

Solar photo-assisted electrochemical peroxidation process for the sustainable treatment of tannery industry wastewater

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ABSTRACT

Tannery wastewater is a complex mixture of organic and inorganic components from various processes with high concentrations of Cr, BOD, COD, TDS, strong colour and pH. The goal of the present work was to determine the optimal solar photo-assisted electrochemical peroxidation process (SPECP) experimental conditions for the treatment of tannery wastewater. Experiments were conducted in a bench-scale stirred tank SPECP reactor of 5 L with iron plates as anode and cathode in a contact effective area of 218 cm². In the stirred tank reactor at optimal conditions, the SPECP yielded 97% COD, 98% of colour and 92% of chromium (III) removal after 60 min at 15 mA/cm². SPECP improved the biodegradability (BOD₅/COD) of tannery wastewater from 0.4 to 0.6 in 15 min. These results showed that wastewater from tannery industries could be treated up to the level of the minimal national standards of India for waste disposal; COD=90 mg/L, BOD=30 mg/L and chromium (III)=1.2 mg/L at a treatment time of 60 min. The operating cost of the best economic condition with maximum degradation was \$8.2/m³.

Key words: bench scale reactor, electrochemical process, energy consumption, solar energy, tannery wastewater

HIGHLIGHTS

- SPECP using iron electrodes was very effective for the treatment of tannery wastewater.
- Effect of process parameters was investigated with CCD design.
- The closeness of experimental & CCD predicated shows great model roundness.
- 97% of COD, 96% of BOD, 98% of colour and 92% of Cr (III) removal efficiency was obtained.
- Less energy consumption and higher degradation efficiency provided SPECP as a cost-effective approach.




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Treatment of dairy wastewater by using moving bed biofilm reactor sequential with integrated fixed-film sludge

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Abstract— Moving Bed Biofilm Reactor (MBBR) is a leading technology of biological solution for wastewater treatment based on the aerobic principle. In this study, lab scale experiments were done by using MBBR with Integrated Fixed-film Sludge(IFAS) process and polypropylene media to analyze BOD and COD removal from wastewater of dairy industries. The system efficiency in removal of BOD and COD was examined at a different rate of Hydraulic Retention Time (HRT) of 1, 1.5, 2, 2.5 and 3 hours. Similarly BOD and COD removal efficiency of 60% and 88% respectively was achieved with 3hrs HRT and also settling time was observed as 4 hours. Finally this study indicates that MBBR with IFAS process and polypropylene media as biofilm carrier posses very good removal of BOD and COD from Dairy Wastewater.

Index Terms—Dairy wastewater, MBBR, IFAS
Hydraulic Retention Time (HRT)

INTRODUCTION

The dairy industry is generally considered to be the largest source of food processing wastewater in many countries. With increase in demand for milk and milk products, many dairies of different sizes have come up in different places. These dairies collect the milk from the producers, and then either simply bottle it for marketing, or produce different milk foods according to their capacities. Large quantity of wastewater originates due to their different operations. The organic substances in the wastes comes either in the form in which they were present in milk, or in degraded form due to their processing. As such, the dairy wastes though biodegradable, are very strong in

nature. Several methods are available to reduce the high load content of pollutants in Dairy waste water. Among them Moving Bed Biofilm Reactor (MBBR) is considered as one of the promising process for treatment of wastewater. The basic principle of moving bed process is the growth of biomass on plastic supports that move in the biological reactor via agitation generated by aeration systems (aerobic reactors) or by mechanical systems or by anaerobic reactors. Integrated Fixed Film Activated Sludge (IFAS) is emerging technology that is highly efficient low footprint activated sludge solution. IFAS consists of submerged fixed bed polypropylene, textile media which promotes attached growth biomass in Integrated Fixed Film Activated Sludge.

A MOVING BED BIOFILM REACTOR (MBBR)
Two technologies are commonly used for biological treatment of sewage which is activated sludge and trickling filters, a MBBR is a compilation of these two technologies. The biomass in the MBBR exists in two forms suspended flocs and a biofilm attached to media. MBBR has become popular in the field of wastewater treatment because it maximizes the capacity and efficiency of the treatment plant by minimizing the footprints. It has the capacity to retrofit the old treatment plants, higher nutrient removal ability, produce less sludge as a result of high biomass, retention time, and easy maintenance, economical and so on. The key element of the MBBR is the use of small plastic biofilm support media to allow a high concentration of protected biofilm growth in a well-

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Applying ANN – PSO algorithm to maximize the compressive strength and split tensile strength of blended self curing concrete on the impact of supplementary cementitious materials

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Abstract

This study was intended to get the optimized Compressive strength and split tensile strength of Blended Self Curing Concrete (BSCC) on the impact of Supplementary Cementitious Materials (SCM's). The experiments were conducted by varying the quantity of





COMPUTERISED INVESTIGATION OF CCD OPTIMIZED FRGPC BEAM COLUMN JOINT SUBJECTED TO QUASISTATIC LOADING

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KARTHIK, MP ; SREEVIDYA, V.

▼ Abstract

Geopolymer concrete is widely accepted as a sustainable alternative for the conventional concrete and in this study the behavior of fiber-reinforced beam column joint made with geopolymer concrete is studied under quasi-static loading. In addition to fly ash, steel fibers, M-sand as an alternative for river sand as fine aggregate, granite as coarse aggregate, NaOH and Na₂SiO₃ as activators and potable water, are used as ingredients. Initially the mix design is carried out for casting cubes and tested for compressive strengths by varying the concentration of NaOH, curing temperature and duration for optimization of input parameters experimentally. Then the optimization is done analytically using Central composite design (CCD). The optimum parameters determined from experimental investigation for the production of Fibre-reinforced geopolymer concrete (FRGPC) are: NaOH concentration of 16 M, curing temperature of 100°C and curing duration of 18 h, and thus a maximum compressive strength of 48.67 MPa is produced. By using CCD it was possible to obtain a 48 MPa strength with optimized parameters of 12 M NaOH concentration, 94°C curing temperature and 22 h curing duration. The numerical results validated with experimental ones show a ratio of Partial differential equations to experimental value of 0.975. Based on the optimized mix design, beam column joint is casted and tested under static load and compared with FEM Model using ANSYS 16.2. The ultimate load carrying capacity of beam column joints made with CC, GC-EXP-OP, GCCCD-OP by numerical investigation are 3.77, 1.86 and 3.18(%) than the experimental results. The beam column joints behavior is also studied under forward and reverse cyclic loading conditions.

▼ Keywords

Central composite design (CCD); Fibre-reinforced geopolymer concrete (FRGC); beam column joint; geopolymer concrete; structural performance

▼ Cite this article

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Combination of improved Harris's hawk optimization with fuzzy to improve clustering in wireless sensor network

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Abstract: A Wireless Sensor Network (WSN) is divided into groups of sensor nodes for efficient transmission of data from the point of measuring to sink. By performing clustering, the network remains energy-efficient and stable. An intelligent mechanism is needed to cluster the sensors and find an organizer node, the cluster head. The organizer node assembles data from its constituent nodes called member nodes, finds an optimal route to the sink of the network, and transfers the same. The nomination of cluster head is crucial since energy utilization is a major challenge of sensor nodes deployed over a hostile environment. In this paper, a fuzzy-based Improved Harris's Hawk Optimization Algorithm (IHHO) is proposed to select an able cluster head for data communication. The fuzzy inference model ponders balance energy, distance from self to sink node, and vicinity of nodes from cluster head as input factors and decides if a candidate node is eligible for becoming a cluster head. The IHHO tunes the logic into an energy-efficient network with less complexity and more ease. The novelty of the paper lies in applying the hawk-pack technique based on fuzzy rules. Simulations show that the combination of Fuzzy based IHHO reduces the death of nodes through which network lifetime is enhanced.

Keywords: Harris's hawk optimization, fuzzification, cluster head election, energy efficient routing

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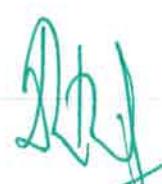
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Enhancement of Network Lifetime and Data Security in Underwater Sensor Network Using Leach Protocol.

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ABSTRACT.

Due to facts of the submerged surround, some negative factors will seriously muck with data transmission rates, responsibility of data communication, communication range, and network throughputs and energy consumption of submerged detector network(UWSN). hence, full consideration of node energy saving, while maintaining a quick, correct and effective data transmission, extending the network life cycle are essential when routing protocols for submerged detector networks are studied. In this paper, we've proposed a two types of fresh routing algorithm for UWSNs. LEACH is extended by searching a cluster head according to the lowest distance from the base station in order to reduced energy consumption in cluster head an in the total enclosing network. To increase energy consumption effectiveness and extend network life span and information security, we propose a time- place grounded routing algorithm(TSR), Hierarchical Clustering Algorithm(HCA). we designed a probability balanced process and applied it to TSR and HCA.

The proposition coding is introduced to TSBR to meet the necessary of another meet the need for information security, reducing nodule energy consumption and extending network life span. Hence, time- place grounded balancing routing algorithm and compared it with other classical aquatic routing protocols. The simulation results show that proposed protocol can reduce the probability of nodule conflicts, abridge the process of routing construction, balance energy

consumption of each node and effectively extend the network life span.

Keywords:Under water sensor, Network, LEACH,TSR,WSN.

I. INTRODUCTION

In lately times, further and further operations have appeared with the development of wireless communication network ways. Aquatic detector networks are an arising and promising network fashion which has attracted considerable attention. In this paper, we present a time- slot based routing algorithm(TSR) by applying a series of advancements of the flooding protocol. Conflict between bumps is avoided when they start to shoot packets only within their own time- places, and they do not need to reply to their parents collectively in the process of establishing routing, rather they directly broadcast the routing dispatches. Meanwhile, to save further time and energy to quicken routing establishing process, the packet could act as the ACK to reply to their parents.

The network topology of aquatic detector networks of this paper searched is a planar centralized- tree construction. This construction has two advantages. One is easy to be extended. Tree construction can extend numerous branches and child branches which can be fluently added into the networks. The other bone is the convenience for segregating malfunctions. We can accessibly separate malfunctions from the rest of the system when bumps or routes in one branch breakdown.

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Motor Imagery EEG Recognition using Deep Generative Adversarial Network with EMD for BCI Applications

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Abstract: The activities for motor imagery (MI) movements in Electroencephalography (EEG) are still interesting and challenging. BCI (Brain Computer Interface) allows the brain signals to control the external devices and also helps a disabled person suffering from neuromuscular disorders. In any BCI system, the two most essential steps are feature extraction and classification method. However, in this paper, the MI classification is improved by the performance of Deep Learning (DL) concept. In this proposed system two-moment imagination of right hand and right foot from the BCI competition three datasets IVA has been taken and classification methods utilizing Conventional neural network (CNN) and Generative Adversarial Network (GAN) are developed. The training time is reduced and non-stationary problem is managed by applying Empirical mode decomposition (EMD) and mixing their intrinsic mode functions (IMFs) in feature extraction technique. The experimental result indicates the proposed GAN classification technique achieves better classification accuracy in terms of 95.29% than the CNN of 89.38%. The proposed GAN method achieves an average positive rate of 62% and average false positive rate of 3.4% on BCI competition three datasets IVA whose EEG facts were resulting from the similar C3, C4, and Cz channels of the motor cortex.

Keywords: convolutional neural network (CNN); electroencephalogram (EEG); empirical mode decomposition (EMD); generative adversarial network (GAN); intrinsic mode function (IMF); motor imagery (MI)

1 INTRODUCTION

BCI converts the brain doings documented by the human scalp into PC control instructions to regulate the external strategies and thereby assisting incapacitated people in regaining their motor skills [1]. The use of EEGs to control intelligent wheelchairs has been investigated [2], as well as other external equipments. In the brain-computer interface (BCI), the characterization of EEG signals is formed as a significant component. Generally used EEG data contains event-associated SSVEP capabilities [3], and motor image (MI) [4]. The EEG signal has few different features compared to other types of signals. The gathered EEG signs vary according to the subject of the mental state [5]. Therefore, the EEG signs of each subject are different. EEG signs are non-stationary and non-linear, meaning the change of EEG data features over the period of time [6]. Furthermore, the EEG signals analysis is challenging since the composed EEG signals are normally combined with noise. Operative processes should, therefore, be in use to develop the SNR of the EEG data.

The EEG characteristics are controlled by the methods for assessing the frequency and the signal energy delivered in the Time-frequency or Time signal range. As far as the best authors, however, no comprehensive comparative analysis of these methods has been carried out using sophisticated linear and non-linear BCI classifiers in the BCI framework. Most of the comparative values given in the literature are limited to few techniques or only one classification [7]. Wavelet transform (WT) is basically used in the feature extraction process [8], normal spatial patterns (CSP) [9], and Principal Component Analysis (PCA) [10], EMD [11, 12] and so on. Since EMD algorithm is able to optimally split the signal, it has been proven to be a suitable candidate for the examination of non-linear and unsteady EEG signals. For example, [13] uses the EMD algorithm to filter the motor imagery EEG signal. However, common EMD algorithms typically select Intrinsic Mode Functions (IMFs) based on the researcher's experience so that some EEG samples can mix unnecessary information or lose useful data. Additionally,

features created using these existing schemes are usually designed by hand, which requires high level of expertise. Therefore, it is very significant to extract the EEG signal active features robotically.

In current period, particular DL methods have been used to categorize EEG signals, among which CNN is the special representative's model for classification. The greater advantage of the DL is that it can deal with non-linear and transient data energetically to extract the feature representations from the unique data. In a study by Amin et al. [14], a multilayer CNN feature fusion model for classifying EEG signals is proposed, and this model extracts the spatial and temporal structures from EEG facts. To match the non-linear and transient features of the EEG signal, CNN features are applied to the autoencoder and the EEG signals are classified. The outcome expresses that the EEG signal detection accuracy has been enhanced. There are some approaches to join traditional feature removal methods with DL techniques [15]. For illustration, Xu et al. [16] used Wavelet transform to change 1-D EEG signals into 2-D time-frequency imageries and it was created as a CNN classifier. The main limitations of CNN for avoiding local optima depends on class imbalances over the data capacity, and initial parameter tuning. Compared with physical analysis of the classification task by using Convolutional Neural Network (CNN), it is found much more convenient, but it needs a certain volume of annotated training instance which cannot be acquired easily. Hence to overcome this issue, Generative Adversarial Network (GAN) is used for classification. In this regard, GAN has achieved satisfactory results. It is believed that GAN can be used to optimize feature information networks, confirm the efficiency of the features used, and improve the ability to select features.

2 RELATED WORKS

Lu et al. [17] has developed a deep learning technique based on a constrained Boltzmann and an FFT to classify the motor imaginary images. Extensive and systematic experiments were carried out with publicly available



Performance Improvement of SIMD Processor for High-Speed end Devices in IoT Operation Based on Reversible Logic with Hybrid Adder Configuration

Vinoth Kumar KALIMUTHU*, Karthikeyan SOMASUNDARAM, Bhavani SRIDHARAN, Vennila CHOCKALINGAM

Abstract: The reversible logic function is gaining significant consideration as a style for the logic design by implementing modern Nano and quantum computing with minimal impact on physical entropy. Recent advances in reversible logic allow for computer design applications using advanced quantum computer algorithms. In the literature, significant contributions have been made towards reversible logic gate structures and arithmetic units. However, there are many attempts to dictate the design of Single Instruction-Multiple Data (SIMD) processors. In this research work, a novel programmable reversible logic gate design is verified and a reversible processor design suggests its implementation of SIMD processor. Then, implementing the ripple-carry, carry-select and Kogge-Stone carry look-ahead adders using reversible logic and the performance is compared. The proposed reversible logic-based architecture has a minimum fan out with binary tree structure and minimum logic depth. The simulation result of the proposed design is obtained from Xilinx 14.5 software. From the simulated result, the computational path net delay for 16×16 reversible logic with Kogge Stone Adder is 17.247 ns. Compared with 16-bit Kogge Stone Adder, the reversible logic-based 16-bit Kogge Stone Adder gives low power and low time delay. By looking at the speed, energy and area parameters, including fast applications in which two smaller delay and low power adders are required, the effectiveness, including the proper area use of the hybrid adder recommended by it is evaluated.

