

FEATURE EXTRACTION TO DETECT AND CLASSIFY DIABETIC RETINOPATHY USING FUNDAL IMAGES

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Abstract— Diabetic retinopathy (DR) is a human eye disease found in diabetics that damages the retina and can lead to long-term vision loss. It causes visual impairment and, in the worst case, severe blindness as lesions form in the retina due to rupture of retinal vessels. Early detection of the disease has become critical to avoid exacerbation and difficulty in identifying subtle lesions in advanced stages of the disease. The main cause of blindness is believed to be asymptomatic in the early stages. Diagnosis of these diseases is time-consuming and difficult for ophthalmologists. Early detection and classification of DR cases is an important step in providing needed treatment. This work is mainly focused on DR detection and classification based on features extracted from retinal fundus images. Feature extraction for DR detection and classification includes microaneurysm detection and Exudates detection. The proposed system consists of phases such as Pre-processing which includes image resizing, Green channel separation, and CLAHE (Contrast Limited Adaptive Histogram Equalization), Gray-Level Co-occurrence Matrix (GLCM)-based method is used to extract textural features, i.e., exudates and microaneurysms, from retinal fundus images. Evaluating the results, the proposed method showed better performance on real-time dataset collected from LV Prasad Eye Hospital.

Keywords— Machine Learning, Diabetic Retinopathy, Image Processing, Microaneurysm detection, Exudates detection

1. INTRODUCTION

The anatomy of the eye is complicated. The major structures of the eye have associated changes that can affect the eye and surrounding structures. Diabetic retinopathy is the leading cause of blindness in adults from age 20 to age 74 in the United States. Diabetic retinopathy is caused by elevated glucose levels in the optic nerve. High blood sugar can block blood vessels in the optic nerve, causing leakage and swelling. There are several signs to recognize Diabetic Retinopathy, such as microaneurysms (MAs), hemorrhages, hard exudates, cotton wool spots, and venous loops. Under certain conditions, the optic nerve of patients with diabetic retinopathy experiences abnormalities as it grows on the surface of the retina. If not detected early, it can lead to blindness. Symptoms in DR patients are difficult to identify and it is too late for effective treatment. Therefore, detection and early medical intervention are critical. Ophthalmologists typically observe DR based on features such as vessel segmentation, hemorrhage, microaneurysms (MA), texture, and vasodilation. MA is the first scientific sign indicating and identifying as red lesions of diabetic retinopathy.

The basic method of diagnosis is for a doctor to examine a person's eyes and perform tests to determine what disease the person has. Detecting and classifying diabetic retinopathy is a time-consuming process, and time is of the essence when cases are severe. Therefore, an automated system is required to do the job correctly and efficiently. Early diagnosis and continuous monitoring of patients suffering from ocular diseases have been major concerns in computer-aided detection techniques.

Texture features have properties that describe visual patterns based on the spatial definition of an image. Identifying a particular texture in an image is done by representing the texture as a two-dimensional Gray-level variation known as a Gray-level co-occurrence matrix (GLCM). GLCM is defined as a statistical method for finding textures that considers spatial relationships of pixels. The GLCM function computes the frequency of occurrence of pixel pairs with a particular value and a particular pixel relationship in the image, and subsequently extracts a statistical measure from a matrix defining normalized probabilities of the co-occurrence matrix to determine the texture of the image.

Automatic detection of eye diseases by analyzing retinal images provides a better alternative for timely diagnosis and treatment of eye diseases. This allows patients to consult an ophthalmologist in terms of screening. This proposed system consists of three major steps, at first the retinal image is taken as input, Then the GLCM features are extracted from the image as second step. Then the third step involves classifying the Diabetic Retinopathy into different classes. The developed model is less complicated with a good accuracy. The following Fig. 1 and Fig. 2 shows the retinal images of DR and No DR.

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A deep transfer learning approach for identification of diabetic retinopathy using data augmentation

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In ophthalmology, deep learning acts as a computer-based tool with numerous potential capabilities and efficacy. Throughout the world, diabetic retinopathy (DR) is considered as a principal cause of disease however loss of sight cannot be seen in adults aged 20-74 years. The primary objective for early detection of DR is screening on a regular basis at separate intervals which should have a time difference of every ten to twenty months for the patients with no or mild case of DR. Regular screening plays a major role to prevent vision loss, the expected cases increase from 415 million in 2015 to 642 million in 2040 means is a challenging task of ophthalmologists to do screening and follow-up representations. In this research, a transfer learning model was proposed with data augmentation techniques and gaussian-blur, circle-crop pre-processing techniques combination to identify every stage of DR using Resnet 50 with top layers. Models are prepared with Kaggle Asia Pacific Tele-Ophthalmology Society blindness dataset on a top line graphical processing data. The result depicts- the comparison of classification metrics using synthetic and non-synthetic images and achieve accuracy of 91% using the synthetic data and 86% accuracy without using synthetic data.

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A deep transfer learning approach for identification of diabetic retinopathy using data augmentation

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ABSTRACT

In ophthalmology, deep learning acts as a computer-based tool with numerous potential capabilities and efficacy. Throughout the world, diabetic retinopathy (DR) is considered as a principal cause of disease however loss of sight cannot be seen in adults aged 20-74 years. The primary objective for early detection of DR is screening on a regular basis at separate intervals which should have a time difference of every ten to twenty months for the patients with no or mild case of DR. Regular screening plays a major role to prevent vision loss, the expected cases increase from 415 million in 2015 to 642 million in 2040 means is a challenging task of ophthalmologists to do screening and follow-up representations. In this research, a transfer learning model was proposed with data augmentation techniques and gaussian-blur.

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JAVA SOURCE CODE SIMILARITY DETECTION USING SIAMESE NETWORKS

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ABSTRACT

Software plagiarism checkers can be important during coding competitions, to review, evaluate, and rank the participants. For a problem statement, if the number of submissions is relatively small then inspecting each code submission and being able to determine whether they are similar to the existing code segment or not is easy, but in the case of huge code submissions, it is very difficult to determine the presence of code clones in the submitted code snippet. Therefore, there is a need for plagiarism checkers to detect similar clones. In existing studies, we could use various approaches to detect code clones, but code clone detection using an abstract syntax tree is one of the popular approaches. Our proposed approach based on AST is experimented on a BigCloneBench dataset consisting of Java code fragments and implemented using recursive neural networks. The siamese networks were used to detect similarities between two code fragments and presented the influence of contrastive learning in source code clone detection with high accuracy. This paper showcases the improvement in precision, recall and F1-score at least with 5% compared to existing approaches.

Keywords: *Code similarity, Plagiarism detection, Siamese networks, Recursive Neural Networks, LSTM, Contrastive learning*

1. INTRODUCTION

Sometimes, Source Code Plagiarism checkers can help academia to evaluate students' programming assignments and judge their work. The participant's work can easily be inspected against plagiarism checkers even in coding competitions. Code clone detection is the base work to design such as plagiarism checkers. But in the industrial field, programmers look for particular source code, by which their task is highly satisfied. They will not bother about plagiarism or author details. There are too many online platforms to host projects' source code, even researchers sharing their work publicly. This makes it easy for developers to easily search for code and copy the code for their software implementations. Of course, copy-paste approach in software development has advantages and disadvantages. However, to check for the similarity in code segments, we followed an Abstract Syntax Tree (AST) based approach, employed deep learning models, and evaluated on an open-source large dataset available publicly.

Most of the research studies addressed the problem with clone detection. An existing research work [1] proposed AST-based neural networks to extract abstract syntax trees from code fragments and transform them into code vectors. The vector representation of ASTs then processed by a bidirectional Gated Rectifier Unit (GRU) to get source code embedding. Such embeddings help train recurrent neural networks and detect syntactically accurate and similar representations of source codes. Comparatively, this ASTNN approach showed better results than the previous traditional approaches. However, this model was evaluated on two publicly available datasets namely OJClone and BigCloneBench. Another model ASTNN-c [2] proposed Siamese-Networks [9] to identify code clones of the C language. In this approach, a contrastive study was provided between cross entropic loss function and contrastive loss function.

Our main contribution to work is to detect java source code similarity by supervised contrastive learning [3] by modifying the ASTNN model. Contrastive learning was mostly used in image

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Reliability Enhancement and Optimal Path Selection in MANET Communication

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Keywords: MANET communication, reliable path, route discovery, path switching and risk monitoring.

Abstract

Providing Secure routes for data exchange is a major challenge in mobile Adhoc network (MANET). The reliability of the path for data exchange is highly demanded in MANET as the network is volatile in nature and the nodes are dynamically variant. The existing approach of secure path routing is developed using trust monitoring. The existing methods are designed to discover the path for data exchange at initial setup phase and relies on the path for complete data exchange period. This consideration however, fails with the communication in MANET. To develop a reliable path during data, exchange a probabilistic path selection using risk monitoring and predicting node switching during communication is proposed. This paper, outlines a method of path selection and path switching in the path discovery phase and data exchange phase for reliable communication in Adhoc network. The presented routing offers a high data exchange probability resulting in improved network throughput, and network life time with reduction in data exchange delay time.

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Smart Wheelchair Cum Bed Based on Voice Recognition for Disabled Person

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Abstract - The Internet of Things (IOT) is a growing and disruptive technology with standards emerging for wireless communication between sensors, actuators, and gadgets in everyday human life. With the development of IOT systems, it is obvious that the medical industry needs a technology system for providing health care to those with disabilities. This paper describes a voice-activated wheelchair convertible bed prototype that was created especially for bedridden individuals. The goal of this study is to design, develop, and build a voice-controlled wheelchair cum bed that can be moved using voice commands. Additionally, this bed allows the patient to turn to the side. The patient can choose to sleep on their left or right side by using separate mechanisms on the left and right sides of the bed. Additionally, using voice commands, the bed may be transformed into a chair position. There are two stages to the bed's design and development. A bed with movable parts is designed first. The addition of a side-turning mechanism later improves this design. Secondly, voice instructions can be used to control wheelchair movement by using the input provided. A wheelchair that has been designed includes an automated obstacle detection system that uses ultrasonic sensors to stop the wheelchair as soon as an obstruction suddenly blocks its path. To plan and evaluate bed operations and positions, computer modeling, simulation, fabrication, and testing are used. Both immobile patients and their caretakers would benefit much from this device. Therefore, the created voice-controlled wheelchair cum bed may offer simple access for individuals with physical disabilities and provide automated protection from an obstacle collision if any voice command error occurs.

