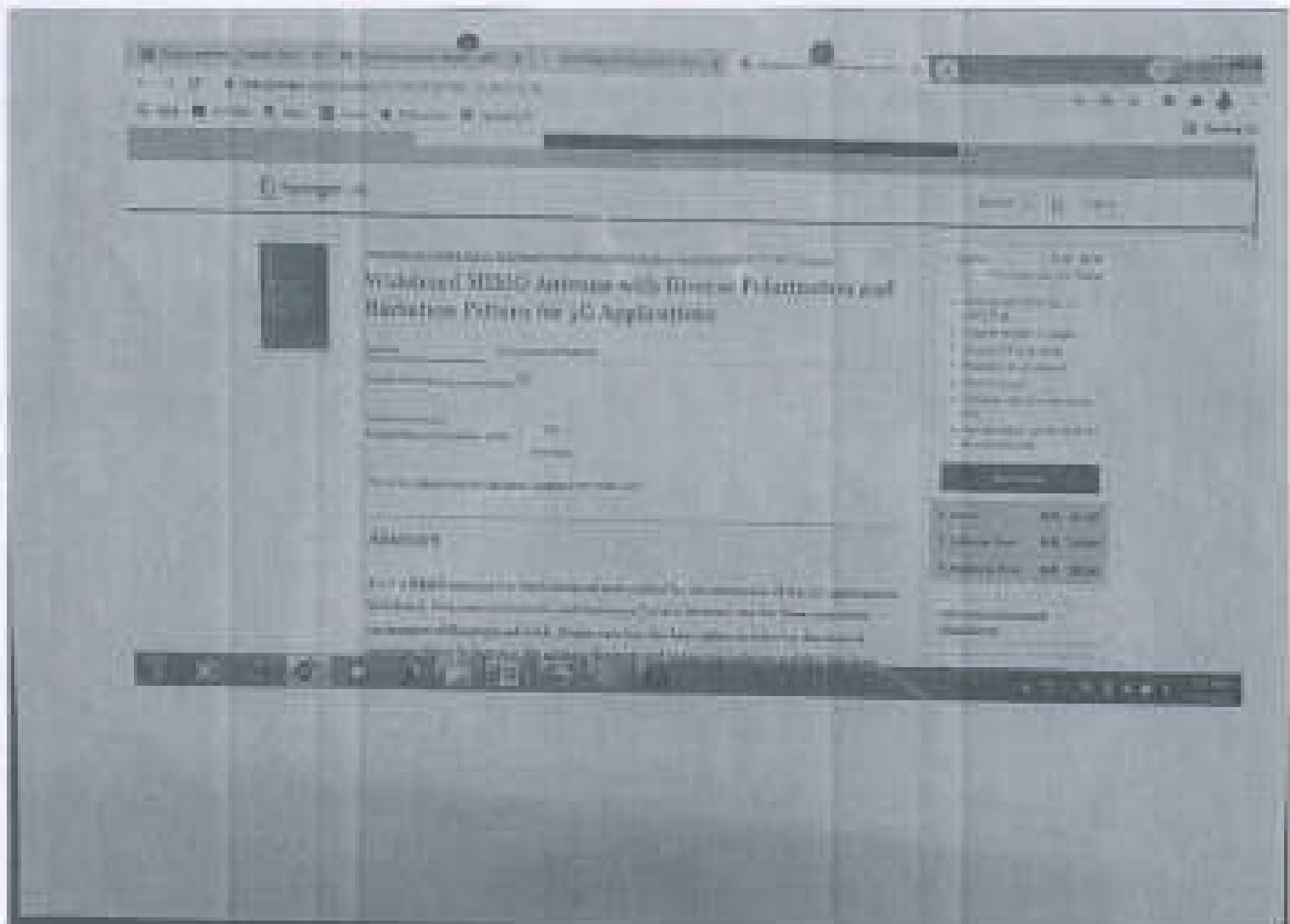
Present-day communication systems require multimode and multi-band antennas to satisfy the multifunctional requirements of the users. For an antenna to serve multiple applications techniques of polarization diversity and radiation pattern diversity have come into limelight. But the major limitation of the MIMO antennas is the mutual coupling effect, which can be eliminated by using some decoupling structures [2]. In [3], a space coupling technique has been proposed to reduce the coupling but it will increase the size of the antenna. In [4], a separate built-in decoupling structure has been used in the antenna to reduce the coupling but with the introduction of the additional structure, the design complexity has been increased. Similarly, different techniques were been proposed by different researchers in [5–12] but all of them have either antenna size increasing problem or increase in design complexity.

D. Sharma
ECE Department, CCET, Chandigarh, India
e-mail: sharmad1306@gmail.com

E. Kusuma Kumari (✉)
ECE Department, Sri Vasavi Engineering College, Tadipatri, Andhra Pradesh, India
e-mail: kusuma.matha.1991@gmail.com

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G. Singh Tomar et al. (eds.), *International Conference on Intelligent Computing and Smart Communications 2019: Algorithms for Intelligent Systems*, https://doi.org/10.1007/978-981-15-0633-8_68



Compact Square patch antenna for 5G Communication



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Abstract: The paper deals with design of a compact microstrip antenna (MSA) to communicate signals in the sub 6GHz band of 5G communication, particularly 3.4 -3.6GHz band. In this work, a square microstrip patch antenna with a slotting pin is printed on the RT Duroid substrate. It is fed by coaxial feeding. Square slot is etched from the patch and the thickness of the substrate is increased for bandwidth improvement. The parameters such as return loss (dB), gain(dB) and radiation pattern are taken for analysis. It is inferred that the proposed antenna operates at desired band.

Published in: 2nd International Conference on Data, Engineering and Applications (IDEA)

Date of Conference: 20-20 Feb. 2020 **INSPEC Accession Number:** 19896440

Date Added to IEEE Xplore: 19 August 2020 **DOI:** 10.1109/IDEA48133.2020.9170660

Publisher: IEEE

ISBN Information:

Conference Location: Shripat, India

A Flag Shaped Microstrip Patch Antenna for Multiband Operation

Parvina K. Sharma¹, Manish Sharma², Ch. Jayaram Reddy³,
¹ VIT-VEIT Dept., Sri Varaha Engineering College, Tadipatri (A.P.), India
² VIT-VEIT Dept., VIT-VEIT, Chandigarh, India
Email: parvina@vit.ac.in

Abstract. A flag-shaped antenna has several narrow gaps which are used to provide and developed in this paper. The shape of antenna is very close to human body dimensions 2.5x1.8 cm on FR4 substrate having an isotropic and good conductivity. The designed antenna works at multiple frequencies, being at U-band, X-band and Ku-band. The radiation pattern of the antenna design allows for an easy identification process. The radiation pattern shows a wide coverage and narrow communication. The experiment results indicate that the proposed antenna design, having 2.1 GHz, 8.7 GHz and wide band at 17.9 GHz used in different areas of communication. The simulated antenna is modeled and successfully compared using HFSS. The simulated results are compared and presented to demonstrate the performance of the designed antenna.