Keywords: IoT; Kogge-Stone carry look-ahead; quantum; reversible logic; single instruction-multiple data

1 INTRODUCTION

The Internet of Things (IoT) exemplifies a wide range of sensors, computations, and networking that multiply our physical world. As a result, it is shaping up to be one of the most influential technologies in the modern world. IoT is affecting regions spreading over from agriculture [1-3], medical services [4], manufacturing [5] and by empowering unavoidable information assortment to help further investigation. One of IoT's key segments is the sensor hub, normally a little, low-power device with various sensors, remote communication, and an unassuming measure of computation. As these nodes are often set at locations without significant networking or power structures, such as on farms and forests, many sensor nodes are designed to be highly resource-efficient to operate arbitrarily time-efficient automatically. For example, they may work for quite a long time on a little battery [6, 7] and convey through slow and low-power communication networks [8, 9].

While we see development in both data assortment abilities of IoT devices and examination limit on the gathered data, wireless communications' exhibition and power effectiveness have not scaled as much because of actual imperatives. Subsequently, the data assortment limit of low-power IoT gadgets is regularly confined by the upheld data rate and power utilization of its wireless communication module [10-11]. Network advances for IoT devices give a wide spectrum of decisions, traversing from fast and eager for power to moderate and power proficient. One noticeable way to address the communications issue is edge mining, where the IoT nodes themselves play out some calculations to reduce the measure of data to be sent. Some true applications have shown various adders can reduce the data transmission prerequisite by more than 95% [12-15]. In any case, moving calculation to the edge additionally implies the IoT nodes should have critical calculation capacities, which builds the expense and power prerequisites of every node.

In this research work, we present a case reversible logic-based Kogge-Stone carry look-ahead adder for Field-Programmable Gate Arrays (FPGA), improving execution and power effectiveness calculation significantly [16]. Besides, by offloading the calculation initially done at a central server to power-productive FPGAs, this methodology additionally improves the absolute organization's calculation of power proficiency by a significant magnitude [17, 18]. While using redesign hardware such as FPGAs to achieve high performance on the accelerator is not a new idea [19, 20], we provide an instance of a complex adder implementation and in-depth evaluation on performance and power efficiency incorporating wireless communication overhead.

1.1 IoT Applications

The function of IoT devices in different application regions is shown in Fig.1.

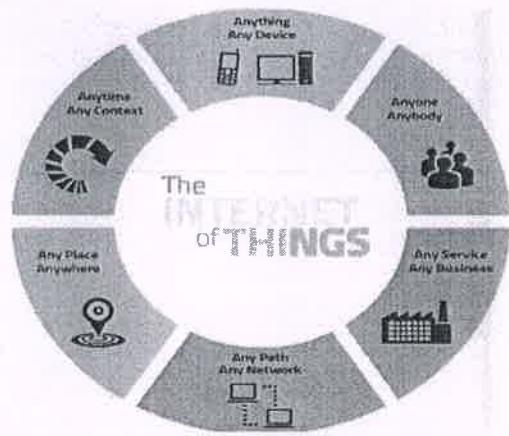


Figure 1 The function of IoT device

The significant destinations for IOT are simply the formation of smart environments/spaces and mindful things (for instance smart vehicle, cities, urban

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An efficient framework for glioma tumor classifications and diagnosis using proposed CNN architecture

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(Communicated by Madjid Eshaghi Gordji)

Abstract

This article proposes the deep learning algorithm- Convolutional Neural Networks (CNN) for both Glioma tumor classifications and diagnosis process. This proposed CNN architecture is derived from the conventional CNN architecture to obtain the optimum classification and diagnosis accuracy. This proposed CNN architecture is derived from the conventional system for obtaining the high classification and diagnosis performance. This proposed methodology stated in this paper uses BRATS 2015 open access dataset for obtaining the brain Magnetic Resonance Image (MRI) for tumor region detection. The proposed methodology stated in this paper for tumor diagnosis achieves 97.7% of Jaccard Index (J) and 83.8% of Dice Similarity Index (DSI) and 99.025 of Diagnosis Rate (DR) using CNN algorithm..

Keywords: Glioma, tumor, deep learning algorithm, classification, diagnosis

2020 MSC: 68T05

1 Introduction

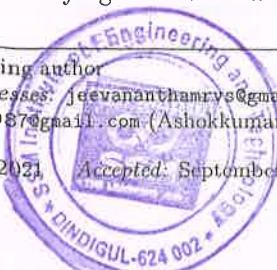
The brain is a permanent and foremost important area for storing the memory of the persons. It is the origin of all human behavior, thoughts, feelings and understanding [5], [7], [9] and [10]. It also integrates and controls relating to balance and autonomic functions in the body. The development of the uncontrolled tissue patterns in brain region causes tissue damage which leads to tumor cells. The tumor cells are rapidly developing and their boundaries are slashed with the boundaries of nearby cells in brain. The modality of the brain can be viewed in Magnetic Resonance Imaging (MRI). This paper utilizes MRI scanning modality for identifying the tumor cells in brain regions. This MRI scan produces the clear cross sectional view of the brain regions and it locates the tumor pixels. Even though many methods were developed for the last two decades for detecting the tumor pixels in brain regions, they were not able to provide high grade diagnosis factor [14] and [6]. This issue can be solved using the modified deep learning method in this article.

Hayit Greenspan et al. (2018) [3] implemented an automated segmentation algorithm to segment brain MRI images acquired under varying noise conditions using Expectation Maximization (EM) and Gaussian Mixture Model (GMM).

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Fuzzy Logic Based DSR Trust Estimation Routing Protocol for MANET Using Evolutionary Algorithms

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Abstract: In MANET attaining consistent routing is a main problem due to several reasons such as lack of static infrastructure, exposed transmission medium, energetic network topology and restricted battery power. These features also create the scheme of direction-finding protocols in MANETs become even more interesting. In this work, a Trust centered routing protocol is suggested, since trust plays a vital role in computing path in mobile ad hoc networks (MANETs). Estimating and computing trust encourages cooperation in mobile ad hoc networks (MANETs). Various present grade systems suddenly estimate the trust by considering any one of the parameters such as energy of node, number of hops and mobility. Estimating trust is an Energetic multi objective optimization problem (EMOPs) typically including many contradictory goals such as lifetime of node, lifetime of link and buffer occupancy proportion which change over time. To solve this multi objective problem, a hybrid Harmony Search Combined with Genetic algorithm and Cuckoo search is used along with reactive method Dynamic Source routing protocol to provide the mobile hosts to find out and sustain routes between the origin node (SN) to the target node (TN). In this work, the performance of the direction-finding practice is assessed using throughput, end to end delay, and load on the network and route detection period.

Keywords: Mobile ad hoc network; reactive; reputation; trust

1 INTRODUCTION

Mobile Ad hoc Networks (MANET) are frameworks made of autonomous portable hosts which interconnect with all others over wireless associations. The versatile hosts, which are in correspondence scope of every host, are able to straightforwardly convey, yet others need the guide of transitional hosts to transmit their data (Mohammed et al 2007). MANETs are useful without the support of any settled foundation and are totally appropriated. These systems are made exceptionally adaptable and strong by this property.

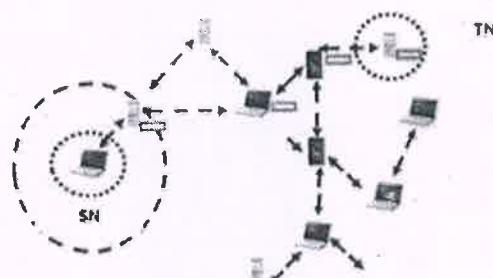


Figure 1 Mobile ad hoc network

In this fashion, the topology of the ad hoc network may vary rapidly and abnormally. However, by the absence of any settled foundation, it gets to be distinctly muddled to abuse the present directing methods for system administrations, and this gives some huge difficulties in giving security to the message, which is not done easily, as the quantity of requests of system security struggle with the prerequisites of portable systems, fundamentally because of the way of the cell phones e.g. low power utilization, low handling load. Fig. 1 demonstrates that MANETs do not rely on any previous infrastructure or base stations.

The routing tactics for MANET remain inherited from conventional systems which can be disciplined to so much criticism as they do not take into account ad-hoc community traits corresponding to mobility and useful resource constraints. Numerous direction finding

approaches were suggested. Pre-emptive direction finding protocols invent paths for every pair of hosts by constantly informing the routing tables at constant time intervals with all the hosts in the network. If a host wants to transmit data to any host, the path is available in the direction table. Preemptive direction-finding protocol centered wireless networks have additional overheads within the network as a result of stable updating of route tables; however, origin to target data transfer delay is reduced. However, on demand direction finding protocols found a path to a target only when there is a necessity.

There is no central mechanism to observe the node actions. These features power a constituent node to be careful when cooperating/connecting with other nodes as the conduct of nodes varies with time and environmental conditions. Therefore, creating and measuring behaviour of nodes in the form of trust is vital for safeguarding suitable process of MANET.

Three models, Reputation based, Trust based and Credit based were produced to authorize cooperation and demoralize node trouble making. Utilization of past end client conduct, notoriety, and trust-based plans empower nodes to choose whether to trust different Centres. Inevitably, nodes with high status are offered administrations while those with poor status are disconnected from the system.

2 RELATED WORKS

Theodorakopoulos and Baras [1] proposed a mechanism which models the path problem in the mobile ad hoc network on directed graph where nodes represent entities and edges represent trust relations. They used the concept of smearing to assess the trust value or confidence.

Li & Delgado Frias [2] proposed a scheme, which gives assurance against individual/agreeable getting rowdy hubs. It needs no trust relationship or interruption identification framework to find misconduct. It joins multipath steering and the single way information transmission with a conclusion to end input system. Prior to a hub starting to speak with a goal hub, it picks two hubs

Dynamic Defense Mechanism for DoS Attacks in Wireless Environments Using Hybrid Intrusion Detection System and Statistical Approaches

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Abstract: Security in wireless frameworks is a significant and difficult task because of the open environment. The Denial of Service (DoS) is as yet significant endeavour to make an online assistance inaccessible. The objective of this attack is to keep the authentic nodes from getting to the administrations. Intrusion detection systems assume an essential job in identifying DoS attacks that improve the performance of the system. However massive information from the system presents huge difficulties to the discovery of DoS attack, as the identification framework needs adaptable techniques for gathering, storing and processing a lot of information. In order to defeat these difficulties, this paper proposes Hybrid Intrusion Detection System (HIDS) framework dependent on different MLP strategies. In this article HIDS utilizes Naive Bayes (NB), irregular random forest (RF), decision tree (DT), multilayer perceptron (MLP), K-nearest neighbours (K-NN) and support vector machine (SVM) for better outcomes. The NSL-KDD dataset and UNSW-NB15 dataset are taken to examine the detection accuracy. The experiment results show that the proposed defence system is accomplished with high accuracy, high detection rate and low false alarm rate in both the datasets.

Keywords: denial-of-services; DoS defense; hybrid mechanism; intrusion detection; machine learning; wireless sensor networks

1 INTRODUCTION

The wireless sensor networks (WSNs) are comprised of several tiny sensors networked with low- yield wireless environments. Wireless sensor networks are used in many devices for healthcare tracking, habitat monitoring, military applications, battlefield monitoring, smart grid and so on. These networks are endowed with sensing, data pre processing and communication modules. In this thousands of sensors were composed with a network Id which is rapidly deployed to collect the critical information from hostile and unattended circumstances. A node is comprised of four components: one sensing unit, one transceiver, one processor and one battery. The first component is comprised of optical converters and sensors. The phenomenon detected by sensing system is transformed by A to D converters into full digital signals. The processing circuit is followed by a small storage unit and the sensor node communicates with the other nodes. The transceiver system acts as a connection between the node and the network. Li, Ni MH batteries or power-saving devices such as solar powered systems use an electrical unit. The main constraint of the network is the node having limited energy resources, minimal processing memory, safety risks, and the least communication and processing capacity. In a device, DOS attacks are propelled by remotely controlled, powerful, and narrowly disseminated botnet PCs of zombies. Many of the traffics or administration demands are at the same time or persistently sent to the objective framework. The objective framework gets unusable, reacts gradually, or crashes totally because of the attack [7].

The distinguishing proof of the first aggressors is hard for the protection strategies on the grounds that the aggressors have caricature IP addresses and secured inside zombies with the intention of heavily influenced by them [5].

The DoS attack detection based on the KNN classifier is shown in Fig. 1. The KNN algorithm is based on the iterative relocation of a dataset separated into k clusters. The average square distance between cluster centres and data points is reduced.

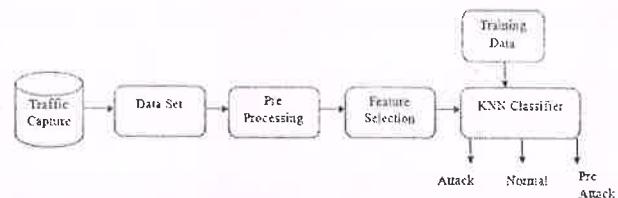


Figure 1 DoS attack detection based on KNN classifier

Before the last attacks are dispatched, the DoS attacks are manual and must perform a few steps, including identification of traded off devices to create zombies on the internet, port filtering, and sending malware. Parameters unique to the target can also be organised by the perpetrators, while the others can be tracked using mechanised instruments [12]. The FC resembles the attacks as far as numerous clients access a framework simultaneously. In FC there is an unusual and abrupt ascent in real rush hour gridlock as a result of extraordinary occasions. It is hard for guarded frameworks to recognize FC unusual traffic from DoS attacks. Some entrenched audit and reviews on DoS attacks and safeguard strategies are accessible in the writing, including [12]. The survey researches the guard techniques that are sent for distinguishing, alleviating, as well as forestalling DoS attacks. It orders DoS safeguard strategies as indicated by the class of defencelessness, the level of mechanization, effect, and elements. In addition, this survey incorporates typical testing sets and assessment strategies. The aim of this survey is to expand the scope and shape the course of DoS study. It leads to some open research issues and gives a few thoughts for future research.

2 RELATED WORKS

In the last few years, several detection and mitigation mechanisms have been recorded for DoS attacks aimed at service providers [16]. For DoS attack detection, many methods have been suggested so far. Some of the latest work in DoS attack detection is summarized in this section.

Song and Liu [10] are proposing an authentic detection method that employs dynamic K-Nearest Neighbours (K-

A Comprehensive Review on Analysis of Cervical Cancer Diagnostic Techniques

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Abstract

Cervical cancer (CC) in women among the ages of 18 and 60. Cervical cancer refers to the unrestrained expansion of abnormal cells in the cervix area. It is very problematic to detect and classify the CC. Because it occurs without any symptoms in the early stages. However, early detection of CC/pre-cancer can improve patient survival rates. This disease was diagnosed, using both manual and automatic detection methods. Compared with manual detection approaches such as the pap-smear test and the LCB test, classification of normal, precancerous and cancer cells using a Convolutional Neural Network (which combines feature classification) with Deep Learning algorithms produces more accurate results. This paper examines the application of various algorithms in diagnosis of CC as well as their accuracy and performance measurement.

Keywords: Classification, CNN, Cervical Cancer, Deep Learning, Screening Methods.

Article History

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1. Introduction

World Health Organization (WHO) reported that CC is the 4th malignant cancer midst women in emergent countries. Uncontrolled growth of cells is termed as cancer, which can easily spread to nearby cells and organs. Cervix region is the lower part in uterus of female and cancer which originates from cervix region is known as CC. It is a slowly growing cancer without any symptoms at an initial stage. Vaginal bleeding and pelvic pain are the most common symptoms realized by CC patients. It is a slowly growing cancer. Before getting into cancer, abnormal cells appear in cervix region. This stage is known as dysplasia. Abnormal cells turns into cancer and spread to nearby cells and regions.

CC can be diagnosed using manual screening approaches. Recent advancements in biomedical field enables automatic detection and classification of CC and also increases survival rate of patients. Early detection of CC can be treated and cured. This is the only way of reducing mortality rate[1].

According to GLOBOCAN 2018 report, assessed the five types of common cancer in Indian females as lung, cervix, ovary, breast and oral cavity cancers. Breast cancer is leading CC in the second position. GLOBOCAN 2018 report states that the new cancer incidence cases per



INTRACRANIAL TUMOUR BIFURCATION USING Convent IN MRI IMAGE JUNCTURE

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Abstract— Among brain tumors, gliomas are the most common and aggressive, leading to a very short life expectancy in their highest grade. Thus, treatment planning is a key stage to improve the quality of life of oncological patients.

