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## A STUDY OF LIGHT WEIGHT CONCRETE BY USING CERAMIC WASTE AS A REPLACEMENT OF AGGREGATES

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### ABSTRACT

**Abstract**—This paper examine the prospect of utilization of the ceramic wastes (CW) such as coarse and fine aggregate in lightweight aggregate concrete (LAC) that is consequence of coarse aggregate material (CAM) substitute with CW and consequence of biscuit substitute fine aggregate material (FAM) on properties of LAC. The composition of ordinary Portland cement (PC): FAM: CAM are 1: 2.21: 3.03 and substituted CAM with CW and FAM with biscuit at the levels of 0, 25, 50, 75 and 100 wt.%. All conditions of LAC was subjected to tested water absorption, thermal conductivity and unit weight at the age of 28 day. The compressive strength at 7, 14, 28 and 56 days was also conducted. The results show that when proportion of CW is increased then density and compressive strength decreased but the water adsorption and thermal conductivity increased. After 28 days, the sample with 100% CW compressive strength and bulk density has reduced from 55.4 to 11.4 MPa and 2394 to 1362 kg/m<sup>3</sup>. On the other hand 50 wt.% gave the compressive strength and density of 38.1 MPa and 1803 kg/m<sup>3</sup> respectively. 50% mix was collected for study with biscuit replaced FAM on mechanical properties. The compressive strength improved when levels of biscuit increased for 50 wt.% were as decreased with excess 50 wt.%. The bulk density and thermal conductivity dropped from 1803 to 1584 kg/m<sup>3</sup> and 0.689 to 0.592 W/m°K. The optimum configuration that meet the ASTM C330: standard range for structural lightweight aggregate concrete has t contain 50 wt.% of CW and 100 wt.% of biscuit.

**Key words :** *lightweight aggregate concrete (LAC), ceramic wastes (CW).*

### INTRODUCTION

Lightweight concrete (LWC) outlined as a sort of concrete that contains of AN increasing agent that will increase the degree of the mixture

that is lighter than the standard concrete.. USA, UK, Sweden, etc has been wide exploitation LWC. The LWC has denseness and thermal conduction. Reduction of load, quicker building rates in construction and lower transport and handling prices square measure of LWC. light-weight mixture concrete may be shaped employing a vary of light-weight aggregates from natural materials, thermal treatment of natural raw materials, by-products from industrial. Volcanic rock, clay, slate, shale, fly ash, feather palm shell ash, biscuit ceramics, bottom ash etc. were used be light-weight mixture in concrete [1]-[6]. the specified engineering properties of LWC can have a sway on the most effective style of light-weight mixture to use. it's a touch structural, however high thermal insulation properties, square measure required a light-weight, weak mixture may be used. The LAC have AN air dry density not exceptional 2000 kg/m<sup>3</sup>, however may be as low as four hundred kg/m<sup>3</sup> reckoning on the materials used and therefore the compressive strength will vary between one and sixty five MPa [7]. The LAC was usually being designed in accordance with ACI 213R-04 [8].

The environmental problems square measure important and anxious in industrial sector. The small, medium and huge industrials turn out pollution akin to water, air, solid, risky and noise. In ceramic industries, they're the one in all industries that generates solid wastes from method





# Experimental Analysis on LECA as Fractional Substitution for Sand in Mortaring and Concreting

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**Abstract:** This research work deals with partial usage of LECA (Lightweight Expanded Clay Aggregate) as partial replacement for fine aggregate in mortaring, plastering and concreting. The experimental work had been gone through by replacing the fine aggregate by 25%, 50%, 75% and 100%. M20 grade of mortar and concrete is used in this project, the consistency of water-cement ratio initiated at 0.4 and increased up to 0.5. When the percentage of LECA increased the w/c ratio also get increased. Material study like specific gravity, water absorption and grading of LECA was initially done. strength characters of mortar cube and concrete had been done for 7,14 and 28 days. A comparison study of conventional specimens and LECA was done in this project. Comparatively replacing LECA in 100% obtaining the optimum strength in concreting and in mortar cube 25% replacement of LECA obtain the maximum result. The compressive strength of brick masonry structure had been studied for 9"x9" wall by replacing the fine aggregate by using LECA.

**Keywords:** sand, replacing, LECA, mortar, concrete, brick wall, compressive strength

## I. INTRODUCTION

Sand is the main constituent of construction world. Without sand, the mortar or concrete will not function as intended. Sand is used for filling the voids it supports to pay uniform strength to concrete and in plastering it offering by cover the surface in peaceful manner. By taking fine aggregates from the riverbed will spoil the eco system of water, so the replacement of fine aggregate is an important issue in this era. Many of the government agencies and private sector were insisting to use M-Sand, some of the drawback were seen in M-Sand like water absorption, grading, angular and workability. So it is needed to find the alternative solution for fine aggregate. Here we planned to replace the fine aggregate by using LECA.(Light expanded clay aggregate). LECA is a material made of clay burnt in kiln under 1200°C used as coarse aggregate in light weight concrete, which is easily available in the market and less expensive.

Whether doing large-scale or small-scale construction projects, in order to make the building process cost-efficient and run more smoothly, building materials need to be easy to handle, easy to transport and flexible to work. LECA satisfies the above requirements and also Durable, Recyclable, Environment friendly and Resistant to fire.

This project aims to use crushed LECA as fine aggregate by partial replacement for sand in various proportions like 0%, 25%, 50%, 75% and 100% for M20 grade of mortar and concrete.

## II. LITERATURE REVIEW

M. Mahdy was concluded that concrete to be considered is light weight concrete (using leca as coarse aggregate) that is concrete with a density in the range 1.65-1.85 t/m<sup>3</sup>.in order to obtain high strength concrete, LECA was treated by solution of silica fume of different concentration (10% and 20 %) by weight of mixing water .three levels if silica fume (5, 10, 15%) and two ratios of course of total aggregate content (0.48, 0.65 by volume) were used. For this concrete, information on mechanical properties was provided. Silica flume content seems to lead to high early age strength in 7 days with relatively smaller increase in strength at 28 days .the economic silica fume content for LWC is 10 %.At 0.48 coarse aggregate ratio, the compressive strength and flexural strength were higher than for 0.65 coarse aggregate ratio.

A research by Gurpreet singh and Rafat Siddique on effect of waste foundry sand as partial replacement of sand states that, Waste foundry sand(wfs) is the major byproducts of metal casting industry and successfully used as a land filling materials as many years. This experimental investigation natural sand was partial replaced with (0%, 5%, 10%, 15%, and 20%) of wfs by weight.

A examine from malkit singh and Rafat Siddique on Effect of coal bottom ash as partial replacement of sand on properties of concrete conclude that Coal bottom ash is formed in coal furnaces, it also used for as structural fill. Effects of coal bottom ash on properties of fresh concrete, mechanical and durability properties.



# EXPERIMENTAL INVESTIGATION ON REPLACEMENT OF PLASTIC IN BUILDING BLOCKS

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**Abstract**— This experimental investigation is based on replacement of traditional building blocks by custom shaped and molded plastic blocks, which are made from the shredded waste plastics thereby, make use of the waste plastic in an effective manner.

**Keywords**— waste plastic, custom Mould, plastic blocks

## I. INTRODUCTION

There has been problem of rising cost of building in the developing countries for some time. this is especially in rural areas where the local income has often increased at the same pace as the national average and this has been a source of concern to governments. The population now resides in the urban area meanwhile the overwhelming amount of plastic crowding in land fills to combat these issues the concept of plastic building blocks is introduced by this type of construction people can easily build their homes on their own. The concept of plastic building blocks is to recycle the plastics and convert it into building blocks. This concept work with local municipalities for the source of plastics. By these building blocks people can even build their emergency shelters, community halls, classrooms. The designed blocks fit together like LEGOs. These blocks put an additive that makes the product fire resistant. The blocks take more than 500 years to degrade. The building blocks can be detached whenever needed. These building blocks put an additive that makes the product fire resistant and since the blocks are made of plastic, they'll also resist the earthquake. It also gives a cheaper mode of construction. Each blocks help rid of the world discarded plastic and is cheaper and more fuel efficient to manufacture than conventional bricks. it's also less energy intensive than recycling the plastic into other forms such as in building blocks, bricks etc.,

## II.

## MATERIALS USED

### A. Tin container

Most of the samples are produced using an open cuboid shaped tin container of dimension 300x300x600mm.

### B. Shredded plastics

These are the waste plastics which are shredded into small sized plastics which is available in municipal office.

### C. River sand



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# CORRELATION BETWEEN SURFACE ABSORPTION AND CHLORIDE ION PENETRATION OF CONCRETE WITH NANO SILICA AND ITS CORROSION RESISTANCE

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▼ Abstract

Water absorption and its transportation through the concrete greatly affect its durability. A concrete with less permeability makes it durable. Nano silica (NS) when added to concrete can act as a filler material and also participate in pozzolanic reaction to improve the density as well as the strength of concrete. In this investigation, concrete samples were made by adding NS (0.5, 1, 1.5 and 2 wt.%) of cement to concrete. The compressive strength increased with increase in NS content up to 1.5(%). Ultrasonic pulse velocity test showed improvement in concrete density with increase in NS content. Sorptivity test proved the reduction in surface absorption with increase in NS. Reduced chloride ion penetration was also noted during Rapid chloride penetration test (RCPT). A relationship between water absorption and current passed was found, and using this relationship a prediction chart was proposed. The impressed current technique with constant voltage and varying current was used to study the corrosion resistance property of concrete. The denser concrete with NS showed better resistance to corrosion than concrete without NS. When NS was used the concrete became stronger, less permeable and corrosion resistant.

▼ Keywords

nano silica; RCPT; sorptivity; Ultrasonic pulse velocity (UPV); accelerated corrosion; surface absorption; impressed current technique; COMPRESSIVE STRENGTH; IMPRESSED CURRENT; NANOPARTICLES; PERMEABILITY; WORKABILITY; NANOSILICA; MORTAR; DAMAGE; SLAG

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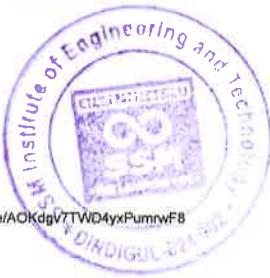
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# STUDY OF STABILIZATION OF RED SOIL BY USING RECRON -3S,FLYASH & LIME

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**Abstract--** The Growth of Population has created a need for better and Economical vehicular operation which requires Good highway with proper Geometric design, pavement condition and maintenance . There are Various Infra structures projects which are used in Highways , Railways, ,Water reservoir etc. which requires earth materials in very Large quantity. The Highways have to be Maintained so that comfort, convenience, and safety are provided to the travelling Public. In this project strength of the soil is increased by stabilization method by using Recron -3s as (1%, 2% ), Lime (2% ,3% ) and Fly ash at (10%,12% ,15%) with different proportion of soil with additive materials California Bearing Ratio values ,Unconfined Compressive Strength value will be more compare to conventional materials and from that thickness of pavement can be minimized to the certain extent.

**Keywords**— recron-3S, fly ash, lime, CBR (California Bearing Ratio), Unconfined compressive strength, Optimum Moisture Content, Maximum Dry Density.

## I. Introduction

In India about 3.5 lakhs sq.km of the land ( 10.6% of total area ) are covered with Red soil. A.valayapatti village in melur in Tamilnadu consist of 2366 total population,1267 workers,318 students. In these area the nature of soil is Red soil type which has created several challenges for civil engineers. Various method can be adopted inorder to increase the engineering characteristic of Red soil.The process of soil stabilization helps to achieve the required properties in a soil needed for the construction work. Ancient civilizations of the Chinese, Romans and Incus utilized various methods to improve soil strength etc. The process of soil stabilization helps to achieve the required properties in a soil needed for the pavement,channel and reservoir lining construction work. One of the main reasons for the failure of Pavements is due to lack of strength. Strength can be increased by adding additive materials to the sub grade in different proportions. In these by using Recron-3s when mixed with soil, fly ash and lime it will give wonderful result. Recron absorbs everything and keeps the road surface in contact and many problems can be solved like potholes, cracking and failure of the pavement.

## II. Materials

Following are the materials which are used for stabilization of red soil:

a) **Red soil:** The soil used in this study is red soil collected at a depth of 1m from the ground level in A.valayapatti village at Melur.

Physical properties of soil after testing are

Specific gravity – 2.69

Liquid limit -40 %



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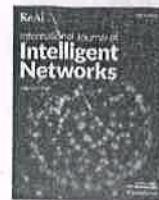
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## SDARP: Security based Data Aware Routing Protocol for ad hoc sensor networks

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### ARTICLE INFO

#### Keywords:

Ad hoc sensor networks  
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### ABSTRACT

Ad hoc sensor networks are the very popular network and play a vital role for producing high performance. In existing networks techniques has not perfectly balanced both energy and security in ad hoc sensor networks and gathering sensed information in an energy efficient manner is critical to operating the sensor network for a long period of time. In this research, we concentrate about security and network traffic issues. To over come this issues we have proposed a novel technique focused on Security based Data Aware Routing Protocol (SDARP) for high data gathering, to attain balancing between security and energy metrices. The security model contains two phases in first phase is here Optimal Cluster Head (OCH) is used to monitor the behavior of CH and cluster members. In second phase, security based energy efficient model is enhanced with data gathering algorithm to encrypt and decrypt with energy metrics. The proposed protocol is simulated using network simulation tool.

### 1. Introduction

Wireless sensors are small devices with limited energy without energy backup; they are more of one-time-use sensors [1]. A wireless ad hoc network are majorly divided into types of wireless network suc as (WANET) [2] wireless ad hoc network or Mobile ad hoc network (MANET) [3] is a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre-existing infrastructure, such as routers in wired networks or access points in managed (infrastructure) wireless networks Security and energy become major issues, it should be concentrated throughout the communication in WSN. Sensor networks have the self-organizing feature and thus the automatic selection of sender and receiver is applicable hence security become a milestone in WSN [4].

Therefore, an energy-efficient routing mechanism would mean longer sensor lifetime and higher network efficiency. Active research is going on in the field of routing in ad hoc sensor networks [5]. In there are lot of development in ad hoc such as security aware routing, energy routing techniques. Secure and Energy Aware Routing Protocol. This two factors are most important contribution of the AODV. Energy-aware routing protocol (EARP) suitable for ad hoc wireless sensor networks and presents an analysis for its energy consumption in various phases of route discovery and maintenance [6, 7]. Based on the energy consumption

associated with route request processing, EARP advocates the minimization of route requests by allocating dynamic route expiry times. In contrast to AODV, EARP reduces the repeated flooding of route requests by maintaining valid routes for longer durations [8].

In Some previous existing algorithms proposed scheme base on clustering to address concerns such as security and energy based routing methods in sensor networks. When the ad hoc networks is absence while the nodes can be easily compromised by attackers [9]. The internal attackers try to eavesdropping between source and sink node [10]. The external attackers try to damage the network performance. Security is a major concern which will provide authentication to the network. In this work, both authentication and network lifetime is improved by providing encryption and decryption scheme. Background work concerning the topic is discussed in the section 2. Section 3 deals with the Performance of SDARP development model. Section 4 presents about the various phases involved with simulation model. The paper concluded in Section 5. Conclusion of this paper presented in section 5.

### 2. Previous work

Jing Xu et al. [11] has proposed the maximum likelihood based estimation method to find the position of sensor nodes during mobility scenarios. All nodes were moving randomly to communicate with each

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## FISH DETECTION AND CLASSIFICATION USING SUPERVISED MACHINE LEARNING

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### ABSTRACT

One of the major challenges with collecting these data is the inherent difficulty associated with accurately measuring the movements of marine animals underwater. The growing demand for marine monitoring calls for robust computerized structures to guide researchers in gathering data from marine ecosystems. The major goal is to realize and hit upon their respective locations. The idea of classification in machine learning is involved with constructing a model that separates statistics into distinct classes. This paper introduced a computationally-inexpensive marine mammal detection and classification algorithm with excessive possibilities of detection and distinct classification. There is a use of a support vector machine active learning algorithm for conducting effective relevance feedback for image retrieval. Here algorithm selects the most informative images to query a user and learns a boundary which separates the images that satisfy the user's query concept from the rest of the dataset.