Key Words: Smart Bed, Arduino UNO, Voice recognition, Wheelchair, Sensors, Motors.

1. INTRODUCTION

Health monitoring is essential to our daily lives. The use of various specialized sensors in hospitals has increased recently because of efforts to enhance patient outcomes and overall construction efficiency. Modern hospital beds serve more purposes than simply providing sleeping space for patients. To make the people who are bedridden more comfortable and at ease. The voice-controlled wheelchair convertible bed that can be operated via voice commands is described in the proposed system along with its design and prototype development. The bed has unique characteristics that set it apart from other beds. Moreover, the bed may be transformed into a chair position using voice instructions. Therefore, this study proposes a wheelchair that may be operated by the user's simple vocal instructions and discusses the design and development of a voice-controlled automatic wheelchair. Additionally, the created wheelchair has ultrasonic sensors that can detect obstructions and halt the wheelchair's motion. The users will be more secure as a result.

1.1 LITERATURE SURVEY

This study presents a medical care bed with the Internet of Things technologies. A bed designed specifically for hospital patients or other people who need specific forms of treatment, controlled by a button, voice commands, or phone apps. Common features include adjustable height for the entire bed, for the head and feet, adjustable temperature, adjustable pressure, voice command, and programs to run both families using sensors and monitoring the patient's body temperature. This group of traits is distinctive in that it caters to both the convenience and comfort of patients as well as the comfort of medical professionals. [1].

A smart bed is a medical bed that is a part of an increasingly protective patient-care habitat. Raspberry pi is interfaced with a stepper motor using a motor driver circuit and is then brought forward with an audio input. The accuracy of detecting the voice commands was found to be troublesome. Wireless communication can be a hindrance to the patient [2].

Voice recognition software in a variety of languages is used to regulate wheelchair movement. The wheelchair may stop or pause when an obstruction or barrier is present in front of it because of the obstacle-detecting technology. The level of user safety is raised by this strategy. If the user does not adjust with voice control, the wheelchair system additionally has a keypad option. Only large obstructions are detected by the obstacle detection system [3].

A Review on the Determinants of a suitable Chatbot Framework- Empirical evidence from implementation of RASA and IBM Watson Assistant Frameworks

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Abstract - The rapid emergence and evolution of AI chatbots has been phenomenal. There are countless frameworks out there that are trying to catch up to each other in order to be the best. From modest start-ups to significant partnerships, these conversational professionals are utilized in a variety of industries. On the market, there are a variety of code-based and interface-based chatbot development solutions. However, they lack the adaptability and agility required to create sincere conversations. Chatbots are currently developed utilizing rule-based techniques, rudimentary machine learning algorithms, or retrieval-based techniques, however the results are not adequate. It can be difficult to decide which one is most suited to your requirements. The purpose of this paper is to look into the factors that influence the choice of a chatbot platform between RASA and IBM Watson Assistant. This paper presents a survey of these frameworks for researchers in identifying the areas of development and methodology. This study offers a critical examination of these frameworks, with current tactics thoroughly examined and analyzed. 30 publications from well-known digital databases were analyzed using a systematic review approach. In this paper, an extensive comparative analysis is carried out using evaluation models for chatbot performance. This survey concludes with curiosity to know why would we prefer one over the other and what are the future aspects of each. The data is collected from several resources including 50 respondents from 2 MNC's dealing with chatbot providing services.

Key Words: Chatbots, RASA, Machine learning, Deep Learning, IBM Watson Assistant

1. INTRODUCTION

A chatbot is an artificial intelligence software. It can communicate with a customer in natural language via informative applications, websites, and a variety of applications. It can have a simulated interaction with the user in such a way that they don't feel like they are talking to the machine directly. They are designed to help organizations maintain track of their client interactions. It's ubiquitous on popular chat apps like Facebook Messenger, Telegram, Rocket Chat, and Google Hangouts Chat, among others. Despite the fact that chatbots appear to be a relatively new concept, 75 percent of web customers use courier stages, according to research from the Global Online Index. It is a piece of correspondence programming that mimics written or voice communication with humans.

The chatbot established in the past maintains a rudimentary conversational stream with customers in the form of a simple solicitation and response stream. As research progressed, chatbots have been able to recognize the customers' settings and the flow of interactions and respond appropriately. According to Fortune Business Insights, the chatbot market will reach \$721 million in 2022. This number may project to reach 3 billion dollars by the end of the decade, based on its current compound annual growth rate (CAGR) of roughly 22%. Smaller firms are currently using chatbots in large numbers. Adding a third-party customer care bot powered by one of the popular chatbot builders is fairly simple. Larger companies, on the other hand, tend to take a more strategic approach. This pushes them to create their own in-house solution, which prolongs the development process. Conversational bots, according to 61 percent of executives, boost staff productivity by automatically following up on scheduled tasks. (According to Accenture, 2018). Chatbots are expected to provide consumers with 24-hour service (64 percent) and rapid responses (55 percent). (2018, Drift). Chatbots or comparable technology will automate 29% of customer service activities in the United States. (Tableau). During the COVID-19 epidemic, AI-powered chatbots played a crucial role in handling patient demands. The World Health Organization estimates that 4.2 billion people might potentially be reached by the WHO Health Alert Messenger App and other related communication channels. 2020 (World Health Organization)

1.1 Chatbot Usage and Engagement Statistics

AI advancements enhance chatbots' ability to mimic human agents in conversation. Contrasting with human-human conversations, human-chatbot communication is distinguished by noticeable variances in both content and quality. A human-

A Machine Learning Perspective on Emotional Dichotomy during the Pandemic

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Abstract - Mental health is a stabilizing force of an individual's emotional well-being, and any distress can cause imbalances in one's conventional routine and plethora of mental disorders. Mental health concerns usually took a backseat during the pandemic and impacts seamless functioning for teachers and students in educational environment. Depression is a mental health condition manifesting constant elevation or lowering of person's mood and little interest in everyday activities causing substantial impairment in everyday life. Depression in particular is influenced by complex array of factors including everyday stress, academic strain, compounded negative emotions and panic due to COVID-19 outbreak. Research conducted in healthcare domain in par with Artificial Intelligence provides various methods for detection and diagnosis of depression. However, minimal research is conducted predicting depression based on individual's situation and their environment in early stages. The objective of this study is to propose a context aware model for teachers and students for predicting risk of depression in educational framework and pandemic. The datasets are created through structured self-reporting questionnaires and potential variables for depression risk are identified with Regression analysis. Related context information is extracted in relevance with each potential variable and Convolutional Neural Networks is applied for depression risk prediction. Subsequently, accuracy of the proposed model for teachers and students is evaluated with performance metrics and comparative analysis of Multiple Regression and Convolutional Neural Networks.

Key Words: Mental Health, Depression Risk, Convolutional Neural Networks, Multiple Regression, Machine Learning.

1. INTRODUCTION

COVID-19 is a global humanitarian cataclysm that has left the world in shambles over the recent years. In India, it has enforced rapid transition in education, IT, healthcare, and other sectors, to digitize and implement various strategies for their seamless functioning [10]. Specifically, schools and colleges were forced to run emergency online learning/classes causing prolonged social isolation and increasing academic stressors on both teachers and students. It also had major impact on everyone's life, disturbing individual's conventional activities along with their physical and mental health. Mass fear and uncertainty has reflected disparaging effect in holistic well-being of a person steering strong emotions like stress, anxiety, anger, depression, and other complex array of factors. Work stress, difficult financial situation, family issues, personal and professional problems, changes due to the COVID-19 and other psychological and environmental parameters originating from an individual's way of life contribute to distress and mental health disorders.

According to World Health Organization (WHO), depression ranks high among common mental debilities. Depression is a mental health condition manifesting constant elevation or lowering of person's frame of mind and loss of interest in daily activities causing substantial impairment in everyday life. Given the current shifts in the educational landscape over the past years, depression has become increasingly common in teachers and students in India. It is an emotional dichotomy found in various strata of the society and in different age groups. Parameters like complete burnout, extreme work strain due to academic and curricular responsibilities in teachers; and academic stressors, peer and societal pressure in students could afflict the individual's ecosystem. Thus, a souring need rises to support the emotional well-being of teachers and students by predicting depression risk in preliminary stages to potentially reduce the escalation of the illness and in turn improve their quality of life.

Machine Learning and Deep Learning based mental health explorations [11] have attracted lot of attention to predict mental disorders using multimodal data like text, images, and videos. Approaches like Deep Neural Networks (DNN) and Regression has opened a new frontier to address early screening, detection, prediction, and diagnosis of various disorders by tracking compound emotional parameters associated with the mental health challenges. The statistical and computational methods extended by Machine Learning assist in constructing robust automated prediction and detection of depressive symptoms with the ability to learn and train from data. Multimodal data relying on frequent measurements of depression status procured from various sources have been implemented with deep learning models for early recognition of depression symptoms in the individuals. However, minimal research exists for classifying and predicting individual's emotional state based on their



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Monitoring system for the baby using wireless sensors and camera

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ABSTRACT: Working women's responsibilities for child care baby have grown more complex in recent years. When working women are at home, they will not have the time to constantly supervise their children(babies). They either hire a babysitter or send the kid to their grandparents' place to take care of the child. A warning message will be sent to both the caregiver and the parents if the results are out of the ordinary. Motion Eye OS can keep tabs on the baby's prance. The prototype of a baby monitoring system saves time for parents and makes life easier for those who provide care for the little ones. This newborn monitoring device has been shown to be the safest and most accurate for the infant. This IoT-based real-time monitoring system has the greatest security protections in the industry.

KEYWORDS: Smart device Wearable Sensors, Smart Sensors, Wireless Sensor Networks, baby care, multi-sensor, physiological signal, Body Sensor Networks, Body Area Networks Wearable Devices

I. INTRODUCTION

In recent years, it has become more typical in India for both parents to work. Working parents' biggest challenge right now is keeping an eye on their children. While they can have a caretaker for the infant, it would be challenging and difficult for them to keep an eye on the baby's health and well-being. As a result, about one in ten babies are born prematurely. When a baby is born prematurely, it is more vulnerable than a normal-born child. Premature babies have a hard time adapting to their new surroundings, both at home and in the hospital. More than three weeks before the expected due date, a baby is said to be prematurely born. They're more likely to have health problems and be at greater danger of death. Every second and every now and then, the baby's condition must be checked on. They'll be monitored minute by minute in a solitary chamber or incubator.

