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## EXPERIMENTAL STUDY ON SELF-HEALING OF RIGID PAVEMENTS

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**Abstract** - This paper majorly focuses on the application of Self-healing of Rigid pavements and its sustainability. It is built using ultra high strength concrete and special fibers, it is not only cost-effective, but has greater longevity. Unlike the typical Rigid Pavement in which cement is a key component, in self-repairing road it uses 80% Cement And 20% Fly-Ash and 5 % Activated Carbon & 2.5 % of Fibers. These materials on constituent with cement and Activated Carbon makes a normal grade concrete as High Strength and High Performance Concrete. The main content that self heals the Pavement is fibers. The Fibers being used in constructing self- repairing Pavement, should have a epoxy resin and un hydrated cement attracts water in the event of rains. The water then becomes a key component in healing cracks. When a crack appears, this water gives hydration capability to the un- hydrated cement, and produces more silicates, which actually close the crack before they grow larger. The total number of cubes were casted for this project for Compressive Strength for 7, 14, 28 days are 12 cubes, In which 3 are Conventional concrete, 3 cubes were made with 5% of Activated Carbon, 3 cubes were 2.5% of Fibers, 3 cubes were made with 5 % of Activated Carbon & 2.5% of Fiber. The total number of cylinder were casted for this project for Split Tensile Strength for 7, 14, 28 days are 12 Cylinders , In which 3 are Conventional concrete, 3 Cylinders were made with 5% of Activated Carbon,3 Cylinders were 2.5% of Fibers, 3 Cylinders were made with 5 % of Activated Carbon & 2.5% of Fiber. Additionally 3 moulds with 100 mm thickness with 5% of Activated Carbon& 2.5% of Fibers & 5% of Epoxy Resin were prepared for Generation of crack and Healing of Crack at 7, 14, 28 days. The road is about 100mm thick, which makes it 50% to 60% less thick than the standard Indian road. This makes the first-time cost of laying out such a road about 20% to 30% cheaper.

**Key Words:** Rigid pavement, Cement, Concrete, Fibers, Fly-Ash, Activated Carbon, Water, Rain, Epoxy Resin, Self-Healing, Compressive Strength, Split Tensile Strength.

### 1. INTRODUCTION

Self-healing technology is a new field within material technology. It represents a revolution in materials engineering and is changing the way that materials behave. Incorporating self-healing technology into the road design process has the potential to transform road construction and maintenance processes by increasing the lifespan of roads and eliminating the need for road maintenance. By decreasing the unnecessary premature ageing of rigid pavements, self-healing asphalt can reduce the amount of natural resources used to maintain road

networks, decrease the traffic disruption caused by road maintenance processes, decrease CO2 emissions during the road maintenance process and increase road safety. In addition to environmental savings, self-healing materials have the potential to deliver significant cost savings for road network maintenance .

Concrete structures often suffer from cracking that leads to much earlier deterioration than designed service life. To prevent such deterioration, regular inspection of cracks in concrete structures and their repair are usually carried out by means of some kind of human intervention.

The roads will require less servicing, increasing productivity while decreasing cost. Self-healing roads far outperform conventional roadways, self-healing Rigid Pavement can improve traffic flow, reduce maintenance activity, and can easily extend the life of a road up to 40 years. Durability is experiencing a shift from the idea of minimizing damage to the new era of self-healing capabilities.

### OBJECTIVE

- To test and lay high strength concrete road 5% of activated carbon, 20% fly ash and cement content 80%. The presence of Activated carbon & Fibers in concrete increases the strength of the road to 15-30% compared to conventional concrete.

- To give secondary reinforcement for the high strength concrete road with Steel and coir fibers.

- To induce the concept of self-repair when crack are formed with polar substances natural and Synthetic Fibers.

- To increase the life span of the road and durability when compared to normal asphalt and cement roads.

- To increase the Compressive strength and Split Tensile of the rigid pavement by adding Activated Carbon and Fibers which will increase the strength by 15-30% compared to conventional concrete.

### MECHANISM

- The Activated Carbon in the Concrete will increase the compressive strength evidently and reduce the pores in the rigid pavement. This will significantly resist the road from cracks.

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## REMOVAL OF CHROMIUM USING VIGNA MUNGO AS A BIOSORBENT IN TANNERY EFFLUENT AT DINDIGUL DISTRICT

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### ABSTRACT:

This present study conception is the removal of Heavy Metal of Chromium ions from Tannery effluents using low cost natural absorbent Vigna mungo. The activated carbon prepared from the Vigna mungo (Black gram) husk can be employed as a potentially low cost adsorbent. The activation process was found to increase the high surface area and offering good adsorption capacity. Vigna mungo husk was taken to prepare activated carbon by physical activation (Pyrolysis at 700°C in furnace) and chemical activation (using H<sub>3</sub>PO<sub>4</sub>). The temperature and dosages are the important factors of finding the metal adsorption capacity of activated carbon. To know the chemical functional groups such as hydroxide group (-OH) and carboxyl group (C=O) are present in the activated carbon can be analysed by FTIR analysis. The pore structure analysis was examined on the basis of SEM analysis. The removal percentage for chromium at 700°C of dosage 0.15 g shows the greater adsorption capacity.

### KEYWORD:

Activated carbon, Vigna mungo husk, Adsorption, Tannery effluents, Chromium

### INTRODUCTION:

Heavy metals are toxic and detrimental water pollutant. They are toxic and non-biodegradable in nature. They cause so many ill effects in human beings and also animals and vegetation. Most cases in the field of environment studies are the removal study of heavy metal in wastewater. Therefore many researchers attempt a method and technologies for wastewater treatment. Basically some bio-sorption efficient approaches are in the heavy metal removal process. In the tannery industry tanning process started with using the chemical tannin. Mostly chromium (III) sulphate is used as a tanner. The trivalent chromium now commonly used in tanning has a lower toxicity than the hexavalent chromium. Tannery waste water pollution causes a serious health hazards to man and surroundings. During the tanning operation direct contact with chemicals can cause disability, allergy, asthma various skin diseases and permanent illness and even death. Chromium is a controversial on account of the persistent and potentially toxicity of some of its chemical forms.

N.K. Akunwa et al., (2014) describes the standard treatment methods are very precious and demanding to treat waste water from various industrial process. Sometimes wastewater may not treat properly it will cause environmental risks. Saleh and Al-Saadi, (2015); Goscińska et al.,(2016); Shu et al., (2017) discussed about the usage of activation carbon in adsorption studies plays an important role far and wide due to its cost effectiveness. A. Sharma et al., (2019) explains the importance of activation carbon to overcome the accepted methods such as ozonation, sonolysis, membrane filtration, Ion exchange, photochemical oxidation etc., Danish et al., (2013).show as there are two types of activation process takes place in practice namely physical and chemical activation. A. Abdolali et al.,(2014) carried out FTIR studies to explain while using phosphoric acid , activation carbon have an increase of some acidic functional group like C=O and O=H. This present study aims that the preparation of easily available and effective sorbents to be an activated sorption material. A known ecofriendly, cost effective and easily available Vigna mungo (Black gram husk) adsorbent is used to study the adsorption Chromium ions in the tannery effluents.

### MATERIALS AND METHODS:

#### SAMPLE COLLECTION:

Tannery Effluent is collected from Dindigul Tannery Industry. Tannery effluent was taken for the removal study of heavy metals particularly chromium present in it. Physico-chemical characteristic of tannery wastewater was showed that their high organic content leads to environmental pollution. The pH value of effluent is increased due to chemical process involved in it. The wastewater becomes very basic and affects the soil tendency cause environmental degradation.

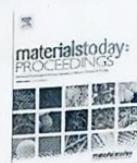
#### ACTIVATED CARBON (AC) PREPARATION:

The material used for the production of activated carbon is Vigna mungo (Black gram) husk. Among the variety of Indian food products Black gram is one of the important pulse. It is popular as "Urad dal". In Black gram dal, the outer skin is peeled off and the husk is the by-product .Black gram



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## Effectiveness of industrial waste materials used as ingredients in fly ash brick manufacturing

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### ABSTRACT

Flyash is waste industrial by-product from thermal power plants used as a raw material for Brick manufacturing. These Flyash bricks are proposed as an alternative to the conventional burnt clay bricks avoiding the consumption of clay to ease the stress on an exhaustible resource which also threatens the sustainability of our environment. But flyash as a material has its own problems as well as lot of stress on one material could lead to demand ultimately affecting the construction industry. To negate this prospect several industrial waste materials such as Ground granulated blast-furnace slag (GGBS), Granite powder (GP), Foundry sand (FS), Bottom ash (BA), Bagasse ash (BHA), Steel slag (SS), Quarry dust (QD) and Rice husk ash (RHA) which are considered environment friendly are chosen to partially replace flyash in flyash bricks. This would surely reduce the consumption of flyash thus leading to conservation. The selected industrial waste materials are replaced at 25%, 50%, 75% and 100% separately. The casted specimen along with a control specimen is tested for their compressive strength, water absorption and efflorescence. As bricks are generally compressive members and their moisture content affects both the strength and durability. Efflorescence indicate the presence of salts and water absorption shows the moisture content of the brick. Thus, the brick specimen are tested for the above-mentioned tests and the results are recorded. 100% replacement of the waste materials in FA bricks can be achieved using the mixes GGBS, GP, FS, BHA, SS and QD for safe waste disposal and use of important minerals in waste materials in view of compressive strength. Average water absorption for all the waste material mixes in bricks was lower than the limit specified in IS code. Bricks with replacement of SBA and RHA represent nil and slight efflorescence respectively. The efflorescence of FS mix bricks is nil for all the percentage replacement as the calcium oxide and ferric oxide percentages in FS is way lower than the FA Bricks. This research findings could broaden the perspective of replacement of flyash in flyash bricks and enhance their effectiveness.

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### 1. Introduction

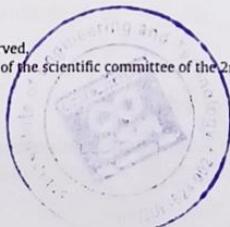
Bricks are an important construction material for almost 5000 years in human history. Bricks belong to the category of Masonry structures and remains common cost-effective way of construction even today. Brick as a construction material, didn't lose its significance like stones. Bricks are produced by burning dried hardened clay blocks. Burnt clay bricks remained a primary construction material for all ancient civilizations. Brick masonry

was considered important because of several favourable features such as its ease of construction, high durability, easy manufacturing (clay is easily available for brick manufacture), thermal properties, etc. Clay was an easily available raw material in olden times. But population burst in our society has caused a high demand which has resulted in exploitation of this resource. Additionally, the brick production process involves burning which has high carbon footprint and has become a concern as carbon emissions across the world hike and its effects have started to give profound impacts in day to day life of the people.

Alternatives to Bricks are being proposed and used for centuries and several other materials have also been in the table for years.

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# EXPERIMENTAL STUDY OF AN ECO-FRIENDLY PAVER BLOCK

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**ABSTRACT** - The aim of this project is to replace cement with plastic waste in paver block and to reduce the cost of paver block when compared to that of conventional concrete paver blocks. The degradation rate of plastic waste is also a very slow process. Hence the project is helpful in reducing plastic waste in a useful way. In this project we have used plastic waste in different proportions with fly ash, coarse aggregate. The paver blocks were prepared and tested and the results were discussed for 9 casts.

We are using LDPE plastic waste and completely replacement of cement. Adding fly ash replacement for cement. We did this to make it necessary for unwanted waste. Using round dumbbell paver block mould. The materials used in this work are fine aggregate, coarse aggregate, fly ash, plastic LDPE (Low Density Polyethylene).

**Key words :**plastic waste LDPE.

## INTRODUCTION

Paver block paving is versatile, aesthetically attractive, functional, and cost effective and requires little or no maintenance if correctly manufactured and laid. Most concrete block paving constructed in India also has performed satisfactorily but two main areas of concern are occasional failure due to excessive surface wear, and variability in the strength of block. Natural resources are depleting worldwide at the same time the generated wastes from the industry and residential area are increasing substantially. The sustainable development for construction involves the use of Non-conventional and innovative materials, and recycling of waste materials in order to compensate the lack of natural resources and to find alternative ways conserving the environment.

Plastic waste used in this work was brought from the surrounding areas. Currently about 56 lakh tonnes of plastic waste dumped in India in a year. The dumped waste pollutes the surrounding environment. As the result it affects both human beings and animals in direct and indirect ways. Hence it necessary to dispose the plastic waste properly as per the regulations provided by our government. The replacement of plastic waste for cement provides potential environmental as well as economic benefits.

With the view to investigate the behavior of quarry rock dust, recycled plastic, production of plastic paver block from the solid waste a critical review of literature was taken up. An attempt was made by Nivetha C et.al to reuse the solid waste quarry dust fly-ash and PET with an aim not to lose the strength far from original Paver blocks. From the observations of test results, PET can be reused with 50% of quarry dust and 25 % of fly-ash in Plastic Paver block. The physical and mechanical properties of materials used in Plastic Paver block were investigated. For the test 6 cubes cube were cast for measuring Compressive strength. SatishParihar et.al used recycled plastic aggregate in various proportions in concrete mix and check there stability. Amount of waste plastic being accumulated in 21st centuries has created big challenges for their disposal, thus obliging the authorities to invest in facilitating the use of waste plastic coarse aggregate in a concrete is fundamental to the booming construction industry. Three replacement levels of 10 %, 20 %, 30 by weight of aggregates were used for the preparation of the concrete. Poonam Sharma et. al. discussed about cement concrete paver blocks for rural roads. The study of Joel Santhosh and RavikantTalluri indicated that fly ash and waste glass powder can effectively be used as cement replacement without substantial change in strength.

## Materials used

Cement

Fine Aggregate, Coarse Aggregate, Fly Ash

Plastic (LDPE)

## Equipment

Paver blockmould, Metal bucket.

## OBJECTIVE AND SCOPE OF THE STUDY

- To reduce the weight of the conventional concrete.
- To increases the compressive strength of the concrete.