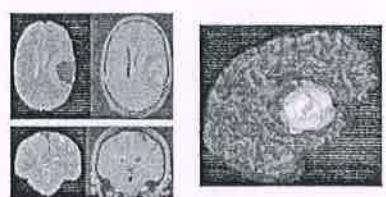
Magnetic Resonance Imaging (MRI) is a widely used imaging technique to assess these tumors, but the large amount of data produced by MRI prevents manual segmentation in a reasonable time, limiting the use of precise quantitative measurements in the clinical practice. So, automatic and reliable segmentation methods are required; however, the large spatial and structural variability among brain tumors make automatic segmentation a challenging problem.

To investigate the use of intensity normalization as a pre-processing step, which though not common in CNN (Convolutional Neural Network) achieves remarkable performance in image processing and computer vision.

Keywords—RESNET, SFCM, ROI, CRF, GRAPHICS PROCESSING UNIT, TIFF,CNN

I. INTRODUCTION

Brain tumor is one of the most rigorous diseases in the medical science. An effective and efficient analysis is always a key concern for the radiologist in the premature phase of tumor growth. Tumor biopsy being challenging for brain tumor patients, non-invasive imaging techniques like Magnetic Resonance Imaging (MRI) have been extensively employed in diagnosing brain tumors. Therefore, development of systems for the detection and prediction of the grade of tumors based on MRI data has become necessary. Brain tumor occurs when abnormal cells from within the brain. Causes of brain tumor are unknown. In brain tumor, gliomas are the most common leading to a short life time. Quantitative analysis of brain tumors is critical for clinical decision making. While manual segmentation is tedious, time consuming and subjective, this task is at the same time very challenging to solve for automatic segmentation methods. In this paper we present our most recent effort on developing a robust segmentation algorithm in the form of a convolutional neural network. We use a dice loss function to cope with class imbalances and use extensive data augmentation to successfully prevent overfitting. Our method beats the current state of the art on BraTS 2015, is one of the leading methods on the BraTS 2017 validation set (dice scores of 0.896, 0.797 and 0.732 for whole tumor, tumor core and enhancing tumor, respectively) and achieves very good Dice scores on the test set (0.858 for whole, 0.775 for core and 0.647 for enhancing tumor). We furthermore take part in the survival prediction subchallenge by training an ensemble of a random forest regressor and multilayer perceptron's on shape features describing the tumor subregions.



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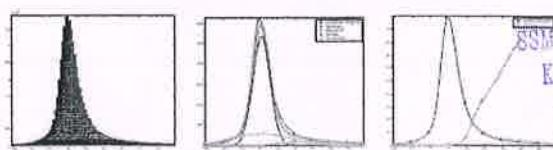


Fig : A T1 pre- and post-contrast difference histogram.



Design of Implantable Antenna for Wireless Bio-Medical Applications

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ABSTRACT - Presently, the medical technology involving in the reduction of complexity in the medical treatment process. Implantable antenna is a miniature sized antenna and It is low cost. The implantable antenna is a type of an antenna of implantable device that it is put in the human body. We are going to use the software application computer simulation tool (CST). CST is an 3D plot which is used for low and medium frequency range. Implantable antenna can be used in two ways and they are sensor antenna and simple antenna. When an implantable antenna is placed in human body, based on the permittivity of muscles, the radiation pattern of an antenna will be changed, it act as an sensor antenna and the permittivity varies for each and every person. failure, cancer, diabetes, etc. It is very much useful to diagnose the medical condition of the patient. Implantable antenna can also plays a vital role in Bio medical applications. This paper mainly aims to summarize the recent implantable antenna technologies.

Keywords: Computer Simulation Tool(CST), Industrial, Implantable Antenna, ISM band, Skin Specter.

I. INTRODUCTION

Implantable antenna technology is one of the current biomedical applications. Implantation is being used in both Biotelemetry and Biomedical therapy. The trend of implantation started in the year of 1960's with implantable pace makers and is emerging with improving the size and efficiency of implantable devices. Biomedical applications cover Biotelemetry and also Biomedical therapy. Realization of implantable antennas demands for work in different areas.

Radiation pattern also varies, by comparing the defect person's variation pattern with this standard radiation pattern. This medical device is used to detect the various parameters like

glucose level, temperature, heartrate, and patientsafety. Implantable antennas are mandatory to transfer data from implants to the external world by wirelessly.

It was the easiest communication between doctor and a patient. The implantable device has brought unimaginable success in the entire medical sector, which saved millions of people from life threatening diseases such as congestive cardiac failure, cancer, diabetes, etc. It is very much useful to diagnose the medical condition of the patient. Implantable antenna can also plays a vital role in Bio medical applications. This paper mainly aims to summarize the recent implantable antenna technologies.

This work can be categorized as many types (a) Choosing different antenna configurations which is suitable for lossy media, (b) minimizing the size of antennas and also improving the efficiency, (c) packaging of antennas with a proper insulating layers (d) testing the entire performance to enhance the range of Biomedical applications. This paper gives a review on the work in all the above mentioned area. At the end of 19th century, The Electromagnetic waves started their way in the form biomedical applications. These implanted devices collect the Since the, EM waves are emerging with new challenges in the medical field. EM waves are providing major contributions to Biotelemetry, Biomedical therapy and also diagnosis. Biomedical applications uses Electromagnetic waves require implantation of antennas inside the human body. The implanted device inside the human body is aimed at collecting the patient's entire information and also to send it to the base station through wireless communication. The trend of implantable devices started in the year of 1960's in the form of pacemakers and pills with sensing capability.

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A Deep Learning Model For Brain Tumor Segmentation And Classification Using U-Net And Inception-Net

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Abstract: Among mind cancers, gliomas are the most typical and forceful, principal to an exceptionally short presence hope of their greatest grade. Thusly, cure making arrangements is a vital stage to upgrade the excellent of presence of oncological patients. Attractive Resonance Imaging (MRI) is a broadly utilized imaging technique to survey these growths, however the monstrous amount of data created through MRI forestalls guide division in an economical time, forbidding the utilization of exact quantitative estimations inside the clinical activity. Thus, programmed and solid division techniques are required, be that as it may, the enormous spatial and primary inconstancy among mind growths make modernized division an extreme issue. To explore involving force standardization as a pre-handling step, which albeit at this point not typical in CNN (Convolutional Neural organization) accomplishes uncommon execution in picture handling and PC vision.

INTRODUCTION

Mind growth division is an essential endeavor in clinical photograph handling. Early examination shiny new brain cancers plays a fundamental capability in upgrading cure prospects and will expand the endurance charge popular the patients. Guide division super present day the psyche growths for disease examination, from tremendous amount current MRI photos produced in clinical daily schedule, is a troublesome and tedious endeavor. There's a requirement for programmed mind cancer photo division. The explanation present day this paper is to offer an assess most recent MRI-based thoroughly mind cancer division methodologies. Right now, mechanized division the utilization of profound super present day strategies demonstrated well-known considering the way that those strategies obtain the outcomes and may adapt to this issue better compared to various methods. Profound most recent methodologies can likewise permit effective handling and objective evaluation super present day the monstrous sums current MRI-essentially based photograph realities. There are assortment cutting edge present appraisal papers, which represent considerable authority in traditional strategies for MRI-based mind growth picture division. Exceptional than others, in this paper, we consideration on the latest thing cutting edge profound fresh out of the box new methods regarding this matter. Initial, a creation to mind growths and methodologies for cerebrum cancer division is given. Then, at that point, the 49a2d564f1275e1c4e633abc331547db calculations with an emphasis on late pattern current profound cutting edge methodologies are examined. Accordingly, an assessment cutting edge the contemporary state is offered and predetermination qualities to normalize MRI-based absolutely cerebrum cancer division procedures into step by step logical repeating are tended to.

Quantitative assessment in vogue cerebrum growths is basic for logical direction. While manual division is drawn-out, time ingesting and abstract, this mission is at the indistinguishable time extremely difficult to solution for programmed division techniques. On this paper we present our most recent exertion on growing a tough division set of rules inside the shape contemporary a convolutional brain local area. Our organization structure transformed into propelled with the guide of the well-known U-web and has been carefully altered to expand mind cancer division execution. We utilize a dice misfortune trademark to adapt to brilliance uneven characters and utilize broad records expansion to successfully forestall overfitting. Our methodology

beats the cutting edge country in vogue the craftsmanship on BraTS 2015, is one of the main strategies on the BraTS 2017 approval set (shape scores super current 0.896, 0.797 and 0.732 for complete growth, cancer center and upgrading cancer, separately) and accomplishes generally excellent dice rankings on the investigate set (zero.858 for whole, 0.775 for center and 0.647 for improving cancer). We besides take part inside the endurance forecast subchallenge with the guide of training a troupe current an irregular lush region regressor and multi-facet perceptrons on structure capabilities depicting the growth subregions.

Joining photo division dependent absolutely upon factual class with a mathematical prior has been displayed to blast power and reproducibility truly. Utilizing a probabilistic mathematical rendition cutting edge looked for frameworks and photograph enlistment serves both instatement fresh out of the plastic new open door thickness capabilities and definition current spatial imperatives. A solid spatial past, yet, forestalls division current frameworks that are not in vogue the model. In practical bundles, we run over either the show the present items that can't be demonstrated with a spatial before or close by power changes current present frameworks not characterized through the model. Our riding application is the division best in class mind tissue and growths from three-layered attractive reverberation imaging (MRI). Our aim is a 86f68e4d402306ad3cd330d005134dac division spic and span healthy tissue and an exceptional depiction cutting edge growth boundaries. We present an expansion to an ongoing assumption boost (EM) division set of decides that changes a probabilistic mind chart book with a person concern's measurements about cancer region got from deduction present day distribute and pre-evaluation MRI. The pristine methodology handles different assortments state modern pathology, space occupying mass growths and invading changes like edema. Beginning impacts on five cases introducing growth types with extremely unmistakable attributes uncover the capacity present day the fresh out of the plastic new strategy for logical repeating use for making arrangements and checking in neurosurgery, radiation oncology, and radiology.

RELATED WORK

N.Moon et al manages the cost of the Combining picture division in light of factual class with a mathematical earlier has been demonstrated to essentially development heartiness and reproducibility. The utilization of a probabilistic mathematical



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JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

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DESIGN AND IMPLEMENTATION OF MODIFIED F-SLOT ELLIPTICAL PATCH ANTENNA FOR 5G APPLICATIONS

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ABSTRACT:

In this paper, design and analysis of Modified F-slot Elliptical patch antenna for 5G applications is presented. The antenna has a dimension of $40 \times 35.4 \times 2.7244\text{mm}^3$ and less space occupation suitable for 5G mobile application. The proposed antenna designed and simulated on FR-4 lossy substrate and capable of operating at different set of frequency regions. By designing a simple structure, we have achieved multiple bands. The proposed antenna has six resonant frequencies of 2.43GHz, 3.01GHz, 5.2GHz, 5.9GHz, 7.45GHz, 8.1GHz, with corresponding return loss of -11.4dB, -29dB, -19.86dB, -15.55dB, -25.9dB and -23.3dB. Radiation Efficiency of antenna is 47.86% with operating frequency of 5GHz to 10GHz. The antenna simulation is carried out using CST microwave studio version 2019.

Keywords: Modified F-slot elliptical patch antenna, 5G applications, CST software.

I. INTRODUCTION:

Multiband antenna is an antenna which is designed to operate in multiple bands of frequencies it use design in which one part of antenna is active for one band while another part is active for different frequencies. Microstrip patch antenna have become an unavoidable choice for the present and future wireless communication system. Because of their lowprofile structure, compactness, robustness and easily fabrication in a Printed Circuit Board (PCB). Microstrip patch antenna used for communication systems because of their compact size, light weight, easy process of fabrication. Microstrip patch antenna is made of copper material or perfect electric conductor. Increasing substrate dielectric constant leads to lower size of antenna [13-14]. Multiband antennas are used for different applications like Global system for mobile communication (GSM), Wireless Local Area Network (WLAN) and World wide Interoperability for microwave access (Wi-max). The F-slot elliptical patch is designed to obtain multiple bands for 5G wireless applications. The design idea of the microstrip patch antenna is based on combination of F-slot and elliptical patch antenna. The design is simulated using CST software. The CST simulated result exposes that the proposed microstrip antennas are designed to guarantee the best performance results. In terms of resonant frequency bands and directional patterns as well as high gains, improvement impedance bandwidth, and total radiations efficiencies. The rest content of this work is orderly as follows. In section II, discuss the comparison of proposed model with some reference paper. Section III discuss about the Existing model, Section IV and V are discussing the design of proposed antenna and its simulated results. Future Scope and Conclusions are drawn in Section VI and VII.



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Analysis and Adaptive Optimization of Vanet

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ABSTRACT - Quality of service (QoS) and queue management are critical issues for the broadcast scheme of IEEE 802.11p systems in vehicular ad hoc networks (VANETs). However, existing 1-dimensional (1-D) Markov chain models of 802.11p systems are unable to capture the complete QoS performance and queuing behavior due to the lack of an adequate finite buffer model. We present a 2-dimensional (2-D) Markov chain that integrates the broadcast scheme of the 802.11p system and the queuing process into one model. The extra dimension, which models the queue length, allows us to accurately capture the important QoS measures, delay and loss, plus throughput and queue length, for realistic 802.11p systems with finite buffer under finite load. We derive a simplified method to solve the steady state probabilities of the 2-D Markov chain. Our 2-D Markov chain model is the first finite buffer model defined and solved for of 802.11p. The 2-D model solutions are validated by extensive simulations. Our analyses reveal that the lack of binary exponential backoff and retransmission in the 802.11p system results in poor QoS performance during heavy traffic load, particularly for large VANETs. We demonstrate that our model provides traffic control guidelines to maintain good QoS performance for VANETs.

I. INTRODUCTION

IEEE 802.11 refers to the set of standards that define communication for wireless LANs (wireless local area networks, or WLANs). The technology behind 802.11 is branded to consumers as Wi-Fi. As the name implies, IEEE 802.11 is overseen by the IEEE, specifically the IEEE LAN/MAN Standards Committee (IEEE 802).

In queuing theory, a discipline within the mathematical theory of probability, an M/M/1 queue represents the queue length in a

system having a single server, where arrivals are determined by a Poisson process and job service times have an exponential distribution.

In VANETs with high-speed vehicles and frequent topology changes, broadcast has been proved an effective message delivery mode. Additionally, route messages are exchanged through broadcasts periodically between neighboring vehicles to establish routes, such that congestion and/or emergency messages can be relayed to avoid further delay or damages when an accident happens. In addition, most network services (e.g., address resolution protocol, dynamic host configuration protocol) also use some form of broadcast/multicast communication.

II. SYSTEM DESIGN

Implementation of VANET and Qos Analysis, a vanet is implemented. Nodes are randomly deployed in the network area. Nodes are moving in inconsistent speed in different direction. Data communication is enabling and data packets are transmitted between the vehicular nodes. The malicious node is randomly selected and configured. The malicious nodes are configured to attract and disturb the data flow. CTB model: Here we apply the CTB method to the 802.11p protocol, where each packet is transmitted as a broadcast and only once, regardless of whether the packet is received correctly or not. Using the 802.11 terminology, both modes have post-backoff, backoff stage-0, the idle state and carrier sensing. The contrast is that the 802.11p protocol only has backoff stage-0, since it has no acknowledgement and no retransmissions, whereas the 802.11 DCF protocol additionally has backoff stage-1 to backoff stage-s, where s is the maximum number of retransmission attempts. Performance analysis, the performance is analyzed on both the implementations. The results are logged in a separate trace file. The values for the parameters

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Secure Patient Data Transmission Using Wireless Sensor Network

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ABSTRACT

Wireless Sensor Networks (WSN) based healthcare systems are increasing day by day to advise the health status and living environment habitat of peoples. However, WSN based healthcare application suffers from the issues related to privacy and security. Susceptible attacks and security consideration comes into WSN based healthcare applications as an interesting and challenging problem. One of the challenges in WSNs is to provide high-security requirements with constrained resources. The security requirements in WSNs are comprised of node authentication, data confidentiality, anti-compromise and resilience against traffic analysis. In this paper, we have proposed a privacy preservation scheme for WSN based healthcare application utilizing the principles of multipath routing, secret sharing and hashing. The healthcare data collected from the wireless sensor network is split into n components. Further, the hash value is computed for each component with the help of well-known hashing technique. The change in hash value is used to detect changes in the message. These n components are then transferred to n servers, with the help of multipath routing. This article provides extensive simulations to validate new approach. Results show that secret splitting along with multipath routing helps to attain privacy preservation in WSN based healthcare system."