A preterm infant will spend more time in the hospital's neonatal intensive care unit or nursery than a term infant would (NICU). Premature infants often have low blood pressure and respiratory distress syndrome (PDA) due to their underdeveloped respiratory systems (hypotension). In addition, kids suffer from hypothermia since their immune systems are still developing. Studies show that almost 4 million infants globally die at a young age due to complications associated with their low birth weight. A lack of oxygen causes babies to suffocate under high temperatures and humidity. The health of the new born is further jeopardized by these issues. Similarly, after a preterm infant's time in the hospital is through, they will need to be cared for at home. Caregivers and parents alone are unable to satisfy a baby's demands. In most hospitals, an incubator will keep track of every vital sign, temperature, and ventilation rate, among other things, that pertain to a baby's health. At home, the baby's health and safety may be regularly monitored and supervised in a more child-friendly setting. [1].

The advanced baby monitoring device aids working parents in keeping a check on their youngsters from afar. While several tools exist to aid with newborn monitoring, many of them fall short of expectations. As a result, this project's objective is to create a cheap system with high-quality capabilities. The term "Internet of Things" (IoTs) is often used to refer to a network of interconnected electronic devices and everyday things. It makes it simple for a wide variety of devices to send and receive data over the internet. The goal of this study is to use the Raspberry Pi microcontroller, a powerful IoT device, to build a smart newborn monitoring system. This is because real-time monitoring is one of the most important tasks for IoT. In particular, a camera, and a sensor for assessing ambient will be used to keep tabs on the infant. Designing a system that permits and provides high-quality monitoring would be a significant issue. [2] In this way, parents may save time and effort by not having to repeatedly check on their child if no new information is being provided. To implement this situation, we need sensors and a CPU. The microprocessor is equipped with sensors that detect environmental conditions and track the baby's movements. To some extent, its usefulness depends on the specific

DETECTION AND LOCALIZATION OF IMAGE SPLICING FORGERY USING DEEP LEARNING

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Abstract- Nowadays digital image forgery has turned out to be a major problem because of some user-friendly photo editing softwares and high-resolution capturing gadgets. Not only can legal documents be stolen and forged, but criminal evidence such as photographs and security footage can also easily be tampered. Image splicing is a common type of digital image manipulation or image forgery. It is also called image composition. Cropping and pasting portions from the same or other sources is known as image splicing. These types of forgeries are extremely difficult to detect. In this vein, the work proposes a new method for detecting photographic splicing by deep convolutional neural networks to recognize the forgery directly from the training data. The proposed method is to detect and localize image splicing forgeries using Deep Convolutional Neural Network (DCNN) and Saliency algorithm. DCNN algorithm is used to classify authentic and spliced images, whereas the image saliency algorithm is used to detect and localize image forgery. The saliency algorithm extracts important features such as color illumination, pixel resolution, etc. of the image. The experimental results on datasets show that the proposed DCNN based model outperforms some state-of-the-art methods in image splicing detection and localization performance.

Keywords: Image Splicing, Deep Learning, Deep Convolutional Neural Networks, Saliency algorithm

I. INTRODUCTION

Since the invention of photography, individuals and organizations have often sought ways to manipulate and alter images to mislead viewers. With the help of digital photography, anyone can easily modify the image, and it is even easier to get professional-looking results. The manipulated images may cause social issues like images reported by the media to the doctoring of photographs of models to improve their looks or body image. Since there are so many methods available for image manipulation, image forgery detection has to be a growing field for academia and experts world alike.

It is possible to make graphically manipulated images with minimal effort with the availability of many image editing softwares. As a result, a vast array of counterfeit photographs can be found on the internet. These images are used on unique platforms, such as digital and social media, which may exasperate societal conflicts. The forged components are usually treated through distinct image editing techniques throughout the creation of a forged image to make them appear visually plausible. For example, in image splicing forgery the spliced objects are subjected to image-enhancing techniques such as resizing, rotating, smoothing, contrast enhancement, and compression. Although, it is challenging for human eyes to perceive the tampered region and each

image editing operation leaves a unique trace of manipulation.

Image forgery has occurred when the first image was created. Image forgery was firstly done in the 1860s. When digital scanners and cameras were no longer in use, image editing is used to be carried out by using tools such as burn, dodge, smudge, and airbrush to manipulate the image with various traditional artwork methods. In the traditional era, the image is manipulated during the process of printing. As new-technologies are being innovated, digital images are becoming popular and analog image editing method has worn out.

The outcomes of the study would be of great use to improve the credibility of images used within the media. Image forgery is an ever-increasing issue in the modern community, where forged images are used to deceive people, especially when the images are doctored to be deceptive. Despite the importance of the issue, there is still no widely recognized method to detect image forgeries. Therefore, the individuals have an exquisite chance to decide the credibility of the images, either through expert sources or elsewhere, such as the internet or shared by a friend on a social network. Digital images can be used as proof against crimes, and anyone can alter digital images to hide or erase important information

Plant Leaf Disease Detection and classification Using Deep Learning

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Abstract- Agricultural productivity plays a major role in India and is extremely important. Nearly 60% of the population is involved in some form of agriculture activities, either directly or indirectly. Identification and treatment of illnesses of plant leaf diseases has become a significant challenge due to the rapid expansion of a variety of plant leaf disease detection and adequate knowledge of farmer. Taxonomy and identification of infected plant leaves have become important in the agricultural industry, both technically and economically. As a result, deep learning algorithms provides a solution to this problem, as well as assisting farmers in taking the appropriate action after recognizing symptoms of leaf diseases. The main goal is to detect various plant leaf diseases using Convolutional Neural Network (CNN), Residual Network (ResNet), AlexNet, comparative analysis on different leaves with various diseases and the development of a user interface for plant leaf disease detection.

Key words- Plant Leaf diseases, Deep Learning (DL), Convolution Neural Network (CNN), Residual Network (ResNet), AlexNet.

I INTRODUCTION

Every country's primary needs are agricultural products. When plants become affected to the diseases, it has a significant impact on the agricultural productivity and economic resources of the country. The important to diagnose of plant leaf diseases in early stage and correctly is essential for reducing productivity losses. Automated plant leaf disease detection is beneficial as it reduces monitoring requirements on large plants while also identifying disease symptoms. There are a variety of illnesses that result in a significant reduction in production of respective fields. To overcome this loss, an approach that is deep learning techniques is implemented to detect and classify the diseases. Deep learning is the fast growing and broader part of the machine learning. Deep learning method will automatically classify and detect plant diseases from leaf images. The plant leaf disease detection and classification model success will be determined by its accuracy and speed.

The proposed model will assist farmers in correctly detecting and classifying plant leaf diseases. There are four phases to this model. The dataset of different plant leaf diseases and healthy plant leaves will be collected

in the first phase. The noise from the images is eliminated in the second stage, and the images are then provided a colour transformation structure. The third step is to segment the images using one of the existing segmentation techniques. Throughout this stage, the leaf-covered frontal area is easily extracted. Deep learning techniques including CNN, ResNet, and AlexNet will be applied for accuracy in the fourth phase. Finally, the user interface for detecting of plant leaf disease will be implemented based on the highest accuracy of the algorithm.

II RELATED WORK

This system includes information on methods for detecting diseases in plant leaves, with the ANN algorithm [1] to be used for image classification techniques for disease detection and classification in leaves. Another advantage of this model is that early detection of plant diseases is possible. This proposed work outperforms the deep learning methods in detection and prediction. The development of improved algorithms for the rapid and accurate identification of diseased leaves would be the focus of this system.

Perinatal Mental Healthcare System using Machine Learning Techniques

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Abstract- Perinatal mental health(PMH) problems are types of mood disorders which arise during pregnancy and within 24 months after the birth of a child, which affects pregnancy women, newborns and family relationships. These problems may occur at any stage of maternal women. PMH is mainly diagnosed through behavioral observation, self-reporting, and behavioral scale testing. Chatbot is an effective technology. Through human-robot interaction, it can monitor the mental health status of perinatal women in real time while collecting user health data. The application of human-robot interaction in mental health services has attracted widespread attention. Compared with traditional methods, robot intervention in mental health care can help reduce the obstacles for subjects to seek help for mental health, and can collect more comprehensive and detailed data of patients, which helps users recognize their own mental health level, can also help clinicians make diagnoses more accurately and in a timely manner. The principle objective is to propose a Chatbot to monitor and assess the mental state of perinatal women. This uses supervised machine learning to analyze and train a model to determine the anxiety, depression and hypomania index of perinatal women. Meanwhile, psychological test scales are used to assist in evaluation and make treatment suggestions to help users improve their mental health.

I. INTRODUCTION

Pregnancy is a transitional period involving the most complex experiences is a women's life, during which the woman's psychological status can be affected by a wide range of psychological variables. It is already known that pregnancy and transition to parenthood includes significant biological and psychological changes that have been associated with increased anxiety symptoms, depressive symptoms and discomfort. Appropriately 20 to 50% of women in developing countries will be confronted with issues related to mental health during the perinatal period. Perinatal mental illness is a major complication of pregnancy and the postpartum period. These disorders include depression, anxiety disorders and postpartum psychosis, which usually manifests as bipolar disorder, maternal obsessive compulsive disorder (OCD) and postpartum posttraumatic stress disorder (PTSD). Perinatal mental illness has been recognized since the time of Hippocrates and commented on through the centuries. The International Marce Society for Perinatal Mental Health, devoted to the study of perinatal mental disorders, has published a significant number of case studies of women suffering from various forms of perinatal mental disorders, 150 years ago. Nowadays, research in this field on the prevalence and risk factors of mental illness has increased dramatically; as a result, many government agencies and specialist teams have developed guidelines for the diagnosis and management of these diseases.