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## Improving Network Longevity in Wireless Sensor Networks Using an Evolutionary Optimization Approach

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**Abstract:** Several protocols strive to improve network longevity but fail to ameliorate the uneven overhead imparted upon the sensor nodes that lead to temporal deaths. The proposed work uses a metaheuristic approach that promotes load balancing and energy-efficient data transmission using the fruit fly optimization algorithm (FFOA). The approach combines the LEACH protocol with differential evolution (DE) to select an optimum cluster head in every cluster. The algorithm is designed to provide energy-efficient data transmissions based on the smell and vision foraging behavior of fruit flies. The approach considers the compactness of nodes, energy capacity, and the distance of sensor nodes from the base station and geocentric location, and other factors to select an optimal cluster head. It provides an optimal solution for the nodes in overlapping cluster heads and the energy problem that occurs due to uneven clustering. The metaheuristic approach implements multi-hop routing by finding an optimal path and allows the cluster head re-election strategy when the data transmission is intense. Simulations prove that FFOA-based LEACH increases the network lifetime through energy-efficient clustering and routing when compared with LEACH and DE-LEACH.

**Keywords:** LEACH; differential evolution; fruit fly optimization algorithm; cluster head selection; multi-hop routing

### 1 Introduction

Wireless sensor networks (WSNs) have attracted interest in recent years for many applications where human intervention is not possible. Application-oriented sensor nodes are positioned in a geographical location referred to as a sensing field to perceive the changes in the surroundings. These sensor nodes are of low cost, use less power, and have limited transmission capability. Hence, prolonging the lifetime of WSNs is a major challenge in addition to security, reliability, and scalability [1]. Balancing the energy consumption for the sensing and transmission of data can be achieved by clustering. This process organizes a set of sensor nodes, which are referred to as clusters, based on criteria like distance or



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## Transformation of Education Rooms into Smart Environments in Post Pandemic Period using IOT

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### ABSTRACT

Covid-19 pneumonia is rapidly spreading in India after America and other Western countries. Its rapidness is exponential that few of the states in India have highly been affected especially the western and southern parts. The furiousness of this pandemic has not omitted even the rural areas. Besides providing safety guidelines the government also follows mechanisms to safeguard people. The virus is asymptomatic that the spread couldn't be easily identified without testing. Due to this severity, effective classroom learning becomes a major concern. This work provides a proficient methodology during post Covid period to conduct classroom teaching through new tracking methods. The paper proposes a novel approach using Internet of Things (IoT) that can be applied in educational institutions. The work encompasses an easy tracking system of students who do not follow safety mechanisms when they are in classrooms.

#### Keywords

Covid-19 pneumonia, Internet of Things, Post Covid Classroom

### Introduction

The Covid-19 has rapidly progressed and their causes are widely proliferated. The wide spread is mainly because of over-crowding in public areas such as markets, road side shops etc., and the movement of COVID positive cases people from one place to another place. This panic situation imposed lockdown of schools, colleges and public areas. Based on an assessment of risks to education, the schools and colleges remain closed from March 2020 after the announcement from central government countrywide shutdown. The classes are now conducted through online. Online classes pave a successful alternative to provide continuing education if it has reached every target individual. Also the classes are accessible to all part of the students who own a smart phone with proper internet connectivity. These online classes face more challenges than face to face peers. Doubts clarification, special attention to specific students, behavioral maintenance is important factors missing from online class learning. Teachers, students and parents wish to reopen the educational institutions. Prolonging lockdown cannot be extended further; hence conduct of classes with safety measures is the need of the hour.

Internet of Things (IoT) endows with a solution to this existing issue. IoT enables better connectivity and promotes better information access. It aid in performing useful analysis and is considered to be a boon in technological advancements. IoT based smart classroom can aid to conduct classes in the post Covid-19 period. The approach provides a key to college return. This entire new infrastructure offer safety classroom teaching. The classrooms are structured to handle classes for about minimum strength of students. This promotes teaching and learning with existing infrastructure and available faculty requirements for all students at a time [1].

### Literature Review

Andre Gunther et. al. [2] introduced an approach to measure distance between nodes in wireless LANs using the round trip times. An extraordinary investigation was made on computing the difference in time between sending and receiving a data packet. The distance was estimated based on the delay incurred on propagation of data packets. Statistical methods were used to resolve low time resolution time issues.

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## Weather Forecast Warning System using Big Data and Naive Bayes Classification Algorithm

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### **ABSTRACT**

Weather prediction is the application of technology to predict the weather for a given location based on historical or current data as applicable. The study of changes in the weather is necessary to get numerous advantages such as saving lives, conquering risk, intensifying profits and quality of weather-based life, etc. To forecast weather, we need to analyze huge amounts of data. Huge Data helps in getting, handling and breaking down a lot of heterogeneous information from applications to infer important results. Using traditional methods to analyze the huge data has become very resource dependent. Hence big data is used in this research as a prime methodology that provides many leads for forthcoming natural disasters like heavy rainfall, thunder, tornadoes, tsunamis, etc. in advance. This research focuses on predicting the weather for a given location based on temperature, humidity and air pressure by using the data recorded from sites around it and uses a novel approach, which combines several important factors of weather data to enhance the prediction rate.

**Keywords:** Big Data, Weather forecasting, Map Reduce, Naive Bayes classification

### **1. INTRODUCTION**

Weather is the most critical for human in many aspects of life. The monitoring and forecasting of how weather temperature evolves over time in some location in the world can be beneficial for several predictions. It's difficult to process large quantum of weather data [8] in traditional data management tools as the complexity increases with increase in size of the data. In the traditional data management method, the large quantum of data [1] collected to forecast the weather may have many duplicate copies, thus makes the system complicated. The data collected from various sources are not clear in some situation. Metrological departments use different types of sensors such as temperature, humidity to get the data. And thus, processing of the data [1] in each of sensor makes it time consuming and complex.

Big Data is used to describe a collection of data that is huge in size and yet growing exponentially with time. The specific requirements for performing analysis on Big Data, a step-by-step methodology is needed to organize the activities and tasks involved with acquiring, processing, analyzing and repurposing data [8]. The existing weather monitoring systems have been developed using only micro controller devices in the past. These systems were failed to handle huge volume of data and this is the major drawback of the existing system. In our proposed research we have introduced big data which is capable of handling huge volume of structured, semi structured and unstructured data.



## A survey on the Rise of Social BOT detection techniques and Research Challenges

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### **ABSTRACT**

BOTS (software robots) have been around since the early days of computers. A social bot is a computer algorithm that automatically produces content and interacts with humans on social media, trying to emulate and possibly alter their behavior. Social bots have inhabited social media platforms for the past few years. Social bots populate techno-social systems: they are often benign, or even useful, but some are created to harm, by tampering with, manipulating, and deceiving social media users. Social bots have been used to infiltrate political discourse, manipulate the stock market, steal personal information, and spread misinformation. The detection of social bots is therefore an important research endeavor. A taxonomy of the different social bot detection systems proposed in the literature accounts for network-based techniques, crowd sourcing strategies, feature-based supervised learning, and hybrid systems. Therefore, this reveals the potential hazards of malicious social bots, reviews the detection techniques within a methodological categorization and proposes avenues for future research.

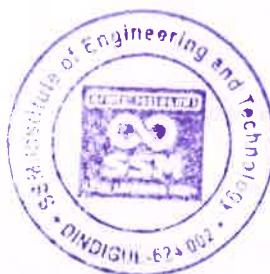
**Keywords:** Social Bot Detection, Flow based detection, Graph based detection, Feature based, Crowd sourcing.

### **1. INTRODUCTION**

With every new technology comes abuse, and social media is no exception. A second category of social bots includes malicious entities designed specifically with the purpose to harm. These bots mislead, exploit, and manipulate social media discourse with rumors, spam, malware, slander, or even just noise. This may result in several levels of damage to society. The novel challenge brought by bots is the fact they can give the false impression that some piece of information, regardless of its accuracy, is highly popular and endorsed by many, exerting an influence. Journalists, analysts, and researchers increasingly report more examples of the potential dangers brought by social bots. These include the unwarranted consequences that the widespread diffusion of bots may have on the stability of markets.

In recent years, Twitter bots have become increasingly sophisticated, making their detection more difficult. The boundary between humanlike and bot-like behavior is now fuzzier. For example, social bots can search the Web for information and media to fill their profiles, and post collected material at predetermined times, emulating the human temporal signature of content production and consumption—including circadian patterns of daily activity and temporal spikes of information generation. They can even engage in more complex types of interactions, such as entertaining conversations with other people, commenting on their posts, and answering their questions [2]. Some bots specifically aim to achieve greater influence by gathering new followers and expanding their social circles; they can search the social network for popular and influential people and follow them or capture their attention by sending them inquiries, in the hope to be noticed [3]. To acquire visibility, they can infiltrate popular discussions, generating topically appropriate and even potentially interesting content, by identifying relevant keywords and searching online for information fitting that conversation [1].

After the appropriate content is identified, the bots can automatically produce responses through natural language algorithms, possibly including references to media or links pointing to external resources [4]. Other bots aim at tampering with the identities of legitimate people: some are identity thieves, adopting slight variants of real usernames, and stealing personal information such as pictures and links. Even more advanced mechanisms can be employed; some social bots are able to “clone” the



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## A survey on Blockchain Architecture, Applications and Challenges

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### **ABSTRACT**

Over the last decade, blockchain technology has emerged to provide solutions to the complexity and privacy challenges of using distributed databases. It reduces cost for customers by eliminating intermediaries and builds trust in peer-to-peer communications. Over this time, the concept of block chain has shifted greatly due to its potential in business growth for enterprises and the rapidly evolving applications in a collaborative smart-city ecosystem, healthcare, and governance. Many platforms, with different architectures and consensus protocols, have been introduced. Consequently, it becomes challenging for an application developer to choose the right platform. In this survey, the evolution of various architectures and types of Blockchains to build collaborative applications is discussed. A classification of those architectures helping developers to choose a suitable platform for applications is also explored. In this survey, use of blockchain technology in wide applications area and its implementation challenges have been done. In this paper challenges in implementing of blockchian and its associated security and privacy issues have been discussed.

**Keywords:** Public Blockchain, Private Blockchain, Consortium Blockchain, Hybrid Blockchain, Blockchain applications.

### **1. INTRODUCTION**

Blockchain, a peer-to-peer system, enables users to maintain a ledger of transactions that is replicated and synchronized over multiple user servers [1]. The transactions are processed and verified by consensus of most of the network participants, eliminating the need for an intermediary. The transactions are packed in blocks and the blocks are chained together using a cryptographic hash to provide immutability. Since its introduction in 2008 [2], the blockchain platforms and consensus protocols have proliferated, due to the evolution of collaborative applications in smart cities, such as healthcare and governance, as well as the need for green and cost-efficient computing. Therefore, it becomes difficult for an application developer to choose the right platform.

Blockchain technology is the popular in the recent year because of its decentralized, peer to peer transaction and immutable properties. It is a digital ledger available publicly to all users present in the network. The concept is derived from Satoshi Nakamoto's 2008 [3] Bitcoin crypto currency. The different issue like anti-money laundering (AML) [4] legal and illegal mining performance [5] is associated with Bitcoin. This concept is useful to many application areas like healthcare, Internet of Things (IoT), industry, supply chain management etc. In this survey, the main focus has been given to analyze the technical implementation of Blockchain in different application area from the academic point of view as well as some recent development by different organization to apply Blockchain technique in different fields.

In the modern area, digital information flows one end to another end through an untrusted transmission channel. Here the privacy and confidentiality is a major concern. Blockchain technology provides a secure peer to peer communication. In Blockchain technology transaction are publicly available for reading but none can modify the transaction once it is recorded. Extensive literature survey has been done and it has been found that Blockchain is being used in many useful application areas. Authors in [6] specify Blockchain is a probabilistic state machine and is not useful where finality of decisions is needed. Authors in [7] explained some of the potential range of Blockchain utility and addresses how Blockchain technology can be used in different traditional databases problem.

Blockchain technology is one of the most demanding research fields but it lacks technical details to make a really implemented in almost every area. The research articles are classified in application wise. The main focus of this survey is to help developers to select the right platform architecture and





## DMEERP: A dynamic multi-hop energy efficient routing protocol for WSN



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Energy model and overhead etc

### ABSTRACT

Balancing the energy efficiency and path reliability is the biggest task in Wireless Sensor Networks (WSNs). The existing schemes fail to improve the network performance. In this research, a dynamic Multi-hop Energy Efficient Routing Protocol (DMEERP) is proposed to balance the path reliability ratio and energy consumption. It contains three sections. In first section, network model and basic assumptions were made for cluster creation and multi-hop route establishment. The Super Cluster Head (SCH) stores and maintains all records of CH and cluster members. The node activation and weight factor are estimated to obtain new cluster head if existing fails. In second section, path reliability ratio is estimated for routing the packets quickly without making more packet loss. In third section, energy model is implemented based on channel capacity model. The simulation analysis are made using network simulator (NS 2.33) in terms of packet delivery ratio, network lifetime, data flow, energy consumption, path reliability ratio, control overhead and delay etc.

### 1. Introduction

Wireless Sensor Networks (WSNs) signify a key facilitating platform for emergency and pervasive computing areas. The development of WSNs has come with the fusion of data sensing and communication. It was recently deployed for numerous applications such as object monitoring, environmental tracking [1], threat detection and so on. Including this, the usage of WSN is widely increasing in near future. In general, WSN consists of huge number of sensor nodes that are located in static manner with low energy, minimum processing and communicated with short range radio links. Since sensor nodes have minimum storage capacity, batteries and multi-function sensors to read the humidity readings, temperate values and so on. In such scenarios, sensor nodes are located in ad hoc fashion and communicated with intermediate nodes to form a network. Due to limited range of communication, the single hop communication was adopted to transfer the data.