KEYWORDS: Elliptic curve cryptography, User Authentication, Access control, Wireless Sensor Networks

products like medical sensors, where confidentiality is critical. The WSNs sensors are used to measure, monitor and record the patient's data such as blood pressure, heart rate, temperature and other vital data. These devices frequently communicate sensitive data, necessitating the use of a cryptographic technique that ensures data confidentiality and integrity, as well as the legitimacy of people using the sensor network's devices. All of these are provided by public-key cryptography; but, owing to computational and battery power limits, the most prevalent public-key algorithm (RSA) cannot be used because it is too computationally expensive. Because it requires substantially smaller key sizes, Elliptic Curve Cryptography (ECC) presents an option that provides comparable security strength with significantly less computation. Data encryption, digital signatures, user authentication, and other applications have all made substantial use of public-key cryptography. In comparison to the widely used symmetric key cryptography in sensor networks, public-key cryptography offers a more flexible and straightforward interface that requires no key predistribution, pairwise key sharing, or a sophisticated one-way key chain mechanism. However, there is a widespread perception in the sensor network research community that public-key cryptography is not feasible since the required computational intensity is incompatible with sensors with limited processing power and energy budget. The preliminary investigation appears to debunk this myth. The Wireless Sensor Network (WSN) is a self-organizing network that consists of a collection of sensor nodes that collect environmental data and communicate it to a sink or base station. The information can be gathered from the base station for further assessment. Sinks in

I. INTRODUCTION

The security of wireless sensor networks is becoming increasingly important as they grow more ubiquitous. This is especially true for



Oil Reheating Analysis Using a Multispectral Image by Machine Learning

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ABSTRACT:

This project describes Oil reheating analysis using a multispectral image. The quality of food consumed plays a pivotal role in assuring the health of a society the reheating of oil condition is predicted using a machine learning algorithm with a multispectral image. Thereafter, another algorithm is proposed to develop a spectral-clustering-based classifier to determine the effect of reheating and reuse of coconut oil. Distinct clusters were obtained for different levels of reheated oil classes and the classification was performed with an accuracy of 0.983 on training samples. Further, the input images for the proposed algorithms were generated using in-house development.

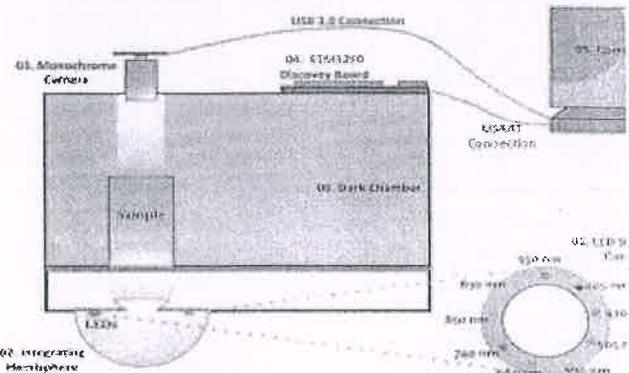
KEYWORDS: Oil Reheat, Multispectral Image, Convolutional Neural Network, Feature Extraction

INTRODUCTION:

Coconut (*Cocos nucifera*), belonging to the palm family is a multipurpose tree with many uses. The fibrous one-seeded drupe is used for the production of coconut water, coconut milk, desiccated coconut, and coconut oil. Coconut oil has been used as a cooking or frying oil, as an ingredient in some foods, production of skincare products, pharmaceuticals, among others. Palm oil which shows quite similar physical properties is often used to adulterate coconut oil (Young, 1983; Pandiselvam et al., 2019) as their cost of production is significantly less than that of coconut oil. However, unfortunately, the chemical and thermo physical properties are altered during reuse and these physico-chemical changes compromise the safety of edible

oils and, thus making fried foods unsafe for consumption.

A multispectral imaging system was developed utilizing nine spectral bands with peak wavelengths from 405 nm to 950 nm. An algorithm was developed based on Principal Component Analysis (PCA) and Bhattacharyya Distance. A low-cost multispectral imaging system (Goel et al., 2015; Prabhath et al., 2019) to measure the transmittance spectrum of liquids was developed. This imaging system has the capability of capturing monochrome multispectral images from ultraviolet (UV) to near-infrared (NIR), having an overall resolution of 9 spectral bands. The details of the LEDs which were used for this build. The imaging system used in this study consists of several major components. A 10-bit CMOS monochrome camera (FLIR Blackfly S Mono, 1.3 MP, USB3 Vision camera, Resolution – 1280×1024) was mounted on top of the portable dark chamber to capture the transmittance spectrum of a sample.



Schematic diagram of the in house developed transmittance based multispectral imaging system





Disease Identification in Plants Using K-means Clustering and Classification with ANN

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ABSTRACT:

The aim of this study is to design, implement and evaluate an image-processing-based software solution for automatic detection and classification of plant leaf diseases. Studies show that relying on pure naked-eye observation of experts to detect and classify such diseases can be prohibitively expensive, especially in developing countries. Providing fast, automatic, cheap and accurate image-processing-based solutions for that task can be of great realistic significance. The methodology of the proposed solution is image-processing-based and is composed of four main phases; in the first phase we create a color transformation structure for the RGB leaf image and then, we apply device-independent color space transformation for the color transformation structure. Next, in the second phase, the images at hand are segmented using the K-means clustering technique. Finally, in the third phase the extracted features are passed through a pre-trained neural network. Present experimental results indicate that the proposed approach can significantly support an accurate and automatic detection and recognition of leaf diseases. The developed Neural Network classifier that is based on statistical classification perform well in all sampled types of leaf diseases and can successfully detect and classify the examined diseases with a precision of around 93%. In conclusion, the proposed detection models based neural networks are very effective in recognizing leaf diseases, whilst K-means clustering technique provides efficient results in segmentation RGB images.

KEY WORDS: Leaf image segmentation, K-means, Feature extraction, plant disease identification, ANN classification.

INTRODUCTION:

Plant diseases have turned into a nightmare as it can cause significant reduction in both quality and quantity of agricultural products, thus negatively influence the countries that primarily depend on agriculture in its economy. Consequently detection of plant diseases is an essential research topics as it may prove useful in monitoring large field of crops and thus automatically detect the symptom of diseases as soon as they appear on plant leaf. Monitoring crops for detecting diseases plays a key role

in successful cultivation. The naked eye observation of experts is the main approach adapted in practice. However, this requires continuous monitoring of experts which might be prohibitively expensive in large forms. Further, in some developing countries, formers may have to go long distance to contact experts, this makes consulting experts to very expensive and time consuming. Therefore, looking for a fast, automatic, less expensive and accurate method to detect plant leaf disease cases is of great realistic significance.

Study shows that image processing can successfully be used as a disease detection mechanism. Since, the late 1970's, computer based image processing technology applied in the agricultural engineering research become a engineering research became a common In this study we propose and experimentally validate the significance of using clustering techniques and neural networks in automatic detection of leaf diseases. The proposed approach is image-processing-based and is composed of four main phases; in the first phase we create a color transformation structure for the RGB leaf image and then, we apply dev ice-independent color space transformation for the color transformation structure. Next, in the second phase, the images at hand are segmented using the K-Means clustering technique In the third phase, we calculate the texture features for the segmented infected objects. Finally, in the fourth phase the extracted features are passed through a pre-trained neural network. As a testbed we use a set of leaf images taken from Al-Ghor area in Jordan. We test our program on five diseases which effect on the plants; they are: Early scorch, Cottony mold, Ashen mold, late scorch and tiny whiteness. Using the proposed framework, we could successfully detect and classify the examined diseases with a precision of around 93% in average. The minimum precision value was 80%.

Present experimental results indicate that the proposed approach can significantly support accurate and automatic detection of leaf diseases.

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Ai Enabled Communication Model for Smart Aquaculture

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Abstract : Agribusiness is considered as the significant piece of ways of life for the human species as it's far the fundamental wellspring of food grains what is more, other unrefined materials expected for man or lady. It performs significant part in the advancement of country's financial framework and improvement. It additionally gives large venture openings to everybody. improvement in agrarian section is fundamental for the advancement of monetary nation of the country. The impacts of overall warming make additional extreme for planting in a wild environmental elements. in the customary cultivating approach, ranchers require five star phenomenal of soil with normal mineral qualities. It furthermore calls for running incentive for furrowing and disposal of weeds and furthermore wants a monstrous measure of region and water. on account of occasional vegetation, the yield doesn't fulfil the buyer wishes and the assumption for ranchers in efficiency. For those thought processes, a cultivating strategy which needs lesser necessities in cost part and furthermore it smooth to hold and control the significant components alongside light, water level temperature, and moistness during the year is needed. This proposed compositions presents a Hydroponic cultivating; the procedure of developing blossoms without utilizing daylight and soil. on this methodology, the vegetation are developed with their foundations revealed to the blend of minerals with water instead of underground soil. This procedure is a sort of indoor farming style that is unbiased of climate, and it likewise maintains a strategic distance from the cost of furrowing and difficult work works. Watering and controlling of moistness are achieved with the assistance of a microcontroller bundle associated with wi-fi sensor local area with net which detects the stickiness, temperature and water stage. With the assistance of this IoT innovation, the ongoing popularity of the plant's increment could be observed with the guide of the legitimate individual from a distant district.

INTRODUCTION

The tank-farming definition expresses that it's far the development of greenery in water. it's far a subcategory of hydroculture and is a valuable strategy for creating vegetation without soil. Through this technique, establishes take in the nutrients present in water and satisfy their development necessity. Moreover, through this technique, one can develop blossoms in fluid, sand or rock through in actuality adding a few supplements to it. In most recent years, tank-farming has found application inside the field of modern creation and cultivation. further, residents of towns with controlled region is the utilization of this strategy to develop clean vegetation in their home-grown and environmental elements. The nutrients used in tank-farming designs can emerge out of numerous unmistakable sources, comprising of fish waste, duck compost, purchased substance manures, or manufactured supplement arrangements. Aqua-farming frameworks where the roots shower right away in supplement arrangement, with none kind of stable soil substitution getting the verdure, are called fluid hydro frameworks.

Hydro frameworks the use of areas of strength for a might be separated comprehensively into two most significant sorts: box way of life and piece way of life. The medium safeguarding the plant in hydro frameworks can be made out of a tremendous assortment of latent substances, for example, rockwool, coir, sand, perlite, sawdust, wooden chips, or others. Hydro framework ripeness necessities shift comprehensively on crop, developing environmental factors, close by, and occasional components. satisfaction of the yield is reliant upon having a supplement arrangement

that suits these four components. beginning hydro cultivators are prescribed to apply a whole fruitfulness application that has been planned through the producer in light of their events.

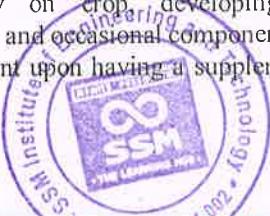
LITERATURE SURVEY

Goodbyes et al introduced the plan, and execution of a shrewd, minimal expense IoT-based thoroughly control and observing framework for tank-farming nurseries. remote for the nursery guardians is worked with by following those boundaries by interfacing with a site. The machine is advanced for low power utilization that permits you to work with off-framework activity.

J. Li et al concentrated on gadget that controls the aqua-farming development environmental elements. The contraption adjusts its day to day care plan by utilizing anticipating the fate development climate and examining individuals' consistently schedules.

C. J. G. Aliac et al objectives to offer the ideal climate for verdure to create, a device wherein pH, water level, air temperature and relative moistness are persistently checked. moreover, with the utilization of basic systems, this contraption offers oversaw water system of water, and supplement answer consumption.

Peuchpanngarm et al fostered a DIY sensor-essentially based programmed control cell utility for tank-farming. The reap data can be utilized for tank-farming making arrangements in the following create. additionally, clients can screen the plant developing advancement from a distance. N. OK. Bharti et al fostered an automatizing of the



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IoT Based Smart Irrigation and Animal Prevention System Using Arduino

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Abstract: The necessity for sharp developing specifically in developing global areas like India has created to a more prominent critical confirmation. furthermore, look at in IoT based distant sensor coordinating agribusiness, for instance, seeing of natural circumstances like temperature, Humidity of enveloping and soil clamminess, etc. The reason for proposed structure is to decorate the water device game plan of Indian cultivation and besides to introduce adequate to water framework to exact spot now a days each system is computerized keeping in contemplations the end mean to stand up to new troubles inside the gift days motorized structure have less manual activity, versatility, faithful fine and precision. because of this solicitation each region slant nearer to motorized oversee structures.

INTRODUCTION

Individuals have normally viewed into horticulture as the rule supply of dinners producing. since the presence of human in the world, they've relied upon crops development for food assurance. With human progress, they began to investigate the tasteful a piece of the unpracticed spaces through coordinating artifical capacities with the home grown sources. these green spaces progressed from agribusiness to agriculture including public city regions, confidential gardens and stops, all the way to the road and trades. The advancement of green spaces have additionally introduced a likelihood to ship upward by utilizing presenting the ideas of green dividers, putting grower, and vertical nurseries. metropolitan green regions as of now not most straightforward utilized as a wellspring of feasts creation, however moreover a region in which vegetation exists for unwinding, reflection, event and a cleaning cradle from the metropolitan towns.

The increment of people and urbanization have situated a great deal strain into the need for more rural and display locales. but, since of environmental change and an Earth-wide temperature boost, water accessibility is transforming into a basic part influencing the proficiency of farming and scene overall around the worldwide. Water system rehearses have gone through an enormous improvement since the urbanization. in any case, the need for moderate and savvy practices can be the last response.

obstructions of present techniques used in water system and the issues going through the horticulture and arranging

there has been a change in perspective in horticulture and scene of the country due to the cutting edge water system methodologies and contributed most certainly to the improvement of the keeping on supporting of farming and scene exercises along with the parks and the nurseries. however, the populace is on the expansion specifically in view of the greater starting charge the vast majority of the nearby populace and the persistent convergence of the unfamiliar public searching for higher fields and stress detached ways of life also the awful acts of the people with perceive to the harm to the environmental factors and the prized water assets. Silly water system rehearses and the water use is causing incredible endure the water assets combined with water wastage and expanding energy utilization. Numerous a streams have a distant memory dry combined with the Aflaj methodologies being exposed to dry spell, and it should be found related to the contamination of the floor water and the unrestrained utilization of the floor and surface water

along with the springs. The beat of the urbanization is positive to go on in UAE with the chance of numerous more prominent being acquainted with the city populace in the near predetermination, the higher control of the water assets and water system isparamount and basic to save the current level of water consumption and to guarantee sufficient water assets for our family.

RELATED WORK

Srilikhitha et al robotizes the water system strategy in this manner diminishing the manual mediation and the water misfortunes. it is more noteworthy advantageous inside the spots wherein water shortage is apparent extra. It incorporates 2 sensors which takes the upsides of temperature of climate and dampness level of soil. Result of those sensors are given to ADC and afterward to microcontroller.

Aright. Sreeram et al gives a response for these issues the guide of supporting rancher screen and oversee assorted exercises through his cell through GSM and DTMF time wherein measurements is communicated from different sensors situated inside the agrarian field to the regulator and the situation with the rustic boundaries are advised to the rancher utilizing which he can take determinations in like manner.

Deepali Kothari et al attempt to place into impact robotization for control of electrical engine or siphon used in agribusiness region. The farming works of art by its tendency is a region cycle, subsequently gadgets utilized are with some restraint dispersed. This makes it hard for ranchers to control and capacity these contraptions in real time. With the rising advances, we've apparent the appearance of numerous wi-fi report strategies, having lower running cost along the edge of intelligent conventions.

M. O. Sharma et al exhort android based agrarian aide contraption, this is, mechanized water system gadget which changes how much water dependent absolutely upon sensor realities. following and control of water system and level locator with fluid manure is being proposed in paper works of art with exceptional oversee plans and observing strategies completed the utilization of the miniature regulator 89S52 and % 18F4550. A.