**Keywords:** Marine animals, detection, machine learning, support vector machine.

### 1. INTRODUCTION

Quantifying human impact on fish biodiversity in order to propose solutions to preserve submarine ecosystems is an important line of research for marine ecology. This quantification requires in situ sampling of the fish community. Measurements based on extraction-fishing give only limited data, and could lead to misinterpretation. Moreover, the use of fishing, even for survey purposes, impacts the studied biodiversity. Another standard method consists in two divers who note visual observations of fishes under water. This kind of survey is expensive in both time and money, and results are greatly impacted by divers' experience and fish behavior. Moreover, data acquisition remains limited by the human physical capacities. A more recent method consists in acquiring underwater images, with either a moving or a fixed camera. An expert will then be asked to detect, count and recognize fishes on a screen offline. At the moment, this task is performed entirely manually, and the amount of data is often too large to be completely analyzed on screen. Moreover, the latest technical improvements of HD camera allow recording fish communities for a long time at a very low cost. Significant examples of a huge amount of underwater HD images that have been collected for assessing fish biodiversity. The



## Hybrid Learning Model for Anomaly Detection and Automatic Labeling for Heart Disease Prediction.

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### **ABSTRACT**

This project proposes a Hybrid Learning Model which uses both Clustering and Classification methods (HLMCC) to automate the labelling process and detect anomalies in data mining. The model consists of two practical phases, automatic labelling and detecting anomalies. First the HLM groups the data into normal labelled one and unlabelled data clusters by adopting Hierarchical Affinity Propagation (HAP) clustering. Second, the labelled data obtained from the clustering phase is used to train the Decision Trees (DTs) and to classify future unseen data. The results show that the HLM is able to automate the labelling of data, which is beneficial to minimize human involvement.

**Keywords:** Hybrid Learning, HAP, DT, HLM.

### **1. INTRODUCTION**

The IoT has been found in several application domains such as smart homes, wearable devices, smart cities, health care, agriculture, transportation, and industrial sectors of industry. IoT devices generate data that may behave inconsistently owing to abnormal or anomaly behavior as a result of attack issues or breakdown in devices, as examples. An anomaly, in this context, means an abnormality in the data that differs from the predicted pattern.

The characteristics of an anomaly are: different from the norm and occurring rarely in the Data Anomaly detection is the technique of identifying rare observations which do not follow the expected behavior. The major technique for performing anomaly detection involves the use of machine learning algorithms. This helps to improve the performance of the system by learning from and using data from previous experiences. There are three types of machine learning task, which are supervised, unsupervised, and semi-supervised learning. Supervised learning trains the model based on predefined labeled data, while unsupervised learning similarities between unlabelled data. Semi-supervised learning deals with partially labeled data to build the model.

Most current anomaly detection systems rely on labeled data which may not be available or it is time-consuming and expensive to produce. In addition, the data collected from IoT devices usually lack the class label and form as unlabelled data. Moreover, the volume of IoT data is growing at an increasingly rapid rate, creating a need to predict, detect, and classify any anomaly for future unseen data. To overcome these limitations, this paper proposes a Hybrid Learning anomaly detection Model that employs Clustering and Classification approaches called HLMCC.

The HLMCC model consists of two functional phases: automatic labeling and detecting anomalies. In the automatic labeling phase, Hierarchical Affinity Propagation (HAP) clustering is applied to



## PHOTO SHARING IN ONLINE SHARING SITES IN TRUST BASED PRIVACY

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### ABSTRACT

Privacy has become a serious problem with the increasing volume of images users share through social sites, as demonstrated by a recent wave where users share their personal information. In light of those incidents, the necessity of tools to assist users to control access to their shared content is clear. Toward addressing this need, this project proposes an Adaptive Privacy Policy Prediction (A3P) system to assist users compose privacy settings for his or her images. This project examines the role of social context, image content, and metadata as possible indicators of users' privacy preferences. This work proposes a two-level framework which consistent with the user's available history on the location that, determines the simplest available privacy policy for the user's images being uploaded. This project relies on a picture classification framework for image categories that can be related to similar policies to automatically generate a policy using a policy prediction algorithm. The generated policies follow the evolution of users' privacy attitudes. This project provides the results over different policies, which demonstrate the effectiveness and prediction accuracies.

**Keywords:** Privacy, online social sites, picture classification, two level frameworks, Accuracy, privacy setting

### 1. INTRODUCTION

Images are now one among the key enables of users' connectivity. The sharing can be done through the already created group of known people or social circles and the sharing can also be done outside of the social circle [2] for the purpose of social discovery. However, rich images may reveal content-sensitive information. Consider a photograph of a student's 2017 graduation ceremony, for instance. It could be shared within a Google+ circle or Flickr group, but may unnecessarily expose the student's family members and other friends. The privacy disclosure and privacy violation problems happened due to sharing images in the online content sharing website [5]. Further, the nature of online social media makes it possible for other users to gather aggregated information [1] about the owner of the published content. The aggregated information may result in unexpected exposure of one's social environment and cause abuse of one's personal information.

The privacy preferences can be entered by users; this is allowed in most content sharing websites [9]. Unfortunately, recent studies have shown that users struggle to line up and maintain such privacy

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# A Secure and High-Capacity Data-Hiding Method using Arnold Transform and Chaotic Scrambling

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**Abstract:** In the fast growing digital world, the protection and transmission of data securely is becoming huge challenge through an open medium like internet. There are several methods for information security process like Cryptography and Steganography. The different data hiding method are lossless compression, advanced encryption standard (AES), modified pixel value differencing (MPVD), and least significant bit (LSB) substitution is presented. In the lossless compression, Arithmetic coding was applied on a secret message to provide 22% higher embedding capacity. The hidden message which is compressed is then given to AES encryption for better security. After compression and encryption, the LSB substitution and MPVD are applied in this work. The proposed scheme is composed of Arnold scrambling and chaotic scrambling (SC-HAC).The security is considered by the proposed scheme which combines Arnold scrambling and Logistic scrambling to improve the encryption effect. Here, Arnold transform and chaotic scrambling is used to increase the SSIM value for better quality of compressed image.

ordinary and innocent looking messages those are generally out of suspicion.

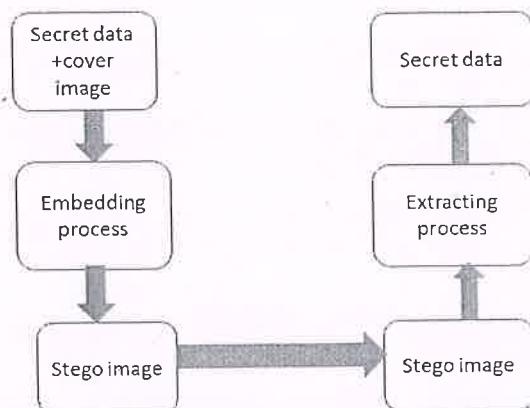


Fig.1 General Structure

**Keywords:** Arnold Transform, chaotic scrambling, encryption, decryption, cover image, Digital Image Processing, Steganography, chaos, Reversible data hiding, absolute moment block truncation coding (AMBTC).

## 1. INTRODUCTION

Steganography is method of hiding information in which prevent the detection of hidden messages and this can be achieved by hiding information inside another piece of innocent looking information. The different embedding methods are the spatial, time domain methods, Transform domain methods, etc. These methods hide/embed information in numerous kinds of media like text, image, audio, video etc. Among these types of different file formats, digital images are considered to be the foremost popular style of carriers due to their size and distribution frequency. Covert or hidden communication is that the process of hiding data in another information. There are many hidden communication techniques such as, Cryptography, Steganography, Covert channel, Watermarking etc. Steganography is the effective means of information or data hiding that protects information from unauthorized disclosure. It works by hiding secretive information into

The proposed system has following methods; they are embedding phase and the extraction phase. Within the embedding phase, the secretive message is first scrambled using transform at different levels, to create it safer against unauthorized extraction. This scrambled message is embedded into the cover image to get the stego image .then the stego image is transmitted and at the receiving end the hidden secret message is extracted by following the extraction and decryption process within the reverse order. During this technique, the values are kept secret and are only known to the authorized users and extraction without the keys results with noises, making the procedure secure.

## 2. STATISTICAL ELEMENTS

### 2.1 Mean:

Mean value gives the contribution of each pixel intensity for the whole image & variance is normally used to find how every pixel varies from the nearby pixel .The mean gives an idea where your pixels are (i.e. are they black, white, 50% gray,). The mean will give you an idea of what pixel color to choose to summarize the color of the complete image



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# Brain tumor Simple Linear Iterative Clustering Segmentation using Chan -vese Contour

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**ABSTRACT:** Brain tumor prediction is a significant task in medical image handling. Early diagnosis of brain tumor assumes a significant job in improving treatment possibilities and expands the survival rate of the patients. Manual segmentation of the brain tumors for cancer growth analysis, enormous measure of MRI images produced in clinical routine is troublesome and time consuming task. In this paper, to recognize thermal data of brain tumors, the proposed basic linear iterative clustering is given a chain vese contour strategy. In this paper, a median filtering strategy is utilized as a preprocessor and segmentation is finished by Fuzzy corner metric algorithm. To diminish the computational complexity and to build the computing time Simple Linear Iterative Clustering is used. The last process is to remove the tumor cells by chan - vese contour utilizing angle vector field as outside force. The proposed strategy accomplishes higher

compared with past fuzzy clustering technique.  
**Keywords-** Fuzzy c-means, thermal information, median filtering fuzzy corner metric, chan vese contour.

## I INTRODUCTION

Medical image investigation plays a most important role in biomedical sciences which is used for studying, analyzing and deciphering the problems. These problems are analysed from medical imaging datasets as acquired by various medical imaging modalities (such as MRI, X-Ray, CT-scan and ultrasound) through various quantitative and computational methods. These techniques helped a clinicians and medical experts to extract the important biological data from images that is useful for clinical decision-making, particularly neurosciences research and developing potential therapeutic strategies.

Past couple of years, there has been tremendous growth in using magnetic resonance imaging (MRI) for diagnostic and treatment process. MRI is a common non-invasive medical imaging modality which can be used for the diagnosis and analysis of internal structures, abnormalities and irregularities i.e., brain tumor.

precision rate of about 98.6% and it is efficient



# A novel two-band equilateral wavelet filter bank method for an automated detection of seizure from EEG signals

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## Abstract

One can determinate the occurrence of epileptic seizure from the electroencephalogram (EEG) signal. Nonautomatic epilepsy detection is onerous and may be prone to error. They have augmented automated detection of seizure methods to attain accurate results. In view of this research work, we designed a frequency localized optimal filter bank to assess their effectiveness for automatic detection of seizures from EEG records. The basic preferred requirement of optimal filters relies on low bandwidth in the discipline of biomedical signal processing. This work provides a novel filter bank method called optimal equilateral wavelet filter bank (OEWF) to satisfy the regularity criteria. This regularity constraint is being satisfied with semi-definite programming (SDP) framework, which specifically does nothing with any parameterization. Implementing the proposed filter banks, it disbands EEG signals into five wavelet sub-bands. The fuzzy entropy (FuEn), Renyi's entropy (ReEn), and the Kraskov entropy (KrEn) are being used for extracting the features from the wavelet sub-bands. The P values provide the distinctive ability of the features. Classification with 10-fold cross-validation for several classifiers such as quadratic discriminant, linear quadratic discriminant, K-nearest neighbor, support vector machine, logistic regression, and complex tree is utilized to classify the EEG signals into seizure vs non-seizure class and seizure-free vs seizure affected class. The proposed research work has gained the highest accuracy, specificity, sensitivity, and positive predictive values of 99.4%, 99%, 99.66%, and 99.35%, respectively, for class-1 (ABCD vs E). The performances of the proposed work using the Bonn EEG data set ensure validation concerning compatibility and robustness.

## KEY WORDS

classification, electroencephalogram, epilepsy, optimal equilateral wavelet filter banks, seizure

## 1 | INTRODUCTION

Epilepsy is a known brain unhealthily condition which might trouble people of all age groups.<sup>1</sup> This disorder occurs because of anomalous variations of electrical discharges from the cortex brain region, which may explicitly

as fits or seizures.<sup>2</sup> Seizures bring about a decrement in mental health, breath, fugue, and other brain health issues. Across the world population, it infests 60 million people with this seizure disorder and hugest affected population are in poor and underdeveloped countries. The functional MRI and Electroencephalogram (EEG) could make the



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# Extreme learning adaptive neuro-fuzzy inference system model for classifying the epilepsy using Q-Tuned wavelet transform

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**Abstract.** Epilepsy is a nervous disorder that causes arbitrary recurrent seizures within the cerebral cortex region of the encephalon. The early diagnosis of a seizure is important in clinical therapy. An automatic epileptic seizure detection method for electroencephalogram (EEG) signals can significantly enhance the patient's life in clinical aspect. The proposed paper is principally based on a completely unique approach of epileptic seizure detection using Q-Tuned Wavelet Transform (QTWT) and Approximate entropy (ApEn). This work focuses by utilizing and testing the common sense of Extreme Learning Adaptive Neuro-Fuzzy Inference System Model (EXL-ANFIS) which foresees the elements of the mind states as a trajectory that results in the seizure event. QTWT is used for decomposing EEG signals into sub-band frequency signals. Approximate entropy is carried out to those sub-band signals as a discriminatory function because of its indefinite disordered feature. The solutions obtained by directing towards EXL- ANFIS shows an incredible advancement in the perpetual performance outlay for the classification of an epileptic seizure. The proposed classification method is implemented on publicly available Bonn dataset. The outcome confirms that by combining extreme learning and ANFIS model improves the classification accuracy and decrease the feature dimension with reduced computational complexity. This method achieves 99.72% of classification accuracy over existing models.

**Keywords:** Epilepsy, electroencephalogram (EEG), Q-Tuned wavelet transform (QTWT), approximate entropy (ApEn), extreme learning adaptive neuro-fuzzy inference system model (EXL-ANFIS)

## 1. Introduction

This The human brain is a compound system manifesting space-time dynamics. Nearly 0.08 billion people worldwide suffer from a brain disorder, namely epilepsy [1]. Epilepsy disease is typically referred to as an Epileptic seizure, it is determined with the aid of an abrupt irregular firing of the nerve cell inside in cerebral cortex area [2]. The epileptic affected people have no apparent abnormal symptoms but may suddenly show attacks or seizures that

damage their everyday capabilities partially or absolutely [3]. Despite the fact that the discovery of a great deal non-invasive method is decided to analysis human mind activities, electroencephalogram is indisputable in representing the electric motion of the brain in millisecond resolution. In the biomedical signal processing, EEG has broadly used the signal for detecting the seizure at specific brain parts that assist in the right analysis of epilepsy. The signs and indication of seizures range by type. Additionally, medical aid is vital to examine EEG recording. An automated classification system has been materialized in latest years for suitable remedy and development of epilepsy detection. Many works have been done to compare normal brain signals, and epilepsy affected

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# A novel approach based on BSPCI for quantifying functional connectivity pattern of the brain's region for the classification of epileptic seizure

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## Abstract

Epilepsy seizure is brain neurological abnormality which arises from the sudden deviation of the electrical interaction in the brain. Electroencephalography (EEGs) are obtained from 22 subjects with epileptic seizure and non-epileptic seizure states recorded using 23 channels with a sampling frequency of 256 Hz. The functional connectivity of the brain region can be exacted from the features obtained from EEG signals by measuring phase locking value (PLV). The neuronal connection in the brain can be expressed in terms of phase synchrony. Despite of the fact that brain states should be characterize independently based upon its extracted features. Therefore, a novel functional connectivity index (FCI) feature is proposed, namely Bi-Spectral Phase Concurrence Index (BSPCI). It is used to represent the spectral information with third cumulant order correlation functions of the EEG signal. In this paper, three FCI features were measured namely, the magnitude's mean of the bi-spectral, the normalized entropy of bi-spectrum (NE1) and the normalized entropy of squared bi-spectrum (NE2) from the BSPCI. Rank sum test based on the Wilcoxon approach is used to find the set of statistical difference between quantitative features extracted from EEG signals. The results provide evidence that the FCI will have an impact in separating the difference among seizure states of various epileptic seizure patients. On the part of reducing a large number of the feature vector, feature selection is performed by utilizing the sequential forward selection method. PLV is measured for quantifying the obtained phase synchrony of EEG signal. For the classification of epileptic seizure, Support Vector Machine is utilized which gain a large accuracy for the proposed bi-spectral analysis method when compared with Incremental Gradient Descent (IGD), Logistic Regression (LR) and Multilayer Perceptrons (MLP). The result is compared with IGD, LR, and MLP for obtaining better performance rate and the classification is 98.79% for the proposed work.