There are three basic subsystems of WSN node i.e. processing subsystem for data processing, sensing subsystem for acquiring data and wireless communication subsystem for packet transmission. Including this, energy source is attached to sensor nodes to energy up the sensor node for doing the specific actions. It is observed that it is not possible to recharge the batteries once it is deployed for tracking and suffered from huge number of environment quantities. In the presence of all

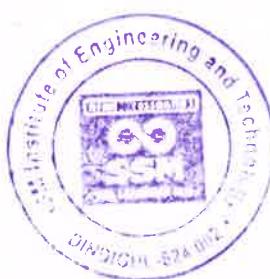
constraints, the sensor nodes are required to be designed with the basic constraints to fulfill the basic requirements for minimum duration. Based on these requirements, the WSN lifetime may be extended to prolong the lifetime of sensor nodes which can be adaptable to various applications.

If any fire or emergency situation, the data will be immediately sent to sink node by the source node. In case of fire detection [2], the energy spent is directly proportional to events held in the particular area. It is also identified that created data contains temporal and spatial correlations [3]. These correlations are exploited to make clusters based on some metrics. All sensor nodes send their data to cluster head instead of sending to sink node due to farthest location. Based on processing of data, the energy will be consumed. Instead of sending data packets periodically to sink node, data can be sent based on demand in order to save energy.

In this case, quick reply will be issued based on immediate response. Based on the requirements of applications, the energy can be saved by limiting queries due to transparent location of sensor nodes. Sensor nodes send their tracked data to sink node by finding its location instead of finding the paths to save more energy. If no tracked data is available, sensor nodes may go to idle mode. In active state, nodes may consume energy to send the data. Additionally duty cycling is added and tracked by the industries. The optimal energy savings are not possible and

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## **ELECTRONIC HEALTH RECORD SYSTEM THAT DEALS WITH UNCERTAINTY**

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### **ABSTRACT**

An Electronic Health Record (EHR) is a electronically-stored health information that is systematically assorted in a digital format. EHRs area unit period, patient-centered records that build data out there instantly and firmly to licensed users. whereas associate EHR will contain the medical and treatment histories of patients, associate EHR system is made to travel on the far side customary clinical information collected throughout a provider's workplace and may be comprehensive of a broader read of a patient's care. However most of the prevailing EHR systems has drawbacks related to the high direct acquisition prices, Security, in progress maintenance prices, and disruptions to workflows that contribute to temporary losses in productivity . The projected EHR system fulfils all of these drawbacks and conjointly focuses on key EHR functionalities, as well as computerised order entry systems, and health data exchange, clinical outcomes (e.g., improved quality, reduced medical errors), structure outcomes (e.g., monetary and operational benefits), and social group outcomes (e.g., improved ability to conduct analysis, improved population health, reduced costs). Moreover, the projected EHR system principally focuses on the Privacy and Security of the patient details and it conjointly deals with the unsure information within the system that allows the admin to observe the knowledge within the operating of the system that ultimately helps to produce a far better building.

### **1. INTRODUCTION**

An Electronic Health Record (EHR) is a electronically-stored health information that is systematically assorted in a digital format. These records will be shared across completely different health care settings. Records ar shared through network-connected, enterprise-wide data systems or alternative data networks and exchanges. EHRs might embody a spread of knowledge, as well as demographics, case history, medication and allergies, immunisation standing, laboratory check results, radiology pictures, important signs, personal statistics like age and weight, and request data.

A decade past, electronic health records (EHRs) were touted as key to increasing of quality care. Today, suppliers ar victimization information from patient records to boost quality outcomes through their care management programs. Combining multiple styles of clinical information from the system's health records has helped clinicians establish and





# FILTERING FAKE PRODUCT REVIEWS BY USING n GRAM APPROACH

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**Abstract---** As the trend to shop online is increasing day by day and more people are interested in buying the products of their needs from the online stores. This type of shopping reduces the shopping time and travelling time of the customers. Customers go to online store, search the item of their need and place the order. But, the thing by which people face difficulty in buying the products from online store leads to bad quality of the product. Customer place the order only by looking at the rating and by reading the reviews related to the particular product. Such comments of other people are the source of satisfaction for the new product buyer. Here, it may be possible that the single negative review changes the angle of the customer not to buy that product. In this situation, it might possible that this one fake review makes the loss and business. So, in order to remove this type of fake reviews and provide the users with the original reviews and rating related to the products, we proposed a Fake Product Review Monitoring and Removal System (FaRMS) which is an Intelligent Interface and takes the Uniform Resource Locator (URL) related to products of Amazon, Flipkart and Daraz and analyzes the reviews, and provides the customer with the original rating. It is a unique quality of the proposed system that it works with the three e-commerce Websites and not only analyzes the reviews in English but also the reviews written in Tamil and Hindi. The proposed work achieved the accuracy of 87% in detecting fake reviews, of written in English by using intelligent learning techniques which is greater than the accuracy of the previous systems.





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## An efficient noise immune image edge segmentation algorithm in wavelet domain

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### ABSTRACT

In image processing and computer vision, edge detection is a process which attempts to capture the significant properties of objects in the image. An edge is defined as discontinuity in gray level values of an image. Edges are predominant features in images and their analysis and detection are essential goals in computer vision and image processing. Wavelet Transform is used to segment the edge features of an image. The image edge detection using Simplified Gabor Wavelet is proposed in this paper.

**Keywords:** Edge detection, Wavelet Transform, Simplified Gabor wavelet, FOM, PSNR

### 1. INTRODUCTION

Research in automatic edge detection has been active because of this topic's wide range of applications in image processing, such as automated inspection of machine assemblies, diagnosis in medical imaging, and topographical recognition [1]. Many researchers have been working on the image edge detection using wavelet transforms and publishing their works in the past few decades. Some of the works are stated in this section. Brannock & Weeks have proposed an edge detection method based on the Discrete Wavelet Transform (DWT), which combines DWT with other methods to achieve an optimal solution to edge detection algorithm [2]. Edge analysis and detection approach using Shearlet transform is presented in [3] and it is used to extract the information about the edges and their orientations even in the presence of noise. Two corner detection methods for gray level images based on log Gabor wavelet transform have been presented by [4]. Gabor Wavelet (GW) algorithm is used to achieve edge detection of precision parts, acquires the precise edge features through a reasonable choice to directions and scales is proposed in [5] This method reduces image noise by optimizing GW filter and extracts the image edge by using wavelet multi scale transform. Simplified Gabor Wavelet (SGW) has achieved a performance level similar to the original GWs for face recognition. The computational cost and performance are better than other methods. The SGW is proposed by some other authors [1, 4, 5, 6, 7]. The computational cost of SGW based edge detection method is less than other wavelet based method. This proposed SGW method yields very good results than the conventional edge detection method and other wavelet based methods. This proposed method proves its performance for noisy images also.



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## Design and implementation of carry Look ahead generator in reversible logic using nano QCA

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### Abstract

The idea of reversible logic is another emerging architecture that has developed its ground in research area. This argument implied zero heat dissipation at the device. According to the physical laws of quantum mechanical effect and the law of coulomb the function and heat relations are satisfied. In this paper, a carry-looking generator is built using reversible logic and its QCA have been reported. To achieve the proposed design use was made of Toffoli and BJT gate. Comparing simulation outcomes to theoretical values verifies the design. The proposed model is tested and simulated using version 2.0.3 of the QCA Designer method.

**Keywords:** Quantum dot Cellular Automata (QCA); Reversible logic; Toffoli and BJT gate; QCADesigner

### 1. Introduction

A power consumption is the most difficult field in nano scale logic design. There is a growing need for a new technology that can provide less power dissipation nano size circuits. QCA provides high density applications, low power consumption and high switching speed [1]. Because of these properties quantum gates were targeted for their enabling computational reversibility functions. The computing systems' weakness of heat dissipation is the primary driving force that draws attention to reversibility. Reversible logic preserves the knowledge that is similar to energy and momentum conservation in physics.

The reversibility inherent leads to a new frame function, which results in zero heat dissipation. In QCA reversibility is one to one mapping of output inputs. Landau indicated in 1961 that the loss of one bit of information cost would be greater than the amount of  $KT\ln 2$  energy joules [2]. This indicates the irreversible processes do not maintain information and are loss-making. In addition to the strength of the theoretical definition, some essential interpretation was obtained by Bennet. The bennet clock mechanism achieves less power dissipation than the  $KT\ln 2$  switch. Reversibility is a notion that requires bijective action. It indicates both

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## DETECTION OF EPILEPTIC SEIZURE BASED ON EEG SIGNALS USING ENSEMBLE AND LSTM APPROACH

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### Abstract

Epileptic seizures are a neurological disorder which consists of immoderate and activities recurring at particular period in the brain. Clinically, diagnosing by skilful clinicians according to EEG, which is time consumption even for doctors. Therefore, the paper proposes a detection program by the major phases for performance of epileptic seizure detection and follows signal preprocessing, feature extraction and classification. EEG signals are divided into certain time and frequency features are drawn out away from one and all epoch. On the layout to assess the proposed method in which experiments are carried on publicly obtainable EEG dataset (CHB-MIT). The proposed scheme benefit from the EEG signals for enhancement by PCA and extracted discriminative feature used to name the onsets of seizure. Ensemble classifiers are used to make additional accurate solutions than single model would. The LSTM model makes use of a broad field of features extracted preceded the classification, as well as time-frequency features. The experimental outcome shows that the task of the method is competitive also performs better than some other futuristic of seizure detection on standard EEG dataset.

**Keywords:** Seizure detection, multi-domain feature, principle component analysis, Ensemble classifier, long-short term memory.

### 1. Introduction

Epilepsy is known to be nervous disorder diseases. To identify epilepsy, most famous testing tool as EEG signal are used, because of its painless, non-intrusive tool for examining multiplex manners and for supervising separate physiological circumstances of the brain. EEG is referred to be graphical data for proceeding activities of the brain between different electrodes. In this aspect, signal enhancements like principal component analysis are used largely for decreasing the proportionality and signal are enhanced by the application such as common spatial patterns which are explored less in number on detection. There

are small group of factors that exert influence on a behaviors which involved in the feature area and the availability of imbalanced labels as well as an efficient method are the main concept to design an accurate feature extraction technique as well as quality of feature set make a role on classification. LSTM networks entrenched on detection of seizure and its algorithms are enlarged by utilizing EEG datasets.

The contributions of the recommended methods are,

- I. Feature extraction based on time as well as frequency domain features.
- II. The output is classified by LSTM and Ensemble classifier.

### 2. Related work

Recently so many researchers aimed on feature extraction namely statistical, wavelet as well as fractal dimension for detection from EEG datasets and then be fused with various classifiers such as bi-spectral phase concurrence index (BSPCI) [1], artificial neural network [9], and Q-Tuned wavelet transform [3]. In EEG database, the benefits of the wavelet transform are outlined in [2] to decompose EEG signal into five frequency wavelets and to achieve overall sensitivity of 91.03%. To developed a patient-non-specific method [6] for seizure detection depending on Undecimated Wavelet Transform and also for the mean values of parameters. It established for similar accuracies in detection by making use of ELM classifier [4] with set up of nonlinear features namely entropy as well as Hurst exponent. Basing on the above mentioned observation, for EEG, the paper explored a latest feature extraction method that use multi- domain for extracting multiple channel EEG datasets and also combined with RF classifier [8]. EEG datasets are used to focus on varies algorithm for detection by an automated soft computing system. It evaluated the performance of three ensemble methods, namely, bagging [5], boosting [10], and random subspace ensembles [7]. The paper is sorted in order as: in Section II explained about the methodology used which deals with signal preprocessing, feature





# An optimized deep learning network model for EEG based seizure classification using synchronization and functional connectivity measures

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## Abstract

Epilepsy is a brain disorder related to alteration in the nervous system which affects around 65 million people among the world's population. Few works are focused on prediction of seizure relied on deep learning approaches, but the capability of optimal design has no longer been absolutely exploited. This work is focused on the seizure prediction obtained from long-short time records using optimized deep learning network model (ODLN). In this paper, the synchronization patterns and its feasibility of distinguishing the pre-ictal from inter-ictal states are examined by utilizing the interaction graph model as a functional connectivity measure. An optimized deep learning network with short- long-term memory is computed for the prediction of epileptic seizures occurrences. For, the modelling of ODLN, pre-analysis is performed with three modules and memory layers. It is finalized from these results; a two-layer ODLN is optimum to perform the epileptic seizure prediction for four different window sizes from 15 to 120 min. The assessment is implemented on the CHB-MIT Scalp EEG data set, providing 100% sensitivity and low false prediction rate ranges from 0.10 to 0.02 for seizure prediction. The proposed ODLN methodology reveals a notable increase in the performance rate of seizure prediction when compared with existing machine learning and Convolutional neural networks methods.

**Keywords** Multicast security · Multiple logical key trees · Group key management · One-way key derivation · Rekeying process · False prediction rate · Convolutional neural networks

## 1 Introduction

Epileptic's seizure is a nervous disorder of the brain which may result in sudden death, fractures, and accidents. Epilepsy can be controlled by therapeutic treatment to some extent. However, intake of antiepileptic drugs (Deckers 2003) fails to reduce the impact of seizures for about 20–30% of affected people. In these conditions, a predominant problem is feasibility of detecting the initial origin

of seizure (i.e. pre-ictal) so that to neutralize the invading seizure or confine the injuries during seizures contingency Cui. The classification can be marked out with extracted features from raw EEG signals (Ashokkumar et al. 2019). This method relies on threshold-based approaches. The most reliable predictive features comprise of measured trends from an increase or decrease in the synchronization pattern and phase locking values of EEG signals at the time of pre-ictal state and through complete seizure (Iasemidis et al. 2005).