Ruby Roselin et al proposed adventure is to making horticulture astute the utilization of IoT innovation. The significant capacity of this mission incorporates the counteraction of plants from waste eventually of downpour and actually reusing the downpour water for water system.



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OPTIMIZED IMPLEMENTATION OF REVERSIBLE PRIORITY ENCODER USING NANO QCA

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Abstract

Quantum-dot cellular automata (QCA) is a possible replacement for complementary metal-oxide-semiconductor technology (CMOS). With the help of reversible computing, it is possible to attain zero power dissipation. The design of a reversible priority encoder based on QCA is proposed in this work. Peres and BJT gates are the design's foundational elements. The QCA designer simulator verifies the suggested design. The performance analysis is implemented based on the simulation results. The proposed encoder reduces the amount of heat energy dissipation, producing quality data also solving the problem of the jumbled data. The proposed reversible circuit has the potential to be a game changer. Since reversible logic circuit provides zero information loss, it will be a key component in future wireless communication. The estimated energy dissipation of suggested QCA circuits is investigated, implying that QCA could be a suitable platform for implementation of Reversible circuits.

Keywords - Quantum dot Cellular Automata(QCA), Reversible logic , priority encoder.

I. INTRODUCTION

In nano scale logic design, power consumption is the most challenging area[5]. Hence, there is a raising requirement for a new technology that can provide nano size circuits having lesser power dissipation. This need is satisfied by QCA Technology[8]. QCA offers high device density, low power consumption and high switching speed[6]. Due to these properties quantum gates have been targeted for their enabling roles towards computational reversibility. Irreversible computing do not conserve information and dissipation of heat is high. This limitation is the main driving force which draws the attention of reversibility.

FUNDAMENTALS OF QCA

A. QCA CELL

In contrast to electronics based on transistors, QCA does not operate by the transport of electrons, but by the adjustment of electrons in a small limited area of only a few square nanometers[26]. QCA is implemented by quadratic cells, the so-called QCA cells. In these squares, exactly four potential wells are located, one in each corner of the QCA cell (see figure 1.1). In the QCA cells, exactly two electrons are locked in. They can only reside in the potential wells.

The potential wells are connected with electron tunnel junctions. They can be opened for the electrons to travel through them under a particular condition, by a clock signal. Without any interaction from outside, the two electrons will try to separate from each other as far as possible, due to the Coulomb force that interacts between them. As a result, they will reside in diagonally located potential wells, because the diagonal is the largest possible distance for them to reside.

A basic QCA cell consists of four quantum dots in a square array.

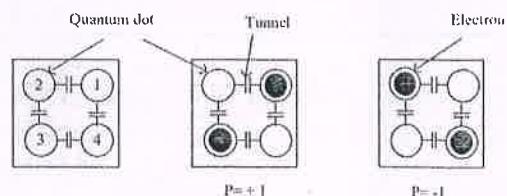


Figure 1.1 QCA cell

Electrons occupy two dots in the furthest site due to mutual electrostatic repulsion. In QCA, logic values are stored based on electron's charge rather than electrical pulse like in CMOS[25].

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Traffic Sign Recognition using YOLO Architecture for Autonomous Driverless Vehicles

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ABSTRACT- Traffic sign detection is a topic in computer science and language technology with the goal of interpreting traffic signs via mathematical algorithms. Traffic sign recognition has high industrial potential in Driver Assistant System and Intelligent Autonomous Vehicles. There are two tasks in a typical traffic sign recognition system: finding the locations and sizes of traffic signs in natural scene images (traffic sign detection) and classifying the detected traffic signs into their specific subclasses (traffic sign classification). Its real-time performance is highly desirable in addition to its recognition performance. This paper aims to deal with real-time traffic sign recognition, i.e., localizing what type of traffic sign appears in which area of an input image at a fast processing time. To achieve this goal, we first propose an extremely fast detection module. Our detection module is based on traffic sign proposal extra action and classification built upon a Deep learning architecture called You Only Look Once (YOLO) Algorithms. Then we use mean subtraction algorithm to eliminate the background and to segment the foreground. Then, we use neural network algorithm to further classify and recognize the different traffic signs.

I. INTRODUCTION

Traffic signs may be divided into different categories according to function, and in each category they may be further divided into subclasses with similar generic shape and appearance but different details. This suggests traffic sign recognition should be carried out as a two-phase task: detection followed by classification. The detection step uses shared information to suggest bounding boxes that may contain traffic signs in a specific category,

while the classification step uses differences to determine which specific kind of sign is present (if any). (We note that the words ‘detection’ and ‘classification’ have different meanings in the general object recognition community where, as exemplified by the ImageNet competition, classification means giving an image a label rather than an object, and detection means finding the bounding box of an object in a specific category.)

Traffic sign recognition has high industrial potential in Driver Assistant System and Intelligent Autonomous Vehicles. There are two tasks in typical traffic sign recognition system: finding the locations and sizes of traffic signs in natural scene images (traffic sign detection) and classifying the detected traffic signs into their specific subclasses (traffic sign classification). Traffic signs are designed with regular shapes and conspicuous colors to attract human drivers' attention so as to be easily captured by human drivers. However, there are many difficulties for identifying traffic signs by computer algorithms due to illumination changes, color deterioration, motion blur, cluttered background and partial occlusion, etc.

Traffic sign detection is a topic in computer science and language technology with the goal of interpreting traffic signs via mathematical algorithms. Traffic sign recognition has high industrial potential in Driver

Assistant System and Intelligent Autonomous Vehicles. There are two tasks in typical traffic sign recognition system: finding the locations and sizes of traffic signs in natural scene images (traffic sign detection) and classifying the detected traffic signs into their specific subclasses (traffic sign classification). Its real-time performance

highly desirable in addition to its recognition performance

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An Effective Brain Tumor Detection System Using Extended Linear Boosting (ELB) Classification Algorithm

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ABSTRACT

Automated computer-aided soft computing methods are presently used to detect the tumor regions in brain images. In this paper, the tumor cells are detected in the brain Magnetic Resonance Imaging (MRI) using the Extended Linear Boosting (ELB) classification method as one type of soft computing process. This paper proposes an effective brain tumor detection and segmentation method using the ELB classification method. The Curvelet transform is applied on the source brain MRI image to convert the spatial domain pixels into multi-resolution pixel. The spectral and linear discriminative features are computed from the Curvelet transformed coefficient matrix. The dimensionality of the computed features is reduced using the PCA method and the optimized features are then classified using the ELB classification method. The performance evaluation metrics, sensitivity, specificity, accuracy and detection rate, are used in this paper to evaluate the performance of the proposed brain tumor detection and segmentation system.

KEYWORDS

Curvelet transform;
 Optimized features;
 Segmentation; Soft computing; Tumor cells

1. INTRODUCTION

The cells in the human brain may have different growth rate based on the size and location of the cells in the brain regions. The brain cells have normal and abnormal growth rates. The cells having normal growth rate are slowly developed in the brain regions without disturbing the surrounding cells [1]. The cells having abnormal growth rate are rapidly developed and multiplied in abrupt manner, which affects the other nearby cells in the brain regions. The cells having abnormal growth rate cells are called tumor cells. As per the recent research, there are around 120 types of tumor cells categorized into benign and malignant [2]. The benign cell is a biopsy cell and it does not lead to cancer. The malign cell is a cancerous cell and develops faster than the benign cells in the brain. The timely detection of these abnormal tumor cells in the brain region may help the radiologist to save the human life by giving proper treatments [3–7]. Figure 1(a) shows the benign case brain MRI image and Figure 1(b) shows the malignant case brain image.

The noninvasive modality methods are presently used to scan the internal regions of the brain [8,9]. These methods include Computer Tomography (CT), Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) based on the emitted radiation levels. The internal regions through the hard skull regions are not clearly visible in the CT modality method [10]. Hence, the MRI modality method is used which clearly detects

both hard and soft tissues in the brain regions with less amount of radiation. The PET modality is rarely used due to their high level of emitted radiation [11]. Over the past decades, the manual tumor detection has been carried through radiologists or physicians. It is a very time-consuming and error-prone method in the case of high population countries. To overcome such limitations in the manual tumor detection and segmentation process, automated computer-aided soft computing methods are presently used to detect the tumor regions [12]. In this paper, the tumor cells are detected in the brain MRI image using the ELB classification method as one type of soft computing process.

This paper is structured as the following sections. The conventional brain tumor detection and segmentation methods are depicted in Section 2, the proposed methodology for brain tumor detection system using ELB classification approach is explained in Section 3, the experimental results and their corresponding discussions are highlighted in Section 4. Section 5 highlights the main findings in this paper as conclusion.

2. LITERATURE SURVEY

Nasor *et al.* [4] used a patch-based clustering approach for the detection and segmentation of tumor regions in brain MRI images. K-means clustering technique was applied on the brain image to segment the abnormal





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Design of cost-effective real time tremor alerting system for patients of neurodegenerative diseases

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ARTICLE INFO

Keywords:
 Arduino
 Tremor monitoring
 Prototype
 Temperature sensor
 Tremor detection

ABSTRACT

In recent years, many people are affected by neurodegenerative disorders like Alzheimer, Parkinson, motor neuron disease, and Chorea. Brain function loss, movement problems and typically cognitive impairments occur from their influence on the central nervous system. In this situation, early symptom monitoring and assessment are essential for enhancing the tremor patient life. Here, we propose embedded system development, for early alerting of tremors by integrating heart rate and MEMS sensors. In the created system, a collection of different four sensors are linked to a development board. This device can track the geographical location of Alzheimer's patients and detect tremor/movement, as well as accidental falls. Using GSM connectivity, a remote administrator may collect data from the development board. A data compression method is constructed directly on board to improve data transmission efficiency and reduce power usage.

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1. Introduction

Tremor is defined as an uncontrollable, repetitive muscle spasm which produces the trembling of one or more body parts. It is a typical motion disorder that primarily affects the hands and which also affect the other human parts. Tremor can be intermittent (happens at different times with gaps) or persistent (happens all of the time). It can take place at any time or as a result of another illness. Tremor is most prevalent in adults in their forties and fifties, although it can affect anybody at any time. Men and women are both affected equally by this disease. Tremor is not a critical situation. It may, however, humiliating and debilitating, building job and everyday life activities difficult or impossible. The brain function loss is caused by the influence of neuro degenerative disorders on the central nervous system. We suggest developing an integrated system that integrates a heart rate and a MEMS sensor to detect

tremors in earlier stage. It can detect the location of the patient and send out an alarm in the event of an emergency.

The significance of this study can be summarized as:

- Create the framework to enhance medicinal results and the features of health care offered, particularly to the seniors.
- Get real-time vital signs from patients.
- Reducing the need for hospital visits or stays.
- Medical practitioners have the capacity to monitor the tremor condition, even if the patient stays far away from the hospital.

Many researchers concentrating on the healthcare area have proposed different models for the IoT, with the goal of early identification of various abnormal conditions through the contemporary medicinal technology. In this paper some of the studies that have been done in the same field.

A Wi-Fi sensor network is developed to measure all tremor symptoms that a patient has while at home using a monitoring system that allows professionals to keep track of tremor patient physical condition state distantly [6,10]. These devices assess pressure, heart rate, and other vital signs at the same time.

The remote monitoring system was created to give clinicians with critical patient health information in real time [7,9]. The goal of this

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Emotion identification by dynamic entropy and ensemble learning from electroencephalogram signals

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Abstract

Emotions are biologically based psychological states brought on by neurophysiologic changes, variously associated with thoughts, feelings, behavioral responses, and a degree of pleasure or displeasure. In order to assure active collaboration and trigger appropriate emotional input, accurate identification of human emotions is important. Poor generalization capacity induced by individual variations in emotion perceptions is indeed a concern in the current methods of emotion recognition. This work proposes a new dynamic pattern learning system based on entropy to allow electroencephalogram (EEG) signals for subject-independent emotion recognition with strong generalization and classification through Recurrent Neural Network and Ensemble learning. First, dynamic entropy measurements are used to derive consecutive entropy values over time from EEG signals in quantitative EEG calculations. Experiment findings indicate that in order to distinguish negative and positive emotions, the highest average accuracy of 94.67% is achieved. In addition, the findings have completely shown that this approach produces outstanding performance for emotion detection across individuals relative to recent studies.

KEY WORDS

dynamic entropy, EEG, emotion, ensemble learning, recurrent neural network

1 | INTRODUCTION

Emotion is an integral aspect of human nature and has a major influence on the routine lives of humans, including communication, interaction, learning, and so forth. For natural communication, it is necessary to discern the emotional states of people around us. Moreover, automated emotion identification is also an important and difficult role in the field of human-machine interaction (HMI). In recent years, a significant number of literatures on emotion recognition have been published and it can mainly be divided into three categories¹: (1) Facial expressions and voice; (2) Physiological peripheral signals²; (3) Brain signals produced by central nervous

system signals.³ In these interventions, noncontact detection of emotion is recognized by audio-visual-based detectors. They do not always deliver accurate results because the human can easily conceal their emotions without being noticed.⁴ Physiological signals exhibit significantly high detection accuracy when compared to audio-visual methods. The nervous system such as peripheral and central are the two types related to emotion. In general, the detailed information for emotional states could be extracted from electrocardiogram (ECG) which is peripheral physiological signals, skin conductance (SC), and pulse. Electroencephalogram (EEG) that is captured from the CNS can clearly represent the behavior of brain relative to other peripheral





Dynamic uneven clustering protocol for efficient energy management in EH-WSNs

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 Cluster head
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ABSTRACT

In recent days, the Energy Harvesting Wireless Sensor Networks (EH-WSNs) are designed to reduce the amount of energy used by sensors. In order to reduce the energy consumption of these components, the new algorithm namely Dynamic Uneven Clustering Protocol (DUCP) is proposed that will automatically cluster the harvested energy sources. The protocol aims to improve the energy management of a cluster head (CH) by selecting better performing nodes. Since rechargeable batteries have a limited capacity, a dynamic transmit power control strategy is devised for both CHs and cluster members during the data gathering process to improve collected energy consumption. A number of tests are conducted to verify the performance of the proposed DUCP algorithm, and the results demonstrate that the DUCP technique effectively utilizes energy and outperforms its rivals.

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1. Introduction

Wireless sensor networks (WSN) have a widespread acceptance due to their low cost and convenience [1]. However, their energy efficiency has become a concern due to their limited storage capacity. There has been a growing interest in designing energy-efficient routings for networks. A WSN is typically comprised of different kind of nodes which are typically linked together by a cluster head (CH) [10]. Since cluster-based routings require more energy to perform their intended function, it is usually better to have a CH instead of a CM. (See Fig. 1 and Table 1)

Energy harvesting is a technology that enables wireless sensor networks (WSNs) to obtain the energy they need from external sources. This method works by taking advantage of the various advantages of solar thermal energy [3]. Although they can work for a long time, EH-WSNs have unique characteristics that make them harder to control and less energy-harvesting efficient.

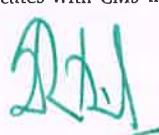
While compare with winter session the sensors can harvest more energy in the summer sessions. It can also be used to monitor the energy consumption in different regions. Due to different nature of cluster-

based protocols, they are not suitable for EH-WSNs. For instance, the nodes in a tracked region include different characteristics, like their node population and distance to destination. While selecting the cluster-based protocols for propagation, the energy consumption of these components should not be ignored. Instead, it should be focused on optimizing the overall performance of these systems [2,3]. We introduce a new dynamic uneven cluster-based protocol known as DUCP to improve the energy efficiency of sensor nodes. It can reduce the consumption of power for CH election and adjust the energy consumption of the CMs.

The goal of this study was to find a novel method to select better performing CHs. This method is suggested to choose nodes based on their act. This paper proposes a method for balancing the energy requirement for transmission when the nodes using rechargeable batteries. This procedure can be reasonably adjusted to provide the required transmission power for data transfer.

2. Related works

Cluster-based routings have gained increasing attention due to their energy-efficient advantages. One of the low-energy adaptive clustering method is known as LEACH. This method works by selecting the right sensor nodes for a given head role in a cluster. The cluster with the most energy-efficient nodes is called the CH. It communicates with CMs in their cluster [4].