Keywords: HFSS, FR4 substrate, Return Loss, S, and Radiation Pattern.

1 Introduction and Literature Survey

Now-a-days wireless communication plays a vital role almost in all our daily needs. An antenna is important component for all wireless applications. An antenna is a passive device used to convert an RF signal, propagating on a conductor material, into an electromagnetic signal in free space. Reciprocity is the fundamental property of antenna. Due to this property antenna characteristics such as antenna gain, radiation pattern, frequency of operation, polarization are reverse same whether the particular antenna is transmitting or receiving [1]. For long distance communication satellites are used in which most of the antennas are microstrip patch antennas. Microstrip patch antennas are used due to their compact size and high fidelity. A Micro strip antenna consists of copper patch mounted on a dielectric material and ground plane is connected to the feed line on the bottom side of the dielectric material.

Mr.S.Masi and Mr.H.G. Goudil has designed the antenna of dual-frequency patch antenna that has been considered, with special emphasis on configurations that are particularly attractive for their simplicity and design flexibility [2]. Mr. Mahanta designed an antenna and array of antenna at Ku band with gain of 6.5dB and 6.5dB [3]. Mr. Animes Ghosal designed a patch antenna which requires bandwidth increases from 13.8% to 18.2% [4]. Mr. Sattapongthaisawan designed an E-shaped patch antenna working at Ku-Band which can be used for different applications [5]. Hasan, Beharati, Henry Saewandien and Hong S. Lee, inclusion of holes (or gaps) in the conducting patch and

DRIVER FRIENDLY AUTOMATIC HEADLIGHT CONTROLLER

U.Yadavkonda¹, S.Srinivas², S.Swarna Durga³, G.Bhargav⁴, V. Yashwanth⁵
Sri Vasavi Engineering college, pedduru-rudrapaligudem, Andhra Pradesh

ABSTRACT

A Driver friendly head light controller that automatically controls the vehicle headlight beam is designed and tested. The microcontroller Atmega328P, Ambient light sensor opt3001 and LEDs are used to prepare a prototype that switches the high beam to low beam whenever it will get another vehicle coming towards with high beam and automatically headlight turns on when surrounding is dark and turn off when day light starts. As a result the road accident will be decreased rapidly. It is possible to implement because the device is cheap in cost, easy to implement and it works automatically. Index Terms: High beam light, Intelligent controller.

1. INTRODUCTION

New a days automobile technology plays a prominent role in developing countries. Every house contains atleast one vehicle for transportation purpose. This development leads to some advantages as well as disadvantages too. Our main motto is to overcome those trouble shoots. One of the main problem is that the rate of night time accidents is higher than the day time. The parameters causing these traffic shoots are poor lighting condition, high glare of light coming from the incoming vehicle which creates blind spot to the automobilist. So, to overcome this trouble an automation system has to install in the vehicle to switch the headlight from high beam to low beam automatically.

This project defines the automatic headlight controller. Usually the headlight system contains two reflective lamps the low beam and high beam lights. Automatic High Beam Controller is our prototype which can able to low the headlight beam when it detects an light of high intensity.

usually the driver manually switches between the low and high beams, to make it automatic this system is very friendly. The second reason is the fear of dazzling other drivers and therefore causes catastrophic accidents. Therefore, an automatic controller to switch off the high beam lights when facing other vehicle is considered necessary. Such feature will make the driving experience more convenient in the night time. Moreover, it makes the road more friendly to the other drivers on the road. Most of the proposed system are based on complex combination of cameras, image processing techniques, LDRA to detect the vehicles and control the high beam light. The second purpose of this system is to on and off the headlights automatically based on surrounding light condition. This avoid the automobilist to operate manual switching. This control unit can be mounted to all vehicles to insure the high beam switching depending on the light density without the influence of the sensor. application of automatic high beam is our high beam response due to another high beam and automatically our high beam becoming low. Hence by mounting this system in the vehicle-driving at night times makes more flexible and secure.

2. WORKING OF THE SYSTEM

When we turn on this system the headlight remains off and the intensity gets calculated continuously. When the luminous value is less than the monitored value the headlight glows and remains on. When a high intensity of light falls on the sensor then it switches to low beam and when it comes to the daytime the sensor detects the surrounding light intensity and the headlight turns off. This saves the battery life time.



A Bird View on Radio Frequency Based Energy Harvesting System

Putrima K Sharma
Sri Vasavi Engineering College
India
Putrima.kodali@gmail.com

Dinesh Sharma
CGET, Chandigarh
India
SharmaDdinesh@gmail.com

J Rajendra
Sri Vasavi Engineering College
India
Jrajendra407@gmail.com

Ramanarayanan Vemana
Sri Vasavi Engineering College
India
vemana@sriwasavicollege.ac.in

ABSTRACT

Mobile devices are an essential part of modern life and are being throughout the globe. The growing telecommunication demand operations that are energy-intensive. With ever increasing usage of mobile phones, the best way to power them is to use a RF-energy harvesting system. The present paper includes experiments under research done regarding RF-energy harvesting was studied and the essential components were highlighted. The author proved that a simple and easy circuit can be used to harvest power for the reception purpose of the RF signals at the frequency of 900 and 1000 MHz because of its compact size. The major components used in the circuit are an aerial, matching network, impedance and potential control circuit. In this paper, the performance and developments of these components were studied. A matching circuit where the impedance process of signal to voltage was studied by the investigator is discussed. Impedance Matching (IM) to know the system performance. The Location Error for impedance matching process is used. Circuit used for harvesting power is able to use the mobile handset/ GSM when adequate power is provided.

Keywords

RF Energy, Antenna, Impedance matching network, Rectifier, Power managing circuit, Load.