The synchronization measures so-called, the phase lock value (PLV), the phase lag index (PLI) and the extended PLI as weighted PLI (WPLI) (Vinck et al. 2011) has been utilized. Furthermore, for capturing the real-time variation in the trends of the synchronization pattern, the modified classical indicator has been implemented namely moving average convergence or divergence (MACoD) (Appel 2005). Finally, these features are utilized for seizure prediction algorithm (Deivasigamani et al. 2020). Machine learning (ML) has transfigured the seizure prediction approach for handling the high complexity and volume of EEG data and

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# A Survey of Computer-aided diagnosis of MRI-Based Brain Tumor Detection and Classification

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**Abstract**— A Brain tumor is very meticulous diseases in the field of medical science that may leads to the deaths of affected person when it is not properly diagnosed at early stage. Detection and classification of brain tumor at right time enhances the probability of diagnostic method and treatment. As per the census, 1 out of every 1000 persons in India is subjected to have brain tumor. Brain tumors are formed due to the abnormal development of tissues inside the brain. The detection and Classification of tumor affected region of brain has been one of the most tedious process for the radiologists or clinical supervisors .Thus medical image processing approaches along with machine learning methodologies aids in diagnosis, pre-post surgical process include Computer-aided detection/diagnosis (CAD) systems to overcome the problem faced by the clinical diagnosing by enhancing the process for accurate detection and classification approaches. Magnetic Resonance Imaging (MRI), the most prudential and useful method for diagnosing the tumor. Good segmentation of brain MRI, have to provide a complete information about tumor and also classification from malignant to benign, which may be difficult due to its variation of gray intensities in tumor tissue. In order to solve the above stated problem, this review paper examines current practices, problems, and prospects of computer-aided detection and classification techniques for Brain tumor .The reason for studies on brain tumor not only helps for diagnosis purpose, also to provide a new avenue for explaining the strength and limitations of previously proposed classification techniques. The main aim of this survey paper is to clearly provide all current developments in the field of computer-aided diagnosis system for diagnosing the brain tumor and summarization of latest classification approaches and the techniques used for improving classification accuracy.

**Keywords**— Magnetic Resonance Imaging (MRI), Feature extraction, Segmentation, Classification.

## I. INTRODUCTION

A Brain tumor is one of the major causes for the increase in death among children and adults around the world. Brain tumor is a group of unnecessary and abnormal cells that grows inside of the brain which may be occupies within the skull as an intracranial lesion causes intracranial pressure [1]. Brain tumors are mainly classified as Benign (noncancerous) and Malignant (cancerous). The location of tumor can be diagnosed by means of imaging techniques used in medical field such as Computed Tomography (CT), Single-Photon Emission Computed Tomography (SPECT), Magnetic Resonance Imaging (MRI) and Magnetic Resonance Spectroscopy (MRS) which may provide a particulars about shape, size, location and gray level of brain tumors . Among various methods of diagnosis, most commonly available method is MRI, is a non-invasive *in vivo* imaging technique that uses radio frequency signals to focus the tissues that are affected under the view of magnetic field.

Magnetic Resonance Imaging (MRI) is based on emission of radio wave energy and magnet that will create an image that traces the structure, size of brain tumor and helps in treatment process accordingly [2]. In MRJ image analysis of brain, the feature extraction must be done in order to reduce the dataset volume. Segmentation is a process of splitting an image into sub images or blocks which may be similar in terms of colour, contrast, brightness, and gray level. In MRI or other medical imaging techniques ,the Brain tumor segmentation is used for separation of the tumor tissues namely as edema and necrosis from other region brain of tissues, such as gray matter(GM), white matter (WM), and cerebrospinal fluid (CSF) [3–7].

Many researches proposed various feature extraction and classification method for detecting and diagnosing brain tumor which will be depicted in the further topics. This paper outlines the various techniques which are used for detection and classification of MRI scanned images of brain tumor. Various performance comparisons of the classification of brain tumor based on MRI are also reviewed.



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# Detection and diagnosis of brain tumors-framework using extreme machine learning and CANFIS classification algorithms

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## Abstract

In this paper, brain tumors are detected and diagnosed using machine learning approaches in brain magnetic resonance imaging (MRI), which has many real time clinical applications. Noise variations in brain images are detected and removed using index filter, which is proposed in this paper. Brain images devoid of noise content are in spatial domain format, which are not suitable for further feature extraction process. Hence, there is a need for converting all the spatial pixels into multi orientation pixels. In this paper, Gabor transform is used for spatial into multi oriented image conversion. The noise filtered images are transformed into multi orientation-based brain image using Gabor transform method. Then, the hybrid features which are the integration of statistical and texture features (GLCM, gray level co-occurrence matrix, and LDP, local derivative pattern), are computed from this transformed brain image. These computed features are classified using extreme machine learning (EML) approach, which categorizes the source brain image as normal or abnormal. Then, the segmented tumor regions are diagnosed using co-active adaptive neuro fuzzy inference system (CANFIS) classifier, which classifies the segmented regions as mild or severe. The proposed tumor detection and diagnosis methods are applied and tested on the brain images which are available as open access dataset. The performance of the proposed brain tumor detection method is analyzed in terms of sensitivity, specificity, and accuracy with classification rate.

## KEY WORDS

brain, features, machine learning, transforms, tumors

## 1 | INTRODUCTION

The detection of tumor regions in brain images is done by either invasive or non-invasive method. In case of invasive method, the foreign material is inserted into the human brain, which locates the abnormal regions in the brain. This method consumes more time for the tumor region detection and also produces high pain for the patients. The blood loss is inevitable in this method.

These limitations are tolerated by proposing a non-invasive method for detecting and locating the tumor regions in the brain. This non-invasive method is based on the scanning techniques, which can be categorized into computer tomography (CT) and magnetic resonance imaging (MRI). The earlier scanning method detects the soft region tissues only as depicted in Figure 1A and hence it is not suitable for the hard tissues region such as scull of the human head. The MRI scanning method



## FUSION OF DIFFERENT MEDICAL SENSOR USING LOCAL LAPLACIAN PYRAMID TRANSFORM

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**Abstract** - The Objective of project is to enhance the quality of medical sensor images for human perception and computerized image processing. The major anxiety about different medical sensor images is not providing comprehensive and accurate information. So this project aims to overcome the problems mentioned above by introducing local Laplacian pyramid transform (LLP) and adaptive cloud model (ACM). The project is classified into three groups. First, the input images like MRI and PET are decomposed into various levels using F-LLP. Second, fusion of two different approximate images is involved using ACM. Finally, reconstruction of original image will be performed by I-LLP.

The assessment of medical image quality will be performed by different parameters like RMSE, PSNR, SD, MI and Entropy, cross entropy

**Key Words:** local laplacian pyramid transform, adaptive cloud model, image fusion.

### 1. INTRODUCTION

MULTIMODAL sensor medical image fusion is the process of merging multiple medical images from a single imaging sensing modality or multiple imaging sensor modalities with limitation information, such as low spatial resolution or lack of functional information. Multimodal sensor medical images are roughly divided into two groups: anatomical images and functional images. Anatomical images (such as magnetic resonance imaging (MRI) and computed Tomography (CT)) provide high-spatial-resolution anatomical morphology of organs, but they cannot represent functional changes in the organs. On the other hand, functional images (such as positron emission tomography (PET) and single photon emission computed tomography (SPECT)) can obtain information about the metabolism of organs. Owing to their low resolution, functional images cannot display anatomical details of organs and lesions. To overcome the defects of various imaging techniques, multimodal sensor medical image fusion methods have been proposed to construct a fused image including both anatomical and functional information.

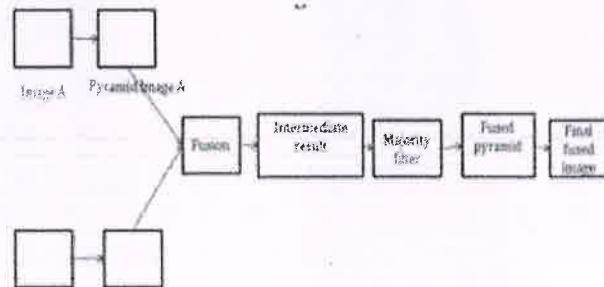
### 1.1. Pyramid Transformation

The basic idea is to construct the pyramid transform of the fused image from the pyramid transforms of the source images and then fused image is obtained by taking inverse pyramid transform. Here are some advantages of pyramid transform:

1. It can provide information on the sharp contrast changes and human visual system is especially sensitive to these sharp contrast changes.
2. It can provide both spatial and frequency domain localization Several types of pyramid decomposition are used or developed for image fusion such as

- Laplacian Pyramid
- Ratio of low pass pyramid
- Gradient Pyramid

A Laplacian Pyramid Image pyramid is a multiresolution analysis model. The Laplacian Pyramid implements a pattern selective approaches to image fusion, so that the composite image is constructed not a pixel at a time.. The basic idea is to perform a pyramid decomposition on each source image then integrate all these decomposition to form a composite representation and finally reconstruct the fused image by performing an inverse pyramid transform. Schematic diagram of the Laplacian Pyramid fusion method is shown in figure



Laplacian Pyramid used several modes of combination such as selection or averaging. In the first one the combination process selects the component pattern from the source and copies it to the composite pyramid, while discarding the fewer patterns. In the second one, the process averages the sources patterns.

## STACK BASED CONFIGURABLE LOGIC GATES TECHNOLOGY FOR IP CORES

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\*\*\*

**Abstract** - Nowadays Logic locking is a promising proactive defense strategy against intellectual property (IP) piracy, counterfeiting, hardware Trojans, reverse engineering, and overbuilding attacks. Logic encryption is also preventing the hardware Trojans insertion which has the entire design is no longer known to an adversary and also making it more difficult to insert a Trojan without causing unintended actions which is more readily detected. To provide a method to increase IC security against a multitude of threats in combinational logic encryption, the current logic encryption techniques has a high usage of power, and area. In this paper, a novel gate level implementation of logic encryption is proposed which is significantly reduces the per-gate overhead of encrypting a gate. Logic encryption method is presented for enhancing security against such threats. In this paper, a novel stack based configurable gate level logic encryption technique is presented with reduced per-gate overheads significantly. The proposed technique also expands the search space of a key sequence and also by increasing the difficulty for an adversary to extract the key value. The proposed technique has been implemented with the comparison of benchmark circuits and also results as a minimum overhead of area and delay increment.

**Key Words:** Encryption, stack, key gate

### 1. INTRODUCTION

Due to the drastic increase of complexity in IC fabrication and/or maintaining a foundry with advanced manufacturing capabilities, many semiconductor companies are becoming fabless. Such companies designed integrated circuits (IC) and send the IC's to an advanced foundry, which is usually an off-shore manufacturing. Criticality of recent trend has forced companies to buy several IC intellectual property (IP) blocks to use it in their systems-on-chip and overall the IP blocks are distributed worldwide.

Globalization of the IC design industry has led to different kinds of hardware attacks. An attacker can reverse engineer the functionality of an IC/IP and then steal and claim ownership of the IP. Some of the unauthorized IC fabrication company may also overbuild ICs and sell the IC illegally. Finally, the unwanted circuits may insert malicious

circuits into the design without the knowledge of designer. Therefore, the semiconductor industry loses \$4 billion annually due to the attacks. Such attacks have led IP and IC designers to re-evaluate in hardware's trust.

Each and every IC/IP designer has an additional responsibility to protect an individual design. If a designer is able to cover the IC's functionality while it passes through the different, potentially untrustworthy design flow, these attacks can be thwarted. To overcome these issues, the logic encryption concept is proposed. Logic encryption is the process of hiding the functionality and the implementation of a hardware design by inserting some additional gates called *key-gates* into the original design. In order to find a correct functionality, the valid key has to be supplied to the encrypted design. By applying a wrong key, the encrypted design will produce wrong outputs.

In this paper, the NAND/NOR stack based logic encryption is proposed to reduces the area, power, and performance overheads of utilizing the stack-based approach. This paper is structured as follow: Section II illustrated the literature survey based on proposed approach. In section III presented a preliminaries approach based on logic locking methodology. Section IV presented the experimental results and discussions and section V concluded the paper.

### II. LITERATURE SURVEY

Yingjie Lao et al [1] presented an approach to design obfuscated circuits for digital signal processing (DSP) applications using high-level transformations, a key-based obfuscating finite-state machine (FSM), and a reconfigurator.

Lannanluo et al [2] proposed a binary-oriented, obfuscation-resilient binary code similarity comparison method based on a new concept, longest common subsequence of semantically equivalent basic blocks, which combines rigorous program semantics with longest common subsequence based fuzzy matching.



## FAKE NEWS DETECTION USING DEEP LEARNING

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\*\*\*

**Abstract** - Due to the exponential growth of information online, it is becoming impossible to decipher the true from the false. Thus, this leads to the problem of fake news. This research considers previous and current methods for fake news detection in textual formats while detailing how and why fake news exists in the first place. This paper includes a discussion on Linguistic Cue and Network Analysis approaches, and proposes a three-part method using Naïve Bayes Classifier, Support Vector Machines, and Semantic Analysis as an accurate way to detect fake news on social media. This Project comes up with the applications of NLP (Natural Language Processing) techniques for detecting the 'fake news', that is, misleading news stories that comes from the non-reputable sources. Only by building a model based on a count vectorizer (using word tallies) or a (Term Frequency Inverse Document Frequency) tfidf matrix, (word tallies relative to how often they're used in other articles in your dataset) can only get you so far. But these models do not consider the important qualities like word ordering and context. It is very possible that two articles that are similar in their word count will be completely different in their meaning. The data science community has responded by taking actions against the problem. There is a Kaggle competition called as the "Fake News Challenge" and Facebook is employing AI to filter fake news stories out of users' feeds. Combating the fake news is a classic text classification project with a straight forward proposition. Is it possible for you to build a model that can differentiate between "Real" news and "Fake" news? So a proposed work on assembling a dataset of both fake and real news and employ a Naïve Bayes classifier in order to create a model to classify an article into fake or real based on its words and phrases.