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Design of an EEG-based transceiver with data decomposition for IoHT applications

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Abstract— Recently the importance of the Internet of Things (IoT) has opened up the possibility of developing new applications related to mobile-Health. These include real-time monitoring of various physiological data such as EEG and ECG. Due to the complexity of remote monitoring applications, the need for continuous sensing is often overwhelming. This causes data processing to consume a large amount of energy. This research work introduces a data specific transceiver design, which takes the advantage of physical layer data collection characteristics. The proposed design shows excellent performance in terms of low complexity and signal distortion with high data gain.

Keywords— EEG signal; data Compression; IoHT; signal decomposition; transceiver.

I. INTRODUCTION

The emergence of various technologies such as Big Data, IoHT and Edge Computing led to the development of E-health systems that enable the gathering, dissemination and recovery of health information [1]. The version 4.0 is a set of principles that aims to enable the healthcare industry to transform itself by delivering better outcomes and lower costs through the use of artificial intelligence and machine learning. The healthcare industry has gained huge popularity due to the increasing number of electronic medical records. However, the challenges of handling and storing the huge volume of data collected in healthcare have emerged. This load on the system's design is usually significant due to the amount of processing power and storage space required to handle the huge volume of data that can be transmitted in real time [2]. Since most m-health devices are battery-operated, they require continuous energy consumption to transmit the data. The lack of flexibility in the design of physical layer modules is one of the main factors that constrain the performance of future networks and IoHT environments [3]. An efficient and cost-effective transceiver is proposed to provide both high-quality

and cost-effective solutions. This research study argues that the characteristics of a convinced type of information, such as EEG, can be utilized efficiently in a devoting transceiver design. This benefit can reduce the cost and energy consumption of the device. These signals are the main resource about the electrical activities related to the brain [15]. It plays a critical responsibility in the identification of various brain disorders and has a secondary responsibility in the development of BCI [14]. An efficient and compact EEG-based transceiver that can provide high-quality transmission and minimize data compression is proposed. It utilizes the existing OFDM technology to perform the data compression task [10] [11]. Decompose processed data into multiple streams and discovered the dependency of different streams in terms of compression ratio [12]. Through simulations, the proposed design is evaluated against various constraints.

II. RELATED WORKS

In recent years, the health 4.0 has the rapid emergence and evolution of cloud storage and networking has enabled data processing to be performed at unprecedented levels. Data processing is a key aspect of Industry 4.0 that requires the proper management and processing of collected data. This is evidenced by the number of patents related to this field in the International Patent Classification. To minimize transmission energy, it is necessary to decrease the information count when it is transmitted. The high computational cost of signal reconstruction often restricts the CS need in concurrent applications. For instance, the OMP technique involves heavy matrix computation [13]. If a data-driven algorithm is used to improve accuracy in signal recovery, less energy consumption is expected. However, the high accuracy is achieved using non-data-driven method.

This research work study about the various techniques that are commonly used in e-health applications. Most of existing techniques are focused on the top layers while ignoring the



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Effective Hybrid Technique in Security Based Wireless Sensor Network

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The Wireless Sensor Network (WSN) is a service provider for remote sensing, including wireless transmission and infrastructure, or for the central monitoring of network assets. Over the years, many researchers have tested the WSN for many tests, such as area Monitoring, Environmental Monitoring, Disaster Management, and Security Monitoring. This does not apply to suggestions for detection and monitoring frameworks. In the present investigation, a strategy is proposed secure direct protocol which offering a versatility. Choice of security, bunch training and high-level cassette results also compared with the LEACH Protocol Control Protocol as progressive network stability.

Keywords: Grouped Grey Wolf Search Optimization; LEACH Protocol; Security Routing Protocol; Wireless Sensor Network

Document Type: Research Article

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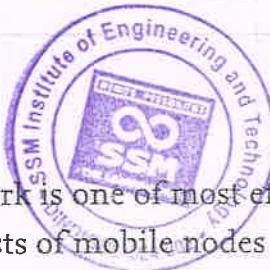
Investigation on thermal energy aware routing in integrated network for efficient energy storage

S. Syed Jamaesha^a , M.S. Gowtham^a, S. Gopinath^a, A. Shenbagharaman^b, K. Vinoth Kumar^c

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Abstract

Mobile Ad hoc Network is one of most efficient and emergency networks where we can apply it for both commercial and domestic applications. It consists of mobile nodes where it transmits the packets without any administrator. Due to mobility, paths may be broken and attackers in the network may discover the unreliable routes to misroute the packets. In this research, a Dynamic Efficient Energy Load based Multi-hop Protocol (DEELMHP) is introduced for reliable path selection. In first phase, cluster region is formed and reliable node selection is done. In second phase, reliable routes are obtained based on packet delivery rate and path reliability cost metric. In third phase, both localization and data transmission phase was implemented to locate efficient node for packet transmission which is nearer to the destination.



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Thermal analysis of Alzheimer's disease prediction using random forest classification model

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Abstract



Missing and irregularly sampled data points are common in time-dependent data collected in Alzheimer's disease studies. As a result, time-series methods based on regular sampling cannot be applied directly to data without first undergoing pre-processing. In this paper developed to learn the relationship between pairs of data points at different times, we implement random forest model separations in time the input vector contains a summary of the time series history. Due to similar brain patterns and pixel intensities, the diagnosis of AD images to feature representation for categorization. Machine Learning approaches can learn things like representations from data. A 4-way classifier is used in this study to distinguish between Healthy Control (HC) and Mild Alzheimer's disease (AD), Very Mild AD, and Moderate AD patients. Experiments are carried out using the OASIS dataset, and the results are used to classify diseases into multiple categories. The Random Forest Classification Model was used to do a thermal analysis of Alzheimer's disease prediction. The random forest classifier models have been





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An optimal lightweight cryptography with metaheuristic algorithm for privacy preserving data transmission mechanism and mechanical design in vehicular ad hoc network

K. Vinod Kumar^a D. Balaganesh^b

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<https://doi.org/10.1016/j.matpr.2022.04.304>

Abstract

Recently, vehicular ad hoc network (VANET) plays a vital part in intelligent transportation system (ITS) that intends to accomplish seamless Internet connectivity amongst the vehicles on the roadway. The VANET can be widely employed to enhance driving safety. But the wireless nature of the network results in challenging issues of security as well as privacy. In this aspect, this study designs an optimal Lightweight Cryptography with Dragonfly Firefly (LWC-DFFF) optimization algorithm to achieve privacy preserving communication in VANET. In addition, the proposed model involves the design of DFFF algorithm to determine the reliable nodes in the network for secured data transmission. Moreover, the LWC technique gets executed to securely transmit the data from source to destination via reliable nodes. The design of reliable node detection using DFFF algorithm helps to considerably improve the privacy preserving communication in VANET. A

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Dynamic Defense Mechanism for DoS Attacks in Wireless Environments Using Hybrid Intrusion Detection System and Statistical Approaches

Magudeeswaran PREMKUMAR*, Tharai Vinay Param SUNDARARAJAN, Gopalakrishnan MOHANBABU

Abstract: Security in wireless frameworks is a significant and difficult task because of the open environment. The Denial of Service (DoS) is as yet significant endeavour to make an online assistance inaccessible. The objective of this attack is to keep the authentic nodes from getting to the administrations. Intrusion detection systems assume an essential job in identifying DoS attacks that improve the performance of the system. However massive information from the system presents huge difficulties to the discovery of DoS attack, as the identification framework needs adaptable techniques for gathering, storing and processing a lot of information. In order to defeat these difficulties, this paper proposes Hybrid Intrusion Detection System (HIDS) framework dependent on different MLP strategies. In this article HIDS utilizes Naive Bayes (NB), irregular random forest (RF), decision tree (DT), multilayer perceptron (MLP), K-nearest neighbours (K-NN) and support vector machine (SVM) for better outcomes. The NSL-KDD dataset and UNSW-NB15 dataset are taken to examine the detection accuracy. The experiment results show that the proposed defence system is accomplished with high accuracy, high detection rate and low false alarm rate in both the datasets.

Keywords: denial-of-services; DoS defense; hybrid mechanism; intrusion detection; machine learning; wireless sensor networks

1 INTRODUCTION

The wireless sensor networks (WSNs) are comprised of several tiny sensors networked with low- yield wireless environments. Wireless sensor networks are used in many devices for healthcare tracking, habitat monitoring, military applications, battlefield monitoring, smart grid and so on. These networks are endowed with sensing, data pre processing and communication modules. In this thousands of sensors were composed with a network Id which is rapidly deployed to collect the critical information from hostile and unattended circumstances. A node is comprised of four components: one sensing unit, one transceiver, one processor and one battery. The first component is comprised of optical converters and sensors. The phenomenon detected by sensing system is transformed by A to D converters into full digital signals. The processing circuit is followed by a small storage unit and the sensor node communicates with the other nodes. The transceiver system acts as a connection between the node and the network. Li, Ni MH batteries or power-saving devices such as solar powered systems use an electrical unit. The main constraint of the network is the node having limited energy resources, minimal processing memory, safety risks, and the least communication and processing capacity. In a device, DOS attacks are propelled by remotely controlled, powerful, and narrowly disseminated botnet PCs of zombies. Many of the traffics or administration demands are at the same time or persistently sent to the objective framework. The objective framework gets unusable, reacts gradually, or crashes totally because of the attack [7].

The distinguishing proof of the first aggressors is hard for the protection strategies on the grounds that the aggressors have caricature IP addresses and secured inside zombies with the intention of heavily influenced by them [5].

The DoS attack detection based on the KNN classifier is shown in Fig. 1. The KNN algorithm is based on the iterative relocation of a dataset separated into k clusters. The average square distance between cluster centres and data points is reduced.

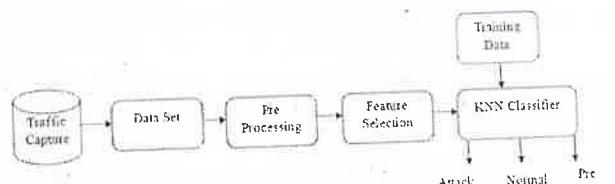


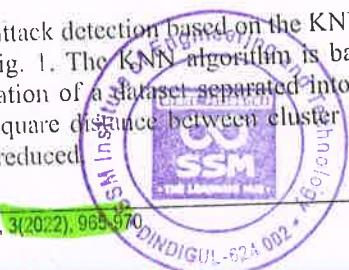
Figure 1 DoS attack detection based on KNN classifier

Before the last attacks are dispatched, the DoS attacks are manual and must perform a few steps, including identification of traded off devices to create zombies on the internet, port filtering, and sending malware. Parameters unique to the target can also be organised by the perpetrators, while the others can be tracked using mechanised instruments [12]. The FC resembles the attacks as far as numerous clients access a framework simultaneously. In FC there is an unusual and abrupt ascent in real rush hour gridlock as a result of extraordinary occasions. It is hard for guarded frameworks to recognize FC unusual traffic from DoS attacks. Some entrenched audit and reviews on DoS attacks and safeguard strategies are accessible in the writing, including [12]. The survey researches the guard techniques that are sent for distinguishing, alleviating, as well as forestalling DoS attacks. It orders DoS safeguard strategies as indicated by the class of defencelessness, the level of mechanization, effect, and elements. In addition, this survey incorporates typical testing sets and assessment strategies. The aim of this survey is to expand the scope and shape the course of DoS study. It leads to some open research issues and gives a few thoughts for future research.

2 RELATED WORKS

In the last few years, several detection and mitigation mechanisms have been recorded for DoS attacks aimed at service providers [16]. For DoS attack detection, many methods have been suggested so far. Some of the latest work in DoS attack detection is summarized in this section.

Song and Liu [10] are proposing an authentic detection method that employs dynamic K-Nearest Neighbours (K-



Energy Conservation of Adiabatic ECRL-Based Kogge-Stone Adder Circuits for FFT Applications

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Abstract: Low Power circuits play a significant role in designing large-scale devices with high energy and power consumption. Adiabatic circuits are one such energy-saving circuits that utilize reversible power. Several methodologies used previously infer the use of CMOS circuits for reducing power dissipation in logic circuits. However, CMOS devices hardly manage in maintaining their performance when it comes to fast switching networks. Adiabatic technology is employed to overcome these difficulties, which can further scale down the dissipation of power by charging and discharging. An Efficient Charge Recovery Logic (ECRL) based adiabatic technology is used here to evaluate arithmetic operations in circuits like inverter, full adder, Carry Look-Ahead adder etc. A better chance at reducing delay in digital circuits is illustrated by developing a Kogge-stone Adder, built using the ECRL technology. The developed circuitry is further integrated into a Fast Fourier Transform (FFT), which demonstrates the circuit's enhancement into DSP applications. Not only does this design reduce delay in VLSI switching circuits, but also narrows the power dissipation down to a minimum. This technique proved superior to the existing PFAL technique by demonstrating almost 10% less power dissipation with minimal propagation delay. All the circuits have been simulated at 45 nm technology using the Tanner EDA tool.

Keywords: Full adder; ECRL; carry look-ahead adder; kogge-stone; multiplexer; FFT

1 Introduction

Designing techniques for low power consumption have vastly influenced the current electronic industry trend, due to the increasing demand for compact gadgets such as cellphones, laptops, and several other handheld devices. The microelectronics industry have immensely evolved since transistors were initially designed, which set forth the foundation for such devices. A large number of gadgets were designed by integrating several transistors in them. As the current portable devices necessitate a huge number of logic gates to assemble in a single integrated chip, the area (or) the size of the chip becomes a major concern. Presently, a single IC incorporates fabrication of around 100,000 or even more transistors in it, thusly calling it VLSI (very large scale integration) [1]. Due to the earlier VLSI technologies relying on speed optimization to improve its performance, it has often suffered from portability issues. Reducing the chip

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RESEARCH ARTICLE

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Emotion identification by dynamic entropy and ensemble learning from electroencephalogram signals

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Abstract

Emotions are biologically based psychological states brought on by neurophysiologic changes, variously associated with thoughts, feelings, behavioral responses, and a degree of pleasure or displeasure. In order to assure active collaboration and trigger appropriate emotional input, accurate identification of human emotions is important. Poor generalization capacity induced by individual variations in emotion perceptions is indeed a concern in the current methods of emotion recognition. This work proposes a new dynamic pattern learning system based on entropy to allow electroencephalogram (EEG) signals for subject-independent emotion recognition with strong generalization

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Abstract

Automated computer-aided soft computing methods are presently used to detect the tumor regions in brain images. In this paper, the tumor cells are detected in the brain Magnetic Resonance Imaging (MRI) using the Extended Linear Boosting



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Design of cost-effective real time tremor alerting system for patients of neurodegenerative diseases

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Implantable biomedical systems that enable the majority of the functions of wireless implantable devices have made significant progress in recent years. Nonetheless, due to limited miniaturization, power distribution limits, and the unavailability of a stable link between implants and external devices, such systems are primarily limited to investigation. Generating electricity from natural sources and human body movement for implantable biomedical devices has emerged as a viable option. Nowadays, energy sources become the emerging use of electricity grid which has formed new challenges for the effectiveness of power quality, efficient energy utilization and voltage stabilization for biomedical applications. Power quality in the implementation of the

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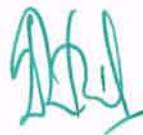
Cohesive DS-PID and FQL Control Mechanisms to Enhance the Performance of the Electric Vehicle System

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Abstract—Electric Vehicles (EVs) have become more popular and attractive in recent days, due to their benefits of zero carbon emissions, cost effectiveness, reduced maintenance, and effectiveness. In which, controlling the speed of motor and proper power regulation are the important tasks for designing the EV systems. For this purpose, various control techniques have been developed in the existing works, but it limits with the major problems of reduced efficiency, increased error output, and high time consumption. To solve these problems, this paper intends to develop an advanced and novel optimization-based control algorithms for controlling the speed of motor and regulating the output power of EV systems. Here, the Maximum Peak Point Control (MPPT) technique is utilized to extract the increased amount of power from the PV panels. Then, the Dual Fold Luo (DFLuo) DC-DC converter topology is utilized to regulate the output DC power to improve the battery storage of the EV system. Consequently, the optimization-based Dynamic Supervision-PID (DS-PID) control mechanism is employed to recognize the maximum power from PV to generate the control pulses for switching activities. After that, the Fractional Quadratic Linearizer (FQL) control technique is utilized for controlling the speed of BLDC motor, in which the current limiter controls the speed based on the input features of the brake and the speed of motor running at each time instant. During the simulation evaluation, the results of the proposed control mechanisms are validated and compared using various performance measures.