**Keywords** Electroencephalography (EEG) · Feature extraction · PLV (phase locking value) · Bi-spectral phase concurrence index (BSPCI) · Classification

## 1 Introduction

Epilepsy is one among the known brain diseases. The clinical indication of epilepsy is the occurrence of seizures, which are described as transient clinical symptoms and changes due to abnormal synchronous neuronal brain

activity. Recently, the ILAE so-called International league against epilepsy proposed a new noteworthy definition for epilepsy (Fisher et al. 2014). Worldwide, 1.5% of the adults and 2% of the children of the world population are reported to have a seizure due to epilepsy. Since the seizure occurrence is unpredictable, the daily life of epileptic affected patients might be in difficult by this uncertainty. Thus, diagnosis and classification methods for epileptic seizure must be enhanced through the proper recordings which may lead to the planning of therapeutic medicines and training. In order to record the brain signal many neurophysiologies techniques like EEG (electroencephalogram), MEG (magnetic encephalogram), and fMRI (functional magnetic encephalogram) are introduced in past decades. The most predominant and reliable method to assess brain activities are based on

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# Characterizing Functional Connectivity Network Based on Multi-Domain Analysis for Epilepsy Classification

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**Abstract:** Epileptic is a neural disease exemplified through untypical concurrent signal discharge from the neurons present in the brain region. This abnormal brain functionality could be captured through electroencephalography (EEG) system. Generally the observed EEG signals are examined by the experienced neurologist, which may be time consuming when observing hours of EEG signal. Therefore, this proposed work provides a fully automatic epileptic seizure detection system by means of the multi-domain features along with various machine learning algorithms. Initially, the obtained EEG signals are processed to clear noise and artefacts. Subsequently, the pre-processed signals are segregated as 5 seconds epochs and for each epoch various features are extracted from frequency domain, time domain. Additionally entropy, correlation and graph theory approaches has been used for analysis the connectivity of the brain network. Subsequently, distinguishable features are chosen carefully in this regard from the immense feature set by virtue of multi-objective evolutionary method and convincingly, classification has been performed using support vector machine(SVM). A Bayesian optimization (BaO) algorithm was utilized to optimize the SVM's hyper-plane parameters. In addition, Quadratic Discriminant Analysis (QDA), Linear Discriminant Analysis (LDA), Random Forest Ensemble (RFE) and k-Nearest Neighbor Ensemble (k-NNE) was also used for comparing the proposed results. These obtained results validates by considering the performance of this work is competing along with state-of the-arts approaches. The proposed work is implemented on a CHB-MIT database. The obtained performance measure of the classifiers are 99.09%, 81.49%, 80.90%, 76.85% and 84.14 % in SVM, LDA, QDA, k- NNE and RFE respectively. Finally SVM with Bayesian Optimization (BaO) algorithm outperforms than other classifiers with accuracy, AUC, sensitivity and specificity, as 99.09%, 99.67%, 98.06% and 98.12%, respectively.

**Keywords:** About four key words or phrases in alphabetical order, separated by commas.

## I. INTRODUCTION

Epilepsy is a nervous disease and it's often caused within functionality variation occur in the brain neuronal activities. It may trouble all age group peoples [1]. It is amongst the most known brain disorder that ends in around 1% among the

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whole populace worldwide and around 0.2% of affected peoples are expire due to this epileptic seizure. Clinically, many diagnostic tools namely, computed tomography scan, magnetic resonance imaging and ultrasound are used for epilepsy diagnosis but these are considered to be expensive and cannot be utilized for evaluation for long time. Rather, EEG is a non-surgical and inexpensive tool perhaps employed for long-lasting evaluation [2]. Thus, it is considered as the greatest practical mechanism for the epilepsy diagnosis. EEG signals are acquired from the scalp of the head. Neurologist observes EEG patterns and decisions are made based up on his observation.

In recent days, many researcher's extracted features from standard deviation, wavelet features [4], entropy , line length , absolute mean value, average power and proportion of absolute mean values[3] and fractal dimension [5] from epileptic signals. Then, the obtained features can be fed into various classifiers such a SVM [7], fuzzy logic model [8], artificial neural network [6] and Markov modelling to classify the seizure occurrences. The most familiar uni-varient features obtained from EEG signal is spectral power estimation. Wavelet [9] and Fourier Transforms [10] are utilized for transforming the EEG signal from time domain into frequency domain. Over the beyond, establishing the overall power of EEG signal of each channel, the energy of the signals is also obtained from the frequency bands: delta (< 3 Hertz), theta (4-7 Hertz), alpha (8-13 Hertz), beta (14-30 Hertz) and gamma (>30 Hertz).

The negative and positive zero level crossing of the signals are also considered for prediction of seizures [11].The known bi-varient feature for estimating the dependence among a pair of EEG channel is obtained from cross-correlation. Secondary cross-correlation features could be extracted as spatiotemporal Eigen values estimated between channels covariance and correlation matrices [12]. In previous work, Connectivity measures for analyzing the synchronization among the signal phase have been calculated from phase coherence, phase locking value and weighted phase locking value [13]. Similarly, the graph theoretic feature has been originated towards observing the functional and analytical connectivity of the brain network [14]. Preceding the constructed graphs, secondary features such as degree, global efficiency, diameter, and eccentricity, characteristic path length and centrality [15] can be obtained.



# An Efficient Lossless Algorithm for EEG Signal Compression using Wavelet Transform

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## ABSTRACT:

Transmission of biomedical signals through communication channels is being used increasingly in the clinical practice. This technique requires to deal with large volumes of information. The electroencephalographic (EEG) signal is an example of this situation. In the EEG, various channels are recorded during several hours, resulting in a great demand of storage capacity or channel bandwidth. This situation demands the use of efficient data compression systems. The objective of this work is to develop an efficient algorithm for EEG lossless compression. In this algorithm, the EEG signal is segmented and then decomposed through Wavelet Packets (WP). Extensive experimental tests were made by applying the algorithm to EEG records and measuring the compression rate (CR). The WP transform showed a high robustness, allowing a reasonably low distortion after the compression and decompression process, for CR typically in the range. The algorithm has relatively low computational cost, making it appropriate for practical applications.

## 1. INTRODUCTION:

Electroencephalography is the bio-signal which deals with recording the electrical activity of the human brain. It can produce the signals of up to 256 channels of up to 32 bps each, and it is sampled at the frequency of 1000Hz [5]. The EEG is used in the evaluation of brain disorders and it is used to find the brain damage. It has a high temporal resolution but poor spatial resolution. It can be efficiently stored and also transmit the huge amount of EEG signal by using the compression techniques. EEG compression has two types. They are lossy compression and lossless compression.

In the medical applications, transmitting the large amount of data through the compressed form. An excellent way to determine the performance by lossless EEG compression techniques.

Lossless data compression techniques allow perfect reconstruction of the original waveform; they yield the high compression ratios. There is some kind of quantization of the input data which leads to compression ratio. The lossless compression has the effective and economic data storage along with real time transmission of the signals. The most efficient data compression technique is the lossless data compression techniques. The efficient compression algorithms are required for the fast transmission of signals. So the signals are compressed before transmission with better accuracy.

The Wavelet Transform is the tool to find signal compression application. In Wavelet Transform analysis, the given equation for wavelet mentioned below.

A signals  $s(t)$  can be described by a linear decomposition method as,

$$s(t) = \sum c_{j,k}(t) \quad (1)$$

Where  $j, k \in Z$  are integer indexes,  $a_{j,k}$  are the wavelet

Coefficients of the expansion, and  $c_{j,k}$  is a set of wavelet Functions in it.

The paper is organized as follows: Section II discusses about the methodology, applied; detailing the clinical data used for the study and various data pre-processing, feature extraction techniques. Section III, the evaluation procedure and the obtained experimental results are presented. Finally, further discussion and conclusions are included in Section IV.

## 2. MATERIALS AND METHODS:

In this work, EEG data sets are analyzed by wavelet transform to decompose the signal in order to extract five physiological EEG bands, delta (0-4Hz), theta (4-8Hz), alpha (8-13 Hz), beta (13-30 Hz), and gamma (30-60 Hz).



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## Ingenious Traffic Control System with Green Signal Timings Using Image Processing

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Authors: Ganesh, Venkateswaran; Sujatha, C.

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In metropolis, traffic congestion affects the daily routine of passengers and in the long run there will be a declination in productivity if such situation is left unaddressed. If an Ambulance, unfortunately, stuck in the middle of congested road, any delay can endanger the life of the patient and, such cases require intelligent, powerful and reliable traffic control system. In this paper, the Infra-Red (IR) Sensors keep track of vehicle density across the lane. The micro-controller in turn, generates the control signals to alter the traffic accordingly. During each transition phase, the Voice Recognition (VR) modules installed on lanes sense the emergency siren and thus temporarily allow passage by turning the signal green for the corresponding lane, while others, being remained at red. Using Image Processing analysis, the exact count of vehicles can be visualized in the Graphical User Interface (GUI) Tool and the green light timings for the consecutive turns can be estimated.

Keywords: ATmega2560; EDGE DETECTION (IMAGE PROCESSING); GUI (GRAPHICAL USER INTERFACE); INFRA-RED (IR) SENSORS

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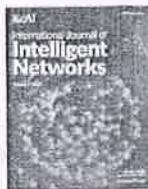
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## SDARP: Security based Data Aware Routing Protocol for ad hoc sensor networks



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### ARTICLE INFO

#### Keywords:

Ad hoc sensor networks  
Data gathering algorithm  
Optimal cluster head  
Cluster head  
Encryption and decryption

### ABSTRACT

Ad hoc sensor networks are the very popular network and play a vital role for producing high performance. In existing networks techniques has not perfectly balanced both energy and security in ad hoc sensor networks and gathering sensed information in an energy efficient manner is critical to operating the sensor network for a long period of time. In this research, we concentrate about security and network traffic issues. To over come this issues we have proposed a novel technique focused on Security based Data Aware Routing Protocol (SDARP) for high data gathering, to attain balancing between security and energy metrices. The security model contains two phases in first phase is here Optimal Cluster Head (OCH) is used to monitor the behavior of CH and cluster members. In second phase, security based energy efficient model is enhanced with data gathering algorithm to encrypt and decrypt with energy metrics. The proposed protocol is simulated using network simulation tool.

### 1. Introduction

Wireless sensors are small devices with limited energy without energy backup; they are more of one-time-use sensors [1]. A wireless ad hoc network are majorly divided into types of wireless network such as (WANET) [2] wireless ad hoc network or Mobile ad hoc network (MANET) [3] is a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre-existing infrastructure, such as routers in wired networks or access points in managed (infrastructure) wireless networks. Security and energy become major issues, it should be concentrated throughout the communication in WSN. Sensor networks have the self-organizing feature and thus the automatic selection of sender and receiver is applicable hence security become a milestone in WSN [4].

Therefore, an energy-efficient routing mechanism would mean longer sensor lifetime and higher network efficiency. Active research is going on in the field of routing in ad hoc sensor networks [5]. In there are lot of development in ad hoc such as security aware routing, energy routing techniques. Secure and Energy Aware Routing Protocol. This two factors are most important contribution of the AODV. Energy-aware routing protocol (EARP) suitable for ad hoc wireless sensor networks and presents an analysis for its energy consumption in various phases of route discovery and maintenance [6, 7]. Based on the energy consumption

associated with route request processing, EARP advocates the minimization of route requests by allocating dynamic route expiry times. In contrast to AODV, EARP reduces the repeated flooding of route requests by maintaining valid routes for longer durations [8].

In Some previous existing algorithms proposed scheme base on clustering to address concerns such as security and energy based routing methods in sensor networks. When the ad hoc networks is absence while the nodes can be easily compromised by attackers [9]. The internal attackers try to eavesdropping between source and sink node [10]. The external attackers try to damage the network performance. Security is a major concern which will provide authentication to the network. In this work, both authentication and network lifetime is improved by providing encryption and decryption scheme. Background work concerning the topic is discussed in the section 2. Section 3 deals with the Performance of SDARP development model. Section 4 presents about the various phases involved with simulation model. The paper concluded in Section 5. Conclusion of this paper presented in section 5.

### 2. Previous work

Jing Xu et al. [11] has proposed the maximum likelihood based estimation method to find the position of sensor nodes during mobility scenarios. All nodes were moving randomly to communicate with each

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## Automated Kitchen Management and Provisions Monitoring System Using IoT Technology

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### Abstract

The primary purpose of this paper is to provide a user-friendly android application of kitchen monitoring for cooking by using the Internet of Things. Applications are available for fetching the recipes, but this project helps to reduce our mind calculation in choosing the cuisines. This application extracts the kitchens which stored in the Web Service. A sensor node is used for sensing the weight of the grocery container and uploads it to the Web Service. By using this update, the user can choose the cuisine and recipes with the available products and cook. This application can be used from anywhere at any time by making the recipe decisions easier. If a particular grocery is found empty, then its weight is notified as 0, that is, that specific grocery has to be refilled in its container. The main aim of this research is to provide a user-friendly android application that is useful for monitoring the food provisions in the kitchen and also provide different variety of cuisines and recipes based on the availability of ingredients.

Keywords: Smart Kitchen Monitoring, Internet of Things, Sensors, Web Service

### I. Introduction

The kitchen is a significant spot of the home, and cooking is one of the everyday exercises. The typical trouble in a kitchen during cooking is seeing some food supplies as unavailable. The developing prominence of computerized frameworks shows the interest of the family unit gadgets to be shrewd and mechanized to help our everyday exercises [1]. Day by day kitchen exercises remember stocking kitchen cupboard for connection to distinguished dietary regiments, likes, and needs, tastes, etc. Smart Kitchen is an imaginative application that utilizes the Internet of Things (IoT). The term IoT defined to scenarios where organize network and computing ability reach out to objects, sensors, and regular things not ordinarily thought about PCs, permitting these devices to produce trade and expend information with negligible human intervention. We use IOT in this project for



## A Hybrid Secure Aware Routing Protocol for Authentication in MANET

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### Abstract

Mobile nodes are the nodes which are roaming inside or outside the network in the absence of infrastructure. Due to that network may be corrupted and degraded if any attacker gets inside the network. It leads to more power consumption and least security. In this research work, a Hybrid Secure Aware Routing Protocol (HSARP) is introduced to meet the requirements of the QoS. It supports the balancing of power and security. It consists of three phases. In first phase, the discovery of multicast routes from source to sink node is done with the help of multicast route request packets. In second phase, the regional power distribution is adopted to increase the power efficiency based on the probability of average power concentration. In third phase, the secret sharing is illustrated based on three trust parameters i.e. data type, reliability of routes and node stability. Based on the extensive simulation results, HSRP produces better performance in terms of link failure rate, worm hole detection rate, detection time, overhead and end to end delay.

### Keywords

QoS, Reliable Power Distribution Model, Multicast Routes, Power Concentration, Security and Detection Time.

### 1. Introduction

MANET is composed of several mobile nodes where it operates without access point. Mobile nodes have limited resource i.e. energy, link capacity, bandwidth. Routing is required if the forwarding of data packets from source to sink node occurs. In general cases, efficient data transmission includes route discovery, route maintenance and information transmission. Source node chooses the best path for packet transmission. The concept of multicast routing in ad hoc network consists of many senders and many receivers via multiple paths. The load balancing can be successfully attained in the presence of multiple links.



## Likelihood based Node Fitness Evaluation Method for Data Authentication in MANET

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### Abstract

Mobile nodes in ad hoc network are easily compromised by attackers. Due to the presence of attackers, the network may be overloaded which leads to least security. In this research work, Likelihood based Node Fitness Evaluation Method (LNFEM) is introduced and developed based on trust model. The trust model consists of three phases. In first phase, trust model is defined based on trust generation and computation. Node recommendation is used to produce the trust vector. In second phase, the clustered secure routing is adopted to provide seamless connectivity in the presence of attackers. In third phase, direct evaluation system is used to inter relate the direct and indirect observation. The proposed method is evaluated using network simulation tool (NS2.3). The performance metrics are throughput, data authentication ratio, data confidentiality rate, control overhead and propagation delay. From the simulation results, the proposed method achieves better performance compared to the existing methods.

**Keywords** Likelihood function, trust computation, trust generation, cluster, throughput, data authentication ratio, data confidentiality rate and control overhead.

### 1. Introduction

In this modern world, handheld devices like laptops, mobile phones and tablets are very important and play a major role in everyone's life. Mobile ad hoc network is a kind of network where it supports vehicle networks very well. It is helpful in disaster management, emergency applications, earth quake and so on. MANET is a powerful platform which provides connectivity, mobility and flexibility to all devices in the world.

Security is an important concern in ad hoc networks due to weak signal strength, limited physical resources and less protection of mobile nodes. Trust can act as an important role to provide the authentication of ad hoc networks. Due to bandwidth constraints, it is not at all possible the participation of all nodes in the network. Both cryptography and trust model can be combined to provide the entire security in the network.

### 2. Previous Work

Ankita Gupta and Abhishek Dubey [1] proposed the trust-based approach to prevent black hole attack using dynamic source routing protocol. In this routing, before packet forwarding process, the entire route stability was found to prevent attackers inside the network. The secure routes were established from source to destination by deploying the trust-enhanced approach. The



## Trilateration based localization method using mobile anchor in wireless sensor networks

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### ABSTRACT

Localization in wireless sensor networks (WSNs) is essential in many applications like target tracking, military applications and environmental monitoring. Anchors which are equipped with global positioning system (GPS) facility are useful for finding the location information of nodes. These anchor nodes may be static or dynamic in nature. In this paper, we propose mobile anchors assisted localization algorithm based on regular hexagons in two-dimensional WSNs. We draw a conclusion that the number of anchor nodes greatly affect the performance of localization in a WSN. An optimal number of anchor nodes significantly reduces the localization error of unknown nodes and also guarantees that unknown nodes can obtain high localization accuracy. Because of the mobility of anchor nodes high volume of sensing region is covered with less period of time and hence the coverage ratio of the proposed algorithm increases. Number of communications also decreases for the reason that the system contains  $\log_e(n)$  number of anchor nodes which leads to less energy consumption at nodes. Simulation results show that our LUMAT algorithm significantly outperforms the localization method containing single anchor node in the network. Movement trajectories of mobile anchors should be designed dynamically or partially according to the observable environment or deployment situations to make full use of real-time information during localization. This is the future research issue in the area of mobile anchor assisted localization algorithm.