### 1. INTRODUCTION

These days' fake news is creating different issues from sarcastic articles to a fabricated news and plan government propaganda in some outlets. Fake news and lack of trust in the media are growing problems with huge ramifications in our society. Obviously, a purposely misleading story is "fake news" but lately blathering social media's discourse is changing its definition. Some of them now use the term to dismiss the facts counter to their preferred viewpoints. The importance of disinformation within American political discourse was the subject of weighty attention, particularly following the American president election. The term 'fake news' became common parlance for the issue, particularly to

describe factually incorrect and misleading articles published mostly for the purpose of making money through page views. In this paper, it is seeked to produce a model that can accurately predict the likelihood that a given article is fake news. Facebook has been at the epicenter of much critique following media attention. They have already implemented a feature to flag fake news on the site when a user sees it; they have also said publicly they are working on to distinguish these articles in an automated way. Certainly, it is not an easy task. A given algorithm must be politically unbiased – since fake news exists on both ends of the spectrum – and also give equal balance to legitimate news sources on either end of the spectrum. In addition, the question of legitimacy is a difficult one. However, in order to solve this problem, it is necessary to have an understanding on what Fake News is. Later, it is needed to look into how the techniques in the fields of machine learning, natural language processing help us to detect fake news.

Fake news denotes a type of yellow press which intentionally presents misinformation or hoaxes spreading through both traditional print news media and recent online social media. Fake news has been existing for a long time, since the "Great moon hoax" published

In 1835 [1]. In recent years, due to the booming developments of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. With deceptive words, online social network users can get infected by these online fake news easily, which has brought about tremendous effects on the offline society already. During the 2016 US president election, various kinds of fake news about the candidates widely spread in the online social networks, which may have a significant effect on the election results. According to a post-election statistical report [4], online social networks account for more than 41.8% of the fake news data traffic in the election, which is much greater than the data traffic shares of both, traditional TV/radio/print medium and online search engines respectively.

An important goal in improving the trustworthiness of information in online social networks is to identify the fake news timely, which will be the main tasks studied in this paper. Fake news has significant differences compared with traditional suspicious information, like spams [70], [71], [20], [3], in various aspects: (1) impact on society: spams



## AN CNN BASED ROBUST IRIS SEGMENTATION

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**Abstract:** CNN-based iris segmentation have been demonstrated to be better than customary iris segmentation procedures regarding segmentation error measurements. To appropriately use them in customary biometric recognition frameworks requires a definition of the iris, in view of the created segmentation, to get the standardized iris surface commonly utilized for highlight extraction. This is an unsolved issue. We will acquaint a strategy with define CNN based segmentation, overcoming any issues between CNN based segmentation and the elastic sheet-transform. The definition empowers the CNN segmentation as full step in any ordinary iris biometric framework, or on the other hand the segmentation can be used as a commotion veil for other division techniques. Both of these alternatives will be assessed.

**Keywords:** Iris Recognition Framework, CNN, segmentation.

### I INTRODUCTION

Biometrics is computerized techniques for recognizing an individual or confirming the personality of an individual dependent on a physiological or social trademark. Biometric-based confirmation is the programmed personality check, in light of individual physiological or social attributes, for example, fingerprints, voice, face and iris. Since biometrics is very hard to produce and can't be overlooked or taken, Biometric confirmation offers a helpful, precise, vital and high secure option for a person, which makes it has

preferences over conventional cryptography-based validation plans.

The need of individual identification proof has increment a great deal during ongoing occasions. As biometric procedure, iris recognition is getting inclination over different techniques and has drawn incredible consideration of researchers on account of uniqueness, non-obtrusiveness and security of human iris designs. Such huge numbers of business frameworks have been created to treat the eye pictures and perform distinguishing proof or confirmation techniques, since the principal programmed iris acknowledgment framework was proposed by J. Daugman in 1993. Daugman's and Wildes approaches wait the most huge and recognized among the greater part of the perceived iris recognition frameworks. The utilization of various image acquisition and iris segmentation strategies gives it a few preferences in certain angles over Daugman's framework .Almost all different procedures that have been proposed since were created utilizing the fundamental advances delineated in the spearheading work of Daugman and Wildes. The first methodology of Daugman started a significant number of the new examination headways just as business items.

A commonplace iris recognition method comprises of four stages: standardization, segmentation, feature extraction and classification. Unessential parts, for example, student, sclera and eyelids are available alongside the iris. The segmentation procedure



21 August 2020

# Efficient majority logic subtractor design using multilayer crossover in quantum-dot cellular automata

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## Abstract

Quantum-dot cellular automata (QCA) is a potential upcoming nanotechnology for designing digital circuits with high performance. A subtractor is an important arithmetic circuit used in many digital circuits. An efficient multilayer full subtractor design is proposed using majority logic in QCA. The proposed design has only 53 cells and occupies a small area of about  $0.03 \mu\text{m}^2$ . Using the proposed subtractor, a 4-bit ripple borrow subtractor with 256 cells and an area of about  $0.20 \mu\text{m}^2$  is realized. Verification and simulation are done using QCADesigner. Defect analysis is also done for the proposed subtractor. Energy dissipation of the proposed designs is done using QCADesignerE tool.

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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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# APPLICATION OF SEMANTIC SEGMENTATION NETWORKING BASED SEGMENTATION AND GOOGLENET CNN FOR MRI IMAGES OF BRAIN TUMOR

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**ABSTRACT:** In the medical field, BRAIN Tumor Segmentation is a quite challenging task due to different types of tumor appearances and also owing to alter characteristics like locality, and contrast. BRAIN cancer is generally diagnosed by a specialist called a neurologist. Imaging tests which are performed using a Magnetic Resonance Imaging (MRI) and Computed Tomography Scan uses computer technology to produce detailed pictures of the BRAIN. During the last decade, MRI was used to identify the BRAIN abnormality, to determine the location and size of the tissues. The segmentation process of medical image separates the image into a non-overlapped, consistent region, which is homogeneous according to the properties like intensity, color and texture. The property of segmentation is to make partitions in image which consist of complex in nature into a series of non overlapping and constituents based on some characteristic features such as shape, gray level, color, texture and size. Accurate segmentation of brain tumor is an indispensable component for cancer diagnosis and treatment. To improve the tumor detection and identify the tumor accurately with less execution time and also a multi-objective classification scheme Semantic segmentation networking based segmentation and GoogLeNet CNN is applied for classifying the BRAIN tumor.

**KEYWORDS :** Magnetic Resonance Imaging, GoogLeNet, CNN, Segmentation, Tumor

## I. INTRODUCTION

One of the most common Brain diseases is Tumor. The diagnosis and treatment of this Brain disease have become a significant factor for more than 4 lack people per year in the world (as per the World Health Organization (WHO) estimate). In recent years, developments in medical imaging techniques are helping us in many dominions of medicine. Computer Aided pathological diagnosis, planning the surgical procedures and treatment and time series examinations.

Brain cancer has been identified as on the deadliest and adamant one. These tumors can be found in many areas of the Brain that are important to run the body's important tasks. The tumor cells spread to other parts of the Brain and create extra tumors that are very small to diagnose with the normal imaging techniques. Sometimes, it is difficult to diagnose the Brain cancers location and this makes it difficult to cure in those patients who have to suffer with this disease. In recent years, the number of cancer cases has increased compared to previous years. In primary stage of the tumor, it is difficult to recognize. Once it is diagnosed, the course of treatment like radiation, chemotherapy etc. can be planned but late diagnosis of tumor is fatal for the patients. Usually the symptoms of infections in Cancer is found little late, but Computer Supported Technology in diagnosing the tumor has been a wonderful step in medicine, like already applied in Neuro surgery.

## II. PROBLEM STATEMENT

This research study on cloud storage retrieval and tumor of Brain aims at effective usage of advanced technology for medical related problems and also to discuss the upcoming developments and methodologies in the field of cloud storage. Some likely to happen problems in cloud storage retrieval and Brain tumor segmentation are i) High security and less computation cost of the auditor in a multi user setting is provided by



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## DLDM: Deep learning-based defense mechanism for denial of service attacks in wireless sensor networks

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### ABSTRACT

Wireless Sensor Networks (WSNs) include small battery-based self-governing devices that are deployed in a distributed manner to supervise the environmental or physical circumstances. The routers and gateways are connected to the deployed nodes to support many real-time applications. Due to open access, the security issue arises in WSN. In this circumstance, the external users can be verified by securing authentication is necessary one. In real-time applications, to achieve secured communication they have made many lightweight authentication mechanisms. But WSNs are highly susceptible to DoS attacks as it lacks the synchronization between nodes during data routing. In this paper, a new lightweight DoS detection scheme Deep Learning-based Defense Mechanism (DLDM) has proposed to detect and isolate the attacks in Data Forwarding Phase (DFP). This paper describes the new algorithm for the successful detection of DoS attacks, such as exhaustion, jamming, homing, and flooding. We conduct extensive simulation experiments that can accurately isolate the adversaries and it is more resilient to DoS attacks. Our proposed simulation result shows that it can achieve a high detection rate, throughput, packet delivery ratio, and accuracy. This also reduces the energy consumption and the false alarm rate.

### 1.

In recent times, the Wireless Sensor Networks (WSNs) have introduced the broad series of applications and serves a major role in the current research domain. Information technology was developed; it recently became a primary component of the Internet of Things (IoT) [4, 26,37]. The WSNs spatially includes distributed small-sized low power sensor devices with the wireless radio transceiver to sense the various physical phenomena and collect the data in all types of environments. The WSNs could adapt to an extreme environment when the other wired and wireless networks (e.g. WLAN) are compared. The collection of data and establishing communication between one of the sink nodes of the base stations are involved [1,36,41]. So they are widely used in many civilian applications but are not limited to: the wild habitat monitoring [5], forest fire detection, real-time industrial monitoring and automation [3], building safety monitoring, traffic surveillance and control [2], constant health monitoring [6], military surveillance [7] and so on.

Due to their limited capabilities, random deployment, and unattended operations, the sensor nodes are liable to a different attack and having their security compromised in a severe environment like

adversary areas [8,32]. During the deployment of WSN in the hostile region in which the sensor nodes are physically captured and manipulated, WSNs are particularly susceptible to DoS Attacks [9,33].

The network's capacity is diminished or eliminated and the termination of the usual communications by flooding a network with mass "useless" information is depleted by Denial of Services Attacks (DoS) [29]. DoS attacks in WSNs are generally different when compared with other wired and wireless networks. Almost every layer in WSNs is exposed to the variety of DoS attacks and it has varied attack techniques [9] which is illustrated in Table 1. There are many concepts developed to maintain the network from a DoS attack. A taxonomic analysis of wireless network jamming threats, how the DoS attacks targeting the different OSI layers of the WSN and their defensive strategies as described in [19].

The misbehaving nodes are usually identified by Watchdog based schemes and path rater is used to reroute without malicious nodes [11]. In the Reputation Rating scheme [12], the selfish nodes can be identified according to the function of neighbors of a single node such as energy consumption and packet forwarding.

The localization in WSN is achieved by Beacon-based algorithms or

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# Defense Countermeasures for DoS Attacks in WSNs Using Deep Radial Basis Networks

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## Abstract

Wireless sensor networks (WSNs) are inclusive of tiny sized battery dependent autonomous gadgets which are deployed in the decentralized manner in order to monitor physical conditions. Deployed nodes are connected with routers and gateways to support much kind of real-time applications. In the prevailing open access situation, to secure authentication, nodes can be verified by securing authentication. To achieve secured communication, in real-time applications, many lightweight authentication mechanisms are introduced. But owing to lack of synchronization, WSNs become highly susceptible to DoS attacks. Deep learning based Radial basis networks have been proposed in this paper for detection and isolation of attacks. In this article DRBN algorithm is described for efficient detection of DoS attacks, such as exhaustion, jamming, flooding and so on. Extensive modeling tests are carried out in order to reliably isolate the malicious nodes, and they are discovered to be more resistant to DoS attacks. Apart from a decrease in energy consumption and FPR of 2.8%, the proposed simulation result reveals that 94.6% detection rate and 98% accuracy can be achieved.

**Keywords** Countermeasures · Dynamic key management · Deep learning · Radial basis function · Wireless sensor networks

## 1 Introduction

Recently, an extensive series of applications has been introduced by WSNs which play a important role in current research. The Internet of Things (IoT) [1] has recently been a major component of information technology. WSNs are spatially dispersed tiny-sized minimal energy sensors with a transceiver that detect a variety of phenomenon and gather information in a variety of scenarios. In comparison to other wired and wireless networks, WSNs can respond to a difficult environment (e.g. WLAN). It entails data processing and

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# AN EFFICIENT DISTRIBUTED DENIAL OF SERVICE ATTACK DETECTION APPROACH BASED ON SET OF CLASSIFICATION ALGORITHMS USING SPARK

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**ABSTRACT:** Distributed Denial of Service (DDOS) attacks pose a serious privacy challenge to conventional or cloud computing services being made public. Innumerable DDOS attacks, waged during the last decade against different agencies, had a major impact on both producers and users. Through integrating classification algorithms with distributed computation, numerous analysts have sought to resolve the security concern of DDOS attacks. Our formulations are therefore rigid in terms of the classification algorithms used. However, modern DDOS threats have been so dynamic and sophisticated that they can bypass the monitoring programme, while rendering it challenging to spot static solutions. We suggest a versatile intrusion detection mechanism centered on three key aspects in this paper: classification algorithms, a distributed method, and a fuzzy logic System. To efficiently pick an algorithm from a set of prepared classification algorithms that diagnose various DDOS trends, our model uses fuzzy logic. We use as candidate algorithms Logistic Regression, Naive Bayes, Gradient Boosting Decision Tree, Random Forest and Hybrid IDS from among the other candidate classification algorithms. We examined the reliability and delays of classification algorithms, and reviewed the fuzzy logic model. We have analyzed the feasibility of the distributed network and its consequence on the delay in classification algorithms. The results reveal a trade-off between the accuracy level of the classification algorithms used and their delays.