1. INTRODUCTION AND LITERATURE SURVEY

The concept of energy harvesting is not new rather it came into practice 180 years back. The technique of taking out power from external source to produce electric power is called energy harvesting. The advantage of this technique is that as our energy is freely available for harvesting, process flow and hence leads harmful effects of radiation and is "green" for the environment. Huge impact of wireless communication devices in surroundings has resulted in availability of large amount of abundant RF energy in our environment that can be harvested using antennas. These EM waves can be converted into electrical energy by using appropriate antennas. Linearly polarized antenna receives only those signals when the receiving antenna is not aligned with the transmitting antenna. To capture ambient EM waves which occur in all sorts of orientations and polarizations, omnidirectional antenna is a

preferred choice. Wireless power transfer (WPT) is a process in which the electrical power is transferred from one point to another point without any medium or physical link. In the year of 1888, Maxwell first stated the idea of wireless power transfer[1]. In the beginning of 1930s, Nikola Tesla did many experiments related to transferring of electrical power wirelessly. WPT techniques mainly fall into two categories, low inductive and capacitive. In former case, power is carried to larger distance by magnetic fields using inductive coupling. In later case, power is carried by waves of electromagnetic. WPT requires dedicated transmitter, which was a requirement in 1980. Hence, power sent by a small helicopter can be received using RF when a transmitter of high power is used. The oldest existing wireless flow used by Nikola Tesla in 1888 is for his experiments for energy harvesting applications, ideal design of an antenna for energy harvesting, and improved RF power harvesting was described for RF energy harvesting system (used for which an inductive transmitter is required making it more efficient)[2]. Though the concept of RF power was introduced very back in the past, progress with regarding its usage was under process since 2011. Many groups conducted experiments to investigate the possibility of harvesting RF energy. This paper provides a collective analysis and observation of all these experiments. These experiments were mainly focused on the collection of energy by the plane when the circuit operates under uplink where the frequency band is of the order of 1800MHz/540-cm-wavelength systems are made possible by the latest trends in RF energy harvesting technology. The ambient RF power is a good potential candidate for the energy supply as it is widely broadcast from numerous reliable electromagnetic sources [3]. Enhanced use and expansion of facilities are improved due to growth in the usage of devices such as mobile, routers, sensors, imaging and wireless computing[7].

2. RF-ENERGY HARVESTING SYSTEM

The RF energy is ubiquitous. Nowadays, almost TVs, radio, mobile phones and a lot of electronic gadgets transmitting RF signals into air continuously. These RF signals are available almost in all locations. This paper is aimed at harvesting the RF signals power and use the harvested energy to give supply to a wireless sensor or a small electronic device[4]. Fig 1 shows the proposed structural block diagram [1].





Different Fading Channels

Jampa Rajendra
K. Sharma Purnima
Sri Vasavi Engineering
College,
Andhra Pradesh

Preepalli Sai Kumar,
Kolla Jainadhras
Sri Vasavi Engineering
College,
Andhra Pradesh

Virenakota Pratyusha and
Bodugu Anurupa
Sri Vasavi Engineering
College,
Andhra Pradesh

ABSTRACT

Due to the predominant use of wireless communication networks by diverse systems, there is inevitable growth in network traffic that leads to the insufficient network capacity. This can be mitigated by using MIMO/MISO has been considered as the efficient and simple technique to improve capacity and Spectral Efficiency for future generations in wireless systems. Channel modelling is significant in MIMO. The transmission of signal in wireless communication depends upon the channel. Hence the performance of wireless communication can be obtained by modelling of fading channel. Here, the capacity of different fading channels and Spectral Efficiency is derived and results are shown using MMSE and VBF-MMSE techniques.

1. INTRODUCTION

Even in the present scenario, wireless Communication has major impact when compared to wired [1]. Day-by-day technologies growing exponentially in the field of wireless communication such as 4G and 5G (further which use the principle of MIMO, Spatial Multiplexing and Beamforming). Here in wireless communication the Channel Modelling plays a crucial role. The Channel Capacity is important parameter in wireless communication. But the signal transmitted in wireless communication is received in various due to nature which results in multipath propagation. At the receiver end, these signal will combine which results in Destructive or Constructive Interference between the signals due to arrival of signals in different directions. In this paper we are going to obtain capacity of different fading channels.

1.1 FADING

The signal transmitted from transmitter undergoes various paths in channel due to various factors such as geographical positions, obstacles, variables that vary with time, these factors are known as Fading. Due to these factors the signal gets Reflected, Refracted, Diffracted and Scattered, which results in multipaths. This phenomenon is known as Multipath propagation [2]. During this, the signal strength varies which is known as FADING. The various factors that affect the signal strength are as follows:

- 1) Reflection: When the signal travels in medium it will get affected by buildings or vehicles around the surroundings then the signal reflected or refracted which results in phase change of the signal [3]. Reflection takes place when the surface is flat.
- 2) Diffraction: This happens when the signal is obstructed or affected by curved surface then the signal gets diffracted and slight bending of the signal happens [3]. It mostly happens at the edges of surfaces or curved surfaces.

- 3) Scattering: When the incoming signal is obstructed by the particles (such as buildings, cars etc) the signal scatters in various directions. The signal is reflected in various direction [3]. The reflection, diffraction and refraction are the various forms of scattering.
- 4) Doppler Shift: This happens whenever there is relative motion between signal and the receiver then there is change in frequency or wavelength. The apparent shift in signal frequency or wavelength due to receiver's motion is known as Doppler Shift [3].

The Fig (1) which is shown below explains about the Multipath Phenomena.

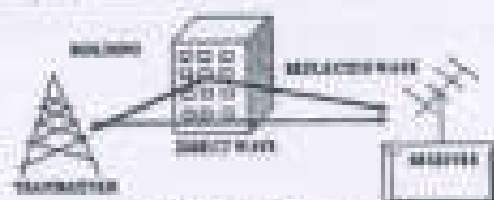


Fig 1: Multipath Phenomena

2. METHODOLOGY

2.1 Channel Modelling

The transmitted power is equal to sum of received power and noise power.

$$P_T = P_R + P_N$$

where P_T is transmitted power [3]

P_R is received power [3]

P_N is the power loss (it includes noise power) [3]

In wireless communication, when the signal transmitted from transmitter it propagates in multiple directions [7]. This results in variation of signal strength. As receiver end, if the signal strength is greater than the threshold, we can reconstruct the signal. If the signal strength is less than the threshold, we cannot reconstruct the signal.

In order to reconstruct the signal, the received power should be more. To have more received power, the transmitted power should be more. We can increase transmitted power up to some extent, but it results in more cost as well as the size of the antenna increases as length, large amount of the power. Sometimes if the noise power is more (greater than the received power) we cannot receive the signal at receiver.

$$y(t) = R + z(t) + noise$$

(4)

where R is channel response between user equipment and Base Station, it depends on the channel.

By characterizing the channel, we can overcome the loss and transmitted power can be reduced. Characterizing defines how the signal is varying in the channel. Therefore, it is necessary to model the channel. In wireless communication the signal



Analysis of MIMO Microstrip patch antennas for 5G Applications

Ponnam K. Shanna,
Rajasekar Dhanasekaran,
Sri Vasavi Engineering College,
Andhra Pradesh

Sriniva Dasika,
Ravindra Sud Ravindra,
Sri Vasavi Engineering College,
Andhra Pradesh

Madhu Kiran Karthi,
Sri Vasavi Engineering College,
Andhra Pradesh

ABSTRACT

This paper discusses relative study of different 2x2 MIMO microstrip patch antennas for 5G wireless (5G) applications operating at 2.45GHz system frequency. To design these antennas we use a simulation software called HFSS which is used to design complex wide frequency structures using 3D models. For designing these antennas we use FR4 material epoxy substrate which has a dielectric constant of 4.4. From the simulation results the parameters like Gain, Bandwidth, Return loss, Radiation Efficiency, Radiation directivity. The proposed receiving systems are suitable for LTE and 5G.