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### 1. INTRODUCTION

A sensor network comprises of a large number of sensor nodes that are densely deployed in a field. Each sensor performs sensing task for detecting specific events. The sink node is responsible for collecting sensed data reported from all the sensors, and finally transmits the data to a task manager. If the sensors cannot directly communicate with the sink, some intermediate sensors performs the operation of forwarding the data to sink [1]. Wireless Sensor Networks (WSNs) have emerged as one of the key enablers in recent years for a variety of applications such as environment monitoring, vehicle tracking and mapping, and emergency response. One important problem in such applications is finding the position of a node. To solve the localization problem, it is natural to consider placing sensors manually or equipping each sensor with a GPS receiver. Constraints such as cost and power consumption make these two methods inefficient in the network, especially

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# Fuzzy Clustering Enhanced Multipath Routing to Enhance the Network Lifetime in Wireless Sensor Networks

Dr.K.Vinoth Kumar, Dr.V.Eswaramoorthy, S.Nagakumararaj and J.Wilson

**Abstract:**— Wireless Sensor Networks (WSNs) energy potency has used a restricted battery. We have a tendency to given a multi-parameter higher cognitive process cluster head choice below fuzzy surroundings. Fuzzy clustering technique is employed for the choice of cluster heads in WSNs. Three criteria as well as residual energy distance of the nodes from main node and the variety of neighbor nodes measure the throughput. So we have to optimize the quantity of cluster heads. The simulation result shows that this approach is simpler in increasing the property among every cluster and conjointly localizing high intensity traffic among a cluster.

**Index Terms:**— Cluster head, Fuzzy clustering, network period, WSN

## 1. INTRODUCTION

He Routing protocols for WSNs should be fastidiously designed to consider resource constraints like low process power, little memory and restricted energy of device nodes [1]. Additionally, WSNs ought to be scalable and ready to tolerate dynamic network changes. they vary from tens to thousands of device nodes. Therefore, the standard of the routing formula ought to be freelance of the size of the networks or the amount of device nodes [2]. They'd be impractical if memory utilization can increase as a result of the nodes can increase. New nodes are additionally new deployed, or some nodes would possibly disappear, because of malfunctions [3].

The figure.1 shows the system architecture for wireless sensor networks. The author proposes [4] the fuzzy based multipath routing protocol supported AODV routing formula .The delineate protocol throughout this study tries to go looking out the distinct ways in which between offer and destination nodes with victimization Omni directional antennas, to send info through these at the same time.

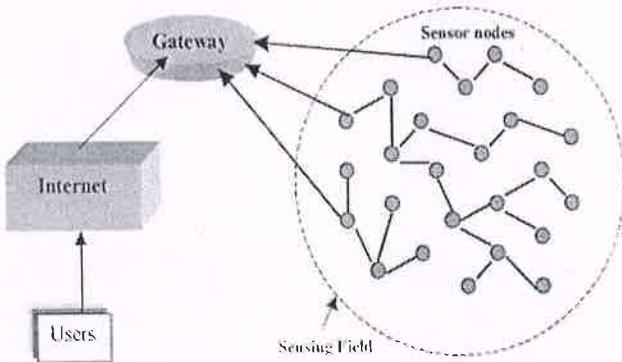


Fig.1: System Architecture for WSN

This protocol [5] counts the amount of active neighbors for every path, and eventually, it chooses some ways that for inflicting info among which every node has lower vary of active neighbors all quickly. Here, active neighbors of a node are created public as nodes that have antecedently received the RREQ (route request). The aim of this work is to do to boost the energy potency of specific networks. The authors [6] proposed the fuzzy logic based multi-path routing theme constructs multiple ways in which from every node to chop back the prospect of congestion. Throughout this routing theme, every information packet is delivered to the amount of nodes. The authors [7] developed an analytical model to estimate network traffic load and to reduce energy consumption of sensor networks. The calculation was made on number of dead nodes, rising time and energy hole site during data gathering. In addition to this, polynomial time approximation method was also implemented to extend the time period of active nodes. Number of sensor nodes is reduced to cover the target points given by cluster regions. A Base station will keep on monitoring the activity of active and rising time period. A constant factor approximation algorithm was derived from the optimal solution inside the target point to develop coverage sensor factor. The authors [8] had proven the data reliability from the cloud computing to WSN by aggregating the data from source to sink node. The analysis was made on data gathering ability, powerful data storage and data processing capacity in WSN. The critical issues were

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3415



# Motor Imagery Recognition of EEG Signal using Cuckoo-Search Masking Empirical Mode Decomposition

S.Stephe, T.Jayasankar, K.Vinod Kumar

**Abstract:** Brain Computer Interface (BCI) is a collaboration between a brain and device that enables the signals from the brain to do the external activity, i.e. Cursor, Prosthetic control or Wheel chair movement. The brain and object have the direct communication control by using BCI systems. Mostly the current research should be focused on non-invasive method. The array of neurons should be read by using the computer chips and programs then translate the signals in to action i.e., Motor Imagery (MI). The main objective is used to help the disable person without someone help. Mainly the BCI System should be very helpful for the people those who are affect from paralysis to write something and control the motorized wheel chair through thought alone. In Brain Computer Interfacing BCI) the Electroencephalogram (EEG) is a very challenging non-stationary signal. In this paper the preprocessing should be done by Least Mean Square (LMS) algorithm and Empirical mode decomposition (EMD) is a new method to extract the non-stationary signal should be apply on motor imagery recognition task. The features of EEG such as energy, fuzzy approximate entropy, Morphological features and AR coefficients are extracted using Masking empirical mode decomposition. The extracted features are selected by using the cuckoo search algorithm (CSA). In this paper the extracted features should be compare, with cuckoo search or without cuckoo search algorithm analyzed. After the feature selection features are classified by using the linear discriminant analysis (LDA) with respect to some parameters like Accuracy, Precision, Recall, Maximal (MI).

**Keywords:** Brain Computer Interface (BCI), linear discriminant analysis (LDA), Empirical mode decomposition (EMD), Cuckoo Search Algorithm (CSA), Motor imagery (MI), Least Mean Square (LMS).

## I. INTRODUCTION

The interface between the brain activity and electronic device are enable by the brain computer system (BCI).The bio signal is taken as a input to the BCI system and predicts the action is suggested in [1].The corresponding brain sensorimotor areas are activated when the people imagining an action without execution and the same EEG should be generates as if the action is done in motor imagery [2,3].The main challenge in the EEG classification, the brain signals should be small in amplitude. Therefore, some events like eye movement, muscular movements, etc. should have the lower SNR value. The various techniques have been proposed to

prevent the decoding system to correctly decode the user's thoughts such as temporal filtering methods, [4], feature extraction and feature selection techniques [5], and classification algorithm [6]. The several feature extraction techniques such as common spatial pattern (CSP) [7], power spectral density (PSD) [8], have been studied. Classifiers such as k-nearest neighbor (KNN) [9], support vector machine (SVM) [10], etc. have been explored for Classification of MI-EEG signals. Actually, the EEG signal is almost invariably non -linear and non-stationary [11]. To overcome this the empirical mode decomposition should be analyzed (EMD) [11]. The mode mixing and edge effect should be hardly avoided by the EMD and also it makes a sub-signal being a lower signal-to-noise ratio. The EMD is used to rectify the problem such as mode mixing and edge effect. It is also given the better classification to given the higher accuracy. In Masking empirical mode decomposition [12], the original signal should be added first and secondly it should be subtracted to get the frequency masking signal. Initially filtered the EEG using Linear mean square(LMS) algorithm and then the Intrinsic mode function (IMF)extraction should be done using MEMD technique. The required signals are selected as a mu and beta subcomponents, from these components the Energy, morphological features, and fuzzy approximate entropy auto-regressive (AR)coefficients are extracted [2]. The extracted features are selected by the cuckoo search algorithm and finally applied to the linear discriminant analysis (LDA) for classification purpose.

## II. MATERIALS AND METHODS

### A. EEG Data

In this work , the Brain Computer Interfacing competition IV data set I was given by Berlin institute of technology is used to verify the motor imagery movements of left or right hand/foot. BCI Competition is an open competition which aims at evaluating various approaches used in brain computer interfaces and comparing them on the same data set in order to obtain a reliable measurement of performance for each algorithm. It is an attempt to solve the problem of comparing BCI-related signal processing. Methods that are published, but their accuracy was verified on different data sets or they use different performance measures, which makes the relative comparison between any two of the selected methods impossible [13]. Four editions of the BCI Competition were organized and each edition

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Effective RCA Design using Quantum dot Cellular Automata

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# OPTIMIZATION of CODE CONVERTERS using MS GATE IN QUANTUM DOT CELLULAR AUTOMATA

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**KEYWORDS:** Quantum Dot Cellular Automata, Optimized MS gate, Code converters, QCA designer tool.

## ABSTRACT

Quantum Dot Cellular Automata (QCA), the most efficient Technology at nanoscale level in quantum electronics has replaced the CMOS technology due to very high Integration density, low power consumption, high speed and low circuit area. This work proposes a novel binary to grey and grey to binary code converters using an optimized MS gate .The proposed low complexity optimized MS gate can overcome the Feynman gate with reduced number of quantum cells thereby reducing the area and power consumption. The proposed MS gate requires only 31number of total cells and total area of 37,772nm<sup>2</sup> whereas the Feynman gate in previous work requires 54 number of total cells 38,880 nm<sup>2</sup> areas. The proposed design was compared with the previous work and it was analyzed that about 42% optimization has been achieved in terms of number of QCA cells and area respectively when compared to previous results. Code Converters based on MS gate can be used to realise nanotechnology based architecture which will be used for nano-communication. The efficiency of the nano circuits has been achieved through the proposed work. QCA Designer-2.0.3 tools are used for evaluating the functionality of the digital circuits.

## INTRODUCTION

CMOS Technology was one of the most prominent technologies for applications like Microprocessors, Static RAM; Microcontrollers and application specific integrated circuits (ASICs) in the past decades. The features of CMOS technology include noise immunity, static low power consumption, very high operating speeds and efficient usage of energy.

However CMOS technology have practical limitations when subject to nano level scaling.Recently,the most emerging technology at nanoscale called Quantum Dot Cellular Automata(QCA).High performance,higher densities, higher operating speed ,low power consumption are the most important features of QCA technology.Here,the method of computation and information transformation in QCA differs from CMOS technology.



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## Design of Water Hemispherical Antenna for Wide Band Applications

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**ABSTRACT:** Liquid antennas are a type of antenna utilizing fluid to transmit and receive radio signals. Two types of liquid antennas are widely investigated: liquid metal antennas and water-based liquid antennas. As a special type of liquid antennas, water antennas are one of the most popular. They have attractive features such as: a) low-cost and readily accessible; b) compact size - water is a high permittivity material. This project describes a hemispherical antenna made of pure water. The water hemispherical antenna is realized by replacing the metallic arm of a conventional hemispherical antenna with a plastic tube of circular cross section and filled with pure water. The axially symmetric TM01 mode is excited along the water arm and accounts for the wave propagation and radiation. Circular polarization is achieved by choosing a proper dimension of the water helix. The hemispherical antenna exhibits polarization-reconfigurable capability over a wide frequency band. The proposed system is designed and simulated using HFSS software design tool by forming virtual radiation. The proposed work increases a gain and bandwidth by using circular polarization technique.

### I. INTRODUCTION

Liquid antennas, especially the non-metal liquid antennas, have drawn more and more attentions in recent years due to the potential in reconfigurability and the virtue of flexibility, transparency, together with the low price, etc. Several kinds of non-metal liquid antennas have been proposed or demonstrated. The first type is to use sea water, saline water or distilled water to build the radiation structure. For instance, to form a monopole or a dielectric resonator antenna. The second idea is to substitute some part of the conventional antenna to make a new one. The water patch microstrip antenna is one of the examples. A wideband hybrid rectangular water antenna for DVB-H (Digital Video Broadcasting - Handheld) applications was developed. The hybrid structure combined a dielectric resonator antenna and a monopole antenna to effectively double the available bandwidth without compromising other characteristics. A transparent water dielectric patch antenna fed by an L-shaped probe was proposed. In contrast to other reported water antennas, the proposed design had the operation mechanism similar to the conventional

metallic patch antenna. A mechanically reconfigurable frequency-tunable microstrip antenna that uses a liquid actuator as the dielectric layer to reduce the size is reported. The dielectric liquid is encapsulated in the polymer to form an actuator, which can change the liquid thickness. Thus, the resonant frequency of the fabricated antenna can be changed. A sea water monopole antenna consists of a feeding probe and a sea-water cylinder held by a clear acrylic tube for maritime wireless communications was presented to demonstrate the feasibility of liquid antenna. Measurement shows that the proposed sea-water antenna has high radiation performance. A Compact dual-feed water-based antenna for hand portable systems was developed, and a ground defect structure was employed to provide a decoupling path between the antenna ports.

A Sea-Water Half-Loop Antenna was designed for maritime wireless communications, which could generate a new antenna when needed with the help of a pump in the ocean environment. An antenna consisted of a cylindrical conducting monopole antenna, saline-water and a biocompatible shell was designed for Industrial, Science and Medical (ISM, 2.45 GHz) band. The miniaturization of a liquid-based DRA due to the high relative permittivity of water was demonstrated. Furthermore, a DRA-based technique was proposed for measuring liquid permittivity [8]. A hybrid antenna with solid and liquid materials was discussed [9], with the focus of the influence of the feeding locations and the distribution of the liquid.

The water antennas are designed according to different working mechanisms. By tuning the salt concentration, integrating the radiating and feeding structure or using water as a load, the water antenna can be considered as a conducting antenna, a hybrid antenna, or a water loaded antenna.

The rest of the paper contains the related works in the section 2 and the proposed methodology of water antenna illustrates in section 3. In section 4, the simulation and the design results of screenshot are presented and the performance analysis is given in section 5. Finally paper concludes in section 6.



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## Design and Implementation of Soil Moisture Detector using Arduino

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**Abstract** - India is known as land of farmers. It gives more importance to farming as agriculture contributes a lot in the economic growth of the country. Weather is very important for growing crops and should be monitored for proper growth and good quality of crops. The farmers have to adopt the modern technology to have better yield and quality crops. In order to help the farmers we decided to make this automatic water supply using microcontroller. The main aim of this project was to provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically watering the plants when we are going on vacation or don't we have to bother my neighbors, Sometimes the Neighbors do too much of watering and the plants end up dying anyway. There are timer based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. Assimilation is that the artificial application of water to the land or soil it is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall

**Key Words:** (soil moisture sensor, adurino uno, LCD, pumping motor,...)

### 1. INTRODUCTION

On the hardware side, there are a number of products currently on the market that can perform some of the requirements of this project. The Automatic Sprinkle System is the best example. The Automatic Sprinkle System is a Connect microcontroller with a built-in Bluetooth module. It is able to perform many of projects functions, such as communicating with wired and wireless sensors, transmitting information to an Android device via Bluetooth, and storing data to an SD card. However, the main problem with this solution, along with many others like it, is that the microcontroller must be programmed to perform this operation. This makes the microcontroller an impossible solution for users who don't know how to program, and an impractical solution for those that can program, but don't want to. A better product would already have the code pre-compiled, the input ports clearly labeled, and require little to no setup from the user.

### 1.1 SOIL MOISTURE MEASUREMENT

Moisture content of the soil is a major factor determining plant growth<sup>1</sup>, especially in irrigated systems. Currently there are many and varied methods for determining soil water content on a volume basis or a tension as described by Gardner. The basic objective of irrigation scheduling is to minimise water stress of the plant, that of over irrigation, and under irrigation. The manager aims to manipulate the biological process of cell elongation and cell reproduction for improved plant yield<sup>3</sup> and maximum use of available effluent

### 1.2 Types of Soil Moisture Measurement

**1.2.1. The Neutron Probe (NP):** The technique is based on the measurement of fast moving neutrons that are slowed in the soil by an elastic collision with existing Hydrogen particles in the soil. Hydrogen (H<sup>+</sup>) is present in the soil as a constituent of

1. Soil organic matter
2. Soil clay minerals
3. Moisture content

**1.2.2. Tensiometers:** Portable and stationary tensiometers measure the soil moisture content as a tension or pressure ranging from 0 to -100 kPa). Tensiometers fundamentally act in a similar fashion to a plant root measuring the force that plants have to exert to obtain moisture from the soil. As the soil dries the water is lost from the tensiometer via a ceramic cup. The loss of water creates a vacuum in the tensiometer and is reported as a pressure reading, the drier the soil the higher the pressure reading. Tensiometers may be placed permanently in the soil giving an analogue or digital output.