**KEYWORDS:** DDOS Attack, DDOS Detection, Machine learning, Classification algorithms, hybrid IDS

## I. INTRODUCTION

Distributed Denial of Service (DDOS) is a security breach that does not render resources accessible, or just partial. The primary priority of a DDOS attack is to expel the network with a high volume of traffic, thereby disputing legitimate users access to services. There have been countless DDOS attacks against Various entities over the last decade have culminated over depletion of income as well as rising security costs System Accessibility [1]. DDOS attacks have been so complex and multifaceted nowadays in that they deployed in a multitude of ways, rendering it tough to identify static solutions [2]. Lots of studies intended at detecting and preventing DDOS attacks incorporating classification algorithms [3–7] and distributed systems [8–10] have been undertaken. However, existing research has many problems, including the performance of the detection system, that is, the success in detecting a DDOS attack, computation cost of detection, as well as the ability to deal with large amounts of data. Therefore, a new method is required for dynamic tracking of DDOS attacks, for effective handling of dynamic DDOS attack trends and massive quantity of data. No DDOS detection method relies on the power of integrating N classification algorithms, distributed system strategy and a fuzzy logic approach to the best of our understanding, and also able to dynamically adjust itself. Within this work, by integrating these guiding criteria, we recommend a reactive DDOS attack detection method: classification algorithms that are operated in a distributed network and driven by a fuzzy logic system. The innovative aspect of this work is the convergence of the three conceptions of classification algorithms, distributed systems, and a fuzzy logic method. Although our process serves N classification algorithms, we included five classification algorithms, namely Logistic Regression, Naive Bayes, Gradient Boosting Decision Tree, Random Forest and Hybrid IDS, for evaluation purposes. Classification algorithms use to recognize the retrieved traffic packets. Choosing these classification algorithms based on a variety of criteria: classification precision, model training period, and classification feature disparities. On the other flip side, the distributed system is based on the framework of Apache Spark and the Hadoop Distributed File System (HDFS), in which they can be provisioned



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## A Novel Approach Based on Eigen Vector Methods and Hybrid BOA-SVM optimization Techniques for the Classification of Epileptic Seizure

**S.Anupallavi , G MohanBabu , S.R Ashokkumar, M.Premkumar, V.Jeevanantham**

### Abstract

The most common neurological disease of the human brain is known as epilepsy. It affects the nervous system of brain which shows the impact on an individual life because of its repetitious occurrences of seizure. Seizure causes a mild or severe electrical activity variation in the brain which in turns distorts the cortical region of the brain and causes fatigue, unconsciousness, spasms in muscles etc. The most widely used diagnostic method for epilepsy is Electroencephalography (EEG) signals. A novel approach developed on the implementation of a hybrid model along with Eigen Vector Method (EVM) is presented for the classification of epileptic seizure. In this work, combination of eigen vector methods namely Pisarenko's method, MUSIC method, and Minimum-Norm methods are implemented to obtain the features. Then, the obtained features are optimized with Bat Optimization Algorithm combined with support vector machine. The classification accuracy of 99.42% is achieved which implies that the eigen vector method and hybrid optimization method provides high classification accuracies. The main aim of this research work is to use bat algorithm to implement a novel approach, called BOA-SVM, for tuning the SVM parameters to increase the performance metrics of the classification output.

**Keywords-** Eigen vector methods (EVM); Electroencephalogram (EEG) signals; Bat Optimization Algorithms (BOA); Support vector machine (SVM); Classification.





# Implementation of deep neural networks for classifying electroencephalogram signal using fractional S-transform for epileptic seizure detection

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## Abstract

Epilepsy is one of the most common neurological diseases of the human brain. It affects the nervous system of brain which shows the impact on an individual's life because of its repetitious occurrences of seizure. Epileptic detection using automatic learning is essential to reduce the substantial work on reviewing continuous electroencephalogram (EEG) signal in spatial and temporal dimensions. A novel methodology is implemented on EEG signals for the detection of epileptic seizure with the combination of fractional S-transform (FST) and entropies along with deep convolutional neural networks (CNN). The original EEG signals are preprocessed with discrete wavelet transform to generate Daubechies-4 (Db4) wavelets. FST is enacted on every segment of the preprocessed signal for time-frequency representation and the features are obtained through entropies. Afterwards, a 15-layer deep CNN with dropout layer and soft-max is used for classification. The experimental results showed that the singular value decomposition entropy are more stable and deep CNN models always performed better for this entropy. A specificity of 98.70%, sensitivity of 97.71%, and accuracy of 99.70% are achieved for the multichannel segment.

## KEY WORDS

deep neural networks, electroencephalogram, entropy, epilepsy, fractional S-transform

## 1 | INTRODUCTION

Epilepsy is a common cerebral brain disorder affecting people at all ages. Abnormal neural exertion in the brain prompts recurrent seizures to occur and affects the sensory system in the human body. The World Health Organization acknowledges that about 50 million people are falling victim to epilepsy worldwide and an additional 2.5 million people are detected with epileptic seizure (ES) every year. Electroencephalogram (EEG) usually measures seizure activity because it represents electrophysiological disorders in the brain at a given time and is

widely used for diagnosis because of its low cost. Enhancement of EEG signal to analyze physical and prophylactic data helps the patients to know the progress of epileptic treatment. Clinicians usually test EEG signals for three types of activity, they are normal EEG signal activity of healthy persons with open or closed eyes, seizure free (inter-ictal) conditions which may contain short spikes and seizure (ictal) EEG conditions containing sudden spikes.

Generally speaking, EEG recordings are long (hours to days) and it contains an enormous amount of patient data collected. Such recordings are difficult to inspect



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## Paddy Leaf Disease Detection Using an Optimized Deep Neural Network

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**Abstract:** Precision Agriculture is a concept of farm management which makes use of IoT and networking concepts to improve the crop. Plant diseases are one of the underlying causes in the decrease in the number of quantity and quality of the farming crops. Recognition of diseases from the plant images is an active research topic which makes use of machine learning (ML) approaches. A novel deep neural network (DNN) classification model is proposed for the identification of paddy leaf disease using plant image data. Classification errors were minimized by optimizing weights and biases in the DNN model using a crow search algorithm (CSA) during both the standard pre-training and fine-tuning processes. This DNN-CSA architecture enables the use of simplistic statistical learning techniques with a decreased computational workload, ensuring high classification accuracy. Paddy leaf images were first preprocessed, and the areas indicative of disease were initially extracted using a  $k$ -means clustering method. Thresholding was then applied to eliminate regions not indicative of disease. Next, a set of features were extracted from the previously isolated diseased regions. Finally, the classification accuracy and efficiency of the proposed DNN-CSA model were verified experimentally and shown to be superior to a support vector machine with multiple cross-fold validations.

**Keywords:** Leaf classification; paddy leaf; deep learning; metaheuristics optimization; crow search algorithm



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# SOECS: Scheduling based Optimal Energy Clustering Scheme for WSN

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**Abstract:** Balancing the energy consumption and location accuracy is one of the critical tasks in WSN. Energy consumption of sensor nodes is measured in terms of route discovery, packet forwarding and data transmission. In this research work, it is proposed that scheduling based Optimal Energy Clustering Scheme (SOECS) to attain the maximum location accuracy and energy efficiency during route maintenance. It consists of three phases. In first phase, the node deployment is done using Gaussian distribution function to route the packets effectively. In second phase, Cluster heads are chosen and energy is estimated for optimal cluster heads. In third phase, TDMA scheduling algorithm is introduced to improve the energy efficiency using stable routes and scheduling table. The work is evaluated using network simulation tool. The proposed scheme produces high performance than existing schemes.

**Keywords:** Gaussian random distribution function, node deployment, energy efficiency, network lifetime, location accuracy and TDMA scheduling.

## 1. Introduction

In past few decades, Wireless Sensor Networks (WSN) plays a vital role in wireless network and growth of WSN rises rapidly. The wider detection range and flexibility was provided effectively due to radio waves and sensor nodes. The real time environment changes are detected by sensor nodes [1]. The data gathering process is done by the sensor nodes and data aggregation is implemented to save the energy. Energy efficiency is the major issue in WSN and the consumption of energy can be measured based on various applications [2].

## 2. Previous Work

The distributed optimization issue for the energy of wireless sensor network. The nodes or the players completed the iterative solution to increase the energy utilization rate. Meanwhile the energy of WSN was improved with the new revenue model. Individual constraints were converted into players to provide better energy [3].

An energy efficient chain cluster based intelligent routing algorithm to extend the network lifetime [4]. The load distribution was enhanced with routing algorithm to improve network performance and energy efficiency. The Power Energy Gathering in Sensor Information Systems protocol and Ant Colony Optimization were integrated together to find the optimal chain in order to reduce the data redundancy , distance between intermediate nodes and delay of data transmission through longer length links.

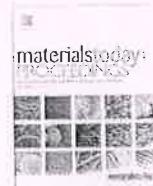
The cluster head selection method was adopted to reduce the energy wastage on packet transmission during data communication [5]. The time division multiple access schedule was adopted to optimize the energy consumption. The progression of cluster head movement, energy conservation and packets transmission to the base station were monitored with LEACH protocol. In initial phase of the algorithm, stable cluster head was chosen to route the packets effectively.

Enhanced set of optimization rule with LEACH routing protocol to improve energy efficiency [6]. The concept of Particle Swarm Optimization algorithm was adopted to provide optimized clusters. The major inputs were the fitness functions, set of rules and residual energy estimation. The special CH was chosen based on average cluster energy, replacement of CH with least value of fitness function and hub density distribution.

<http://annalsofrscb>.



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## SCEER: Secure cluster based efficient energy routing scheme for wireless sensor networks

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### ABSTRACT

Balancing network integrity and energy efficiency is the one of major tasks in the network. In existing schemes, it is failed to balance both the metrics. In this research work, the Secure cluster based efficient energy routing is adopted to attain the more network lifetime. In first phase of the research, network and routing assumptions are made to initialize the effective packet transmission. In second phase, stability metric is determined for the cluster to maximize the energy efficiency. There are two cluster metrics used for the analysis of network stability. In third phase, the optimal cluster design model is initialized to balance the network integrity and energy efficiency. The proposed scheme is evaluated with network simulation tool in terms of node stability ratio, node reliability ratio, network lifetime, packet delay and energy efficiency.

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### 1. Introduction

Wireless Sensor Network contains the huge number of nodes that forms a high density networks. A collection of sensor nodes formed together to create network which can be adopted for various applications such as target tracking, malicious detection, smart network routing and so on. Only scarce amount of resources are spent by the nodes in the network. It is difficult to increase the energy of the resources due to unattended nature of sensor network. The least amount of energy is spent in the sensor network for energy management; hence it is required to design the secure energy efficient routing with least energy consumption and more network lifetime.

In this research work, it is decided to create an energy efficient protocol with security. The optimal cluster design model is adopted to balance the network integrity and energy efficiency.

### 2. Related works

Vinodhini and Gomathy [1] designed a dynamic multi-hop routing protocol for wireless sensor networks to choose the cluster head and to improve the network lifetime. The single hop communication was done to reduce the network traffic. The network lifetime was improved using multi-hop packet transmission. The energy consumption was dramatically using multi-hop communication. Balancing between power consumption and delay was done using the multi-hop routing protocol.

Varun and Gangwar [2] surveyed the energy efficient routing protocols for wireless sensor networks. Sensor nodes consumed more energy for data transmission. The components were switched off for a particular point of period. Various energy efficient techniques were analysed and challenging issues were also identified to reduce the energy drain ratios.

Ariubrakan and Sundari [3] advanced the protocol primarily based totally on multicast routing to enhance the packet transport ratio and bandwidth and to lessen the delay. In the wi-fi community environment, sensor nodes had been deployed. The wide variety of nodes turned into participated in multi-hop communiqué. The supply node sends facts to sink node primarily based totally on hop distance and multi-hop bandwidth. The replica course

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# An Intelligent Particle Swarm Optimization with Convolutional Neural Network for Diabetic Retinopathy Classification Model

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Abstract    References    Citations    Supplementary Data    Suggestions

Diabetic retinopathy (DR), a major cause of vision loss and it raises a major issue among diabetes people. DR considerably affect the financial condition of the society specially in medicinal sector. Once proper treatment is given to the DR patients, roughly 90% of patients can be saved from vision loss. So, it is needed to develop a DR classification model for classifying the stages and severity level of DR to offer better treatment. This article develops a novel Particle Swarm Optimization (PSO) algorithm based Convolutional Neural Network (CNN) Model called PSO-CNN model to detect and classify DR from the color fundus images. The proposed PSO-CNN model comprises three stages namely preprocessing, feature extraction and classification. Initially, preprocessing is carried out as a noise removal process to discard the noise present in the input image. Then, feature extraction process using PSO-CNN model is applied to extract the useful subset of features. Finally, the filtered features are given as input to the decision tree (DT) model for classifying the set of DR images. The simulation of the PSO-CNN model takes place using a benchmark DR database and the experimental outcome stated that the PSO-CNN model has outperformed all the compared methods in a significant way. The outcome of the simulation process indicated that the PSO-CNN model has offered maximum results.

Keywords: Classification; Diabetic Retinopathy; Grading; Messidor; Transfer Learning

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# Investigation of AODV and DSR directing convention in remote systems

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**Abstract:** In this paper, we are utilizing assortment of information progressively to inquire about for government managed savings; we are making an impermanent system utilizing conventions to show signs of improvement execution (delay, organize size, portability) to accomplish proficient yield. In this security issues we are proposed Ad-hoc system to explaining basic security necessities for explicit plans. Execution impedance can be concentrated with a re-enactment model with MAC and physical layer. The On-request conventions, Ad-hoc On-Demand Distance Vector Routing (AODV) and Dynamic Source Routing (DSR) perform better than the table-driven DSDV convention. In spite of the fact that DSR and AODV share comparative on-request execution, the distinctions in the convention mechanics can prompt critical execution differentials. A variety of outstanding task at hand and situations, as described by versatility, burden and size of the impromptu system were mimicked. The exhibition are assessed and thought about as far as Packet Delivery Ratio (PDR), normal throughput, deferral and complete vitality. Our goal is to gauge the presentation of directing model for city situation. The principle objective is to locate the appropriate directing convention in a high thickness.

## I. INTRODUCTION

In an advert hoc network, conversation among the nodes is feasible with the multi-hop wireless hyperlinks present in the community. Every node inside the community will serve as a router, forwarding facts packets for each other node. Dynamic routing protocols produce a venture in the design of advert hoc networks for effectively locating routes between two communicating nodes. Now a days interest in this discipline is renewed because of the advent of laptops having low fee and palmtops with radio interfaces. Further ignition of the interest is due to the growing requirement in walking not unusual network protocols in actual time application without making any changes in specific infrastructures. On this paper, the primary goal is to work out a scientific have a look at of the performance of two dynamic routing protocols for advert hoc networks: the dynamic source routing protocol (DSR) and the ad hoc on-demand for distance vector protocol (AODV).