Research from high-income countries has received that 7%-15% of women suffer from antepartum depression, and about 10% of women experience postpartum depression. Available evidence suggests that perinatal mental health issues are more common in low- and middle- income countries (LMICs). According to a 2011 systematic review, the average prevalence of prenatal CPMDs was 16% in LMICs and the average prevalence of postpartum CPMDs was 20%, but these figure were calculated based on limited data from relatively few countries. More recent systematic review based on data from more countries reported an average prevalence of 25% for perinatal depression among women in LMICs, and an average prevalence of 19% for postpartum depression. Prevalence estimates vary widely and are likely low. Inadequate screening and referral systems often result in women with perinatal mental health issues going undiagnosed and untreated. A number of society determinants including socioeconomic status, race/ethnicity and a lack of social support influence a women's risk of experiencing perinatal mental health issues and the likelihood that she will seek and receive adequate treatment. Fear of stigma can also prevent women from seeking care. However, even if a woman seeks



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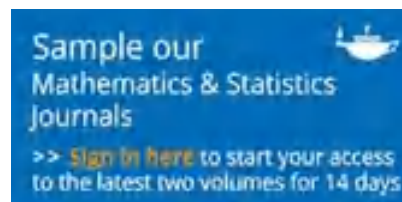
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Research Article

Blockchain in healthcare : Moving towards a methodological framework for protecting Biomedical Databases

G. Ramesh , Avinash Sharma, D. V. Lalitha Parameswari, Ch. Mallikarjuna Rao & J. Somasekar

Pages 891-901 | Published online: 05 Jul 2022

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Abstract

Biomedical databases or repositories have scientific information that is evidence based and protecting such documents from tampering or non-repudiation is very significant. The traditional techniques for the same have limitations in the distributed environments. Scientific contributions are to be safeguarded and it is one of the challenging problems. Blockchain is the promising technology that can support distributed ledger of transactions and thus it is found suitable for protecting biomedical repositories. As blockchain is a proven technology

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Application of soft computing | [Published: 13 May 2022](#)

Deep convolution neural networks learned image classification for early cancer detection using lightweight

[Kothapalli Seshadri Ramana](#), [Kummara Bala Chowdappa](#),
[Oorichintala Obulesu](#), [Deena Babu Mandru](#) & [Suresh Kallam](#) 

[Soft Computing](#) **26**, 5937–5943 (2022)

285 Accesses | **4** Citations | [Metrics](#)

Abstract

Essentially, cancer refers to the formation of abnormal cells in any section or area of the body. The goal of early cancer detection is to identify patients who are showing signs early on in order to maximise their chances of a successful therapy. Early detection and treatment of cancer reduce the disease mortality. A wide range of image processing and machine learning techniques have been presented for the identification of cancer. There was no improvement in detection accuracy or efficiency with existing systems. To overcome these problems, we present the Least Mean Square Filterative Ricker Wavelet Transform-based Deep

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Trust-Based Revocation Mechanism for Isolating the Misbehaving Nodes in MANETs

Jayashree S Patil* & Dr. K.V.N. Sunitha

Keywords: Revocation, Misbehaving, Trust, Historical Trust

Abstract

A mobile ad hoc network (MANET) is self-organizing network consisting of nodes that are interconnected wirelessly to each other. Since the nodes are continuously moving within the network as well as in and out of the network, there is high possibility for any malicious or misbehaving node to enter the network. The proposed revocation technique detects and isolates a node in the network that is doing inappropriately depending on the trustworthiness of every node. This technique uses a coordinator node to broadcast the revocation message against the misbehaving node, which is then verified and isolated from the network.



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Section

DR-DCGAN: A Deep Convolutional Generative Adversarial Network (DC-GAN) for Diabetic Retinopathy Image Synthesis

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Abstract

In image classification, one of the most significant elements is the broad range of data, particularly when supervised learning is used for the classification of images. Several reports are produced by experts who are experienced in their specialty. Even though a huge amount of medical data is complicated and has an expensive procedure which needs teamwork between the scientists and the clinics. The issue is mostly tried to be solved with the utilization of conventional techniques of data augmentation, creating a few adjustments to images of dataset for example rotating, zooming, cropping and size. In this proposed work, the modern technique of data augmentation is shown which is known as DC-GAN i.e., Deep Convolutional Generative Adversarial Network. This is a procedure to produce artificial medical images. Moreover, for the improvement of DR, we will take the help of the classification model that is resnet50 for the eye related classification. The suggested technique is shown on the APTOS-Blindness dataset. First, the current online data augmentation methods are used and the production of artificial images of retina take place with the help of DCGAN. Now, we use the method of classification for both the techniques. In the end, after the training of method takes place by utilizing the original and artificial clinical images, the outcome shows- the suggested model identifies all the stages of DR unlike the present methods and achieve accuracy of 98.66.

Keywords: Diabetic Retinopathy, Data Augmentation, Deep Learning, DC-GAN, GAN.

1. Introduction


Detection of eye diseases like Diabetic Retinopathy [1], Glaucoma and Age Related Macular Degeneration are important as there is a high risk of vision loss with growing age. It is essential to have a monitoring and predictive analytics system for the prevalence and the diagnosis of eye diseases to avoid the future risks.

The eye disease Diabetic Retinopathy (DR) -is responsible for the loss of eyesight among diabetic people. ophthalmologists or eye specialists usually detect & check the levels of DR using the presence of similar lesions and types. In accordance with the international convention, the intensity of Diabetic Retinopathy can be classified in 5 levels [2][3]: class 0 (no disease), class 1 (mild disease), class 2 (moderate disease), class 3 (severe disease), and class 4

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Original Article | [Published: 07 February 2022](#)

Analyzing histopathological images by using machine learning techniques

[Darshana A. Naik](#), [R. Madana Mohana](#) , [Gandikota Ramu](#),
[Y. Sri Lalitha](#), [M. SureshKumar](#) & [K. V. Raghavender](#)

[Applied Nanoscience](#) **13**, 2507–2513 (2023)

212 Accesses | **4** Citations | [Metrics](#)

Abstract

Medical image data have become an important part of every patient's digital health record. With the advancement of microscope technology, pathologists can now handle histopathological tissue slides more quickly with digitized WSI. Manual evaluations of massive histological images are time taking and sometimes error-prone, particularly for pathologists with diverse degrees of skill. Patient can be harmed by a delayed or erroneous analysis. Our research work combines image processing techniques (grayscale, edge-detection) plus supervised machine learning algorithms such as RF, SVM, and KNN for analyzing histopathological images (HI) and finds the optimal algorithm to classify breast cancer.

PERFORMANCE ANALYSIS OF LSTM BASED DEEP LEARNING MODELS FOR ABNORMAL ACTION PREDICTION IN SURVEILLANCE VIDEOS

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ABSTRACT

Video surveillance is increasingly being adopted for ensuring safety and security both in public and private places. Automated prediction of abnormal events like theft, robbery, murder etc from continuous observation of surveillance videos is a multidisciplinary study involving computer vision, deep learning and artificial intelligence. Deep learning-based video analysis and categorization is the most researched topic. Many deep learning models based on Long Short Term Memory are proposed for automated prediction of abnormal events. There are two contributions in this paper; the first contribution focuses on five models - Resnet, VGG16, VGG19, 3DCNN and Inception V3. The second contribution has proposed an approach called Recurrent-Residual-Inception V3 (RRIV3). Advantage of RRIV3 is performance will not get effected more by removal of any residual block. This work does a performance analysis of six LSTM based deep learning models for abnormal event prediction from surveillance videos before and after performing preprocessing. Deep learning models are combined with LSTM for the prediction of abnormal events from past observation of events in the video stream. These six models are executed against different benchmarked abnormal event detection datasets one among them is UCF-Crime dataset and efficiency is compared in terms of accuracy, precision, recall and execution time. It is observed that Recurrent-Residual-Inception V3 with LSTM performs better than other models with training accuracy of 90% and test accuracy of 85% compared to other models. The execution time is 20 milliseconds compared to other models.

Keywords: 3DCNN, Inception V3, VGG16, VGG19, Resnet, Recurrent-Residual-Inception V3

1. INTRODUCTION

Video surveillance systems are deployed in many places like roads, stations, airports, malls etc. for public safety, however detecting abnormal activities and taking proactive actions can provide better security to individuals. For this, people and their interactions must be constantly monitored for a longer duration and any abnormal activity must be predicted. It is difficult for trained personnel to reliably monitor videos for a longer duration and predict abnormal events. With the need to automate this activity with high accuracy, many autonomous abnormal activity detection systems are proposed. The goal of any autonomous anomaly recognition system is to detect/predict any offensive or disruptive

activities in the surveillance video in real-time. The conventional systems extract various features of appearance, dynamic relationships and interactions between the entities in the video and classify them to detect any abnormal activity. The accuracy is limited in this approach due to the insufficiency of handcrafted features to detect abnormal activity. As abnormality is context-dependent, the identification of features that represent the activity in the relevant context is challenging. Recently deep learning algorithms are being used for many computer vision problems. Deep learning algorithms learn features automatically and provide better accuracy. Deep learning uses discriminative feature representations of both appearance and motion patterns to model the event patterns.

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Assistive Interaction Using Gestures and Voice Commands

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Abstract

Due to an artificial intelligence-based voice recognition system, physically challenged people can now operate electronic devices such as laptops, desktops, and smartphones. Over their voice commands, people can open applications, send emails, ask for time and weather, open websites, and shut down their devices. Their voice is captured and converted into text, and this text is searched for keywords to accomplish respective tasks. It is possible for people who are paralyzed and cannot move from their seats to use their desktops and laptops by using hand gestures. By utilizing different hand gestures and tracking hand movements, it is possible to control the mouse in accordance with what hand movement is occurring. In our application, a webcam captures the hand gesture and the movement and performs mouse operations according to the gesture captured. Using contour analysis, feature extraction, and hand tracking, this can be achieved.

Keywords: Artificial Intelligence, Voice Recognition, Hand Gesture, Contour Analysis, Hand Tracking.

1. INTRODUCTION

While PC development continues to advance, the requirement for trademark correspondence between individuals and machines also increases. Despite how our phones impact the usage of touch to screen innovation, it's not ideal for being implemented in work zones. While the mouse is particularly useful for controlling devices, it is also immensely thoughtful to employ it for truly impaired people who are interested in using the mouse for interacting.

The technique employed in this paper uses voice commands and a webcam to capture and distinguish hand motions given by the client. In this study, we explain how the technique can be applied to the making of a straightforward connection interface. This can be done using Hand Tracking, Contour Analysis, and Feature Extraction.