**1.2.3. Oven drying method:** The soil sample is dried in hot air oven at 105°C until constant weight is obtained and dry weight of the sample is recorded. Moisture content (on weight basis) = Wet weight-Dry weight X 100/ Dry weight



# EFFECTIVE DESIGN OF HEMISPHERICAL ANTENNA USING WATER SUBSTRATE

Devikapriya V, Geetha A, Jayakumar S

**Abstract:** The present world depends on wireless communication. Because of which a lot of research on communication satisfying the measures of rapid has been expanded. To satisfy such necessity huge BW, high radiation, high increase, smallness, adaptability qualities are required. This offers ascend to explore an upgraded antenna satisfying the trademark. Fluid antennas are a sort of antenna using liquid to transmit and get radio signals. Two sorts of fluid antennas are broadly researched: fluid metal antennas and water based fluid antennas. As an extraordinary sort of fluid antennas, water antennas are one of the most famous. They have alluring highlights, for example, a) minimal effort and promptly open; b) reduced size - water is a high permittivity material. This task portrays a hemispherical antenna made of unadulterated water. The water hemispherical antenna is acknowledged by supplanting the metallic arm of an ordinary hemispherical antenna with a plastic container of round cross area and loaded up with unadulterated water. The pivotally symmetric TM01 mode is energized along the water arm and records for the wave proliferation and radiation. Roundabout polarization is accomplished by picking a legitimate element of the water helix. The round polarization strategy is utilized to expands an increase and bandwidth. The hemispherical antenna displays polarization-reconfigurable ability over a wide frequency band. The proposed framework is planned and reenacted utilizing HFSS tool by shaping virtual radiation.

**Keywords :** End fire direction, Circular polarization, Water antenna, Directivity, Reconfigurable Antenna.

## I. INTRODUCTION

As an unusual type of liquid antennas, water antennas have pulled in expanding considerations as of late. It has numerous points of interest, for example, 1) minimal size - water is a sort of high permittivity material. At the point when it is utilized as a DR (dielectric resonator), the antenna size can be decreased on a basic level by a factor of  $(\epsilon_r)^{1/2}$  2) reconfigurability – the operational frequency and bandwidth might be constrained by the length and width of the water stream; 3) likeness – it is anything but difficult to make the antenna to the ideal shape which might be difficult to accomplish utilizing other dielectric or metal; 4) a little RCS (radar cross segment) – it tends to be killed or depleted when not being used, additionally as a dielectric material, the RCS is littler than a metal of a similar size; 5) simple to ship - particularly for a huge

antenna; 6) minimal effort; 7) optical straightforward and eco-accommodating. In view of these appealing highlights, some fascinating structures have been proposed [1-6]. The objective of this work is to give a review on our examination around there in the previous scarcely any years. The water antennas are planned by various working instruments. By tuning the salt fixation, incorporating the emanating and feeding structure or utilizing water as a heap, the water antenna can be considered as a leading antenna, a half breed antenna, or a water stacked antenna

Water is a sort of material with extraordinary plan adaptability. At the point when unadulterated water is utilized as the primary radiator, the water antenna will be a DRA. By including salt into unadulterated water, the dielectric reaction (genuine and fanciful) will be diminished and altered, making the antenna a leading antenna.

In this work proposed a water based hemispherical antenna for high gain applications . By correctly selecting the waterarm sizes, circularly polarized radiation can be achieved . By controlling flow rate of water in arms left or right hand polarization can be achieved. The proposed antenna mainly used in radar and satellite applications

## II. RELATED WORKS

In this section, the work is related to a hemispherical antenna using water substrate which is done before with various method is discussed with references.

Min Wang et al is proposed a monopole water antenna based on single-tube monopole salty-water antenna in order to achieve a wide band and high efficiency .The proposed antenna constructed by a coaxial tube occupied with distilled water is inserted inside, acting as a dielectric loading of the feeding probe to produce another mode.

Gerard J. Hayes et al introduced a new flexible type multilayer microstrip patch antenna consist of liquid medium. It is well suitable for durable and conformal antenna applications..it uses the advantage of exclusive rheological properties of the liquid metal alloy.

Ya-HuiQian is presented hybrid water antenna for very high frequency (VHF) band applications. By using loading technique ,simple monopole is loaded with multiple close resonances to increase a impedance bandwidth of the



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## CLUSTER-BASED VANET-ORIENTED EVOLVING GRAPH (CVoEG) MODEL USING GREEDY DETECTION (FLGR)

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**Abstract** - Vehicular Ad hoc Networks (VANETs), main objective is to provide road safety and enhance the driving conditions, are exposed to several kinds of attacks such as Denial of Service (DoS) attacks which affect the availability of the underlying services for legitimate users. In vehicular ad hoc networks (VANETs), communication links break more frequently due to the high-speed vehicles. We focus especially on the greedy behavior which has been extensively addressed in the literature for Wireless LAN (WLAN) and for Mobile Ad hoc Networks (MANETs). However, this attack has been much less studied in the context of VANETs. This is mainly because the detection of a greedy behavior is much more difficult for high mobility networks such as VANETs. In this paper, we propose a new detection approach called GDVAN (Greedy Detection for VANETs) for greedy behavior attacks in VANETs. The process to conduct the proposed method mainly consists of two phases, which are namely the suspicion phase and the decision phase. The suspicion phase is based on the linear regression mathematical concept while decision phase is based on a fuzzy logic decision scheme. The proposed algorithm not only detects the existence of a greedy behavior but also establishes a list of the potentially compromised nodes using three newly defined metrics. Moreover, the practical effectiveness and efficiency of the proposed approach are corroborated through simulations and experiments. Our simulation result shows that the proposed scheme significantly outperforms the existing scheme in terms of throughput, delay, energy consumption, cost.

**Key Words:** VANET, Greedy detection, linear regression, fuzzy logic.

### 1. INTRODUCTION

VANET is an application of mobile ad hoc network. More precisely a VANET is self-organised network that can be formed by connecting vehicle aiming to improve driving safety and traffic management with internet access by drivers and programmers. Two types of communication are provided in the VANET.

First a pure wireless ad hoc network where vehicle to vehicle without any support of infrastructure. Second is communication between the road side units (RSU), a fixed infrastructure, and vehicle. Each node in VANET is equipped with two types of unit i.e. On Board Unit and Application Unit

(AU). OBU has the communicational capability whereas AU executes the program making OBU's communicational capabilities. An RSU can be attached to the infrastructure network which is connected to the Internet. Figure 1 describes C2C-CC architecture of VANET.

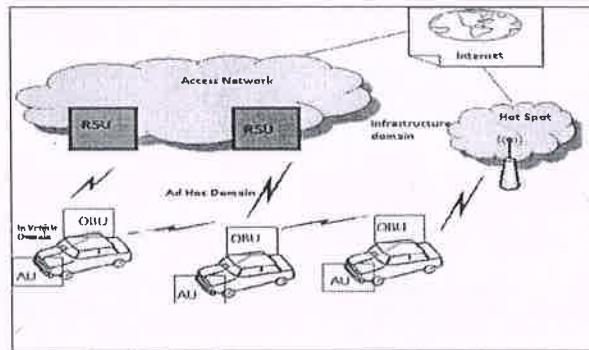


Figure 1. C2C-CC reference architecture

To establish a VANET, IEEE has defined the standard 802.11p or 802.16 (WiMax). A Dedicated Short Range Communication (DSRC) is proposed which is operating on 5.9GHz band and uses 802.11 access methods. It is standardized as 802.11p which provides short range communication with low latency. USA has allocated 75MHz of spectrum in the 5.9GHz band for DSRC to be used by Intelligent Transportation Systems (ITS). Also, Europe has allocated 30 MHz of spectrum in the 5.9GHz band for ITS. In vehicular ad hoc networks (VANETs), communication links break more frequently due to the high-speed vehicles. In this paper, a novel cluster-based VANET oriented evolving graph (CVoEG) model is proposed by extending the existing VoEG model to improve the reliability of vehicular communications[1]. The optimal parameter setting of the optimized link state routing (OLSR), which is a well-known mobile ad hoc network routing protocol, by defining an optimization problem[2].

Some protocols are being developed by the other groups also. NOW (Network on Wheels), which is associated with Car-2-Car Consortium, has developed some protocols. Ford and General Motors have also created a Crash Avoidance Metric Partnership (CAMP) in order to improve the VANET services.



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## DESIGN AND ANALYSIS OF MICROSTRIP PATCH ANTENNA SUITABLE FOR Ku BAND SATELLITE COMMUNICATION

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**Abstract -** This paper represents the well formed rectangular shape truncated micro strip patch antenna. The proposed antenna is simulated using High-Frequency Structure Simulator (HFSS) tool. The purpose of this paper is to design the rectangular micro strip patch antenna and concentrating on the effect of antennas radiation pattern and gain. By considering the parameters of relative dielectric constant ( $\epsilon_r$ ), substrate material and thickness, length & width of the patch. Conducting patch is formed by using rectangular configuration. Microstrip patch antennas are low cost, small size and easy to fabricate and they play a dominant role in wireless communication. The antenna is designed at Ku band frequency(17.5 GHz) with multiple slots on the rectangular patch. These slots on the patch shift the resonant frequency to the lower side and also affect various antenna parameters. The antenna is designed by using RT duroid material that has relative permittivity of 2.2 and loss tangent 0.0009.

**Key Words:** HFSS, Microstrip, RT duroid, Relative permittivity, Satellite communication.

### 1. INTRODUCTION

#### 1.1 ANTENNA

Antenna is an electrical device which converts electrical power into radio waves and vice versa without an efficient antenna, EMF (electro magnetic energy would not be radiated and wireless communication over the long distance would be impossible. Antennas can be designed to transmit and receive radio waves in all horizontal directions equally (omnidirectional antenna), or preferentially in a particular direction called directional or high gain antennas. Radio waves are electromagnetic waves which carry signals through the space or air at the speed of light with almost no transmission loss.

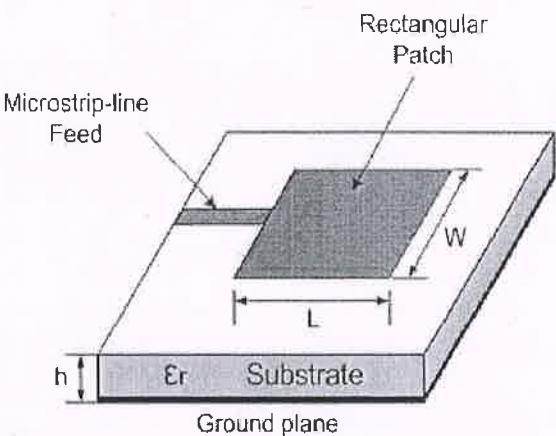


Fig.1.Microstrip Patch Antenna

### 1.2 MICROSTRIP PATCH ANTENNA

A microstrip antenna (also known as printed antenna) usually means an antenna fabricated using microstrip techniques on printed circuit board (PCB). It is a kind of Internal Antenna. They are mostly used at microwave frequencies. The most common type of microstrip antenna is the patch antenna. Antennas using patches as constitutive elements in an array are also possible. A patch antenna is a narrowband, wide-beam antenna fabricated by etching the antenna element pattern in metal trace bonded to an insulating dielectric substrate, such as a printed circuit board, with a continuous metal layer bonded to the opposite side of the substrate which forms a ground plane. Common microstrip antenna shapes are square, rectangular, circular and elliptical, but any continuous shape is possible. Some patch antennas do not use a dielectric substrate and instead are made of a metal patch mounted above a ground plane using dielectric spacers; the resulting structure is less rugged but has a wider bandwidth. Because such antennas have a very low profile, are mechanically rugged and can be shaped to conform to the curving skin of a vehicle, they are often mounted on the exterior of aircraft and spacecraft, or are incorporated into mobile radio communications devices. It is used as telecommunication.



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## Design of Compact UWB antenna for the Detection of Breast Cancer Tumor

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### Abstract

A coplanar waveguide (CPW) feed metamaterial inspired rectangular antenna is proposed for breast tumor detection here. The antenna is designed on a Roger RT5880 substrate with the size of 26 mm x 31 mm x 0.127 mm. The proposed antenna has a dual band characteristic operating from 2.86 GHz to 9.53 GHz and 14.0 GHz to 14.89 GHz. The proposed antenna has an Ultra-wideband characteristic with the band width of 6.72 GHz in the frequency range 2.86 GHz to 9.53 GHz. The simulated result of the proposed antenna shows a very good performance in terms of impedance matching, gain, radiation pattern. The proposed antenna is implemented with human breast model in order to detect the tumor. The size and location of the tumor varies and the SAR results are presented. The coordinates of the SAR maximum values are used to detect the location of the tumor inside the breast and the result clearly shows that the proposed antenna has very high precision in identifying the tumor inside the breast. The entire simulation is carried out using CST studio EM software.

**Keywords:** Coplanar waveguide, Breast tumor, Ultra-wideband, SAR values, Radiation pattern.

### 1. Introduction

The second largest cause of death among women's is breast cancer [1]. The available standard method to detect the breast cancers are MRI, Ultrasound and X ray. Out of which the most effective method to diagnose and detect is the X ray method. But the major disadvantage is that it cannot differentiate the benign tumor and malignant tumor and it also fails to detect the tumor at the initial stage [2]. In [3], 258 patients are studied out of which 177 having malignant and remaining having benign tumor. By combining the MRI and X ray techniques, the maximum sensitivity obtained in the result is 95% and accuracy is 77%. All these limitations lead to the development of new method which overcomes the disadvantage of all the previous methods. One such method is microwave imaging in ultrawide band frequency region. In recent days the MWI (microwave Imaging) becomes the most targeted technique by the researches because of its own advantage like low cost and complexity, high data rate and accuracy. The basic principle used in the MWI is based on the change in properties of the back-scatter signal which changes with respect to the change in the properties of the tissue. The antenna used in MWI is used at the transceiver to impinge signal on to the human tissue. The contrast in the dielectric properties of the normal and cancer tissue is the basic principle behind the microwave imaging [4, 11]. In the literature there are large number of UWB antennas reported but the size is larger [5,6]. Metamaterial are the artificial materials which has negative permittivity and permeability, whose properties are derived based on the structure rather than its constituents. They are included in the radiating element, ground or substrate in order to enhance the various parameter performance of the antenna.

Various types of metamaterial structures such as Split Ring Resonators (SRR), Complementary Split Ring Resonators (CSRR), Omega shaped and S shaped metamaterial are reported in the literature [7-10]. In this paper, a novel metamaterial inspired UWB antenna is proposed for the breast tumor detection. A rectangular CPW antenna with hexagonal CSRR in the ground is introduced to convert the conventional UWB antenna into dual band antenna which is resonating at 7.8 GHz and 14.06GHz. The first band is the UWB band which normally used in the microwave imaging and the second band is the future extension of ISM band. The proposed structure is implemented with the breast model of three size of radius 50mm, 55mm and 60mm. A tumor of size 4 mm and 5 mm is introduced at different locations in the designed breast model. Then entire structure is analyzed for SAR with the help of CST studio. The SAR result of the proposed system is presented which clearly shows that the proposed metamaterial inspired CPW fed dual band antenna has very good detection competence. The antenna

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## Identification of Glaucoma Using Convolutional Neural Network

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**Abstract** -Glaucoma is a chronic eye disease that damages the eyes optic nerve. The eye produces a fluid called aqueous humor which is secreted by the ciliary body. It is a condition in which the fluid pressure within the eye rises, if left untreated the patient may loss vision or even become blind. Glaucoma cannot be cured but you can keep the condition under control. It is an inherited disorder which affects the people over fourth years of age. In this paper, we have extracted the features from the retinal fundus images using convolutional neural network (CNN). The neuro retinal rim usually follows the normal pattern called ISNT rule where inferior is broader than the superior broader than the nasal broader than the temporal. The alteration of this pattern is a sign of glaucoma. Another non-invasive technique is to calculate the CDR ratio (cup to disc) both horizontally and vertically via optic disc and cup segmentation. This novel technique is implemented on large data set with the accuracy, sensitivity, specificity.

**Key Words:** Glaucoma, Cup to Disc Ratio (CDR), ISNT, Fundus Images.

### 1. INTRODUCTION

Glaucoma is an eye disease of the major nerve of a vision, called the optic nerve and it is often associated with elevated intraocular pressure, in which damage to optic nerve is continuous over a long period of time and leads to loss of vision. Glaucoma is a disease of the eye in which fluid pressure within the eye rises if left unprocessed the patient may lose eyesight, and even grow into blind. The disease generally influences both eyes, although one may have more severe signs and symptoms than the other.

Glaucoma cannot be cured, but its development can be slowed down by medicament. Therefore, detecting glaucoma in time is critical to preserve the vision. Since glaucoma continue with few signs or symptoms and the vision loss from glaucoma is irreversible, screening of people at high risk for the disease is vital. There are two types of glaucoma

- (i) **Open-angle glaucoma:** The approach to the eye's drainage canals are clear, but a blockage develops within the canal, trapping fluid and causing an increase in pressure in the eye. Eyesight loss is usually slow and gradual
- (ii) **Angle-closure glaucoma:** The entrance to the canal is either too narrow or is closed completely.

pressure can rise very quickly. The known tests to detect Glaucoma are Tonometry (inner eye pressure), Ophthalmoscopy (shape and color of the optic nerve) & Perimetry (complete field of eyesight).