Remote correspondences offer associations and clients numerous advantages, for example, compactness and adaptability, expanded profitability, and lower establishment costs. Remote advancements spread a wide scope of contrasting capacities situated toward various uses and

needs. This part arranges remote system security dangers into one of nine classifications: Errors and exclusions; extortion and robbery submitted by approved or unapproved clients of the framework; representative harm; loss of physical and foundation support; pernicious programmers; modern undercover work; malevolent code; outside government reconnaissance. Notwithstanding, the more prompt worries for remote correspondences are extortion and burglary, pernicious programmers, malignant code, and mechanical and outside undercover work. Robbery is probably going to happen with remote gadgets because of their conveniences. Approved and unapproved clients of the framework may submit extortion and burglary; in any case, the previous are bound to complete such acts. Since clients of a framework may recognize what assets a framework has and the framework security imperfections, it is simpler for them to submit misrepresentation and burglary. Noxious programmers, now and then called saltines, are people who break into a framework without approval, typically for individual increase or to do hurt. Malevolent programmers are for the most part people from outside of an association (in spite of the fact that clients inside an association can be a danger also). Such programmers may access the remote



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# AUTOMATIC SERICULTURE MONITORING USING IMAGE PROCESSING

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## ABSTRACT:

Sericulture is the science that manages creation of silk by rising of silkworm. Creating silk is a protracted, complex process .Silkworm is perhaps the most significant domesticated insects, which produces silk string in type of cover by consuming leaves during larval period. The occasional differences in the natural parts extensively influence yield of silkworm harvest, for example, case weight, shell weight, and cocoon shell proportion. Sericulture industry consolidates the quality of both agriculture and industry If the leaf is influenced by infection Image securing is finished by OPENCV which is discover utilizing pixel concealing and division. Tainted leaf is move into the garbage plate and solid leaf is gathered in the natural plate. On the off chance that the container is full IR sensor sense the phase of plate and turned off the engine. This will helps the rancher in sericulture.

**Keywords:** Raspberry pi 3+, camera, Servo motor (TowerPro SG-90), IR sensor, Relay module.

## I.INTRODUCTION

Horticulture is the foundation of India. These days, ranchers are dealing with numerous financial issues. Thus there is an answer for our ranchers to emerge from their monetary emergency. Sericulture is perhaps the most ideal approaches to bring in more cash and it can give independent work and profitable returns. India positions second worldwide in the silk creation market, as indicated by the focal silk board report. On the contrary hand, just 15% of overall silk creation is contributed by India when contrasted with china which produces 85% of silk. Silkworms are brought up in request to deliver silk in sericulture. Silkworms are sustained for the readiness of silk in sericulture. Silk creation is very tedious, requires a ton of devotion and furthermore a troublesome cycle. Silkworm is viewed as quite possibly the most significant house-trained animals that gather dynamic cover formed silk-fiber by ingesting mulberry leaves during the underlying larval stage. The key factor which can be distinguished for an enormous distinction is the absence of automation in the sericulture division. The occasional changes likewise influences the casing and shell load proportion as casing consistency. In this manner, the silk quality is influenced in the silkworm raising house because of the natural change. To expand the quality and creation of silk string, this paper proposes the utilization of computerization in sericulture. Exploration shows that the components have a significant task to carry out inside the silk reap.

## II EXISTING SYSTEM

In existing system, the silkworms are burning-through parcel of unfortunate leaves in inappropriate way and measure of leaves isn't checked. Also the silkworms are fill in ill-advised climate. Consequently prompts the lesser efficiency of the covers. Accordingly, creating second-quality silk and little length silks.

## III PROPOSED METHOD

We Should take care of the silkworms required measure of food. The nature of the leaves is checked prior to taking care of to the silkworms. The measures of leaves are checked by Raspberry Pi utilizing picture handling.

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## RECOGNITION OF FLY SPECIES-LOCUST BASED ON IMPROVED RESNET

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### ABSTRACT

A dozen species of locusts (Orthoptera: Acrididae) are a major threat to food security worldwide. Their outbreaks occur on every continent except Antarctica, threatening the livelihood of 10% of the world's population. The locusts are infamous for their voracity, polyphagy, and capacity for long-distance migrations. For effective control, the insects need to be detected on the ground before they start to develop air borne swarms. Detection systems need to determine pest density and location with high speed and accuracy. Location of the swarms on the ground then enables their control by the application of pesticides and biopesticides. This work proposes a locust species recognition method based on Resnet50 - convolutional neural network (CNN). We experimentally compared the proposed method with other the state-of-the-art methods on the established dataset. Experimental results showed that accuracy of this method reached higher than the state-of-the-art methods. This method has a good detection effect on the fly species recognition.

**Key Words:** Orthoptera: Acrididae , CNN-Convolution neutral network, good detection.

### 1. INTRODUCTION

Crop pest identification and classification represent one of the major challenges in the agriculture field. Insects cause damage to crops and mainly affect the productivity of crop yield. Classification of insects is a difficult task due to the complex structure and having a high degree of similarity of the appearance between distinct species. It is necessary to recognize and classify insects in the crops at an early stage, especially to prevent the spread of insects, which cause crop diseases by selecting effective pesticides and biological control methods. Traditional manual identification of insects is typically labour-intensive, time-consuming and inefficient. The vision-based computerized system of image processing

using machine learning was developed for accurate classification and identification of insects to overcome these problems in agriculture research field.

### 1.1 Feature extraction

Feature extraction transforms the raw data into meaningful representations for a given classification task. Images are typically composed of millions of pixels with associated colour information each. The high dimensionality of these images is reduced by computing abstract features, i.e. a quantified representation of the image retaining relevant information for the classification problem (e.g. shape, texture or colour information) and omitting irrelevant. Traditionally, features to be extracted were designed by domain experts in a typically long term and rather subjective manual process. For instance, it was observed that humans are sensitive to edges in images. Many well-known computer vision algorithms follow this pattern and use edge or gradient based features, e.g. the scale invariant feature transform (SIFT). SIFT is a widely adopted approach for object detection and image comparison that efficiently detects and describes characteristic and scale invariant keypoints within images that provided a huge improvement over earlier approaches

### 1.2 Classification

Depending on the application, the score is either compared to a threshold solely deciding whether an object is present or not (e.g. presence of a plant or animal in the image), or it is compared to other scores to distinguish object classes (e.g. species name). Prominent classification methods are machine learning algorithms such as support vector machines, Random Forest and artificial neuronal network (ANN).



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Volume 41, Part 5, 2021, Pages 1195-1201

# Development of an iron powder metallurgy soft magnetic composite core switched reluctance motor

**K. Vijayakumar<sup>a</sup> , Y. Thiagarajan<sup>d</sup>, R. Rajendirakumar<sup>c</sup>,****A. Joseph Bosanth<sup>b</sup>, R. Karthikeyan<sup>e</sup>, S. Kannan<sup>f</sup>**<sup>a</sup> Electrical Engineering, SSMIET, Dindigul 624002, India<sup>b</sup> Electrical Engineering, AU Campus, Dindigul 624002, India<sup>c</sup> Electrical Engineering, MEC, Mailam 604304, India<sup>d</sup> Associate Professor, Electrical Engineering, CCET,

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Volume 46, Part 17, 2021, Pages 8325-8332

# Viscoelastic characteristic iron powder core for reducing vibration and noise radiated by switched reluctance machine



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# Next Generation Advanced Core Material for Reluctance Machine

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## ABSTRACT

The field of manufacture of electrical machines has advanced significantly in recent years due to the introduction of new materials. New electrical steels have reduced losses and rare-earth permanent magnet materials have provided a 'lossless' source of magnetic flux. The soft magnetic materials most predominately used in electrical machines are silicon steels and ferrites. In the world of Permanent magnet materials (PM) the choice of laminated stack is Soft Magnetic Composite (SMC) iron powder. Here it is the iron powder grains which are separated from one another by electrically insulating layer using phenolic or silicone resin. As compared with laminated stacks, SMC materials offer a greater resistance to eddy current formation, as well as presenting designers with the advantage of magnetic properties which are isotropic in nature, instead of being confined to two dimensions as within the case of laminates. This reveal exposes the possibility of creating complicated 3-D flux paths, which would be impossible or prohibitively expensive to fabricate from conventional laminated sheet. This paper presents option of research the SMC iron powder as core material in a switched reluctance machine that might run as a motor or generator mode of operation. Results of in-depth finite element analysis and experimentation of the proposed prototype are delineated.

**Keywords :** Switched reluctance motor; Switched reluctance generator; Pre-form blanks; Finite element analysis; Prototype.

## INTRODUCTION

Soft magnetic composite material (SMC) comprises particles of iron powder wherein every particle is insulated by an oxide layer. Compaction of iron powder particles with a binder and a lubricant, at high pressure results a bulk

material [2]-[3]. Lubricant ease compaction and the ejection of component. The binder strengthens the material. The insulation between particles is rendered by the lubricant and the binder. Internal stresses generated during compaction can be relieved through the heat treatment process of curing. Compared to lamination material lower permeability (850(SMC)) and higher iron losses are major shortcomings of SMCs [2]. Even though the SMC material has inferior permeability it has the following advantages: Improved overall thermal loading of the motor, reduced vibration due to the cushioning nature of insulation (lubrication) binder between the iron powder particles of the material and a prospect for greatly reduced production cost.

SMC materials find application in the design and fabrication of complex geometry electrical machines such as claw pole alternator and transverse flux motor. Switched Reluctance Machines are characterized by simple and rugged construction, high power density, wide speed range and high speed operation owing to lack of magnets and winding on the rotor [1]. The switched reluctance motor (SRM) can be a feasible substitute to generate high torque or thrust and power density at relatively low speeds, thereby eliminating the need for a speed reducer between the motor and the washer or pump drive applications. Switched reluctance generator (SRG) can be a cost effective alternative in variable speed wind generating systems that normally employ permanent magnet generators or field wound synchronous generators. The SRG is also characterized by maintenance free and highly reliable operation [4]. This paper work delineates the fabrication of a switched reluctance machine using pre-form soft magnetic composite material Somaloy 1000 3P and along with the presentation of some of the test results.

## SWITCHED RELUCTANCE MACHINE

The switched reluctance machine is a doubly salient but singly excited machine wherein the stator carries the winding while the rotor is simply made of stacked silicon steel laminations [1] as evidenced from the Computer Aided Design (CAD) model of a 6/4 switched reluctance generator shown in Fig. 1.



Technical Volume of 35<sup>th</sup> Indian Engineering Congress, December 18-20, 2020

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## An Investigation on Wireless Power Transfer for Electric Vehicles

Manoj.D, Dr.F.T.Josh

### Abstract

Electric Vehicles (EV) have the potential to achieve eco-friendly transportation compared to internal combustion engine vehicles. Wireless power transfer (WPT) is the benchmark for the electric vehicles, it

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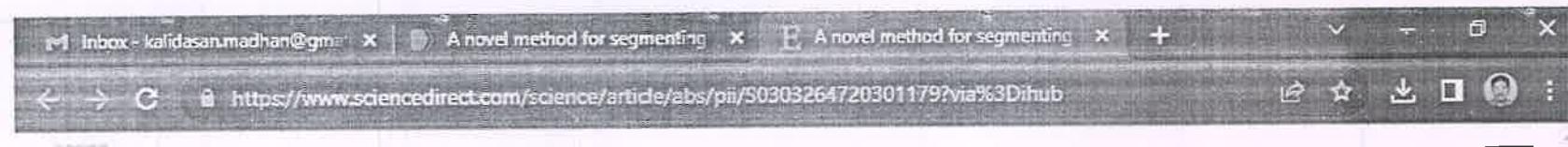
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# ONLINE MONITORING OF DISTRIBUTION TRANSFORMER USING IOT

**Dr. N. Balamurugan<sup>1</sup>, S. Rishya Dora<sup>2</sup>, A. Karthick<sup>3</sup>, M. Sathish Kumar<sup>4</sup>, R. Dhamodharan<sup>5</sup>**

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**Abstract** - In power system network, distribution transformer is electrical equipment which distributes power to the low-voltage users directly and its operating condition is a vital part of the operation of distribution network. Operation of distribution transformer under rated condition assures their long life. However, their life is significantly reduced if they are subjected to overloading condition, resulting in sudden failures and loss of supply to a large number of customers thus affecting system reliability. Overloading and rise in oil & winding temperature of transformer are the major causes of failure in distribution transformers. Our system is designed based upon online monitoring of key Operational parameters of distribution transformers can provide useful information about the health of transformers which will help the utilities to Optimally use their transformers and keep the asset in operation for a longer Period.

system, reliability and safety issues of power system have been more important. Development of distribution Transformer Health Monitoring System (THMS) has been done in that reason. Distribution transformer is the most vital asset in any electrical distribution network and therefore it needs special care and attention. This THMS can monitor the health status of the distribution transformer in real time aspect.

## 3. PROPOSED SYSTEM

Our system is designed based upon online monitoring of key Operational parameters of distribution transformers can provide useful information about the health of transformers which will help the utilities to Optimally use their transformers and keep the asset in operation for a longer Period.

1) Distribution transformers are as of now observed physically where a man intermittently visits a transformer site for support and records parameter of significance. This type of monitoring can't give data about incidental over-load and overheating of transformer oil and windings. Every one of these variables can essentially decrease transformer life.

2) A monitoring system can only monitor the operation state or guard against steal the power, and is not able to monitor all useful data of distribution transformers to reduce costs.

3) Auspicious detection data will not be sent to observing centers in time, which cannot judge distribution transformers three phase equilibrium.