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PAPR REDUCTION OF FBMC-OQAM USING A-LAW AND MU LAW COMPANDING

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ABSTRACT

A possible waveform for 5G, the filter bank multicarrier system is an effective multicarrier scheme. The high Peak-to-Average Power Ratio (PAPR) of FBMC (Filter Bank Multicarrier), like that of OFDM (Orthogonal frequency division multiplexing) and other multicarrier systems, necessitates the usage of high-power amplifiers with wide dynamic range. By using companding methods, PAPR is decreased at the price of BER performance loss. A unique application of the A-law and Mu-law companding methods is presented in this study to reduce the PAPR of the FBMC-OQAM (Filter bank multicarrier-Offset quadrature amplitude modulation) system. The trade-off between PAPR reduction and Bit error rate performance of FBMC-OQAM employing A-law and Mu-law companding methods is also examined in this article. The PAPR of the system has significantly decreased, while the system's BER has risen, according to simulation findings. Both companding methods have shown comparable outcomes, however Mu-law companding has performed somewhat better than

A-law companding in terms of reducing PAPR, while A-law companding has a higher BER.

Keywords— High Power Amplifier (HPA), Filter Bank Multicarrier (FBMC), Bit Error Rate (BER), Peak to Average Power Ratio (PAPR).

1. INTRODUCTION

Future wireless communication systems must be built to these requirements due to the growing need for greater data speeds. The greatest option for increasing bit rate is to use multicarrier schemes since each sub-band in these schemes has less frequency selective fading than the others do [1]. By increasing the number of subbands at the receiver, simple equalisation may be accomplished, and each subband can then be thought of as having simply flat fading. Orthogonal Frequency Division Multiplexing (OFDM), which is utilised for Digital Audio Broadcast (DAB), Digital Video Broadcast (DVB), and other multicarrier applications, is a well-liked multicarrier method [2]. The spectrally efficient OFDM system reduces ISI by cyclic

A Heuristic Deep Feature System for Energy Management in Wireless Sensor Network

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Research Article

Keywords: Energy consumption and management, Wireless sensor network, Alive and dead nodes, Communication delay, Deep learning

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Published: [15 November 2022](#)

An optimized deep networks for securing 5g communication system

[Ambidi Naveena](#) , [Maddala Vijaya Lakshmi](#) & [Meeniga Vijaya Lakshmi](#)

[Cluster Computing](#) (2022)

39 Accesses | [Metrics](#)

Abstract

Nowadays, cellular applications rule the digital world with their betterment. However, security is the primary concern for a better communication range during the communication process. If the messages are hacked, data overhead and collisions occur. So, the present research work has aimed to design the novel Buffalo-based Autoencoder Security Framework (BbASF) developed in the Orthogonal-Frequency-Division- Multiplexing (OFDM) channel. Consequently, the function of the designed model is checked with the Denial of Service (DoS)-CICIDS dataset. The planned model is tested in the python environment. After that, the communication



Diagnosis of Brain Disease through Deep Learning Approaches

Dr.C. Padmaja^{1*}, Dr.T. Kishore Kumar²

Abstract

Medical image analysis to detect and prevent the problem associated with it is one of the major problem solving approach in the gamete of medical field. Neurological disease detection at early stage can improve the necessary treatments and survival of the patients. The existed computational models are proposed in literature based on Magnetic Resonance Image (MRI), Computed Tomography (CT) and Positron Emission Tomography (PET) images. These models differ from the design and development of accurate models to assess the brain images and to provide the necessary quantitative medical data. The paper presents a brief review on various ML and DL approaches, their modalities and datasets to detect four most common types of brain diseases such as Alzheimer's [1], brain tumor [2], epilepsy [3], and Parkinson's [4]. The key findings from survey are discussed for future betterment.

Key Words: Alzheimer's Disease, Brain Tumor, Epilepsy, Parkinson's Disease, Machine Learning, Deep Learning, Support Vector Machine and Artificial Neural Network.

DOI Number: 10.14704/nq.2022.20.10.NQ55145

NeuroQuantology 2022; 20(10):1622-1626

1622

Introduction

Recently the medical image processing is becoming vital role for diagnostic purpose. Rather than conventional practices for diagnosis which are prone to human error and time consuming, machine learning and deep learning approaches are used to diagnose diseases thereby demonstrates technology's efficacy in medical fields.

It is difficult for humans to yield classification and regression for large data set, ML and DL techniques enables researchers, lab technicians and patients to propose novel computational algorithms which can collect the data, pre-process them and classify for data analysis and performance evaluation by exploring the machine learning strategies.

The design of computational model depends on the image classification and feature extraction [1]. The initial step is to collect the data and to convert raw data into enhanced version to acquire needful information from it. The second step involves the image classification using ML/DL techniques (to extract information class), image segmentation

(to divide medical image into multiple segments) and image visualization (to find the region of interest on selected object for treatment). The steps involved in the bio-medical image processing are listed in figure 1.

Few ML classifiers include Support Vector Machine (SVM), Random Forest (RF), Logistic Regression (LR), Decision Trees (DT), Naïve Bayes (NB), K-nearest neighbors (KNN) and Artificial Neural Network (ANN). DN employs Recurrent Neural Network (RNN), Convolutional Neural Network (CNN), Boltzmann Machine, auto encoders and Deep Belief Network (DBN) to detect the brain diseases. The list of ML and DL techniques for brain disease diagnosis are summarized in figure 2 and figure 3.

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^{1*}ORCID: orcid.org/0000-0003-0521-916X



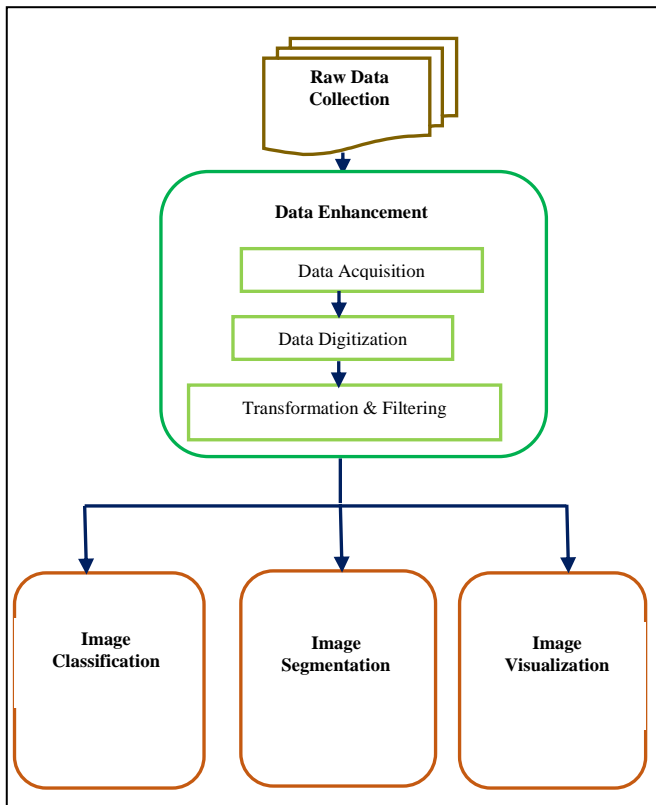


Figure 1. Steps involved in medical image processing

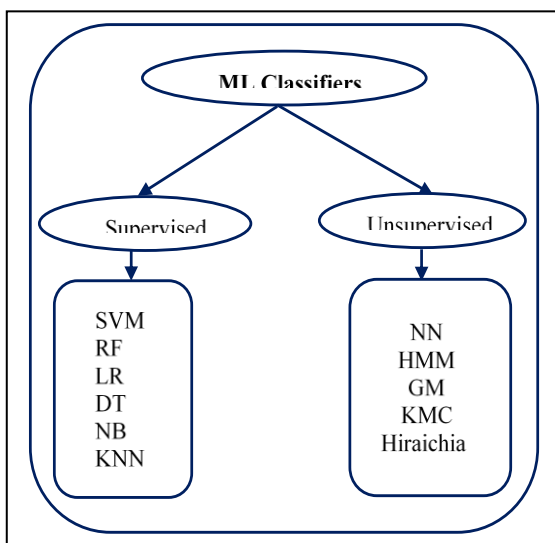


Figure 2. List of ML techniques

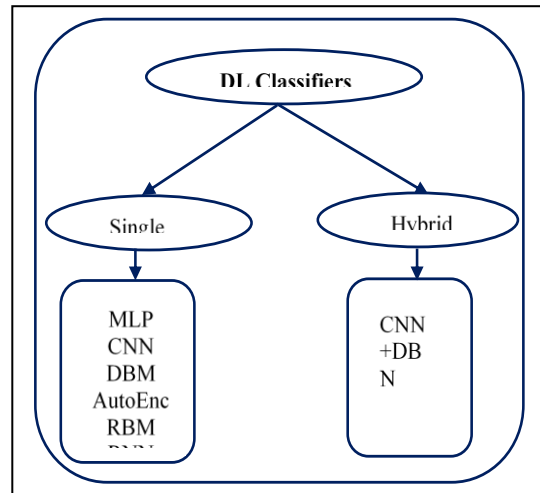


Figure 3. List of DL techniques

Machine Learning (ML) and Deep Learning (DL) are subfields of Artificial Intelligence (AI) and its intelligence enables the machine to process the input data automatically and provide useful information. But the difference between ML and DL relies on the design of classification algorithms [2]. ML’s classification implies handcrafted feature whereas DL approach relies on feature extraction from several hidden layers on which classifier works on. Currently DL replaces the ML due to its better performance. ML and DL approaches can be used to detect four different most common types of brain diseases such as Alzheimer’s [3], brain tumor [4], epilepsy [5], and Parkinson’s [6].

1623

The paper gives an overview of ML and DL approaches, issues associated with each of the mentioned brain disease. The rest of the paper is organized as follows. Section 2 described the available data sets related to different types of brain diseases. In Section 3, brief Literature Survey related to four brain diseases is summarized. Section 4 demonstrated the key findings and anticipated trend techniques for better performance. Section 5 describes the open issues and future directions to carry out the research.

Database Collection

A. Alzheimer Disease (AD)

AD usually seen in older people and it is symptom free disease. So, it is hard to diagnose at early stage.

- a) **ADNI Database (Open Source)** Associated with USA and Canada Universities used to find biomarkers and to track the stage of AD accurately.