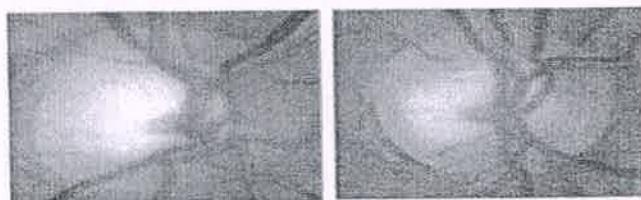


Fig-1: L to R: Normal Disc (CDR<0.5), Glaucoma tic Disc (CDR>0.5)

### 1.1 RETINAL IMAGE DATABASE

RGB retinal fundus images are acquired from different sources. Experiments were performed on 20 fundus images having variable size but all were in RGB color space. Websites for data sets indication that images were taken using fundus camera and fixed light conditions.

### 1.2 PROPOSED METHODOLOGY

To discover glaucoma, extractions of two features are involved by Mean Threshold Morphological method in order to compute CDR and NRR ratio in ISNT quadrants. Optic disc and cup are involved for CDR assessment and to find NRR ratio NRR itself is required.

**A. Image Preprocessing** After performing the top-hat transformation, the aim is to extract the micro calcification cluster part. For that segmentation algorithm is applied on the image.

#### B. Extraction of Optic Disc and Cup

Analysis of CDR is primary thing for glaucoma discovering, which is computed by extracting optic cup and optic disc. From native image green plane is fetching for extraction of optic cup and then converted to gray scale image. Optic cup having the brighter contrast with esteem to others in image, the gray scale image is then converted to binary image.



# Various Defense Countermeasures against DoS Attacks in Wireless Sensor Networks

M. Premkumar, Dr. T.V.P. Sundararajan, Dr. K. Vinod Kumar

**Abstract**— Wireless Sensor Networks (WSNs) is actually a group of much kind of sensor nodes. These sensor nodes are restricted to limited capabilities, for collecting precise information. Security is one of the today's major issues in this era of advanced technology. Due to their unique deployment places ultimately in ordinary territories WSN are supposing various kinds of attacks. Self configuration, autonomous device addition, network connection and resource limitation are the dominant features of WSN that makes it highly prone to network attacks. Denial of Service (DoS) is one of the practically common and competitive means of attacking these computing systems. Furthermore the limitations of energy, computation and computerized information for sensors etc, the risks are at some future time usually more when we talk virtually military and scientific applications. This research paper attempts to study the DoS attacks and its main types. The study will provide valuable knowledge about the defence measures for these attacks. Based on the survey we express the best approach to designing a WSN resilient against DoS attacks.

**Index Terms**— Wireless Sensor Networks, DoS Attacks, Classification, Countermeasures, Security, Energy, Computation.

## 1 INTRODUCTION

WIRELESS Sensor Networks (WSNs) consists many number of small sensor nodes communicated through They are used for surveillance and data collection purposes in many civilian applications such as military, home, agriculture, industry and healthcare. Wherever the deployment of infrastructure is difficult, it can be deployed which is the main advantage. Due to the constraints of vitality, computation and memory capacity of sensors so on, the WSNs have also been generally implemented in numerous applications; presenting the efficient and lightweight security protocol to avoid

multiple attacks in WSN, particularly for the DoS attack is a enormous challenge [1-6]. Generally, different types of sensors are used randomly in WSNs to monitor the environment situations.

A Denial of service (DoS) attack is a attack which is extremely easy to implement, however is an exceptionally ground-breaking technique to attack the internet distributed systems. This kind of attacks can unplug the whole country's internet. The DoS attack is viewed as the section of cyber war strategies [7], however it is repeatedly used for Blackmailing and extortion purposes. In both wired and wireless environments [8], this DoS attack can be introduced by flooding the packets to a specific server to render them unresponsive. With the goal that the legal users won't get any desirable service from the base station. DoS attack is an effort to render a computer or network inaccessible to its legal users, such as disrupting the host services associated with Internet. Over the past few years, DoS attack has become an intensifying issue, foremost augment in the quality services of victims.

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# SESCAS: A System for Mitigating Forwarding Misbehaviour in Wireless Sensor Networks

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**Abstract:** Remote Sensor arrange is the most standard administrations utilized in business and modern applications because of its specialized advancement in the processing, communication and low-control utilization of installed PC equipment. Due to open sent nature, the attackers effectively attack the node, so there is an absence of security. To avoid this, Selective sending approach is actualized. This paper aims to establish a simple countermeasure Scalable and Energy efficient Single Check Point based Acknowledgement Scheme; SESCAS is to detect and isolate the misbehaviour node in a wireless sensor network based on time out and retransmission. We carry out extensive simulation experiments to evaluate and compare performance with the extensive CHEMAS, CAM and CAD. The result of the simulation shows that the proposed mechanism can diminish the false recognition rate, collision of packets, energy utilization rate, propagation delay; we likewise enhance the packet delivery ratio and identification rate.

**Index Terms:** Check point detection, Forward misbehaviour, Software Cluster based Management, Wireless sensor network.

## I. INTRODUCTION

A wireless sensor network (WSN) is a network which consists of many low powered devices that are spatially deployed to supervise the environmental conditions in hostile areas. These gadgets, or nodes, when combined with routers and a gateway, give rise to a typical WSN system. These distributed nodes will communicate wirelessly to a central gateway. It provides a link between the wired world and them to collect, process, evaluate, and present the data. To extend distance and improve the reliability in a WSN, the routers can be used to gain an additional communication link between end nodes and the gateway. Currently, the WSNs are ready to be deployed at an accelerated pace. This new technology is exciting with unlimited potential for numerous application areas including environmental monitoring, medical applications, transportation, crisis management, homeland defence, entertainment and smart spaces.

Since, nodes of WSNs are exposed to different environmental factors during deployment stage and are often left unprotected during communication, this make them vulnerable to attacks. When sensor network are deployed in

hostile environments security becomes more important as they are prone to different types of malicious attacks [16] & [22]. The attacker easily attacks the nodes and retrieves the data or even change the data due to its open nature. Most of the networks routing protocol are not suitable for security purpose. WSNs are easily attacked by the popularly-known denial of service attack (DoS) [15] that mainly target the availability of services by interrupting network routing protocols or interfering with currently running communications. Selective forwarding attack means disruption in packet transmission due to the unfortunate invitation of one or more malicious nodes in the communication path. In selective forwarding attack, dropping of packets takes place due to the malicious node in the network. This malicious node does not allow the forwarding of the packet to the sink [14]. This type of selective forwarding attack drops the packet from the nodes in a random manner. In black hole attack [1] & [11], whereby an infected node drops any incoming packet without letting the communication parties have knowledge about it (blindly), is a problem that needs greater attention to address forwarding misbehaviour issues aroused due to such nodes.

In order to provide security for sensor network, various types of key management techniques are applied. Due to this attack, adversaries cannot forward the certain messages and simply drop them. This leaves the attacker to stick to an option to use a malevolent device to create a huge number of entities in order to gain influence in the network traffic. The ID of these malevolent nodes can be the result of forged network additions or duplication of existing legitimate identities. The attack especially Sybil targets fault tolerant schemes including distributed storage, topology maintenance, and multi-hop routing and it leads to data loss.

## II. RELATED WORKS

In this paper, the selective forwarding misbehaviour is overcome [3], [11-13] & [21], which means the malicious node in the network, deny the forwarding packets and selectively drop the packets and lack of security in the network. This mainly affects the forwarding packet transmission efficiency. To overcome this, in the network, the neighbouring node will intimate the previous node regarding failure and then it decides to change the path. Then the packet follows the alternate path which means shortest path. The remaining packet is forwarded to the destination as it is. This leads to reduction in the fake recognition rate and improve packet transport efficiency.

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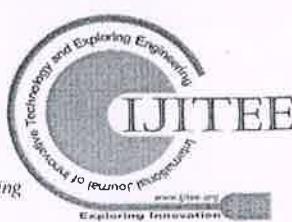
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## Wireless Powered Cognitive Radio Network to Reduce Path Handoff

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**Abstract:** This work deals with an asynchronous channel access model performed by a primary ad hoc network underlaid with a cognitive secondary wireless-powered ad hoc network. Specifically, we consider that the primary transmitters are connected to the power grid whereas the cognitive secondary transmitters have radio frequency energy harvesting capabilities and their asynchronous channel access is established based on certain energy and interference-based criteria. The sporadic channel traffic is modeled by time-space Poisson point processes and we provide an analytical framework, based on stochastic geometry, for the performance of this asynchronous system.

**Keywords:** Cognitive network, energy harvesting, Poisson process.

### 1. INTRODUCTION'

Previous technologies are independent types. There are different technologies like Wi-fi, WiMAX, Bluetooth, 2G, 3G... etc. The problem of previous network technologies in communication is possible only in its technologies of the communication device (Bluetooth to Bluetooth).

#### 1.1 Infrastructure mode

An Infrastructure mode network requires the use of an Access Point. The Access Point controls Wireless communication and offers several important advantages over an Ad-hoc network. For example, an Infrastructure based network supports increased levels of security, potentially faster data transmission speeds and integration with a wired network. To improve the infrastructure communication, researchers implemented the cellular concept and handoff schemes. A cellular network or mobile network is a radio network distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station. In a cellular network, each cell uses a different set of frequencies from neighboring cells, to avoid interference and provide guaranteed bandwidth within each cell. The transfer of a cellular phone transmission from cell to another adjacent cell is called as a handoff. Handoffs occur when a cellular phone user passes out of the range that the cell can handle and into another cell range, and the signal is passed from one base station to the next.

#### 1.2 Ad-hoc mode

An Ad-hoc network allows each device to communicate directly with each other. There is no central Access Point controlling device communication. Ad-hoc networks are only able to communicate with other Ad-hoc devices, they are not able to communicate with any Infrastructure devices or any other devices connected to a wired network. Besides, Ad-hoc mode security is less sophisticated compared to an Infrastructure mode network. An already available new technology is a heterogeneous network with a vertical handoff scheme. The previous scheme used in cellular communication is like a 2G-3G communication model. The researchers implemented the same technology for WiMAX and WLAN but the problem in the WiMAX communication area is larger than WLAN, the same technique hand off is not efficient like some other network (2G-3G). The main reason is whenever it's getting another network signal also there is no hand off from home station. If the node moves from home station to another station then the only node participated in the hand off. Cognitive radio technology proves the efficient spectrum usage. In the existing vertical hand off scheme, when the user is available in the home station then it can't participate in hand off, so communication (spectrum) problem will occur due to an increased number of users. To solve this problem, we are proposing an optimized proactive vertical hand off named as cognitive radio. In the next generation of wireless communication systems, there will be a need for the rapid deployment of independent mobile users. Significant examples include establishing survivable, efficient, dynamic communication for emergency/rescue operations, disaster relief efforts, and military networks. Such network scenarios cannot rely on centralized and organized connectivity and can be conceived as applications of Mobile Ad-Hoc Networks. Cognitive radio (CR) will lead to a revolution in wireless communication with significant impacts on technology as well as regulation of spectrum usage to overcome existing barriers.

#### 1.3 Problem Statement

In the base, the model author has considered only the Spectrum hand off in static mobility (within a region). By this model, we can achieve effective spectrum hand off but if node moment occurs between different



# DEVELOPMENT OF DEVICE FOR THE MUTE COMMUNITY TO CONVERT THEIR GESTURE SIGNS TO SPEECH

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**Abstract -** The mute community around the globe has a hard time communicating with the rest of the world's population. This communication gap is there because a dumb person uses sign language which is not comprehensible by a normal person. This project mainly focuses on removing the barrier of communication between the mute community and the people not familiar with the concept of sign language so that the messages that a dumb person is trying to relay is understandable to a person with no knowledge of sign language. The design of the device is based on embedded systems. Flex sensors and microcontroller are the key components. **Keywords—**Flex Sensors, Arduino, Android Phone, Bluetooth, 2 axis accelerometer, Mobile App.

## I. INTRODUCTION

Technology is developing day by day but no significant developments are undertaken for the mute people. Mute people have no ability to interact with their environment. Such people depend on the sign language to access. So importance of hand gesture recognition increases. It creates the natural interaction between them and normal human. According to the statistics of the world federation of the dumb and the world health organization, approximately 70 million people in the world are the mute community. The majority of the speech and hearing impaired people cannot read or write in regular language. Sign language is the native language used by the mute people to communicate with others. Natural input device like these attract more attention because it is powerful, more effective, and does not require extra connection, than any other devices. Hand gesture recognition is used in TV controlling, robot control, human computer interaction, education, daily information retrieval etc,. This device is developed to improve the life style of the person who has speaking disabilities. This device converts the gestures to speech i.e., gives voice to the mute person. Speech is one of the important factors required for the humans to convey their messages. In this project, flex sensors play the major role. They are stitched to the glove. The output from the flex sensors is fed into the arduino development board. Arduino converts analog signal to digital and then data is sent to android phone via Bluetooth where the speech output is obtained using an android phone. The purpose of this paper is to present a survey on different hand gesture recognition approaches with advantages, disadvantages and recognition methodology of hand gesture recognition. Although a lot of work has been done on hand gesture recognition and recognition methodology, this paper focuses

on advancement of gesture recognition system. It is up to date and represents a good point for investigators in hand gesture recognition area.

## II. LITERATURE SURVEY

### A. Blind Separation of Doppler Human Gesture Based on Continuous-Wave Radar Sensors [1].

Zhitao Gu, Jun Wang, Fazhong Shen & Kuiwen Xu represents a set of experiments used to develop a statistical system from translating speech into sign language for deaf and dumb people. Two different approaches have been used to perform the translations. A phrase-based system and a finite state transducer. The system which is composed of an Automatic Speech Recognition (ASR) system. This paper presents translation results of reference sentences and sentences from automatic speech recognizer. In this experiment, Radar system is used. It creates problems like high power consumption in this system. In order to overcome the problems, we can modify that power consumption is lower than their radar system.

### B. A Framework for Hand Gesture Recognition & Spouting Using Substrate Modeling [2].

Dinesh mandalapuet al propose a new sub-gesture modelling approach which represents each gesture as a sequence of fixed sub-gestures(a group of consecutive frames with locally coherent context) and provides a robust modelling of the visual features. We further extend this approach to the task of gesture spotting where the gesture boundaries are identified using a filler model and gesture completion model. Experimental results show that the proposed method outperforms state-of-the-art Hidden Conditional Random Fields (HCRF) based methods and baseline gesture spotting techniques.

### C. Hand Gesture Recognition Using Deep Learning[3].

Static and eight dynamic hand gestures. The three main steps are hand shape recognition, tracing of detected hand (if dynamic), and converting the data into the required command. Experiments show 93.09% accuracy HyunChal



# LONG RANGE AND SELF POWERED IoT DEVICES FOR AGRICULTURE BASED ON MULTI-HOP TOPOLOGY

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**Abstract:** This project presents the prototype design and testing of long-range, secured IOT devices for use in precision agriculture environment. A line-of-sight range of up to 1.8km is achieved with the use of transmissions. However, the coverage area and range can be extended significantly by deploying the devices in multi hop network topology. The custom multi-hop protocol provides energy efficient communication from any device in a wireless sensor network. The sensor data is transmitted to a gateway, which then forwards it to a local server or cloud service, where the data can be analyzed to optimize the production in agriculture. IOT network system can monitor environmental parameters. The proposed network system incorporates multiple sensors to monitor environmental parameters. The sensors on different subjects can communicate with each other and transmit the data to a gateway via RF. the sensor node will provide an effective notification. A smart IOT gateway is implemented to provide data processing, local web server and cloud connection. After the gateway receives the data from sensors, it will forward the data to an IOT cloud for further data storage, processing and visualization.

**Keywords:** Temperature sensor, microcontroller, RF module, LCD display, ESP8266MCU, Cayenne app.

## I. INTRODUCTION

Internet of things is a system of inter-related computing devices, mechanical and digital machines. The term "Internet of Things" was coined by Kevin Ashton of procter and Gamble in 1999. Long range is a low power wide area network technology. It is based on self spectrum modulation Technique. It uses license free sub-giga hertz radio frequency banks. 868MHz(Europe), 915MHz(Australia and North America) and 923MHz(Asia). Radio frequency module is used to transmit or receive radio signals between two devices. The main aim of this paper is to collect the information in the agricultural fields or in any other environment and transmit through wireless communication. IoT devices for agriculture and aquaponics have been designed and tested based on the nRF52840 with a multi-hop protocol and energy harvesting. The multi-hop protocol

is highly efficient with ranges upto 1.8km per hop and a maximum hop by hop delay of 0.6s assuming successful transmission. The data are displayed in LCD as well as in Cayenne app and the temperature is measured by temperature sensor.

## II. LITERATURE SURVEY

In the year 2018 a paper "Design and Implementation of long range self-powered wireless IoT devices" was written by Rolf Arne Kjelby, they detect using nRF52840 based on energy harvesting. The test-bed is setup in both star and multi-hop configurations with optimized custom protocols. The average power by which the battery was charged during the test was  $941.94\mu\text{W}$  in an indoor environment. Based on measurements, a line of sight range of 1.8km is obtained using coded transmissions. Sensors of temperature, relative humidity and visible light are integrated into the nodes.