According to the above requirements, we need a distribution transformer real-time monitoring system to detect all operating parameters operation, and send to the monitoring centre in time. It leads to Online monitoring of key operational parameters of distribution transformers can provide useful information about the health of transformers which will help the utilities to optimally use their transformers and keep the asset in operation for a longer period. This will also help identify problems before any catastrophic failure which can result in a significant cost savings and greater reliability.

## 1. INTRODUCTION

In Indian perspective, power system network is visible and controlled only up to this extent. Transformers have an average life of 20- 25 years. Most of the transformers installed are in the verge of their operational life. The current monitoring methods are only associated with electrical parameters which gives no clue about the internal condition of the distribution transformer. Periodical maintenance is not enough for such a major asset in power system. Condition based maintenance will be effective only when an online monitoring system is present so that equipment condition will be known remotely and maintenance scheduling as well as control. Most power companies use Supervisory Control and Data Acquisition (SCADA) system for web-based monitoring of power transformers yet amplifying the SCADA system for online monitoring of distribution transformers is an a costly suggestion.

## 2. Literature Survey

As a large number of transformers are distributed over a wide area in present electric systems, it's difficult to monitor the condition manually of every single transformer. So automatic data acquisition and transformer condition monitoring has been an important issue. With the progress and development of national economy as well as power

## 4. BLOCK DIAGRAM

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The block diagram consists of primary distribution transformers, IOT module and relay circuit to provide protection. **Principal  
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1/2021 vol. 59

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ARTICLE



## Crashworthiness and comparative analysis of polygonal single and bi-tubular structures under axial loading – experiments and FE modelling

I. Vimal Kannan<sup>1</sup> R. Rajkumar<sup>2</sup>

▼ More details

Journal of Theoretical and Applied Mechanics 2021;59(1):81–94

> DOI: <https://doi.org/10.15632/jtam-pl/128901>

Article (PDF)

References (25)

### KEYWORDS

crashworthiness • thin-walled structures • single and multi-cell tubular structures • energy absorption • key performance indicators

### TOPICS

mechanics of materials • structures mechanics

### ABSTRACT

This article aims to present a report of experimental and numerical investigations on crashworthiness characteristics of single and multi-cell/bi-tubular structures. Novel multi-cell/bi-tubular structures are proposed in order to improve the crashworthiness performance. LS-DYNA FE software is applied for the modelling of axial crashing behaviour to validate with experimental results and a good agreement is observed. The KPIs are used to compare various structures and to determine the best performing ones. The Investigations reveal that the HMC4 has significantly obvious effects on the structural crashworthiness and improved 515% energy absorption efficiency. Afterward, a parametric study has been carried out for the best energy absorber.

### REFERENCES (25)

1. Abramowicz W., Jones N., 1984, Dynamic axial crashing of circular tubes, International Journal of Impact Engineering, 2, 3, 263-281.  
[CrossRef](#) [Google Scholar](#)
2. Abramowicz W., Jones N., 1986, Dynamic progressive buckling of circular and square tubes, International Journal of Impact Engineering, 4, 4, 243-270.  
[CrossRef](#) [Google Scholar](#)
3. Baroutaji A., Sajjia M., Olabi A.G., 2017, On the crashworthiness performance of thin-walled energy absorbers: recent advances and future developments, Thin-Walled Structures, 118, 137-163.  
[CrossRef](#) [Google Scholar](#)
4. Bigdeli A., Nouri M.D., 2019, A crushing analysis and multi-objective optimization of thin-walled five-cell structures, Thin-Walled Structures, 137, 1-18.  
[CrossRef](#) [Google Scholar](#)
5. Deng X., Liu W., 2019, Multi-objective optimization of thin-walled sandwich tubes with lateral corrugated tubes in the middle for energy absorption, Thin-Walled Structures, 137, 303-317.  
[CrossRef](#) [Google Scholar](#)
6. Hu L.L., He X.L., Wu G.P., Yu T.X., 2015, Dynamic crushing of the circular-celled honeycombs under out-of-plane impact, International Journal of Impact Engineering, 75, 150-160.

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# Parametric Effect and Laser Beam Machining of Rhenium Diboride-Based Molybdenum Metal Matrix

Anbarasu Augustine, Joseph Dominic Vijayakumar, S.

Paulsingarayar, S. Marichamy , B. Stalin & V. Dhinakaran

Conference paper | [First Online: 21 October 2020](#)

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### Abstract

The applications of super hard material have been increased in aerospace, marine and automobile industries. In the present, the investigation deals with rhenium diboride ( $\text{ReB}_2$ )-based molybdenum metal matrix which is fabricated through stir casting method. Rhenium diboride is mixed to the

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# Experimental prediction and investigation of spring back in 'V' bending profile process modelling using artificial neural network

 C. Kathirvel, M. Saravanan and K. Vetrivel Kumar

 Published Online: September 25, 2020 · pp 294-308 · <https://doi.org/10.1504/IJRapidM.2020.110775>


ABOUT

## Abstract

Artificial neural network (ANN) is accustomed to foreseeing responses of enormous range of parameters. A few scientists concentrated on the improvement of insightful the spring back and bend force in air bend of semi-legitimate and numerical models. ANN has utilised consistently in making estimated model on the grounds that ANN has high flexibility in fitting of educational accumulation. ANN has some exceptional characteristics, for example, power, adjustment to non-basic disappointment, parallel use. More that, it has ability to describe non-straight associations, joint efforts of procedure parameters. It can make it a promising gadget for showing many amassing issues. In this work is to distinguish the nature of ANN in 'V' bending profile among the specialists of sheet metal bend as the data included and the relations of parameters are very non-straight was contrasting and RSM.

## Keywords

artificial neural network, ANN, extensive parameter, logical parameters, 'V'bending process

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RESEARCH ARTICLE | OCTOBER 29 2020

# Machining and abrasive wear performance of tantalum carbide based stellite metal matrix composite

P. Ganesan ; S. Paulsingarayar; S. Joseph Dominic Vijayakumar;  
S. Sridhar; D. Madan

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AIP Conf. Proc. 2283, 020054 (2020)

<https://doi.org/10.1063/5.0029320>

The application of metal matrix has been increased in manufacturing industries. The demand of advanced metal matrix in aerospace and nuclear plant has gradually increased. The stellite is one of super alloys which consist of cobalt and chromium. In present article deals with the machining performance of tantalum carbide (TaCx) based stellite metal matrix composite. The various unconventional machining processes such as Ultra Sonic Machining (USM) and Laser Beam Machining (LBM) processes are used to machine the metal matrix composite. The various control and response parameters are considered for the experimental investigation. The abrasive wear resistance is also discussed.

## Topics

Composite materials, Alloys, Machining, Materials degradation,  
Transition metals, Industry

## REFERENCES

- S. Aykut, M. Golcu, S. Semiz and H. S. Ergur, *J. Mater. Process. Technol.* 190, 199–203 (2007).  
<https://doi.org/10.1016/j.jmatprot.2007.02.045>

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**MANAGERIAL DECISION MAKING USING  
BEST WORST METHOD WITH MULTI-VALUED NEUTROSOPHIC  
APPROACH**

NIVETHA MARTIN<sup>1</sup> AND S. SUDHA

**ABSTRACT.** The subject of intrinsic and extrinsic factors constitute to the elements of decision making process characterized by the influence of multi benchmark, diverse consents of the experts on different aspects-at managerial level. Decision makers strive hard to construct consensus in formulating decisions by minimizing the complexity in the process of decision making by applying various approaches of decision making. The efficiency of the decision making methods depends on the time and cost efficiency. In the research area of decision making, best worst method is being explored presently and this method is modified with the integration of various kinds of fuzzy numbers and single valued neutrosophic fuzzy number is one such instance. The efficacy of best worst method with single valued neutrosophic fuzzy number has motivated us to extend the same decision making method with multi valued neutrosophic fuzzy number. It is proposed to formulate a decision making model using best worst method with multi valued neutrosophic approach and to present a comparative analysis of single and multi-valued neutrosophic fuzzy number. The formulated model is validated with real life application and it will certainly benefit the decision makers in framing optimal decisions.

<sup>1</sup>corresponding author

2010 Mathematics Subject Classification. 90B50.

Key words and phrases. Neutrosophic fuzzy numbers, Best-Worst method, Decision making, multi-valued neutrosophic.





# An integrated production-distribution inventory system for deteriorating products in fuzzy environment

S. Hemalatha<sup>1\*</sup> and K. Annadurai<sup>2</sup>

## Abstract

A key issue for the organization of responsiveness to uncertainties is intelligent manufacturing design of a complex production inventory system. To effectively handle imprecision or uncertainty, fuzzy methodologies provide a useful way to model vagueness in human recognition and judgment. Fuzzy numbers are frequently used in applications to ensure easy handling of the realistic problem. Priyan and Uthayakumar (2015) proposed an integrated production-distribution inventory system for deteriorating products that involve fuzzy deterioration rate and variable setup cost environment. They offered strategic decision-making to produce and supply products to minimize total system cost under fuzzy deterioration rate and variable setup cost environment. In this paper, their model is extended by considering the demand, production rate, deterioration rate, holding cost for both the vendor and the buyer and the ordering cost for the buyer as the triangular fuzzy number and the setup cost as a function of capital expenditure. Signed distance method is used to defuzzify the total cost and differential calculus optimization technique is employed to find optimal solutions of the model. Numerical example and sensitivity analysis are depicted to feature the contrasts among crisp and the fuzzy cases.

## Keywords

Triangular fuzzy number; signed distance method; inventory costs; logarithmic function.

## AMS Subject Classification

62A86.

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## 1. Introduction

Inventory collaboration schemes involve mechanization of a company's replenishment processes as well as the connection of buyers and suppliers circle with real-time forecast, inventory on-hand, optimal lot sizing, quality improvements and inspections, and shipment information to reduce inventory and eliminate unnecessary expenses. Henceforth, cooperation and integration are in hot board of supply chain management. The main goal of supply chain and inventory management research is to reduce unnecessary costs without sacrificing customer service. Our main objective is to study the impact and sensitiveness of the impreciseness of cost components in the



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## A comparative study of removal of Ni (II) ion using low cost carbonaceous sorption

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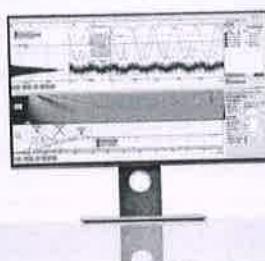
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## REMOVAL OF CHROMIUM USING VIGNA MUNGO AS A BIOSORBENT IN TANNERY EFFLUENT AT DINDIGUL DISTRICT

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### ABSTRACT:

This present study conception is the removal of Heavy Metal of Chromium ions from Tannery effluents using low cost natural absorbent Vigna mungo. The activated carbon prepared from the Vigna mungo (Black gram) husk can be employed as a potentially low cost adsorbent. The activation process was found to increase the high surface area and offering good adsorption capacity. Vigna mungo husk was taken to prepare activated carbon by physical activation (Pyrolysis at 700°C in furnace) and chemical activation (using H<sub>3</sub>PO<sub>4</sub>). The temperature and dosages are the important factors of finding the metal adsorption capacity of activated carbon. To know the chemical functional groups such as hydroxide group (-OH) and carboxyl group (C=O) are present in the activated carbon can be analysed by FTIR analysis. The pore structure analysis was examined on the basis of SEM analysis. The removal percentage for chromium at 700°C of dosage 0.15 g shows the greater adsorption capacity.

### KEYWORD:

Activated carbon, Vigna mungo husk, Adsorption, Tannery effluents, Chromium

### INTRODUCTION:

Heavy metals are toxic and detrimental water pollutant. They are toxic and non-biodegradable in nature. They cause so many ill effects in human beings and also animals and vegetation. Most cases in the field of environment studies are the removal study of heavy metal in wastewater. Therefore many researchers attempt a method and technologies for wastewater treatment. Basically some bio-sorption efficient approaches are in the heavy metal removal process. In the tannery industry tanning process started with using the chemical tannin. Mostly chromium (III) sulphate is used as a tanner. The trivalent chromium now commonly used in tanning has a lower toxicity than the hexavalent chromium. Tannery waste water pollution causes a serious health hazards to man and surroundings. During the tanning operation direct contact with chemicals can cause disability, allergy, asthma various skin diseases and permanent illness and even death. Chromium is a controversial on account of the persistent and potentially toxicity of some of its chemical forms.

N.K. Akunwa et al., (2014) describes the standard treatment methods are very precious and demanding to treat waste water from various industrial process. Sometimes wastewater may not treat properly it will cause environmental risks. Saleh and Al-Saadi, (2015); Goscianska et al.,(2016); Shu et al., (2017) discussed about the usage of activation carbon in adsorption studies plays an important role far and wide due to its cost effectiveness. A. Sharma et al., (2019) explains the importance of activation carbon to overcome the accepted methods such as ozonation, sonolysis, membrane filtration, Ion exchange, photochemical oxidation etc., Danish et al., (2013).show as there are two types of activation process takes place in practice namely physical and chemical activation. A. Abdolali et al.,(2014)carried out FTIR studies to explain while using phosphoric acid , activation carbon have an increase of some acidic functional group like C=O and O=H. This present study aims that the preparation of easily available and effective sorbents to be an activated sorption material. A known ecofriendly, cost effective and easily available Vigna mungo (Black gram husk) adsorbent is used to study the adsorption Chromium ions in the tannery effluents.

### MATERIALS AND METHODS:

#### SAMPLE COLLECTION:

Tannery Effluent is collected from Dindigul Tannery Industry. Tannery effluent was taken for the removal study of heavy metals particularly chromium present in it. Physico-chemical characteristic of tannery wastewater was showed that their high organic content leads to environmental pollution. The P<sup>H</sup> value of effluent is increased due to chemical process involved in it. The wastewater becomes very basic and affects the soil tendency cause environmental degradation.

#### ACTIVATED CARBON (AC) PREPARATION:

The material used for the production of activated carbon is Vigna mungo (Black gram) husk. Among the variety of Indian food products Black gram is one of the important pulse. It is popular as "Urad dal". In Black gram dal, the outer skin is peeled off and the husk is the by-product .Black gram