Keywords

HFSS (High Frequency Structural Simulator), 3D (3D Dimension), MIMO (Multi Input Multi Output).

1. INTRODUCTION

Now a days 5G is important because it has the potential to support billions of devices at ultrafast speeds and it has the potential to transform the lives of people around the world. (5G) 5G is used for various applications like real time control and it network availability will be everywhere. (5G) communication can require MIMO technology to deliver better throughput and better spectrum efficiency. In order to increase the overall gain and to provide diversity reception by using antenna array. As the first wireless system is SISO (single input single output) it has the ability to increase the received signal gain and provide multipath fading but it fails in multiple antennas which is an advantage in MIMO systems. (MIMO) systems are used because they have the capacity to increase coverage and data rates. In order to achieve the same size the MIMO system uses MIMO code. MIMO antenna provides high data rates.

Due to advancement of multiple data systems simultaneously using wireless antennas. As the antennas designed at 2.45 GHz use patch antennas. These are integrative in manufacturing, provides good efficiency and easy for fabrication which are easily used in mobile communication systems. (1) The circular patch antenna is designed by FR4 epoxy substrate which has a dielectric constant of 4.4 and the substrate height is 1.6mm. (2) The microstrip patch antenna is an antenna which uses a microstrip technique implemented on a Printed Circuit Board which is referred as an antenna.

2. MIMO TECHNIQUE

This technique has multiple antennas at transmitter and receiver which is used for sending and receiving more than one data signal simultaneously by exploiting wave interference for multipath propagation.

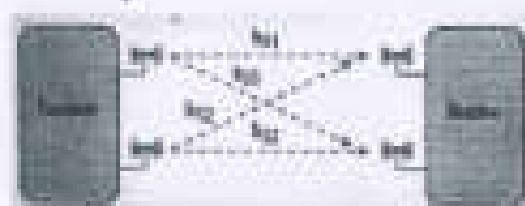


Fig 1: Block diagram of MIMO system

2x2 MIMO antenna has a pair of transmitting antenna on one end, two antennas at receiving end. It operates in exchanging wireless signals across the propagation channels.



Fig 2: 2x2 MIMO (single input multi output)

3. OPERATING MECHANISM

MIMO is a technique used which needs for high frequency structural simulation. It is used for designing of antenna with full wave electromagnetic field which is a 3D volumetric model. Various modeling that has an advantage of flexible structure, modeling and graphical user interface, optimization, visualization, and modeling.

4. ANTENNA DESIGN

4.1 Microstrip

Microstrip antenna which have a low profile and it is a dielectric constant which is mounted in between a microstrip antenna with a metal patch mounted on it. These are small in size and has a low radiation. These are light weight, volume is low, low cost, low mass, low fabrication cost, wide size substrate material, variety of operating dual and triple frequencies. These antennas are used in HFSS, mobile communication, health care operating at 2.45GHz.

4.2 Patch

This is also known as patch because of its wide flat structure antenna structure. This structure has multiple planes where these two planes are overlapped, where one is larger than the other which has dielectric plane in the middle. This is used for parallel wireless devices which are easy for fabrication or printed circuit boards. In this the least is

TRANSFORM BASED APPROACH TO MITIGATE PILOT CONTAMINATION IN MASSIVE MIMO



Parvina K. Sharma
Dept. of ECE
IITG (affiliated by AICTE)
Tatasaheb, India
parvina.ksharma@iitg.ac.in

Vinaya Venkatesh
Dept. of ECE
IITG (affiliated by AICTE)
Tatasaheb, India
venkatesh.vinaya@iitg.ac.in

Aravind Padmanab
Dept. of ECE
IITG (affiliated by AICTE)
Tatasaheb, India
aravind@iitg.ac.in

Chaitan Padmanab
Dept. of ECE
IITG (affiliated by AICTE)
Tatasaheb, India
chaitan@iitg.ac.in

Chaitanya Prakash Dept.
of ECE
IITG (affiliated by AICTE)
Tatasaheb, India
chaitanya@iitg.ac.in

Abstract— Massive MIMO is one of the prime technologies in wireless communication systems for spectral efficiency and achieving high data rates. MIMO is a technology which uses diversity as a basic principle that mitigates the effect of fading at receiver by using multiple antennas at input as well as output. One of massive MIMO is technology that promises to deliver enhanced link reliability as well as high data rates. This has given a way for a lot of research interest in this field. When it was tested for use of very large antenna array at the base station (BS), typically of the order of few thousands, can potentially provide large gain in robustness, security and system throughput of wireless communication systems. As well as with the advantages, there are also getting various new research challenges that need to be provided a solution for massive MIMO. One of these challenges is Pilot contamination. Multiple neighbor cells may use the same pilot sequences, and pilot patterns of the multiple neighbor cells may overlap, which will directly affect the performance of the channel estimation. This is the main reason for the limited performance of massive MIMO. Even though a large number of antennas are incorporated, still the gain is getting degraded. In this paper different matrix based transform using orthogonal basis vectors are used to generate pilot sequences that reduce pilot contamination which is predominant in 5G communication.

Keywords— Spectral efficiency, Massive MIMO, Pilot contamination, Multiplexing gain.

1. Introduction

5G is an upgrade for 4G which is currently under development. 5G provides faster data rates, lower latency, higher connection density. The plans of 5G are better battery consumption, Device-to-device communication, and to improve overall wireless coverage. It is over 10 times faster than 4G. The max speed of 5G is as fast as 20Gbps. Massive MIMO, millimeter wave, small cells, LAA and the new technologies from the previous decade can give a data rate of 10Gbps to a user, with a low latency which can serve for more, and capable of providing connections for at least 100 billion devices. For 5G networks, the date of commercial introduction has been estimated. Different estimations have been made for the date of commercial

introduction of 5G networks. However, Massive MIMO has become a big challenging problem which limit the performance of 5G cellular system.

1.1 PILOT CONTAMINATION

Massive MIMO is one of the prime technologies in wireless communication systems for spectral efficiency and achieving high data rates. MIMO is a technology which uses diversity as a basic principle mitigates the effect of fading at receiver by using multiple antennas at input as well as output (i.e. spatial multiplexing). One of massive MIMO is technology that promises which are expected to deliver enhanced link reliability as well as high data rates. This has attracted lot of research interests in this field. When it was tested for use of very large antenna arrays at the base station (BS), typically of the order of few thousands, can potentially provide large gain in robustness, security and system throughput of wireless communication systems. As well as with the advantages, there are also getting various new research challenges that need to be provided a solution for massive MIMO. With these problems because of the MIMO and because of the limited orthogonal pilot sequences, multiple neighbor cells may use the same pilot sequences, and pilot patterns of the multiple neighbor cells may overlap, which will directly affect the performance of the channel estimation. This is called pilot contamination. The following are different solutions surveyed.