- b) **NACC Database** is a largest multicenter database for AD detection. It is open to all researchers to use after uploading their purpose of research.
- c) **Oasis Dataset (Open Source)** of MRI diseases for AD detection.
- d) **AIBL Database** is used to detect Neuro-degenerative disease such as AD.
- e) **MILAN Dataset** is for Alzheimer’s disorders and stroke detection.
- f) **MIRIAD Dataset** includes 708 T1 MRI scans and describes the age, gender and MMSE score of the patient explicitly.

epilepsy summary is listed in table 1.

Table 1. Study on different ML/DL in brain disease detection

Disease type	Ref. No.	Year	Image type	Datas et	Classifier	
ML Techniques						
AD	[7]	2018	DTI	ADNI	SVM/LR	
	[8]	2018	MRI	ADNI	SVM	
	[9]	2018	MRI-T1	ADNI	SVM-RBF	
	[10]	2019	sMRI	OASIS	SVM	
	DL Techniques					
	[11]	2018	sMRI	OASIS	CNN	
[12]	2018	sMRI	ADNI	OASIS		
ML Techniques						
BT	[13]	2020	MRI	BraTS	RF	
	[14]	2020	MRI	BraTS	A-KNN	
	DL Techniques					
	[15]	2020	MRI	BraTS	CNN+SVM	
[16]	2020	MRI	BraTS 2012	LSTM+SoftMax		
ML Techniques						
ED	[17]	2020	EEG	Bonn Univ.	SVM	
	[18]	2020	EEG	Bern	ANFIS	
	DL Techniques					
	[19]	2020	DWI	CHE-MIT	DCNN	
[20]	2020	MEG	Univer sity	DNN		
ML Techniques						
PD	[21]	2020	sMRI	Med. Univ.	SVM	
	[22]	2020	voice	Synap se portal	LR/RF	
	DL Techniques					
	[23]	2020	Speech	PC-GITA	CNN+AlexNet+MLP	
[24]	2020	Sensor data	SelfTh	CNN+AlexNet+MLP		

B. Brain Tumor Disease (BT)

The BD patient data is manually segmented and classified w.r.t. background, edema, or tumor core.

- a) **BraTS’20 Dataset** consists of 3T multi-model MRI scans of HGG and LGG tumors for training, validation, and testing.
- b) **Figshare Dataset** consists of a total of 2D 3064 T1-weighted MRI images of the brain tumor. It consists of three kinds of brain tumor images (1426 gliomas, 708 meningiomas, and 930 pituitary tumors).
- c) **Kaggle is a Dataset** containing over 50,000 publicly available datasets. Among them, ‘Brain MRI Images for Brain Tumor Detection’ is a dataset that contains MRI images for brain tumor analysis.

C. Parkinson’s Disease (PD)

- a) **PPMI Dataset** presents datasets containing advanced imaging, biological and clinical data to estimate the progression of PD. These data help to discover progression biomarkers of the disease.

D. Epilepsy Disease (ED)

- a) **The European Epilepsy Database** is the largest and most extensive database for ED based on EEG data. This database consists of annotated EEG datasets of over 2500 seizures from more than 250 patients and gives about 45,000hrs of EEG at a sample rate from 250 Hz up to 2500 Hz.

Literature Survey

On recent developments of ML and DL approaches, used to detect four different types of brain diseases such as Alzheimer’s, Parkinson’s, brain tumor, and

Issues Identified

From the contemporary studies in literature, it is clear that ML and DL methods are getting increasing attention from the researchers because of their potentials to significantly contribute to brain disease detection. ML/DL-based brain disease diagnostic approaches must deal with a number of major issues as:

- a) **Opacity:** This opacity is a critical issue of comes with a set of problems, because entrusting key decisions to a brain disease detection system that is not good to clarify itself convey apparent dangers. Recently, Explainable AI (XAI) emerges as an oracle to make the AI-based systems more transparent. The primary goal of the XAI



paradigm is to introduce a set of methods that delivers more explainable models while retaining high performance levels.

- b) **Annotated Data Scarcity:** The ML and DL algorithm performances depends on the accessibility of high-quality training models. Moreover, the problem of annotated data scarcity is the most critical issue in AI-based medical diagnosis. Various techniques such as information augmentation and picture synthesis can be used to produce additional annotated data are formulated for AI-based medical diagnostics. Moreover, the methods need to be further tailored to fit the brain disease diagnosis.
- c) **Interoperability:** The interoperability issues among health providers, manufacturers, and AI scientists is undoubtedly essential to setup this beneficial solution for enhancing the quality of brain disease treatments. This collaboration will even resolve the medial data scarcity to the AI researcher.
- d) **Sensitivity:** ML and DL techniques are typically application-specific where a model trained for detecting one kind of brain disorder might not work well for another brain disorder. To avoid the wrong diagnosis, the underlying DL/ML algorithms need to be separately retrained with respective brain data for each disease class. The security, data privacy needs to be addressed jointly from both sociological and technical perspectives. Efforts are required to design appropriate algorithms for anonymizing sensitive information associated with brain data.
- e) **Hardware Limitations:** ML and DL applications often come with hardware limitations. The issue becomes more severe when the computation processing works on medical data because of the constraint of lossless data preservation. Eventually, increased processing power requires more memory and computation resources. Pre-processing of input data is foremost concern in ML and DL. Investigations on resource efficient existing techniques in the context of ML/DL-based brain disorder identification.

Performance Comparison by Deep Learning Algorithms

Deep Learning for diagnostic classification to select features from neuroimaging data and/or prediction of MCI to AD conversion. Four studies (gray) have used hybrid methods that combine deep learning for feature selection from neuroimaging data and traditional machine learning, such as the SVM as a classifier. Twelve studies (blue) have used deep learning method with softmax classifier for diagnostic classification and/or prediction of MCI to AD conversion.

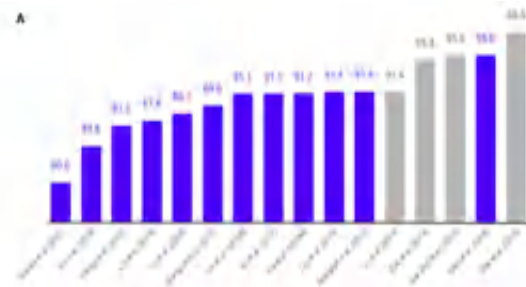


Figure 4. Comparison of diagnostic classification accuracy of pure deep learning and hybrid approach

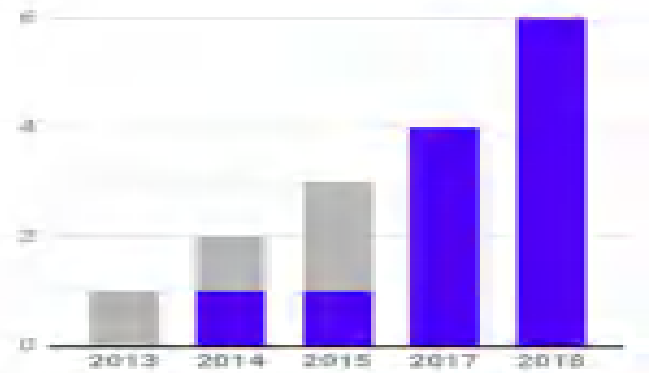


Figure 5. Number of research studies published / year

Conclusion and Future Directions

The aim of the paper is to address the four most dangerous brain disease detection processes using machine and deep learning. The survey reveals some important insights into contemporary ML/DL techniques in the medical field used in today's brain disorder research. With the passage of time, identification, feature extraction, and classification methods are becoming more challenging in the field of ML and DL. Researchers across the globe are working hard to improve these processes by exploring different possible ways. One of the most important factors is to improve classification



accuracy. The use of hybrid algorithms and a combination of supervised with unsupervised and ML with DL methods are promising to provide better results.