In the year 2018 a paper "Design and prototype implementation of an ultra low power wakeup Audio for wireless IoT devices" was written by Anders froylog. This project focus on reducing the overall power consumption of the battery powered and energy harvesting based devices. The prolonged life time of the devices can reduce the overall costs when deployed in large scale.

In the proposed system we designed the "Long range and self powered IoT devices for agriculture based on Multi-hop topology". This project is useful in agricultural field. This project is based on multi-hop topology and focus on the longer transmission of data without loss in transmission. With the help of ESP8266MCU module the data is send to Cayenne app. Thus, the data can be analyzed to optimize the production in agriculture.



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## DESIGN OF SMART SHAKO USING WIRELESS SENSOR AND GSM TECHNOLOGY

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**Abstract** - With the increasing number of two-wheeler vehicles, frequency of accident is on rise. Major causes for calamity one either the rider not wearing a helmet, or he has consumed alcohol and the setback is not reported on time. Currently there are no technological interventions being used to prevent such events. This paper proposed a smart helmet system. This is implemented using advance features like alcohol detection, setback identification, location tracking and fall detection. This will help in avoiding such situations to a significant extent. The smart helmet has a module to detect whether the rider is wearing the helmet and also analyses the breath of the rider to check for consumption of alcohol. The rider will not be able to start the vehicle if the rider is drunk and is not wearing helmet. Instead of calamity occurred then the location of calamity is tracked and sends the alert message to the ambulance with the location of calamity. This system will provide safety to bike rider all time.

**Key Words:** smart helmet, vibration sensor, ultrasonic sensor, GSM Module, MQ5 sensor.

### 1. INTRODUCTION

India ranks 1<sup>st</sup> in the number of road accident deaths across the 199 countries reported in the world as per the WHO Global report on road safety 2018, India accounts for almost 11% of the accidents occur. 1214 road crashes occur every day in India. Two wheelers account for 25% of total road crash deaths. 20 children under the age of 14 die every day due to road crashes in the country. 377 people die every day, equivalent to a jumbo jet crashing every day. Road accidents are increasing day by day because the riders are not wearing the helmet and due to consumption of alcohol. In today's world, huge numbers of people are dying on road accidents. Smart helmet helps to curb "riding without helmet" by ensuring that the rider mandatorily wears the helmet while driving. Thus the objective of this project is to make sure people wear helmets and then ride bikes. Another objective is to make sure the rider isn't drunk. The rider won't be able to ride the bike if he is drunk. One more objective is to reduce the fatality of the accidents by sending a message to the riders' relative about the accident. This was further implemented by where the safety helmet

system included a vibration sensor, GSM and GPS modules that could track the person and send a distress call upon hard impact. Vibration sensors are used when the bike is hitting more this relates to microcontroller board. So, when the rider collides and the rider's helmet hits the ground, the vibration sensor senses the condition and after that controller extracts GPS information and this information passes message to nearby hospital. The rest of the paper demonstrated as below. The proposed works and implementation are described in Section 2 and 3 respectively. Section 4, 5 and 6 discuss about the software description and results respectively. At last, Section 7 concludes the paper with conclusion.

### 2. PROPOSED SYSTEM

Road accidents are increasing day by day because the riders are not using the helmet and due to consumption of alcohol. In today's world, huge numbers of people are dying on road accidents. By using smart helmet, the accidents can be detected. The main target of the project is designing a smart helmet for accident avoidance and alcohol detection. The ultrasonic sensor checks if the person is wearing the helmet or not. The MQ5 sensor recognizes the alcoholic substance in the rider's breath. If the person is not wearing the helmet and if he consumes alcohol, the bike will not start. If there is no sign of alcoholic substance present and helmet is used, then only the bike will start. At the point when the rider met with an accident, the sensor recognizes the condition of the motorbike and reports the accident. Then the GPS in the bike will send the location of the accident place to main server of the nearby hospitals.

### 3. IMPLEMENTATION

#### A. ULTRASONIC SENSOR

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Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. This is similar to how radar measures

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# IOT BASED COAL MINING SAFETY MONITORING SYSTEM USING NODE MCU

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## ABSTRACT

This paper proposes a design of a wireless sensor network (WSN) with the help of ARM controller which is able to monitor the temperature, humidity, gas, vibration and status of smoke in an underground mine. This system also controls the ventilation demand to mine workers depending upon present climate conditions within the mine field. This system utilizes low power, cost effective ARM, DHT11 sensor, smoke detector, gas sensor for sensing the mine climate parameters and Wi-Fi for remote logging of data at central location to control the climate state with the help of motor and valve control circuitry. Traditional coal mine monitoring systems tend to be wired network systems, which play an important role in coal mine safe production. With continuous enlarging of exploiting areas and extension of depth in coal mine, many laneways become blind areas, where in there are lots of hidden dangers. Moreover, it is inconvenient to lay cables which are expensive and consume time. In order to solve the problems, we will design a coal mine safety monitoring system based on wireless sensor network, which can improve the level of monitoring production safety and reduce accident in the coal mines. Wireless sensor network is composed of a large number of micro-sensor nodes which have small volume and low cost.

**Keywords:** wireless sensor network, coal mine monitoring ,the temperature, humidity, gas, vibration

## 1. INTRODUCTION

IoT is nothing but the devices communicating with each other by using the internet. IoT applications vary on a large scale. European Research Cluster on the Internet of Things classifies major IoT applications as smart buildings, smart transportation, Smart energy, smart industry, smart health and the smart city as major areas. IoT is a trend-setting innovation in which all the data from sensors is



## AN ENERGY EFFICIENT WAY OF ROUTING USING LINK QUALITY CLUSTERING TECHNIQUE IN WIRELESS SENSOR NETWORK

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**Abstract:** The scattered nature and lively topology of remote sensor arrange have some fundamental prerequisites that incorporate diminished vitality usage and expanded system's lifetime. In this task, we have concentrated on various leveled conventions. In such convention the hubs are masterminded in bunches. To synchronize activity and course information, bunch head are chosen one for each group. We have presented another methodology in remote sensor organize for choosing the group head by utilizing load balanced cluster routing using link quality (LQI) and neural network in order to increase network's lifetime. This paper utilized residual energy as a factor to make cluster head. Outspread premise work organize model is utilized for bunch head determination issue. Connection quality used to pick a best hub so as to high flag quality and low overhead hubs. The reenactment results give system's exhibition based on certain variables including number of dead hubs, all out vitality utilization, group head arrangement, number of hubs passing on and the quantity of bundles moved to base station and bunch head. The presentation of the proposed calculation is contrasted and LEACH and LEACH-C dependent on vitality proficiency and improved system lifetime.

### I. INTRODUCTION

The Hierarchical clustering of sensor hubs can incredibly add to the general

adaptability, life expectancy, and vitality effectiveness of the WSN. Various leveled steering is a viable method to diminish power utilization inside the WSN, by totaling and blending information caught in groups to lessen the quantity of messages transmitted to the sink. It is especially valuable for applications that expect adaptability to hundreds or thousands of hubs. In this specific situation, versatility includes adjusting the heap and utilizing assets productively. Applications that require proficient accumulation of information are additionally contender for clustering.

Notwithstanding supporting system adaptability and reducing energy utilization through information collection, bunching has numerous other auxiliary advantages and related destinations: it can decide the steering setup in the groups, and along these lines decrease the size of the directing table put away at every hub. It can likewise save correspondence data transfer capacity since it confines the extent of between bunches cooperations to the CHs, and keeps away from repetitive message trade between sensor hubs. Moreover, grouping assists with balancing out the system topology at the sensor level, and lessen the upkeep cost of the topology. The sensors will just deal with the association with their CH and won't be influenced by the collaborations between the CHs.



# HANDWRITTEN CHARACTER RECOGNITION USING NEURAL NETWORK AND FUZZY LOGIC

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**Abstract:** Image based content extraction is one of the quickest developing examination territories in the field of sight and sound innovation. The extraction of content from intricate or increasingly vivid pictures was a difficult issue. Content information present in the pictures contains valuable data for routine clarification, ordering and organizing of pictures. Extraction of this data includes identification, confinement, extraction, improvement and acknowledgment of the content from the given picture. We have recommended that we convert the content from picture utilizing profound neural network. In this paper, an optical character acknowledgement framework dependent on Deep Neural Network (DNN) is used. The ANN is prepared utilizing the Back Propagation calculation. In the proposed framework, each composed English letter is represented by binary numbers that are utilized as contribution to a basic element extraction framework whose yields not resisting the information, are fed to a DNN. A while later, the feed forward algorithm gives knowledge about the activities of a neural network followed by the DNN algorithm which Bargains, Trains, Calculates error and modifies weights.

**Keywords:** Optical Character Recognition, Binarization, Thinning, Skewing.

## I. INTRODUCTION

The goal of this project is to convert printed textual characters or handwritten characters recorded offline using both scanning system and cameras into a device usable textual content through simulating a Neural Network simply, so it would decrease the way of accumulating and storing statistics via human employees. Another motive is to provide an trade higher and quicker algorithm with better accuracy to recognize the characters. In this context we pick synthetic neural network and make it plenty greater tolerant to anomalies in the recorded picture or facts. Common optical person recognition duties include figuring out easy side detection and matching them with predefined patterns. In this research, characters are identified although noise along with inclination and skewness offers with the useful resource of education, the network to search for discrepancies in records and relate them with the use of vocabulary grammar and common place recurrences that may stand up after a person. Images are also masked in more than one method and processed in our own opinions to increase the self-perception stage of prediction.

## II. LITERATURE SURVEY INTRODUCTION

### 2.1 Arabic Scriptor Character Recognition

In 2002 Majid M. Altuwaijri and Magdy A. Bayoumi They develop system to recognize Arabic text using neural network used set of moment invariants descriptors(under shift, scaling and rotation) and artificial neural network(ANN) used for classification. The study has shown 90% of the high accuracy rate.

In 2015 Ashraf Abdel Raouf, Colin A. Higgins, Tony Pridmore and Mah-moud I. Khalil Haar studied approach for recognizing Arabic characters using Haar Cascade Classifier (HCC). These classifiers were trained and tested on some 2,000 images. To extract feature Haar- like feature extraction used and boosting of a classifier cascade. The system was tested with real text images and produces 87% accuracy rate for Arabic character recognition. In 2017 N. Lamghari, M. E. H. Charaf and S. Raghay. On this research the data are divided into three parts. From 34,000 characters 70% are used for training, 15% for testing phase and 15% for validation. To extract feature hybrid feature extraction used (pixel density, resize, freeman code, structural features, invariant) for recognition used feed forward-back propagation neural network. The system has achieved 98.27% high recognition rate.

In 2018 Noor A. Jebrila, Hussein R. Al-Zoubib and Qasem Abu Al-Haijac in addition to the preprocessing step includes in particular three levels. In the primary section, they employed word segmentation to extract characters. In the second section, Histograms of Oriented Gradient (HOG) are used for feature extraction. The very last phase employed Support Vectored Machine (SVM) for classifying characters. They have carried out the proposed method for the recognition of the Jordanian metropolis, city and village names as a case examine, similarly to many other phrases that offers the characters shapes that aren't included with Jordan cities. The set has cautiously been selected to include each Arabic character in its all forms. To the conclusion, they have got constructed their own dataset inclusive of greater than 43.000 handwritten Arabic phrases (30000 used for training and 13000 used for testing stage). Recognition results show 99% rate of accuracy.



## Enthrallment of Received Signal Strength Vaticinate of Cluster Head and Number of Rounds

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**Abstract:** The dispersed nature and vibrant topology of wireless sensor network have some basic requirements that include reduced energy utilization and extended network's lifetime. In this paper, we have focused on hierarchical protocols. In such protocol the nodes are arranged in clusters. To synchronize action and route data, cluster head are selected one per cluster. We have introduced a new approach in wireless sensor network for selecting the cluster-head by making use of artificial neural network in order to increase network's lifetime. We have used residual energy as a factor to make cluster-head. Radial basis function network model is used for cluster-head selection problem. The simulation results provide network's performance on the basis of some factors including number of dead nodes, total energy consumption, cluster head formation, number of nodes dying and the number of packets transferred to base station and cluster head. The performance of the proposed algorithm is compared with LEACH and LEACH-C based on energy efficiency and improved network lifetime

can send the data. Clustering algorithms basic principle, the energy of the nodes in the network to select a CH in order to use the highest efficiency and the data are included in the set is based on its submission to him. If the selected cluster head transmits data from the central node.

Cluster head (CH) selection on the calculated energy to generate a random number with the participation threshold of parameters such as the number of nodes in the CH node or that the network is based on a high. But choosing themselves a CH node of a clustering algorithm clusters close to each other based on the distance from the node would lead to less energy will be more accurate than logically. When analyzed studies on the subject, which appears to be related to the selection algorithm Leach per cluster. LEACH algorithm was developed in 2002 by Heinzelman and CH selection was built. In another study that was made by Heinzelman in the same year, due to the not to be homogeneous distance between CH and nodes in cluster, the CH of the energy efficiency of the nodes has been mentioned is low. There are studies about the measurement of the battery capacity with distance information and the distance estimation between nodes and determine the position of movable objects in confined spaces with RSSI.

The rest of the paper is organized as follows. Section II gives a brief overview of work related method. Section III and IV describes the preliminaries and the proposed methodology. Section V presents the experimental results obtained from the proposed method and comparison with existing work. The paper is Conclusion in section VI respectively.



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# DESIGN AND FABRICATION OF DOUBLE C DUAL BAND SLOTTED MICROSTRIP ANTENNA FOR 5G TECHNOLOGIES

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**Abstract:** The fifth generation (5G) promises more advantages and benefits to the world. It will create an essential difference over 4G. The design of 5G antenna providing broad bandwidth is very important to ensure the performance of 5G networks. In this research, design of double c dual band slotted microstrip antenna for 5G technologies is designed and simulated. The patch has a compact structure of 6mm x 8mm x 1.6mm. The proposed antenna resonates at 28.9GHz with a return loss of -21dB, Bandwidth of 900MHz, gain of 7.47dB and 38GHz with a return loss of -28dB, Bandwidth of 1.47GHz, gain of 7.89dB. An inset feed transmission line technique is used for matching the radiating patch and 50 ohm microstrip feed line. In the design, a FR4 (lossy) substrate was used. The geometry was displayed and analyzed using Computer simulation Technology (CST) Microwave studio.

**Keywords:** CST software; mm wave; dual band microstrip patch antenna; 5G.

## 1. INTRODUCTION

The technology related to antennas in the modern wireless system has been continuously improved with the corresponding increase in the number of requirements for 5G communications. This leads to new challenging network requirements as well as in the antenna design for 5G communication systems in order to meet the expected data rate and capacity.

The frequency greater than 6GHz is called as mm wave spectrum, carriers are likely to use the 28, 38GHz bands that will become available for future technologies. Based on the requirements for 5G, antennas with light weight, low profile (compact size), low cost mass production, ease of installation, conformable to planar surface and also non-planar surface, mechanically robust when mounted on rigid surface and compatible with monolithic microwave integrated circuit are quite important. We proposed a slotted microstrip patch antenna which will satisfy the above requirement.

In this design, the microstrip feed line feeding technique is used. In the proposed antenna, the Double C and H slots are loaded on the patch. The 50 ohms microstrip line feeding is used and the results are simulated in the CST software. The proposed antenna is designed to resonate at 28/38GHz.

After the simulation, the antenna is fabricated using photo-lithography technique.

## 2. Antenna Design

A dual band microstrip patch antenna of shape as depicted in fig.(1) is designed with the dimensions of 6mm x 8mm at 28/38 GHz for millimeter wave 5G applications. The slots are loaded on the patch with different dimensions. The patch is delivered by the 50 ohm microstrip line feed and the antenna is simulated on a FR4 lossy dielectric substrate having relative permittivity of 2.2, loss tangent of 0.0009, and height of 1.6 mm.

CST software is used for simulation purpose. The copper sheet with dimensions of 6mm x 8mm is used as the ground plane. The Double C and H slot cuts which are used to increase the impedance bandwidth, are made on the patch. The length of the patch is 3 mm and width is 3.5 mm. The length and width of the H slot is 2.5 mm and 2 mm. The C slots have an inner radius and outer radius of 0.9 mm and 0.55 mm. The microstrip feed lines have a length and width of 0.5 mm and 3.25 mm. The dual band antenna has been designed at the work 28/38 GHz millimeter wave frequency.



  
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# DESIGN OF SLOT ANTENNA WITH DEFECTED GROUND STRUCTURE FOR WIMAX APPLICATION

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**Abstract:** It is presented a slotted Micro strip patch antenna for WIMAX Wireless application. Embedding slots with Defected Ground Structure (DGS) technique improves overall performance of an antenna at 5.66GHz in this proposed design. The Computer Simulation technology (CST) simulator which can simulate electromagnetic signals is used for the design. The size of this antenna is  $72.54 \times 72.54\text{mm}^2$ . The proposed prototype antenna is well suitable for WIMAX application. The antenna parameters like Bandwidth, Radiation Efficiency, Gain and Directivity have been increased.