1.1.1 Solution 1

If pilot reuse is completely done, inter-cell interference will increase, to reduce this limitation, we use this scheme. Pilot reuse concept is akin to the frequency reuse concept. In this paper [1], the matrix user pilot assignment strategy. In this 2 hexagonal cells are considered and they are three way partitioned. The pilot reuse factor is $1/V$ where V is the number of cells that uses orthogonal pilots. If $V=3$, it means that pilot contamination is reduced by assigning orthogonal pilots to the adjacent cells. In the Fig.1 user pattern the cells having the same color also have set of pilot sequences and cells having non-white will use the Orthogonal pilots.

IoT Based Smart Water Management System Using Long Range Communication

G.T.R. Padmaja, T.D.N.S.S. Sarveswara Rao, K.N.H. Srinivas

Department of Electronics and Communication Engineering,
Sri Vasavi Engineering College, Tadepalligudem, A.P

trpadmaja.ganta@gmail.com, idnnsrso@gmail.com, kth.trident@gmail.com

Abstract—Internet of Things (IoT), which will create a huge network of billions or trillions of “Things” communicating with one another, are facing many technical and application challenges in developing of smart cities. In this paper, an efficient monitoring and consumption of water is addressed by incorporating long range wireless communication technology in accordance with IoT. The sub-GHz module also known as long range wireless communication module can transmit the data to a distance of 3-kilometers line-of-sight using LoRa modulation. This module is used to transmit the water level of the tank to the cloud through gateway. The water level data stored on cloud server is observed using smart mobile application and water meter is automatically switched on or off based on the required water level.

Keywords—Long Range Wireless Communication, LoRa, Smart network meter, Gateway, IoT, cloud, Smart mobile.

I. INTRODUCTION

Water is an vital of life and managing it is an important issue now-a-days. According to the World Health Organization it has been reported that millions of people are unable to access safe drinking water. Global warming and adverse temperature impact caused less drinking water available on earth. Control and standardization of water management is in not in accord with information and communication technology system due to which the problems of water control around. The efficient distribution, consumption and maintenance in water management.

The Internet of Things (IoT) consists of sensors and networks and can be termed as smart, programmable, self-configured & adaptive system interconnecting “all” things, including every day and industrial objects, making a way to interact with humans. The concept of IoT and its deployment is extended to all the fields or applications such as smart city, smart transportation system, smart industries and many other systems.

A novel approach is proposed in this paper, based on IoT to understand and monitor water consumption. Sensors are installed on three water tanks and data acquisition is done using a controller, finally transmitted to the cloud through gateway using long range wireless communication technology.

The paper is organized as, section II is survey on water monitoring system developed, section III presents the design and development, the results are presented in section IV and conclusions are made in section V.

II. EXISTING METHOD

The Internet of Things is multi-disciplinary concept which is categorized into three levels called the technology level, communication level and intelligence level. In this section the works presented by various authors are discussed with respect to water management system.

[1] proposed Smart Campus and in this a mobile application was created to monitor all the details of water consumption in the campus. The data from these applications is uploaded to cloud through online server using Wi-Fi module.

Article [2] has proposed IoT based water flow control system as a part of water distribution in a Smart Campus using Raspberry Pi. Depending on the water level, the submersible pumps start and stop automatically and continuously upload the water level to the cloud.

Yashini [3] has proposed Mobile intelligent system using IoT for smart irrigation. In this Work, Mobile Controlled Smart Irrigation system is implemented with the help of Raspberry Pi. And the information of moisture and temperature sensor data is stored in Cloud. Using Data present in cloud, an application is created in android mobile to interact with the system.

In paper [4], a system is developed which senses the water flow rate and temperature in household. The sensors are placed at various places in a house, and the data collected from these sensors is stored in a cloud via the Internet or Wi-Fi module.

A novel approach is proposed in this paper which mainly focuses on smart water management using long range communication technology.

III. DESIGN AND IMPLEMENTATION

The proposed water management system is shown in Figure 1. This system consists of three units i.e. the tank unit, gateway unit and cloud. The tank unit consists of Ultrasonic

Analysis of Three Port Circulator Using Artificial Neural Networks

G.V.Subrahmanyam¹, J Lakshmi Narayana²

¹Assistant Professor, Sri Sairam Engineering College, Tambacauda, subrahmanyam.gv@gmail.com, tambram@sssc.edu.in, 621107, India
²Professor and Head of the Department, PCCOE College of Engineering, Jalgaon, jlnarayan@pccoe.ac.in, 382005, India

ARTICLE INFO

Article Name:
Received 01 January 2019
Received in revised form 28 January 2019
Accepted 04 February 2019
Keywords:
Three port circulator
Artificial Neural Network (ANN)
Forward and inverse models

ABSTRACT

A Radio Frequency (RF) three port circulator is a non-reciprocal passive device, which transmits signal flowing in one port and transmitting into two port in isolation. These days three circuit become crucial in microwave systems and various circuits in which the high power signals to be directed and isolated. It prevents the microwave component from unwanted reflections. An exact model is used for analysis of three circulators that can be obtained from Finite Element (FE) simulation for the computational cost is very high. Therefore, the Artificial Neural Network model is preferred alternative as there is model with less computational cost. ANN can solve large variety of Radio Frequency and CAD related problems. The neural network model is trained and tested by different ANN algorithms and validated for three performance comparison. The circulator is designed using inverse model. In this paper proposed inverse model and direct inverse model are compared.

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Peer review under responsibility of International Conference on Sustainable Computing in Science, Technology and Management.

1. Introduction

Usually the circulator is a ferrite device having nonreciprocal behavior uses the properties of ferromagnetic materials and enables the transmission of microwave energy. Because of nonreciprocal nature it allows the energy to flow in one direction with very losses and directs it to the opposite direction. Fig.1 shows three port circulator. Usually the circulators are designed according to the coupled theory of Ferrite (H. Stenzel, 1964) and of Far and Gyration (C.H. Lee and R.L. Comstock, 1967). The wide bandwidth can be easily obtained for the circulator provided they are operated in large values of splitting constant (Mickel T.Py and P. J. Raimond, 1975). An artificial Neural Network (ANN) is a computational model based on the structure and functions of biological neural networks.



Fig. 1. Three port circulator

The structure of ANN is affected by the flow of information through the network because learning or training capabilities are depending on input and output of the neural network. These networks are trained to represent any nonlinear continuous relationship between input and output of the data obtained from various sources. Among them the soft area microwave and RF problems. The neural network in this area is developed from training the network with the data obtained from EM simulation software or their any hardware set up. If the neural model results good, the calculation time is very small as compared to EM simulation software. In this paper design and analysis of three port circulator using ANN forward and inverse models are presented also the performance of the neural models with different training algorithms are compared in terms of average and mean case errors. The remaining paper organized as Artificial Neural Modeling Techniques consisting of forward and direct inverse models, proposed inverse model for design of circulator.