References

- G. Dornhege, J.D.R. Millan, T. Hinterberger, D. McFarland, and K. Moller, *Towards Brain-Computing Interfacing*. Cambridge, MA, USA: MIT Press, 2007.
- J. Paul and T.S. Sivarani, "Computer aided diagnosis of brain tumor using novel classification techniques," *J. Ambient Intell. Humanized Comput.*, pp. 1–11, Jul. 2020.
- J. Godyń, J. Jończyk, D. Panek, and B. Malawska, "Therapeutic strategies for Alzheimer's disease in clinical trials," *Pharmacol Rep.*, vol. 68, no. 1, pp. 127–138, Feb. 2016.
- R.T. Merrell, "Brain tumors," *Dis Mon.*, vol. 58, no. 12, pp. 678–689, Dec. 2012.
- Y.M. Hart, "Diagnosis and management of epilepsy," *Medical*, vol. 44, no. 8, pp. 488–494, Aug. 2016.
- D. Calne, "Is idiopathic parkinsonism the consequence of an event or a process?" *Neurology*, vol. 44, no. 1, pp. 5–10, Jan. 1994.
- Y.T. Zhang and S.Q. Liu, "Individual identification using multi-metric of DTI in Alzheimer's disease and mild cognitive impairment," *Chin. Phys. B*, vol. 27, no. 8, Aug. 2018, Art. no. 088702.
- N. Zeng, H. Qiu, Z. Wang, W. Liu, H. Zhang, and Y. Li, "A new switching-delayed-PSO-based optimized SVM algorithm for diagnosis of Alzheimer's disease," *Neurocomputing*, vol. 320, pp. 195–202, Dec. 2018.
- D. Yao, V.D. Calhoun, Z. Fu, Y. Du, and J. Sui, "An ensemble learning system for a 4-way classification of Alzheimer's disease and mild cognitive impairment," *J. Neurosci. Methods*, vol. 302, pp. 75–81, May 2018.
- S. Neffati, K. Ben Abdellafou, I. Jaffel, O. Taouali, and K. Bouzrara, "An improved machine learning technique based on downsized KPCA for Alzheimer's disease classification," *Int. J. Imag. Syst. Technol.*, vol. 29, no. 2, pp. 121–131, Jun. 2019.
- J. Islam and Y. Zhang, "Early diagnosis of Alzheimer's disease: A neuroimaging study with deep learning architectures," in *Proc. IEEE/CVF Conf. Comput. Vis. Pattern Recognit. Workshops (CVPRW)*, Jun. 2018, pp. 1962–19622.
- K. Backstrom, M. Nazari, I.Y.H. Gu, and A.S. Jakola, "An efficient 3D deep convolutional network for Alzheimer's disease diagnosis using MR images," in *Proc. IEEE 15th Int. Symp. Biomed. Imag. (ISBI)*, Apr. 2018, pp. 149–153.
- T. Wang, J.L. Qiu, R.G. Qiu, and M. Yu, "Early detection models for persons with probable Alzheimer's disease with deep learning," in *Proc. 2nd IEEE Adv. Inf. Manage., Communicates, Electron. Autom. Control Conf. (IMCEC)*, May 2018, pp. 2089–2092.
- M. Nguyen, T. He, L. An, D.C. Alexander, J. Feng, and B.T.T. Yeo, "Predicting Alzheimer's disease progression using deep recurrent neural networks," *Neuro Image*, vol. 222, Nov. 2020, Art. no. 117203.
- Z.U. Rehman, M.S. Zia, G.R. Bojja, M. Yaqub, F. Jinchao, and K. Arshid, "Texture based localization of a brain tumor from MR-images by using a machine learning approach," *Med. Hypotheses*, vol. 141, Aug. 2020, Art. no. 109705.
- D.M. Kumar, D. Satyanarayana, and M. N. G. Prasad, "MRI brain tumor detection using optimal possibilistic fuzzy C-means clustering algorithm and adaptive k-nearest neighbor classifier," *J. Ambient Intell. Humanized Comput.*, pp. 1–14, Sep. 2020.
- W. Wang, F. Bu, Z. Lin, and S. Zhai, "Learning methods of convolutional neural network combined with image feature extraction in brain tumor detection," *IEEE Access*, vol. 8, pp. 152659–152668, Aug. 2020.
- J. Amin, M. Sharif, M. Raza, T. Saba, R. Sial, and S.A. Shad, "Brain tumor detection: A long short-term memory (LSTM)-based learning model," *Neural Comput. Appl.*, vol. 32, no. 20, pp. 15965–15973, Oct. 2020.
- R.R. Janghel, A. Verma, and Y.K. Rathore, "Performance comparison of machine learning techniques for epilepsy classification and detection in EEG signal," in *Data Management, Analytics and Innovation*. Cham, Switzerland: Springer, 2020, pp. 425–438.
- R. Srinath and R. Gayathri, "Detection and classification of electroencephalogram signals for epilepsy disease using machine learning methods," *Int. J. Imag. Syst. Technol.*, pp. 1–12, Sep. 2020.
- M.H. Lee, N. O'Hara, M. Sonoda, N. Kuroda, C. Juhasz, E. Asano, M. Dong, and J.W. Jeong, "Novel deep learning network analysis of electrical stimulation mapping-driven diffusion MRI tractography to improve preoperative evaluation of pediatric epilepsy," *IEEE Trans. Biomed. Eng.*, vol. 67, no. 11, pp. 3151–3162, Nov. 2020.
- L. Zheng, P. Liao, S. Luo, J. Sheng, P. Teng, G. Luan, and J.H. Gao, "EMS-net: A deep learning method for autodetecting epileptic magnetoencephalography spikes," *IEEE Trans. Med. Imag.*, vol. 39, no. 6, pp. 1833–1844, Jun. 2020.
- L. Zahid, M. Maqsood, M.Y. Durrani, M. Bakhtyar, J. Baber, H. Jamal, I. Mehmood, and O.Y. Song, "A spectrogram-based deep feature assisted computer-aided diagnostic system for Parkinson's disease," *IEEE Access*, vol. 8, pp. 35482–35495, Feb. 2020.
- F.M.J. Pfister, T.T. Um, D.C. Pichler, J. Goschenhofer, K. Abedinpour, M. Lang, S. Endo, A.O. Ceballos-Baumann, S. Hirche, B. Bischl, D. Kulić, and U.M. Fietzek, "High-resolution motor state detection in Parkinson's disease using convolutional neural networks," *Sci. Rep.*, vol. 10, no. 1, pp. 1–11, Dec. 2020.



VLSI Implementation of High-Performance Ternary Operand PPA for Fir Filter Application

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ABSTRACT

The binary digits adder, which performs mathematical operations, is the fundamental operational element of several cryptographies as well as pseudo-random bit generator approaches. The ripple carry adder, the final CSA step, requires an additional delay to operate. The parallel prefix adders use more space even though performance in terms of latency is improved. Parallel prefix adders can also be used to build three operand adders. A novel, low delay, area-efficient adder has been developed to improve efficiency in terms of delay as well as area strategy is utilized. FIR Filter having the element of adders and multipliers as a design parameter. So, the main objective of the DSP field is to reduce the area and delay in filter designs. This design is less complex in terms of area hardware and delay than similar designs that have been used in the past. Using the Xilinx ISE 14.7 version tool, the findings of the performance study and simulations are validated.

Keywords: Carry save adder, Three operand adder, Pseudo Random number Generator, cryptography.

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I. INTRODUCTION

In modulo, which would be widely applied in cryptography, three operand adding are the most typical. Cryptography techniques must be deployed on hardware to ensure both physical security and optimal system efficiency [1]. Modular arithmetic, with the three-operand adder as the fundamental building block [3], is employed in cryptography applications [2] [4]. Three operand addition is

necessary in these applications that use modular arithmetic; it is a basic operation in just this field. It is therefore imperative to create an effective three operand adder.

Data privacy in internet services could become a pressing issue to be resolved given the rapid evolution of data communication. Cryptographic software is mostly used to offer privacy. Modulo as well as cryptographic applications both use three operand



KALMAN FILTER DESIGN FOR BALLISTIC MISSILE DEFENCE APPLICATIONS

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Abstract: The inappropriate identification of a menace, such as ballistic missiles, poses a serious danger to defence system analysts. Thus, it poses a huge risk and puts the defensive capability of fighter aircrafts under test. Due to the surrounding environment, Radar provides noisy measurements.

We propose the utilization of the Kalman Filter to estimate and track the location of missile for capture attempt by terminating countermeasures. The Kalman Filter produces estimates of hidden variables based on inaccurate and uncertain measurements. It also provides a prediction of the future system state based on past estimations.

The Extended Kalman Filter is a broadened version of the Kalman Filter where non-linearity is approximated utilizing the first or second order derivative. Both the filters utilize similar methods however Extended Kalman Filter beats the constraints of Kalman filter.

The aim is to estimate the states (position, velocity) of the ballistic missile. In this paper a mathematical model for the target will be developed, simulated and the noise corrupted data will be filtered using Extended Kalman Filter. The performance of the filters will be shown in the results.

Index Terms – Ballistic Missile, Kalman Filter, Extended Kalman Filter.

I. INTRODUCTION

Incoming ballistic missiles are a serious danger to the country. They can be detected with the assistance of tracking radars. They are utilized to compute the objective's (Ballistic missile) relative position in range, azimuth angle, elevation angle, and speed. It is the important part of both military and civilian radar systems particularly for missile guidance. Missile guidance is exceedingly difficult without target tracking, as a matter of fact. The issue is that the radar estimation contains specific vulnerability in the measurement of current position of the rocket. In radar, the objective is to estimate the location of targets (ballistic missiles, aircrafts.) by examining the two-way transit timing of received echoes of transmitted signals. Since the reflected heartbeats are unavoidably embedded in noise, their measured values are randomly distributed. The measurements which contain data in regards of interest are often associated with a noisy signal. The Kalman filter has been regarded as the optimal solution to many tracking and data prediction tasks. A Kalman filter is an algorithm used to estimate states of a system from indirect and uncertain measurements. Kalman filters are great for systems which are constantly changing. They make use of their benefit that they are light on memory (they don't have to keep any history other than the preceding state), and they are fast, making them appropriate for real time problems.

II. EXTENDED KALMAN FILTER

In Extended Kalman Filter(EKF), it uses the method called first order Taylor expansion to obtain linear approximation of the polar coordinate measurements in the update. In this process, a Jacobian matrix is produced, which represents the linear mapping from polar to Cartesian coordinate, applied at the update step.

To apply extended Kalman-filtering techniques, it is first necessary to describe the real world by a set of nonlinear differential equations.

$$\dot{x}=f(x) + w$$

where x is a vector of the system states, $f(x)$ is a nonlinear function of those states, and w is a random zero-mean process.

The process-noise matrix describing the random process w for the preceding model is given by $Q=E (ww^T)$.

Finally, the measurement equation, required for the application of extended Kalman filtering, is considered to be a nonlinear function of the states according to

$$z = h(x) + v$$

where v is a zero-mean random process described by the measurement noise matrix R , which is defined as

$$R=E (vv^T)$$

For systems in which the measurements are discrete, the nonlinear measurement equation can be rewritten as

$$Z_k = h (x_k) + v_k$$

AES ALGORITHM FOR SECURE ELECTROCARDIOGRAM (ECG) SIGNAL TRANSMISSION

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Abstract Now a days, communication system requires secure data transfer so as to keep up the privacy of the transmitted message. Exchange of sensitive personal data like medical information tends to require place throughout the world, the Electrocardiogram (ECG) signal may be a recording associated with the heart electrical activity which is more frequently used for the diagnosis of cardiovascular diseases. The ECG signals contain sensitive private health information additionally as details that serve to individually distinguish patients. For this reason, the information must be encrypted before transmission across public media so on to prevent unauthorized access by adversaries. Advanced Encryption Standard (AES) algorithm is one among the algorithms which is broadly employed due to its exemplary security and usage in many applications including connected health systems. The AES Algorithm is applicable for encrypting and decrypting personalized Electrocardiogram (ECG) signals for secure transmission. During this proposed system, the ECG signal is encrypted before it's sent to the destination and at the receiver side, the signal is decrypted and analyzed by the end user. Both the encryption and decryption processes which are being performed using AES algorithm. The AES Algorithm for secure ECG signal transmission is implemented by using Xilinx ISE Design Suite and code is written in Verilog HDL and Python.

Keywords Electrocardiogram (ECG), Advanced Encryption Standard Algorithm(AES), Verilog HDL(Verilog Hardware Description Language)

1 Introduction

Today's data driven world can't be visualized without sharing digital information globally over Internet. Within the current scenario when the strain is towards digitization of various processes to enable easy living like cashless and contactless payments; securing personal data and its linkage to Social Security number or unique number etc.; keeping personal medical anamnesis securely over cloud, are to be named some. With the growing population and inadequate infrastructure, providing emergency medical support has become of paramount importance within this scenario.