Index Terms—Electric vehicle; Dynamic supervision-PID controller; Dual fold Luo DC-DC converter; Fractional quadratic linearizer (FQL); Solar photovoltaic system; Maximum peak point tracking (MPPT).

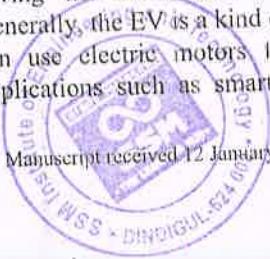
I. INTRODUCTION

In the present days, the Electric Vehicle (EV) [1], [2] application has gained a significant attention due to their enormous benefits of being noiseless, having no vibration, having no smell, and the comfort of gear changes. Generally, the EV is a kind of electrically driven vehicle that can use electric motors for its impulsion. Furthermore, applications such as smart grid, EV, and other electrical

devices use solar PV system with DC-DC converters to regulate and increase the input DC voltage to the desired level [3]–[5]. Conventionally, various types of DC-DC converters have been utilized, which can be differentiated based on their design properties and the architecture of the switching arrangement. In which, the efficiency of converter topologies depends on the control of switching components present in it. Converters can reduce and boost the input power based on the arrangement of switching devices, filtering components of inductors, and capacitors. In existing works [6]–[8], closed-loop controllers have been mainly used to generate pulses in random width size according to the estimated error signal obtained from the feedback loop. To control the switches, several methods are developed to generate triggering pulses based on the feedback signal and reference parameters. Those methods [9]–[12] refer to some fixed rules with certain limits to evaluate the error signal. Since these traditional control methods are limited with the problems of reduced efficiency in regulating the power with distorted output.

To solve this problem, a novel control methodology is proposed in this work that helps to solve the fixed-range issues by estimating the control signal with respect to the varying parameters, which are dynamically updated at every time instant based on the feedback signal. This type of dynamic update will tune the performance of controller with reduced error values and regulated DC power at the output terminal. This model helps to extract the signal features for tuning the parameters of controller and, provides dynamic change in gain properties to regulate the DC power. The control signals are used to trigger the switches present in the converter circuit and the current limiter. In this case, the current limiter controls the speed of EV based on the input features of the brake and the speed of the motor running at each time instant. The main objectives of this research work are listed as follows:

- To properly regulate the maximum amount of power generated from the PV modules, the Dynamic Supervision-based DS-PID (DS-PID) control technique is used.



Optimization of Flexible Manufacturing Systems Using IoT

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Abstract. A flexible manufacturing system (FMS) is an automated material handling and integrated workstation that is computer-controlled and used for the automatic random processing of palletized parts. To assess the effectiveness of the FMS design before deployments, computer simulation is a cost-effective method. It is crucial to test this simulation software before usage since they have such a clear influence on the FMS decision-making process. A FMS is a complicated, integrated system that includes a central computer numerical control machining center and an automated material management system. The sole drawback of FMS is its greater initial cost and replacement cost if it does not function properly. Therefore, it is important to analyze FMS before installing it. The use of Industry 4.0 technologies has expanded the flexibility of the entire manufacturing system. The development of these technologies, which include the Internet of Things (IoT), big data, artificial intelligence (AI), additive manufacturing (AM), sophisticated robotics, virtual reality, cloud computing, simulation, and others, has increased the industrial system's adaptability.

Keywords: Flexible transfer lines, flexible manufacturing cells (FMC), Internet of Things (IoT), and Flexible Manufacturing System.

INTRODUCTION

The availability of several workstations at which generic processes are carried out defines flexible manufacturing systems (FMS). This system's flexibility is realized through a network of programmable transportation that connects the workstations and an advanced control system that coordinates the operations of the workstations and transport systems while keeping track of the status of the ongoing jobs. In general, innovations fascinate people, especially if the results can benefit them. The global marketplace is impatient and price-sensitive.

Due to daily fluctuations in client demand for a wide range of goods with eight pre-specified quality at lower prices, Indian business requires flexible production facilities to compete in today's global market incorporating innovative production technologies like FMS, JIT, CAD, and CAM, which have enormous potential. The many independent manufacturing systems that were discussed throughout this article may be combined in India to create a single, large-scale system in which the production of parts is managed with the assistance of a central computer to

satisfy the daily changes in consumer expectations. Such a production system has the benefit of being very flexible in terms of the little effort and rapid turnaround time needed to make a new product; for this reason, it is referred to as a FMS.

THE FMS CONCEPT

The FMS offers batch production with the efficiency of mass manufacturing. When components are produced in lots of few to more than 50, with a total yearly demand of less than, say, 100,000 units, it is referred to as batch production. When greater yearly production rates are needed, mass manufacturing is used, and thus, the usage of specialized machinery might be justified. It may cost 100 times as much to create a single unit using general-purpose machine tools as it does to produce the identical item using the most effective mass production techniques. It should be able to lower the cost of creating components in small and medium quantities by utilizing FMS technology. Advanced FMS will contain a high-power laser station incorporated into the production line; the laser will be used



METHODS

An internet of things enabled smart firefighting system

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A fire accident is a mishap that could be either man-made or natural. Fire accidents occur frequently and can be controlled but may, at times, result in severe loss of life and property. Many a time, firefighters struggle to sort out the exact source of the fire as it is continuously flammable and spreads all over the area. For this concern, we have designed an Internet of things based device which sorts out the exact source of fire through software and hardware devices, and also allows the complete detail of an area to be visualized by firefighters, which is pre-installed in the software itself. Because of our system's intelligence in decision-making during firefighting, the proposed system is claimed as a "smart firefighting system." The implementation of the smart firefighting system can make the firefighters analyze the current situation immediately and make the decision more quickly in an effective manner. Because of this system, fire losses in a building can be greatly reduced and many lives can be rescued immediately. Furthermore, fire spread can also be restricted.

Keywords: Internet of things (IoT), firefighting system, NodeMCU, ThinkSpeak, Pyrofighter

Introduction

The in the world is about > 7 billion, and most of the people try to gather in the same place where wealth is constant. Also, people move from place to place due to modernization and urbanization. Many places in the world are clustered by shops, buildings, and large apartments. Hence, in such places, accidents that occur in the form of fire and in several other forms cause severe loss of human lives and materials. In India, a reputable newspaper, *The Indian Express*, conducted a study in malls, apartments, and all commercial buildings, and found that most malls and apartments lack proper fire safety systems and awareness. There are many advanced firefighting systems and techniques, but most of them are not utilized as the main reason behind it is that they require high initial investment. Implementation of an effective budgetary controlled smart firefighting system will overcome these difficulties. Most technology is automated and controlled through the Internet of things (IoT). To sort out these difficulties in firefighting and make a required solution, this smart firefighting system was introduced. This

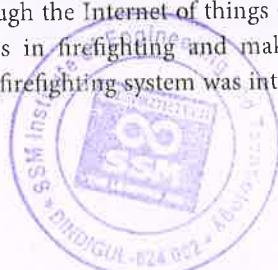
makes firefighting simpler and decision-making can be done in a short time.

Design and methodology

A firefighting system includes both hardware and software design. The hardware design contains the following components:

K-type thermocouple: A thermocouple is a sensor used to measure temperature. Thermocouples consist of two wire legs made from different metals. The wire legs are welded together at one end, creating a junction. This junction is where the temperature is measured. When the junction experiences a change in temperature, a voltage is created. The type K is the most common type of thermocouple. It's inexpensive, accurate, reliable, and has been optimized to detect a wide range of temperature fluctuations.

MQ2 gas sensor: It is a metal-oxide semiconductor (MOS) type gas sensor, also known as a chemiresistor, as the detection is based upon the change of



ANALYSIS OF BIODEGRADABLE 3D PRINTING MATERIAL BY NATURAL FIBRE REINFORCEMENT

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Abstract— The bio compatible organic polymers are nowadays become a number one contender for the plastic manifolds. Owing to its excellent load accepting and withstanding nature, capability to less retardation to temperatures and good strength: weight ratio made them the first choice to go for selection along with its eco-friendly nature. Even though possessing several impacts the boundaries have been fixed which have less strength and high cost. The proceeding work will investigate the pre and post nature of the bio composites when bended with a natural filler as an additive. With keeping the ASTM standards in mind, the mechanical properties have been analyzed and the impact is noted. The study suggests that the mechanical property on adding the natural fibre slightly increased initially but reduces on further addition.

Keywords— Biodegradable, Polylactic Acid, Sansevieria.

I. INTRODUCTION

3D Printing Technology

3D printing an exact contrast of subtractive manufacturing process which develops the desired objects by adding the materials one over the other which reduces the scrap generation. Thus, creates a new opening for the dreamers and innovators to develop their own world in 3-dimensional modeling.

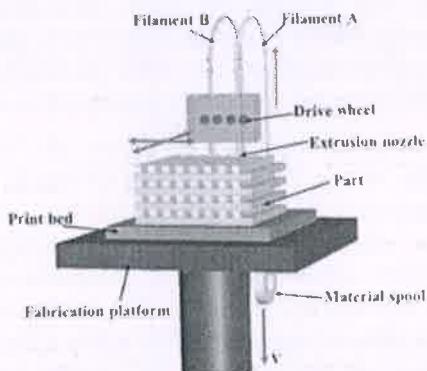


Fig 1. 3D printer

To make this dream come true in the manufacturing stream it is a need of an hour to find a suitable material which satisfies all the overwhelming requirements of the manufactures. Some proven Thermoplastic materials like acrylonitrile buta- diene styrene (ABS), polylactic acid (PLA), poly- amide (PA) and polycarbonate (PC) as well as thermosetting polymer materials like epoxy resins are well suited materials for 3D printing.

The perfect suitability of material will open gates for the 3D printing technology to find its applications in various streams. The love towards these materials is due to its very light weight and accessibility to make very intricate shapes. This property made this material to make its foot print in aero applications, Constructional sectors, Art craft industries, Tissue Engineering and Organ implantations etc.

Even though possessing various attractions the 3D printing technology is tied within certain boundaries due to its weak strength and lack of load bearing nature. That makes this technology to sit in the dugout as a prototype model.

The above-mentioned problems will be addressed by binding the low strength 3D printing materials with suitable binders which enhances the geometrical and load bearing nature whose performance will not be matched by any individual component.

Encapsulation of small materials, fibers or Nano fillers along with the polymers will give birth to PMC's which have a greater mechanical and functional behavior.

The impact created by 3D printing over the past have grabbed attention of various researchers. Mostly all the researcher has their concentration on 3d printing fabrication methods and pure polymer materials. Here the focus is on the combined study of both the composites and 3D printing technology which is growing up like a demand of situation in recent years.

II. LITERATURE ANALYSIS

The fighting nature of Sansevieria roxburghiana against bacteria and other pathogens with exhibit zero negative effects which in turn make way for the development of a new medicines. This responsive nature of this plant ensures the fighting capability against the microbes which enhances the material life against the microorganisms.



Studies on mechanical and morphological of TIG welded aluminum alloy

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ABSTRACT

An automated TIG welding system was employed to increase the welding strength and weld quality of pure Aluminum (Al) plate in terms of bead width and depth of penetration. The control parameters during the welding process are the most critical factors, such as welding speed and arc length. TIG welding is a procedure that involves maintaining an electric arc between a non-consumable tungsten electrode and the weldable component. Due to its strong corrosion resistance, AA5059- aluminium alloy is the most often used in the ship industry sectors as a hull material.

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1. Introduction

Metals and Non-Metals are joined through the mechanism of Plastic deformation. Here more friction and mechanical action are combined process is induced. Numerous FSW's advantages such as induced residual stress, smooth microstructure, less porosity, and less cracking. It can be automated easily also. FSW welding may be used on aluminium, magnesium, and copper alloys [1]. There has been increasing interest in using FSW technology to weld high melting point materials such as steel, aluminium alloys, nickel alloys, and titanium alloys in the last decade. Aluminium and aluminum-based alloys are widely utilized in the automotive and aerospace sectors because to their high specific strength, superior formability, and corrosion resistance [2]. Aluminium alloys haven't gained a lot of traction in the car business. The FSW technique of joining Al and its alloys is frequently used. Joining aluminium laminates has been a source of worry due to the difficulties of fusing aluminium fully using fusion welding methods. Threaded, square, cylindrical, tapered, and triangular pin profiles were employed in the welding trials. The authors came to the conclusion that pin profiles have a substantial impact on weld quality [3–5]. There are two sides to the movement of the metal

and the properties of the welds. In recent days, TIG welding process is an efficient technique for producing high-quality structural components. It is an arc welding practice in which the material accumulates as a result of the high temperature produced by an electrical source established between negative (a non-consumable tungsten electrode) and the positive (workpiece). The material's faying surface is melted and cemented during welding, and an inert gas purging out of the TIG flame protects the weld pool from outside contamination [6–8]. It is generally known that the weld bead shape has a significant impact on the quality of the weld connection. The load bearing capability of symmetrical and fully penetrated weld connections is outstanding, which is a prerequisite for structural components. Structural components are usually made up of a variety of elements with varying thicknesses ranging from thin to mid-thickness [9]. It also lowers welding distortion and production costs while increasing productivity significantly. A-TIG welding offers a wide range of uses. Stainless steel, carbon steel, nickel base alloys, and titanium alloys are the most common materials utilized in A-TIG welding today [10]. It is primarily concerned with the addition of an active agent to AC welding in order to enhance the penetration of AA5059 alloy during AC welding.

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Experimental characteristics and optimization of friction stir welded AA5052-AA6061 using RSM technique

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Abstract

Friction stir welding is a method that is normally used for aluminum alloys and is suitable for alloys which can be sensitive to heating during the welding manner. This mission used reaction floor technique to optimize manner parameters for friction stir welding of numerous aluminum alloys (Al 6061 and Al 5052). The effect of procedure parameters like rotational velocity, traverse velocity, and tilt angle on tensile energy and hardness has been studied. So as to improve productivity and weld excellent, optimized welding situations for max tensile strength and hardness have been predicted. The usage of layout professional software program, distinct aluminum plates have been welded by various parameters along with rotational pace, welding pace, and tilt perspective primarily based on RSM. The effects show that increasing the fee of RPM, feed fee, and device tilt attitude increases ultimate tensile electricity up to a certain point, after which it begins to lower. Joint energy is also exact at better tensile strength at 1100rpm, 1–1.50 tool tilt attitude, and a minimum feed price of 28–30mm/min.



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Design and Fabrication of Seed Sowing Machine by using Electro-Pneumatic System

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Abstract: India is an agricultural country cultivating more number of ground nuts, corns, etc., in the village sides of the country. The available sowing machines are imported from foreign countries. The imported machines are not only bulk in size but cost also very high. In this proposal an attempt has been made for the design and fabrication of maintenance free seed sowing machine exclusively for farmers at low cost. The different components of above multipurpose seed sowing machine are modelled using one of the end parametric modelling software Solid Works and it was simulated by the software Automation Studio. The modelled components are fabricated and assembled together to form a complete machine. The electro-pneumatic action is a control system for pipe organs, whereby air pressure, controlled by an electric current and operated by the keys of an organ console, opens and closes valves within wind chests. This method is used for seed sowing technique. According to the cylinder controlled action seed will sow in the land. Here we are using cascade method for cylinder control. This method is very useful for short term and long term crops. In cascade method, we are use only four sequence for seed sowing those are A+, B+, B-, A-. Due to hopper open and close condition seed will easily have sowed in land.

Keywords: Pneumatic, Solid works, Automation studio, electro-pneumatic, sowing machine.

I. INTRODUCTION

Even through many apparatuses are used for seed sowing purpose, pneumatic seed sowing machine is a one of the good sewing machine in industries. It is mainly use for long level area seed sowing. Many advantages are in pneumatic seed sewing machine, we discuss briefly. The production and productivity of ground nuts, corns, etc., were quite low, when India became independent in 1947. The production was not sufficient to feed the Indian population. The country used to import them in large quantities for fulfilling the need of our people from many countries. The reason of low production and productivity were unavailability of machine in the cultivation field. In India most of the farming work is done manually when compared with foreign countries. There was no machine for sowing the seed like groundnuts, corns then and it is done by man power only.