Prediction of crop production using adaboost regression method

¹Dr Shriya Bhawan Keshari, ²Lochan Gargiwal, ³Ch Raja Ramesh, ⁴K V Motyala and ⁵Dr Ganesh

^{1,2,3,4,5}ICV Department, Sri Vasavi Engineering College, Padmalapalli, Tadipatri, Andhra Pradesh, India

Abstract: Territorial evaluation or forecast of yield creation is basic for some applications, for example, agrarian grounds administration, investment security calculating framework, customer exchange strategy. Machine Learning has risen with enormous information advancements and superior processing to make use over time data for informative evaluated issues in the multi-disciplinary agricultural space. In this paper, we have applied and build a crop production prediction model using Decision Tree Classifier 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 30 per cent 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
-

Attainment of Course Outcomes by using Python tool for Outcome based Education (APTOBE)

Rajesh Arappalli, Asst Prof
Dept: Computer Science and Engineering
SRI YASAVI ENGINEERING COLLEGE(SVEC)
Tadepalligudem, AP, INDIA
rajesharappalli@gmail.com

Lakshmi Arappalli, Asst Prof
Dept: Computer Science and Engineering
SRI YASAVI ENGINEERING COLLEGE(SVEC)
Tadepalligudem, AP, INDIA
lakshmiarappalli@gmail.com

G.Sri Lakshmi, (B.Tech)
Dept: Computer Science and Engineering
SRI YASAVI ENGINEERING COLLEGE(SVEC)
Tadepalligudem, AP, INDIA
laksh771@gmail.com

Abstract— Course Outcomes (COs) plays an important role in Outcome-Based Education (OBE). The attainment of Program Outcomes (POs) is depends on the attainment of Course Outcomes (COs). In this paper, we have discussed the CO attainment for specific course on the basis of various tools such as direct and indirect method in which student's interest and external assessment marks and feedback from Course End Survey have been considered as an input data. The total attainment process has been implemented by using Python Tool.

Keywords—Course Outcomes (COs), National Board of Accreditation (NBA), Outcome-Based Education (OBE), Program Outcomes (POs).

INTRODUCTION

Outcome-Based Education (OBE) is already adopted, in engineering education system, from last few years along with National Board of Accreditation (NBA) [1][2][3].

The attainment level of course outcomes may vary with different courses but at least 50% attainment is mandatory for all courses. In our Institute, we have expected that range up to 60%. In this paper we have given detail explanation for evaluation of CO attainment. Total Assessment is calculated by using Python Tool [2]. This tool assists faculty to construct queries based on the structure of Success Transparency. It also addresses the respective course outcomes and program outcomes. This tool generates reports depicting the query details on course and program outcomes. The systematic approach adopted in this tool, has improved faculty interest in designing relatively good questions.

Here we have selected "Object Oriented Programming through C++" course of five year B.Tech students of Computer Science Engineering.

There are 11 Program Outcomes (POs) developed at department level and six course outcomes (COs) for each subject. Further we have described attainment of CO using both direct and indirect methods in brief. Six course outcomes

specified for Object Oriented Programming through C++ course i.e. it is expected that after completing this course successfully, students must be able to

- CO1, Describe the Basics of Object Oriented Programming, C++ programming and I/O in C++ (K1-Comprehension)
- CO2, Interpret the Basic Concepts in C++ Programming, Constructors, Destructors (K2-Comprehension)
- CO3, Prepare programs using I Functions, Overloading and Inheritance, Type Conversion.(K3-Application)
- CO4, Explain the functionality of Virtual Functions and Pointers. (K2-Comprehension)
- CO5,Write File Operations, Generic Programming, Template and Exception Handling.(K3-comprehension)
- CO6, Predict Programming and Standard Template Library Model. (K3-Application)

BACKGROUND

The Total Attainment process in COE [1] is based on Direct and In-Direct Assessment. Direct Assessment Measurement is based on Internal, External ,On-Line Quiz Examinations and Assignment Marks for the corresponding subject. In-Direct Assessment Measurement is based on Course End Survey which has been taken from Students based on some sample questionnaire on the corresponding subject.

DIRECT METHOD:

PROGRAM OUTCOMES (POs):

Computer Science Engineering Graduates will be able to

- PO1: Engineering Knowledge: Apply the Knowledge of Mathematics, Science, Engineering Fundamentals and Concepts of Computer Science engineering to the solution of complex engineering problems.
- PO2: Problem Analytic Identify, Formulate, review research literature, and analyze complex engineering problems making substantiated conclusions using



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Sarvesh Gajjala


Dr. N. Sreya
Conference Chair


Dr. Y. Robinson
Deans, RVS Technical Campus

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Second Edition

S.K.V.S. Sriramachary

M.A., M.Phil., B.Ed.

Professor & Head (Retd.)
Department of Mathematics
University College of Engineering
(Autonomous)
Osmania University, Hyderabad

M. Bhujanga Rao

M.Sc., M.Phil., Ph.D.

Director
Centre for Distance Education,
Mahatma Gandhi University, Nalgonda
Formerly, Professor, Dept. of Mathematics
College of Engineering,
Osmania University, Hyderabad

Nanubolu Raja Sekhar

M.Sc., M.Phil.

Associate Professor of Mathematics,
Head, Department of Basic Sciences & Humanities,
Sri Vasavi Engineering College,
Peddaturupalli Tadepalligudem,
W.G. District, Andhra Pradesh.

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S.K.V.S. Srinamachary
M.A., M.Phil., B.Ed.

Professor & Head (Hod.)
Department of Mathematics
University College of Engineering
(Autonomous)
Osmania University, Hyderabad

M. Bhujanga Rao

M.Sc., M.Phil., Ph.D.

Director

Centre for Distance Education,
Mahatma Gandhi University, Rajgurunagar

Formerly, Professor, Dept. of Mathematics
College of Engineering,
Osmania University, Hyderabad

N. Raja Sekhar

M.Sc., M.Phil.

Associate Professor of Mathematics,
Head, Department of Basic Sciences &
Humanities

Sri Vasavi Engineering College,
Peddabattipalle Tekmalgudem,
W.G. District, Andhra Pradesh



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Second Edition

S.K.V.S. Sriramachary

M.A., M.Phil., B.Ed.

Professor & Head (Retd.)

Department of Mathematics
University College of Engineering
(Autonomous)

Omania University, Hyderabad

M. Bhujanga Rao

M.Sc., M.Phil., Ph.D.

Director

Centre for Distance Education,
Mahatma Gandhi University, Nalgonda

Formerly, Professor, Dept. of Mathematics
College of Engineering,
Omania University, Hyderabad

D. Rama Murthy

M.Sc., Ph.D.