**Keywords**— WIMAX, DGS, Square slot, CST Software.

## 1. INTRODUCTION

Microstrip patch antenna is a kind of radio wave antenna with a low profile which is embedded on a flat surface. It is a conformal and a planar structure, compactness, low profile, directive with high transmission efficiency and ease of integration with microwave circuit and portable communication equipment. A major factor for recent advancement in Microstrip patch antenna is the current evolution in electronic field miniaturization brought about by improvement in large scale integration. For improved antenna performance, a thick dielectric substrate is desirable since this provides improved efficiency, larger bandwidth and better radiation.

With this added advantage we are implementing slots. The slot antenna is simply an opening cut in a sheet of conductor which is energized in some appropriate manner, such as via a coaxial cable or waveguide. The slot antenna makes use of the fact that energy is radiated when a high frequency fields exist across a narrow slot in a conducting plane. The shape, size of the slot and the frequency determines the radiation pattern. Slot antennas are usually used at Ultra High Frequency (UHF) and microwave frequencies. The introduction of slots in our design enhances bandwidth and gain of an antenna. In this proposed work we made DGS for enhancing antenna parameters for WIMAX Wireless application. The geometrical slot embedded on the ground plane of microwave circuit is known as Defected Ground It is integrated into the ground plane with planar transmission line (i.e.) Microstrip line. It is embedded etching off a basic cut in the ground. The use of DGS in our design improves antenna parameters and radiation characteristics and also it reduces mutual coupling between adjacent element and cross polarization.

WIMAX- Worldwide Interoperability for Microwave Access. It is a family of Wireless Broadband Communication Standard based on IEEE 802.16. WIMAX is an advanced technology based on a standard designed to meet the need for very high speed wide area internet access with low cost. The main aim of WIMAX is to provide business and consumer broadband service on the scale of MAN. The speed of WIMAX transmission is 70 mbps. It provides portable mobile broadband connection across cities and countries through various devices. WIMAX provides compatibility and interoperability of devices. Comparing with Wi-Fi, WIMAX supports further transmission distance and high data rate. The use of both Defected Ground Structure (DGS) and slot enhance the antenna parameters such as Bandwidth, Radiation Efficiency, Gain, and Directivity for WIMAX application at 5.66GHz. Nowadays, DGS has been widely used for enhancing Microstrip patch antenna. Bandwidth enhancement rectangular monopole antenna is reported in [1]. Multiband patch antenna is proposed with the partial ground plane for improving bandwidth [2]. U shape patch antenna and impact on the ground plane is discussed in [3]. Several techniques for improving bandwidth in antennas are stated in [4] to [6].

In this paper, combinations of two methods such as slot and DGS has been proposed to increase the parameters of the antenna. Great improvements in antenna parameters are achieved at 5.66 GHz. The enhancement in bandwidth is achieved by 33%, radiation efficiency by 75.82% and antenna gain and directivity by 6.01 and 8.42 respectively. The paper proceeds as Section II discussing the structure of the design. The results are analyzed in Section III, and finally, Section IV will conclude the work.





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# Influence of iron powder core on the switched reluctance motor performance enhancement



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## Materials Today: Proceedings

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# Effect of L-Ascorbic acid on performance and emission behavior of neem biodiesel operated diesel engine

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## Abstract

Nowadays, researchers are view in multidimensional of the consumption of fossil fuels, energy conversion and emission control. Many researches proved that biodiesel is the best alternate sources for conventional diesel fuel. In worldwide biodiesel is extracted from vegetable oil obtained from transesterification process. In the present investigation, the nerium oil methyl ester (NOME) with L-ascorbic acid as additive is used as fuel in order to find out working characteristics of diesel engine. The NOME proportions with 1% L-ascorbic acid (LA) as additive. The break thermal efficiency (BTE) of B20 with 1% of LA is 3.12% higher than diesel. The brake specific fuel consumption (BSFC) decreased 3.84% by adding of LA additive with B20 blend (B20 + LA)



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## Effect of catalyst coated piston and antioxidant additive on decrease in pollutants in diesel engine using neat biodiesels (B100)

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### Abstract

The present work aims at to analysis the impact of  $ZrO_2$  and L ascorbic acid (200mg) (LA200) on working behaviors in (B100) operated diesel engine. These are nerium, mahua and calophyllum. From the tests, the  $ZrO_2$  with LA200 in B100 of nerium fueled diesel engine showed better brake thermal efficiency (BTE), brake specific fuel consumption (BSFC) and reduction in pollutants such as monoxide of carbon (CO), hydrocarbon (HC), oxides of nitrogen ( $NO_x$ ) and smoke than diesel and B100 of other biodiesels.

**Key words:** B100,  $ZrO_2$ , LA200, diesel engine, pollutants, BTE.

### 1. Introduction

The vegetable methyl ester can be used as alternative for petroleum derive fuels inn diesel engine [1]. The biodiesel in diesel engine showed reduction in pollutants except  $NO_x$  than diesel. There is slight power loss of about 2.8% at full load for apricot biodiesel (B100) with respect to diesel. Also there is a maximum increase of brake specific energy consumption (BSEC) of about 4.8% is observed for B100. Further, the reduction in pollutants with slight increase in  $NO_x$  was achieved [3]. The biodiesel shows the higher  $NO_x$  than diesel [4]. The HC of camelina biodiesel (B100) is 68.8% lesser, while the  $NO_x$  is 58.8% higher than diesel. Further, the BSFC increases to a maximum of 56.25% for B100 [5]. The biodiesel concentration is increased from diesel to B20 and also from B20 to B100 increases the  $NO_x$  [6]. Among the four biodiesels, calophyllum possesses higher calorific value, which is much closer to that of diesel. Further, it has been found that  $NO_x$  is increasing for all biodiesels [7]. Among different proportions of waste biodiesel, B100 showed maximum emission of  $NO_x$  and particulate matter

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# DESIGN AND PERFORMANCE ANALYSIS OF SHELL AND TUBE HEAT EXCHANGER BY VARYING THE FLUID MEDIUM USING CFD

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**Abstract:** In thermal systems, heat exchangers are used to control the operating temperature of the working fluids. Shell and tube style heat exchangers are the most common kind of heat exchangers used in industries. In this work, shell and tube heat exchanger performance analysis is performed using CFD tools under industry-collected boundary conditions. Instead, the cooling liquid ammonia is replaced by  $Al_2O_3$  and evaluated accordingly to increase the performance of the system. Instead the heat exchanger of the shell and tube is replaced by the heat exchanger of the u tube and analysed under the same boundary conditions. Then, the results are compared and the application of  $Al_2O_3$  was found to have a better thermal efficiency.

**Keywords – Heat exchangers – CFD analysis – Optimization of output – Nano fluids.**

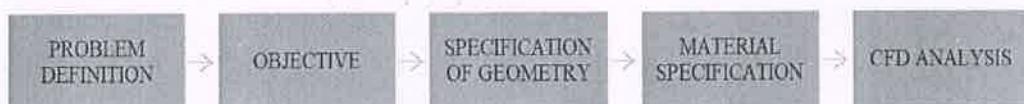
## I. INTRODUCTION

In various thermal and thermal related industries, heat exchangers are commonly used to maintain a desired temperature within the device. The flow of heat occurs in many ways, one of which is convection, also known as convective heat transfer. This method of heat transfer is commonly utilized in all heat exchanger forms. Given this simple construction and less maintenance, shell and tube style heat exchangers are commonly used by different types of heat exchangers. This type of heat exchanger operates under modes of parallel and counter flow.

A shell and tube heat exchanger is taken in this project for the purpose of research. The heat exchanger model is performed using solid works software and the same package will be used for future CFD research, as this program will combine the process between modeling and simulation. The simulation data would be obtained from a nearer diary plant, as they use heat exchangers to hold the temperature within their device. The current system will first be subjected to CFD review, and the findings will then be recorded. Instead, the working fluid is switched from ammonia to titanium oxide while attempting to improve the transfer of heat from gas to liquid. This then tabulates the CFD tests and compares them accordingly.

## II. METHODOLOGY

Methodology is the basic prerequisite of a project, since it establishes the correct requirements for beginning and completing the research to be completed. Proper process preparation and implementation decides the project will be successfully completed. The project's approach is as shown.



## III. PROBLEM DEFINITION

Heat exchangers are commonly used heat transfer devices and are primarily used in food industries for food preservation and also for maintaining constant temperature at different points of the liquid movement. The following is the schematic of the heat transfer network of a typical food processing field.

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# Experimental Investigation of Characterization of bio oil from pyrolysis of Electronic Wastes

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**Abstract**— In recent years usage of technology and growing up of wastes produced by its usage has been increased abruptly. One of the major wastes in it is E-waste. These E-wastes being a harmful pollutant direct disposal of it into the atmosphere affects the eco balance. Since it contains emissions of lead, barium, cadmium, chromium, brominated flame retardants or poly chlorinated biphenyls (PCBs) compounds, these bring about various hazardous health problems. Here this study explains a process of pyrolysis where E-waste are converted into oil known us pyrolysis. It is a low grade oil its can be used in heating of chemicals and also boilers. In the present experimental investigation, E-waste of local scrap stores it is never being used, which is converted into a powdered form by the help of ball milling process containing low carbon percent and maximum volatiles process used here is fixed bed pyrolysis process to convert E-waste powder into oil char that can be used as a fertilizer.

**Keywords**— E-waste, Pyrolysis Process, Bio oil,

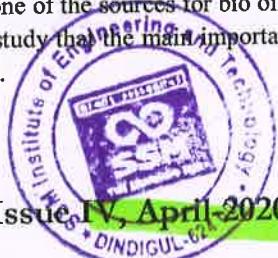
## I. INTRODUCTION

In recent years due to usage of non-renewable sources there is increasing environmental pollution global warming is raising much causing effects to all creatures. These factors passed way to find fuel once such is hydrolysis which is from agree waste. In our topic, “Extraction of bio oil through E-waste”. As this solid E-waste place a dreadful role most of electronic goods come under E-waste reason surveys in India says that E-waste is being used.

P. Madhu et al. [1] studied and reviewed increase in global level effects let the way to find some fuels which are non-hazardous to us biomass is one kind of fuel alternative to fossil fuels. These bio-oil can be produced from lemongrass here to are some factors that affect this (i.e.) temperature, heat rate. The Ultimate rate of oil production from the reaction was temperature reaches 450° C, particle size 0.71-1.00 mm and heating rate of 45° C/ min. Pravakar Mohanty et al. [2] reviewed bio oil obtained through different species once such is hydropyrolysis where heating is involved in present of water two steps take place. In first step raw products are first converted into low calorific values and then to high calorific value through the process of hydro treating and reforming. Yusuf Makarfi Isa et al. [3] studied many alternates production are there for petroleum fuels best example algae and palm oil. These algae and palm oil technique is trending because they can be used in cooking and harmless effect in it. To enhance the bio-oil with the help of transesterification, thermal cracking, hydro cracking and catalytic cracking process.

Venkateswarlu Chintala [4] in this work described the emerging technology solar too places role the main advantage is that simple products or being used in this techniques. Here biomass was put it up and utilized in I.C engines. Water content in oil and high viscosity result in sometime reduces efficiency of I.C engine. Shi Hua Chang [5] has found that, with the help of pyrolysis and solvolysis process, bio oil can be obtained from Empty Fruit Bunch (EFG) from palm oil. In non catalytic fast, catalytic fast pyrolysis process and with lower operating temperature and high pressure, solvolysis process can be achieved. Bo Zhang et al [6] has found that with the aid of ultrasonic pre-treated method, the bio crude oil can be obtained from the micro algae with the optimum operating conditions of 260° C and 300 W power for 2 minutes. By increasing the pre prolonged time, it also gives a maximum yield of 50% which shows the negative effect of this process. Hen Su Heo et al. [7] has analyzed the bio oil yield from waste furniture saw dusts. In this analysis, bio oil production was done based on the temperature, particle size, feed rate and heat flow rate. They concluded that with the temperature of 450 ° C with a small particle size of 0.7 mm and maximum gas flow rates and maximum feed rate, the maximum condition of bio oil yield can be obtained from the fast pyrolysis process.

Many researchers have produced bio oil with the use of pyrolysis process. So, the author has also chosen this method for bio oil preparation. In the current study, bio oil yield from E waste has been carried out by using fixed bed pyrolysis process. E waste is considered to be one of the sources for bio oil production and it also consist carbon contents. From the literature collection, it is investigated in this study that the main important factor that affects the bio oil yielding was pyrolysis temperature, small particle size and heating rate.



# Analysis of spring back and bend power of galvanized iron sheet in V-Die Bending Phase

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**Abstract:** This dissertation explores the springback effect of Galvanized Iron board. Performance of galvanized Iron sheet metal is determined by sheet thickness, die angle, die opening, and punch radius. The parameters above are performed experimentally, and the S / N curve is plotted using Taguchi analysis to classify most affected parameters. The Regression-based mathematical models for springback prediction in the Galvanized Iron sheet bending process V-Die were developed. Sheet thickness, Die angle, Die opening, and Punch radius were considered input parameters, and springback and Bend force were considered output parameters for model creation. For Galvanized Iron sheets, various regression models were built based on experimental findings, including linear, linear-square, linear-interaction, and quadratic terms for the springback prediction.

**Keywords:** Simulation of processes-GI steel – V-Die bending – Bend force – Springback.

## List of symbols

- t Thickness of sheet in mm
- $\Theta$  Die angle in degrees
- X Die opening in mm
- R Punch radius in mm
- $\Theta_s$  Springback angle ( $\theta_1 - \theta_2$ ) in degrees
- $\theta_1$  Bending angle before springback in (deg)
- $\theta_2$  Desired bending angle after springback (deg)
- Y Estimated value
- $B_i$  Regression coefficient of  $i$ th
- $\beta_{ij}$  Regression coefficient of interaction of  $i$ th independent variable
- $x_i$   $i$ th independent variable



## Introduction

Automotive industries, to a great extent are dependent upon the manufacturing of automobile parts which is being used by thin metal sheet. The salient features of sheet metal items are low cost and weight, smooth surface finish and best interchangeability. For past few decades several studies were conducted in order to get better idea in sheet metal bending,. Drawing Processes for sheet metal formation including bending, stretching and drawing are commonly used in industry. Sheet metal bending is an important process in method and manufacture of sheet metal formation. Spring back calculation is a most important problem for sheet metal manufacturing in determining a product's desired form. Springback refers to the difference in form between the configurations fully loaded and unloaded. The process selected for analyzation is V-Die bending due to its outstanding elasticity and lessening in bend power. In V-Die bending, the appropriate angle is created on the piece of work by adjusting the punch depth that enters the die opening. Changing the size of the opening die often affects the amount of force needed for bending. When the die opening , there was a decrease in force for bending and vice versa. In the present investigation the sheet material of Galvanized Iron (GI) steel is used because of its own excellent formability.

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# Simultaneous Scheduling of Assembly and Production Shops Using GA based Heuristic

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 P. Sankar Kannan

*Abstract--- This paper addresses a scheduling problem in an industry that manufactures machines. The manufacturing facility of the industry consist of two sections namely production shops and assembly shops. Production encompasses four subsections in it. Production shop is commonly shared by the components of different machines. But the assembly shops have independent section for each machine. Due to the sharing of production shops the components are not delivered in time to the assembly shop which delays the assembly of a product. The above problem is addressed by simultaneously scheduling the production and assembly shops with an objective criterion of minimum penalty cost. The production environment is of job shop in nature. The schedule generated accounts the alternative routing as it increases the flexibility in scheduling. Job shop problem are combinatorial optimization problems, account of alternative routing increase the complexity of the problem. The above problem becomes NP hard in nature. Meta heuristics are evolving as a promising alternative to address the NP hard problems. Genetic algorithm one among the Meta heuristic is used to evolve the simultaneous schedule of production and assembly shops and it is illustrated with the different products models developed to represent the machines of the company.*

*Keywords-- Scheduling, Meta-heuristic and Genetic Algorithm.*

## I. INTRODUCTION

Manufacturing industries of today need to produce quality products with economy and to deliver without any delay; this situation has led to the companies to focus on every activities or operation. An overall plan is needed to follow the operations effectively and it is a result of decision taken at various levels of operation. Good decision provide good plans and hence increased productivity .Production schedule is an important decision making process at shop floor operation level. This paper addresses a scheduling in manufacturing industry which produces capital goods. Industries of such nature have production and assembly shops. The components or parts that make up a assembly are manufactured in production shops and assembled to form a product in assembly shops. The general job shop problem is one of the well known machine scheduling problems, in which the operation sequence of the jobs are fixed that corresponds to their optimal process plans or resource availability . However the use of other possible process plans in addition to optimal one could provide better schedules resulting through reduced bottlenecks and increased flexibility. Jawahar et al[1], proposed a GA based heuristic for scheduling problem of flexible manufacturing systems associated with alternate routing. They have shown that GA based heuristic search procedure is suitable for FMS scheduling problems and is capable to handle alternative route choice and to revise the

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