The cost spent for manpower was more and the speed of the operation was very less. When small farmers with minimal physical resources or financial assets attempt to improve their productivity, they have a limited choice. The only resource they can maximize is knowledge in which they are not poor. To prove they can statement, Mr. Shivraj was invented the first bullock driven sewing machine in the year 1987 at Madhya pradesh to improve his productivity. It was light weight and can perform up to six agricultural operations. India is a world leader in groundnut farming with 8 million hectare of cultivated area in the year 2003. Groundnut cultivation has increased from 6.8 million hectares in 1980 to 8 million hectare in the year 2003. Groundnut is grown mostly in five states namely Andhra Pradesh, Gujarat, Tamilnadu, Karnataka, and Maharashtra and together they account for about 90 percent of the crop total. The sowing time is the most important non-monetary input influencing productivity. Delay in sowing by one-week result in considerable yield losses

Result obtained from all India coordinated research's revealed that in most parts of the country, sowing should be done between the first week of June and the last week of July, Advancement of sowing by a fortnight with pre-sowing irrigation was found to increase the yield substantially. The government of India appointed a commission to assess the feasibility of increasing the crop productivity under prevailing India ecological conditions. In order to develop the standard of living of small farmers we should make the machine with low cost. Then only small farmers can implement the recent modern machines for farming purposed multipurpose sewing machine is used to sowing different types of seed like groundnuts, corns, etc. so in this work an attempt has been made to provide the multipurpose sewing machine at low cost.





Impact of compression ratio and effect of biodiesel blends in performance, combustion and emission characteristics of VCR DI diesel engine

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Abstract

The work has been carried out to use mahua oil methyl ester (MOME) in variable compression ratio (VCR) engine with three compression ratios (CR) 17:1, 17.5:1 and 18:1 was used for the experiment. Also the blend ratios are (M10, M20 and M30) mahua biodiesel blends at zero to maximum load with a constant speed 1500 rpm. The MOME properties are identical to diesel. The characteristics that means brake thermal efficiency (BTE), specific fuel consumption (SFC), hydrocarbon (HC), carbon monoxide (CO), oxides of nitrogen (NO_x), smoke, cylinder pressure (CP) and heat release rate (HRR) were superior at CR 18:1 and the blend B20, but considering the engine vibration and noise of the CR is limited to a value of 18:1.



Plithogenic CRITIC-MAIRCA Ranking of Feasible Livestock Feeding Stuffs

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Abstract

The objective of any decision-making method in a plithogenic environment is to make an optimal ranking of the alternatives subjected to core essential criteria. The preference for plithogenic decision-making methods is gaining momentum in recent times as plithogenic representations are more comprehensive and efficient in handling uncertain and imprecise decision-making data. In this paper, a plithogenic CRITIC-MAIRCA decision-making model is developed and applied to decision-making on livestock feeding stuff. A total of 20 alternatives under three major feed categories of green fodder, subsidiary fodder and concentrate feed are ranked using MAIRCA (The Multi Attributive Ideal-Real Comparative Analysis) method and the criterion weights are determined using the method of CRITIC (CRiteria Importance Through Inter-criteria Correlation). The final results of the plithogenic ranking are compared with fuzzy and crisp ranking methods and it is observed that the plithogenic CRITIC-MAIRCA method is highly efficient in making a feasible ranking.

Keywords: CRITIC-MAIRCA; plithogenic decision making; livestock; feeding stuff

1. Introduction

Multi-criteria decision-making (MCDM) is a conflict -resolving process characterized by alternatives, criteria and suitable methods of processing data represented in the form of a decision matrix. It is the choice of the experts and their opinions that play a key role in determining the nature of decision making. Deterministic decision making occurs when the input decision matrix is quantitative with precise data, but in many instances only a qualitative decision matrix with uncertain and imprecise data is available. To handle such circumstances, fuzzy decision-making methods are introduced and later they are extended to intuitionistic and neutrosophic decision-making systems.

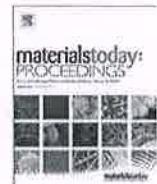
The fuzzy and its extended decision-making methods are differentiated by various forms of data representations. Zadeh [1] introduced the theory of fuzzy sets. In fuzzy MCDM, the values of the decision matrix are either fuzzy values or linguistic variables represented using fuzzy numbers. Intuitionistic fuzzy sets developed by Atanassov [2] are characterized by membership and non-membership values. The intuitionistic fuzzy MCDM decision matrix consists of intuitionistic representations of data. The concept of hesitancy also forms a part of intuitionistic fuzzy sets. Smarandache [3] coined neutrosophic sets as an extended version of intuitionistic fuzzy sets. The neutrosophic sets consist of truth, falsity and intermediate membership values. In neutrosophic MCDM, the representations of data with intermediate membership values facilitate optimal ranking. In addition to these major types of data representations in MCDM, the other forms of representing data as interval-value sets, Pythagorean sets, are also used based on the decision needs.

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Chromium oxide regulated nanoparticles biosynthesis in *Manihot esculenta* leaf extract

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ABSTRACT

The green synthesis of nanoparticles using plant extracts plays an important role in the field of nanotechnology. The potential of biomolecules present in plant extracts in reducing metal ions to nanoparticles in a single step of green synthesis process is very important. In this study we report on synthesis of Chromium oxide nanoparticles (Cr_2O_3) by reduction of potassium chromate solution with *Manihot esculenta* leaf extract. The presence of water soluble carbohydrates which have an aldehyde group may lead the formation of Cr_2O_3 nanoparticles. The fabricated Chromium oxide nanoparticles were confirmed by UV-Vis spectroscopy, X-ray diffraction (XRD), Fourier transform-infrared spectroscopy (FTIR) and Scanning electron microscopy (SEM). XRD and UV-Visible absorption studies. The images showed that the size of NPs of Cr_2O_3 varied with average crystalline size 85–100 nm of nanosized Cr_2O_3 . © 2021 Elsevier Ltd. All rights reserved.

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1. Introduction

Presently metal and metal oxides in NPs have outstanding approaches in various fields owing to their electrical, optical, thermal abilities [1]. Among the metal oxides, Cr_2O_3 has perceptible properties to attract the researchers. Its thermal stability, hardness, chemical resistance and antiferromagnetic property lead to Cr_2O_3 NPs synthesis in various applications [2]. The attractive adaptable properties of Cr_2O_3 NPs have led to the green synthesis. The crucial attractions of Chromium oxides (Cr_2O_3) have an importance in science as well as in technology [3–4]. Distinguishable parts of the plants (leaves, fruit, roots, latex, seed and stem) are having prospective medicinal values. The fabrication of Cr_2O_3 nanoparticles have been developed by diverse technique such as thermal decomposition [5], hydrothermal method [6–8], solvothermal method [9], thermal process [10–12], microwave irradiation method [13], precipitation method [14], magnetron sputtering [15], combustion solution method using glycine [16], laser-induced deposition [17], sonochemical synthesis [18], sol-gel syn-

thesis [19], combustion synthesis [20], thermal reduction [21], urea-assisted homogeneous precipitation [22] and precursor calcinations [23]. Chromium (Cr_2O_3) possess specific applied applications such as liquid crystal displays [24], in high-temperature resistant materials [25], coating materials [26], corrosion resistant materials [27], green pigment [28], solar absorbers [29], heterogeneous catalysts [30], ceramics, coatings, printing and paint industry [31–33].

In contrast with the conventional method, bio synthesis is friendlier to environment because it utilizes plants extract as the chemicals substitute. The plant extract containing destructive compounds helps the reduction of chromium ions in the fabrication of Cr_2O_3 NPs. The *Manihot esculenta* leaves possess biomolecules such as carbohydrates, proteins and lipids [34–35], which could be used as reducing agent to react with chromium ions and act as scaffolds to direct the formation of Cr_2O_3 NPs in solution.

2. Materials and methods

2.1. Preparation of *Manihot esculenta* extract

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EXASPERATION, ANIMOSITY AND DETERMINATION IN SHOBHA DE' S SISTERS

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Abstract

Shobha De is one of the most eminent and popular Indian novelists of our time; She is India's best-selling author. She started her career in journalism in 1970 in the course of which she founded and edited three popular magazines Stardust, Society and Celebrity and was consulting Editor to Sunday and Megacity. She earned both name and fame for several leading newspapers and magazines. Being an efficient writer Shobha De brought out the corporate world of business tycoons' real image in her third novel *Sisters*. This paper attempts to analyze the individual's agony, disappointments and become granite from their earlier experience with special reference of Shobha De's *Sisters*. However Shobha De's characters are encountered as many betrayal, failure and discrimination by their own close circle, they can come out with great determination and shine like a bright star.

Introduction

Shobha De as a writer is gifted with extraordinary ability to discuss very sensitive aspects of human life tactfully. The way she narrates each and every aspects of human relationship and their real life situation in particular, is really wonderful. One of the major reasons of Shobha De's popularity as a writer is her intimate understanding of the psyche of woman and her problems. Indian fiction depicts three kinds of women; first the poor women, belonging mostly to the rural class, portrayed by writers like Kamala Markandaya and R.K Narayan; secondly, the middle classwomen, especially the educated and employed, depicted by writers like NayantaraSahgal and Shashi Deshpande; and thirdly, the neo-rich aristocrat women depicted by writers like NamitaGokhale and Shobha De. Thematically, Shobha De's novels are highly complex. They offer sufficient stuff to the critics to interpret them in varied ways. De's third novel, *Sisters* deals with various themes like love and romance, male- dominance, feminine one, marriage problems, loneliness, semi-urban culture, sexual relationship and woman's struggle for their identity. De's *Sisters*' characters endured through mental stress, so they were in the state of exasperation and animosity, all of which contributed to their determination.

Exasperation

Sisters is novel by Shobha De that unfolds the life story of two sisters- Mikki or Mallika the legitimate daughter of Seth Hiralal and Alisha, the illegitimate daughter of Seth Hiralal and Leelabhen. Both the girls are good looking and wealthy. This novel focuses as much on the seamy side of the business life as on the inner turmoil of protagonist. It is the story of two beautiful, bold and intelligent half-sisters having an industrialist father, Seth Hira Lal. Mallika Hira Lal has to abandon her studies in U.S.A. and return to Bombay to attend the funeral of her parents who had died in air-crash.

Mikki is the main character, who returns to India from the United States after her father's death in an air disaster. Ramanbhai, Hiralal's servant, stood beside Mikki, supporting her. He was the one she could always rely on. He tells her that he can manage the problem and will always remain by her side. Mikki inquired about Alisha after the funeral service was completed. Ramanbhai attempted to divert the conversation away from the subject, but Mikki stood firm and demanded that he divulge the mystery. Mikki questioned why her father's extramarital affair was not disclosed to her when he told



SIGNIFICANCE OF MOTHERHOOD IN SHOBHA DE'S NOVELS *SOCIALITE EVENINGS* AND *STARRY NIGHTS*

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Abstract

Women played an important role in human civilization. Everyone should accept that no nation or society can ever progress without active participation of women in its. When we see it in family level women are the pillar of each family. The role of mother's is indescribable. Woman is ready to compromise herself for everything especially when she plays the role of mother, its unwritten rule in our society. Our society has a list of customary actions to be followed by mothers like, Sacrifice, to satisfy every one's need in the family and manage the economical crisis. When a man abandons his family, the woman is automatically responsible, whether she accepts it or not. In Shobha De's stories, the mother characters play an important role in their daughters' achievement and comfort them when they are in distress. This article depicts the De's mother characters' initiating and moral support to their daughters, as well as how the protagonists achieve success and live a life free of financial hardship.

Introduction

Shobha De is a name to reckon with among the best known women novelists of India, for her upbeat non-conformist attitude in presenting the aristocratic urban Indian society in her novels. De is a modern novelist who recognizes the displacement and marginalization of women and attempts to turn this pattern upside down through her writings. The modern Indian woman who is at the centre of her fiction is bold, daring and ambitious; she has tremendous energy to compete and excel in all walks of life. In her novels *Socialite Evenings* and *Starry Nights* all the mother characters played a vital role in their daughters' success. They never compel their daughters to adhere to classical myths and customs, despite the fact that they come from a traditional and cultured family. They advised and consoled them whenever they needed it.

Motherhood in De's Novels

Shobha De seems to imply that the mother, as meek and humble she may be, is the family's anchor. While the novelist rambles around in her stories, buoyantly depicting her energetic heroines who run hastily to satisfy their limitless demands and therefore yield themselves to messy situations, she also portrays calm and unassuming mothers who may impart strength and empowerment to their daughters.

Karuna is the heroine of *Socialite Evenings* and the youngest of the three daughters. Due to her father's government work, her family relocated from Maharashtra to Bombay. Karuna is more enthusiastic in starting her life in Bombay than the rest of her family. Karuna showed no interest in her schoolwork, but she also didn't want to project herself as a middle-class girl in school. She aspires to live a life that is both luxurious and sophisticated. Charlie, a friend of hers, introduced her to the modeling field. Karuna is also fascinated by modeling. She was able to get her father's consent to model with the support of her mother. Whenever she needs permission to leave the house, she goes to her mother and asks for her father's consent. Karuna's mother approaches her father after reading his mind to get positive response. Karuna's mother thus encourages and supports her daughter, whether directly or indirectly.

Karuna's mother supported her in achieving her goals, and she also explained life's realities.



Optimization of Fuzzy Integrated Inventory Model with Ordering Cost Reduction Dependent on Lead Time

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Abstract: The intellectual and industrial design of a complex inventory system becomes a vital issue for the organization of responsiveness to uncertainties. The parameters involved in inventory model are likely to be varied due to the fluctuating business environment. Therefore, it will be more realistic apply fuzzy model rather than crisp model. This paper derives a single-vendor and a single-buyer integrated inventory model with ordering cost reduction dependent on lead time in a fuzzy environment. In this model, buyer and vendor cost parameters are uncertainties which necessitate the use of trapezoidal fuzzy numbers. The purpose of this model is to determine the minimum integrated total cost and optimal order quantity in the fuzzy scenario. There are two mathematical inventory models proposed in this paper. Initially, a crisp model is developed with fuzzy total inventory cost along with crisp optimal order quantity. Next, the fuzzy model is formulated with fuzzy total inventory cost and fuzzy optimal order quantity. Graded mean integration formula is employed to defuzzify the total inventory cost and the extension of the Lagrangian method is used to determine the optimal order quantity. An algorithm is developed to obtain the optimal order quantity and minimum integrated total cost. The comparison of a fuzzy inventory model with the conventional crisp inventory model is made through numerical examples. This proposed fuzzy model is also compared with some specific cases of the previous models. Finally, the graphical representation is presented to demonstrate the proposed model. The result illustrates that this fuzzy model can be quite useful in determining the optimal order quantity and minimum integrated total cost procedure when the lead time is analysed.

Keyword — Optimal integrated total cost, Optimal order quantity, Graded mean integration representation method, Fuzzy inventory system, Lagrangian method.

1. INTRODUCTION

Many authors handle inventory systems with various lead time cases where the cost components are considered as crisp values which do not represent the actual inventory system completely. In rare cases, the inventory cost components are considered as fuzzy values. In actual life, varying physical or synthetic features may cause an influence on the cost components and exact values of cost features as it becomes a risk to measure the exact amount of holding, order, and setup cost. Thus, in controlling the inventory system, it may allow some flexibility in the cost parameter values in order to treat the ambiguity which always fits the actual situations. Fuzzy set theory meets these prerequisites to some extent. In this paper, fuzziness is introduced by allowing the buyer and vendor ordering cost, inventory holding cost, setup cost and lead time crashing cost. It is suitable for the inventory system to fit the real situation and proves to be profitable.

The integrated inventory management organization is a common exercise in the global markets and provides economic benefits both for the vendor and the buyer. In recent years, most integrated inventory management organizations have focused on the integration between vendor and buyer. Once they form a tactical alliance to minimize their own cost or maximize their own income, trading parties can cooperate and share information to achieve enhanced benefits. Currently, companies can no longer contribute solely as individual entities in the constantly varying business world. Globalization of marketplace and increased competition force organizations to depend on effective supply chains to progress their overall performance. Lead time management is an important issue in manufacture and operation management. In many practical circumstances, lead time can be compacted using crashing cost.

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