Retd. Professor, Former Head and
Chairman,

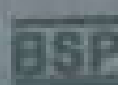
Board of Studies,
Department of Mathematics
Omania University
Hyderabad

N. Raja Sekhar

M.Sc., M.Phil.

Associate Professor of Mathematics,
Head, Department of Basic Sciences &
Humanities

En Vessal Engineering College,
Pedatadepalli Tadepatri Road,
W.G. District Andhra Pradesh



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COMPARATIVE STUDIES ON TERNARY BLENDED CONCRETE

P. N. V. Deepa Prasad
Assistant Professor
St. Xavier's Engineering College
Tadipatri, Andhra Pradesh-151 002, India
deepa.pn@stxaviercollege.ac.in

ALAKA VIDYASAR
Assistant Professor
St. Xavier's Engineering College
Tadipatri, Andhra Pradesh-151 002, India
alaka.vidyasar@stxaviercollege.ac.in

A. Lakshmi
Assistant Professor
St. Xavier's Engineering College
Tadipatri, Andhra Pradesh-151 002, India
lakshmi.a@stxaviercollege.ac.in

Abstract—Now a days concrete is the most commonly used material in the construction. This paper suggests ternary blended concrete and results of an experimental investigation on concrete properties by the addition of river bank ash, slag and fly ash with the partial replacement of cement. The properties that are going to be investigated are workability and compressive strength. This paper discusses about the percentage to be added to get high strength and good workability. Cement replaced with river bank ash/slag and fly ash of different proportions.

Keywords—River bank ash/slag, GGBS, Fly ash, compressive strength, workability, durability.

1. INTRODUCTION

Economic and Environmental considerations play a major role in utilizing industrial wastes like GGBS and Fly ash as a replacement of cement in making of concrete. As concrete is the second most consumed material in the world after water. There are so many surveys saying that if the concrete is prepared with the materials which occur naturally like river sand, ballast that are going to be exhausted in future. Considering that this paper suggests not only utilizing other materials for concrete production but also minimizing the waste generated by industries and with addition to that the concrete properties can be improved by using these industrial wastes. In this an experiment is carried out to calculate strength and behavior of concrete. The fly ash is having pozzolanic properties is already in use and so many researchers are on it.

2. OBJECTIVE

The main objective is to utilize the industrial waste like GGBS, and fly ash in making concrete not only considering about economy but also considering environment. The fly ash is already used because of its pozzolanic nature. Here it is blended with GGBS to improve properties of concrete.

3. SCOPE OF WORK

The title itself says the concrete is going to made with granite powder and fly ash, which are industrial wastes released by thermal and petrochemical industries which release them in a huge quantity. These are very fine and are airborne, that means these are easily carried out by wind. These particles are also going to adverse effects on human beings who inhale them as these are airborne. These are going to creating problems in those who subjected to that polluted environment. Concrete made with GGBS and fly ash will be the key to decline these wastes in the environment. The concrete also utilizes these wastes without going to cause any problems to human health after the usage them as the raw materials.

4. LITERATURE REVIEW

[1] Ternary blended concrete system of OPC+FA+GGBS

comprovises a better choice than binary blend. Some studies of OPC+FA to get strength comparable to control are due to its economic and environmental benefits [2]. Based on the results, a 10% FA and 1% GGBS combination is being proposed as optimum for 20% replacement of OPC in concrete matrix, since at this combination only 1.4% reduction in the compressive strength of OPC+FA+GGBS concrete was observed when compared with the control concrete. [3] Utilized Granite Powder on Strength Properties of Concrete - advised that the water absorption drops to about 6% than conventional concrete and the all strength characteristics are increased. Slump and voids [4] The percentage increase in Compressive strength of Ternary Blended Concrete is found to be higher at higher ages for all water to binder ratios. [5] Blended concrete is always resistant upon 30% replacement of granite powder beyond that the concrete has poor ultimate stress.

5. METHODOLOGY

1. Materials required.
2. Concrete test design.
3. Fresh properties of concrete.
4. Hardened properties of concrete.
5. Comparing and plotting graphs.
6. Conclusion.

Table 1 Material Combinations

Mix 1	Mix 2	Mix 3
Conventional concrete (4% cement replacement)	Cement replaced with 20% of (GGBS+FA)	Cement replaced with 40% of (GGBS+FA ash)

6. MATERIALS AND PROPERTIES

GGBS The ground granulated blast furnace slag (GGBS) is a byproduct from steel manufacturing technology. It is being utilized in place of cement and the compressive and tensile properties of ggbfs concrete is more than normal concrete. The ggbfs provides pore refraction and GGBS reduces alkali-aggregate reaction when aggregate used in concrete are alkali reactive. [6, 7] The fly ash used belongs to class F category. Fly ash is a waste generated by thermal power plants which improve compressive strength of concrete and also decrease permeability and cost. Fly ash in concrete makes it lighter weight.

Table 2 Chemical Composition Of Materials

Parameters (Mass)	Composition	
	Class F Fly Ash	GGBS

Earthquake Analysis of Open Ground Storey Building Using ETABS

B. Govinda

Assistant Professor
Department of Civil Engineering
Dr. Jyoti Engineering College
Mumbai, Maharashtra
govinda@jyotiengg.ac.in

Prakash T. Patil

Assistant Professor
Department of Civil Engineering
Jyoti Engineering College
Mumbai, Maharashtra
prakash@jyotiengg.ac.in

Abstract— The infill material gives an important role under earthquake load on the structure. This article contains study on earthquake response of Open Ground Storey (OGS) building and a comparative study on the OGS building with different infill condition under earthquake load. Typical building models were prepared as per the suggestions given by national Indian earthquake code IS 1893:2016 by using ETABS-2016 finite element software. The applicability of code provision has to be checked.

Keywords— Open Ground Storey, Lateral stiffness, Lateral strength, RC structural wall, Infill frame.

1. Introduction

Steadily increase in the population in metropolitan cities and invasion of smart cities in India, leading to shortage of space or sites for all and ultimately which leads to Vertical growth of the city with taller and bigger buildings. In some cases there will be scarcity for parking space for vehicles. The Open Ground Storey (OGS) of higher building will gives the space for parking of vehicle.

Most of the old building failure in the past earthquake shows that the Open Ground Storey in the buildings are most weak to take lateral loads. The infill material which is present in the building will give lateral stiffness to the building. However, the designer tries to simulate the stiffness of the infill wall for the analysis of framed building. The design based on this type of analysis may result in under-estimation of shear forces and bending moments in columns of ground storey, and it may also be one of the causes for failure of building.

IS 1893:2016 gives the guidelines for OGS Reinforced Concrete Framed Structure with URM infill walls or reinforced concrete structural walls. Code suggested that "Lateral stiffness in soft storey(s) is less than 80% of that in storey with infill wall, and Lateral strength in soft storey(s) is less than 80% of that in storey with infill walls". Buildings in the Indian earthquake zones II, IV and V shall be designed for RC structural walls [1] and can be detailed with all guidelines of IS 13920:2016 [2].

Lateral strength and stiffness of a Reinforced Concrete structure depends on the factors like the type of building configuration adopted, designed size of structural members, ductility and material strengths, percentage of reinforcement present in members, characteristic of joints

between the members in terms of strength and stiffness. There is a composite relation between all these factors which gives the final strength and ductility for the structure during earthquake shaking [3].

M. V. Tazari et al., for column beam joints they modified the capacity design rule, the capacity of column with high stiffness is added to the capacity of beam with low stiffness [4].

On 26/11/2011 morning 8.45 the power full earthquake has occurred in Gujarat, it has been most severe earthquake in last few decades in India. The M_w 7.6 (moment) quake caused a heavy loss of life and property. Almost 20000 people lost their lives, and nearly 1.7 cr. are wounded. The estimated economic loss was \$2.46 crn. Number of newly built high-rised RC framed old new buildings were damaged in various regions in Gujarat at least damage rates up to 57% are reported [5].

H. B. Bhandari et al conducted nonlinear analysis of old storey buildings and formulated a rational method in designing OGS building for higher loss caused of any multi-storey factors given in various national code [6].

Only lateral strength was increasing by code provision and not ductility of the buildings. Whereas some other methods subjected the importance in both ductility as well as lateral strength by improved seismic performance [7].



Fig. 1. Typical provision for Open Ground Storey

Soft storey effects are reduced by using composite bracing in URM infill building in Indian earthquake zone V, which shows that composite bracing adopted in structure have less drift demand and lesser chance of damage [8].

Stabilization of Black Cotton Soil Using Tyre Granules and Gypsum Powder

J. Jyoti Chavhan
Assistant Professor
Civil Engineering
Dr. Jyoti Engineering
College
Tatyasaheb, AP India

P. Raju, Jyoti Jyoti
Assistant Professor
Civil Engineering
Dr. Jyoti Engineering
College
Tatyasaheb, AP India

J. Saravali Jay
Assistant Professor
Civil Engineering
JIT University
Guduru, Guntur, India

Abstract—Black cotton soil exhibits high swelling, shrinkage nature and low bearing capacity. Due to peculiar nature it forms a very poor foundation material for road construction and also for any structure in civil engineering. The method to improve engineering properties of soil is called soil stabilization. To enhance the engineering properties of the soil we use tyre granules and gypsum powder.

Tyre being highly durable, non-degradable, flexible, resistant and high frictional resin helps to improve the engineering properties of black cotton soil. Gypsum has ability to bind soil particles and as a result to increase the strength of soil. It is judged by conducting various laboratory tests like Unconfined Compression Strength (UCS), Ten California Bearing Ratio (CBR) Test, Standard Proctor Test by Soil Stabilization.

Keywords: Black Cotton Soil, Tyre granules, Gypsum powder, Soil Stabilization, Shear Strength, California Bearing Ratio (CBR), Standard Proctor.

I. INTRODUCTION

Black cotton soils form a major soil group in India. They possess high shrinkage and swelling properties and due to these properties it has been challenge to highway engineers. The black cotton soil is very hard and develop cracks when it is dry condition, loses its strength in wet condition, had low bearing capacity. Due to its peculiar characteristics, it forms a very poor foundation material for road construction.

Tyre soil stabilization we have to add certain amount of additive to the soil for improving their properties but these additives finally prove to be more expensive. Whereas in case of soil stabilization some inferior materials or some industrial or agricultural wastes can be used in place of cement or lime with the soil to improve its quality. This will result in cost effective construction. Moreover, due to rapid industrialization throughout the country the production of huge quantity of waste materials create not only the environmental problems but also disposal hazards. Safe disposal of these materials is of great concern and this situation can be addressed by the bulk utilization of these materials mostly in the form of civil engineering applications. In recent years the use of various waste products in civil engineering construction has gained considerable attention in view of the shortage and high costs of conventional construction materials, the increasing costs of transportation and environmental constraints.

Soil stabilization is a geotechnical technique of increasing and maintaining the stability of soil mass and chemical or mechanical stabilization of soil to enhance their engineering properties. Stabilization increases load bearing capacity and shear strength of the soil and reduces the pavement thickness. Different types of techniques are being adopted for stabilization of such weak soil using various substances. Additives like tyre granules, gypsum, fly ash, lime, pozzolan, just there etc.... can be added to improve the properties of soil

soil to CBR.

Tyre granules is finely ground rubber produced from automotive and truck scrap tires. During the recycling process, steel and tire cord are removed, leaving the rubber with a granular consistency. Continued processing with granulator or a trucker mill, possibly with the aid of cryogenics or by mechanical means, reduces the size of the particles further. The particles are sized and classified based on various criteria including color/black only or black and white. The granules is sized by passing through a screen, the size based on a dimension in inch. Tyre granules are also known as chunk rubber.

II. OBJECTIVES OF STUDY

To examine the suitability of rubber tyre granules and gypsum powder for stabilizing black cotton soil.

To improve the California Bearing Ratio of black cotton soil by using rubber tyre granules.

To improve the unconfined compressive strength and increases dry density of the soil.

III. LITERATURE REVIEW

CH. Kavyasa Kaverthi & Sumanth Dasudala (2018) "Stabilization of black cotton soil by using granulated rubber powder", an experimental work it infers that there is improvement in CBR value & therefore increase bearing capacity. Due to increase in capacity, thickness of soil layer can be reduced to save the cost. Furthermore [1].

Ms. Bajender kaur, Dr. Dalvir singh (2014): "Tyre rubber powder as a soil stabilizer", which says that by using optimum content of tyre powder improves the performance of CBR value and this type of stabilization applicable to stabilization of black cotton soil in construction of road or in shoulder portion of highway [2].

Pratiksh Thak, Tushar Raat, Kunal Yadav, M. Iqbaldar (2019): "Stabilization of black cotton soil by using waste gypsum", which concludes that by addition of gypsum, swelling nature of black cotton soil reduces and maximum dry density increased and OMC decreased [3].

T. Gauri prasad, V. Sri Niharika, B. Satish , G. Tejaswini, A. Nandini (2018): Carried out investigation on "Strength improvement of expansive soil by using tyre powder", which says that on addition of tyre powder to the soil result in decrease of plastic nature of soil & increase in stiffness of soil with increase in tyre powder [4].

G. Ravi Kumar, K. Gayathri (2018): Presented the "Performance evaluation of crushed rubber powder as soil stabilizer", which says that this type of stabilizer suitable for improving the load bearing capacity black cotton soil and not suitable for the stabilization of red soil [5].

Jagrat Singh and Prof. Vinod Kumar Senthil (2017)