Due to less number of medical professionals available than required, it's very difficult to administer expert help to people living in rural areas. Even for the persons living within the cities and are under constant medical observation, its demanding to provide them an efficient mechanism of collecting their essential physical parameters continuously and its analysis to forestall any mishap. This ends up in develop a platform to cater medical services including expert help nationwide with ease. This platform requires collection, transmission and processing of the information during a secure manner to stay up privacy of the top users. Therefore, securing the data is that the necessity of the hour and will be a challenging aspect with regard to the real time and low power operations.

So whenever an information is stored or transmitted over a network from one end to a different, there's high probability of these information gets stolen or altered. This sort of unauthorized access to the data over a network must be prevented. The foremost important tool for providing network security is cryptography. Within the last 20 years, many cryptographic algorithms are developed. Among all those algorithms, AES still stands top to provide security against third party unauthorized access to our data. This algorithm can even be applied to many other biomedical signals. All over the world, patients records are often tend to maneuver from one doctor to other. In some cases it's necessary to transmit the record across the countries to induce the clear interception of the knowledge within the patient record. So as to cut back to reduce the

Piloting a Drone Using Hand Gesture Control System

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Abstract-

Nowadays, drones are employed for many different applications all around the world. The problem with methods like remote controls and joysticks is that they are prone to interference noise and have a range of electromagnetic radiation that is limited. The complexity of using a joystick-button controller, however, necessitates an experienced pilot to carry out these activities with the drone, which is extremely expensive.

In this project, we will try to solve the issue by using a motion controller to steer a drone with basic hand movements. The hand controller, the communication base, and the quadcopter are the three subsystems that make up this concept.

In this project, we will try to solve the issue by controlling the movements of a drone with just one hand using a motion controller. The hand controller, the communication base, and the quadcopter are the three subsystems that make up this concept. The positional data is sent to the communication base by the hand controller, which resembles a glove. Based on data from the hand controller, the communication base is built to determine the current gesture and communicate this information to the quadcopter using the appropriate signals. According to the commands of the communication base, the quadcopter is built to fly.

Index Terms- Drone, remote control, joysticks, hand-controller, quadcopter, electromagnetic radiation.

I. INTRODUCTION

Unmanned aerial vehicles, sometimes known as drones, have recently attracted a lot of attention in fields such as the military, agriculture, industry, etc. Drones' small size and simple control are their key benefits. A low-cost system can be designed by using hand gestures as one method of controlling a drone's functioning. A multi-rotor drone with four motors attached is called a quadcopter. Using an electrical sensor and control system, the quadcopter stabilizes the flight. Even though convertiplanes and quadrotor helicopters have been flown experimentally for a long time, the configuration remained mysterious until the development of the current UAV or drone. The primary goal of this project is to build an autonomous quadcopter that can be operated via hand gestures.

II. RELATED WORK

According to [1], authors have suggested a Gesture Controlled Quad-Copter, by representing an idea on the use of quad copter for the sake of pivotal issues like defense tasks and climate calamities, describing the sensing of hand gestures using sensors like accelerometer and gyroscope. The proposed design of gesture controlled gimble gives movement in X, Y axis when the quadcopter is in aerial flight state.

The authors in [2], has suggested Quad copter flight Dynamics, which says the precise handling is fundamental to flying by following a user-defined complex trajectory-based path and also while performing any type of missions. This paper serves as a solution to handling the quadcopter with angular precision by illustrating how the spin of the four rotors should be varied simultaneously to achieve correct angular orientation along with standard flight operations such as taking-off, landing and hovering at an altitude.

The authors in [3], have suggested Simple GUI Wireless Controller of Quadcopter, which presents the development of remotely operated Quadcopter system. The Quadcopter is controlled through a graphical user interface (GUI) where the communication between GUI and Quadcopter is constructed by using wireless communication system.

According to [4], the authors have suggested Gesture-Controlled Quadcopter System which addresses the problem of using joystick by designing and building a one-handed gesture-controlled quadcopter.

Implementation Of Vehicle Theft Detection and Identification System

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Abstract – In recent times property theft has become a major concern. Out of this vehicle theft tops the list and occurs often in all parts of the world. In light of this issue many technologies are evolving and new methods are developed in order to resolve this issue. The methods involved in vehicle theft detection have become aware to everyone including the burglars and they try to break the system and steal the vehicle. This paper proposes a system presenting a mechanism to minimize vehicle thefts. It also aims to acquire the image of an unauthorized person and transmit it to a remote location. The system provides security by sending an alert message as soon the vehicle is stolen or moved without knowledge of owner. System also offers location of the vehicle to the registered user. This provision for theft vehicle tracking is provided by GPS technology by sending location. GSM technology is used to send an alert message to intimate the owner when the vehicle is started. ESP32 Camera module is used to send the picture of the thief to the registered user.

Key Words: Vehicle Theft, GSM, Arduino, GPS, ESP32WIFI Module, ESP32 Camera

1. INTRODUCTION

Vehicle theft identification and detection system is based on Arduino. Its main aim is to reduce the vehicle theft to a great extent. Today vehicles are being stolen on a large scale and that is the reason why this system is being introduced [1]. The aim of this system is to track the vehicle, lock the vehicle and also to send the alerts and images to the owner mobile number and registered e-mail. Vehicle tracking system installed in the vehicle, to track the vehicle location and to stop the engine. When the owner starts the ignition of the vehicle by using key switch, then they also need to press the secret button with in the particular duration of time, 4 seconds to be precise. Then only this system will recognize the owner access. Otherwise, this system will detect vehicle theft and stop the vehicle ignition automatically and also continuously sends the SMS along with location details in the form of latitude and longitude values to the owner mobile through GSM, GPS [2]. If at all a theft occurred, this system will continuously send the images to the registered mail id through ESP32 CAMERA [3].

2. EXISTING SYSTEM

The existing system uses IoT based technology to detect the vehicle theft. The system also uses GPS for tracking the location of the vehicle [4]. An app named BLYNK is installed in the owner’s mobile to control the ignition of the vehicle and also remotely locking the vehicle when being stolen. SMS alert is sent to the user’s mobile using GSM when the vehicle starts [5].

3. PROPOSED SYSTEM

The proposed system uses Arduino based technology for detecting the vehicle theft. The system makes use of two buttons to recognize if the vehicle is being stolen. If the vehicle is theft mode, then the engine stops and SMS alert is sent to the registered mobile using GSM. The location of the vehicle is obtained using GPS [6]. ESP32 Camera module helps in capturing image of the thief and sending e-mail to owner.

4. METHODOLOGY

In this project, Arduino UNO is used for controlling the whole process, GSM module is used for sending and receiving messages. GPS is used to track location of the vehicle; LCD is used to check whether the system is ready and we use relay switch to switch on/off the engine based on the combination of buttons pressed.

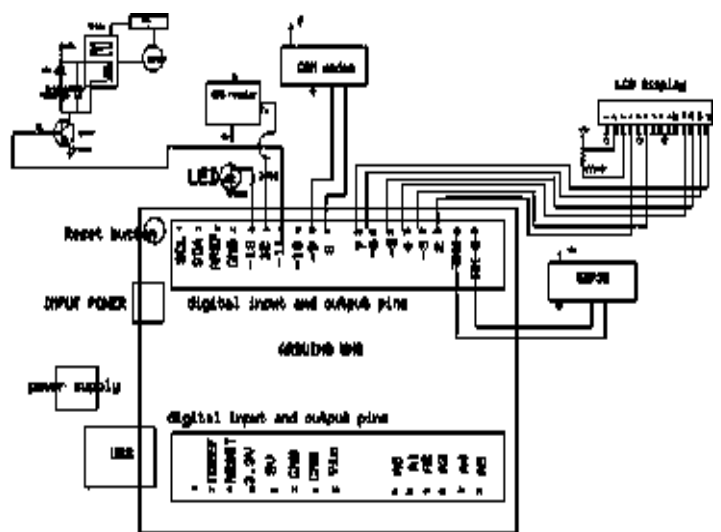


Fig. 5.1 Block diagram of System



All



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Abstract:

This paper explores the role of multiple antennas in mitigating jamming attacks for the Rayleigh fading environment with exogenous random traffic arrival. The jammer is assumed to have energy harvesting ability where energy arrives according to Bernoulli process. The outage probabilities are derived with different assumptions on the number of antennas at the transmitter and receiver. The outage probability for the Alamouti space-time code is also derived. The work characterizes the average service rate for different antenna configurations taking into account of random arrival of data and energy at the transmitter and jammer, respectively. In many practical applications, latency and timely updates are of importance, thus, delay and Average Age of Information (AAoI) are the meaningful metrics to be considered. The work characterizes these metrics under jamming attack. The impact of finite and infinite energy battery size at the jammer on various performance metrics is also explored. Two optimization problems are considered to explore the interplay between AAoI and delay under jamming attack. Furthermore, our results show that Alamouti code can significantly improve the performance of the system even under jamming attack, with less power budget. The paper also demonstrates how the developed results can be useful for multiuser scenarios.

References

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A MATLAB based improved Speech Enhancement and Recognition using Spectral Subtraction Method, MFCC, GMM

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Abstract—Speech recognition is the process of automatically recognizing a particular word from a particular speaker based on the information contained in each voice wave. This document reviews inventions and technological advances in the field of speech recognition and also focuses on the various steps required to identify speaker using MATLAB programming. In this document, we first apply Spectral Subtraction Method to perform speech enhancement and noise removal. This background noise is successfully removed by the Wiener Filter application. In addition, the technique adopted here develops code using MATLAB programming. In this article, nine audio samples were recorded through a microphone and the system was trained according to the recorded audio samples. The MFCC function of the voice sample was calculated and the words were distinguished according to the energy associated with each sampled word and recognized using GMM.

IndexTerms—Wiener filter, Speech Recognition, Speech Enhancement, MFCC, GMM

I. INTRODUCTION

Speech is one of the most important medium by which a communication can take place. With the invention and widespread use of mobiles, telephones, data storage devices etc. has provided a major help in setting up of speech communication and its analyzing. The proposed model of speech recognition technology contains signal pre-processing, which describes a procedure to process signal with endpoint detection, pre-emphasis, framing and windowing; And then it's characteristic parameter extraction technology, author mainly used Mel Frequency Cepstral coefficient extraction and related speech recognition algorithm in the experiment. For analyzing the extracted parameter, cross-correlation was utilized.

II. SPEECH ENHANCEMENT

Noise plays a vital role in speech enhancement. Thus noise estimation is one of the major part while performing the speech recognition task. Therefore, it is understood if the estimated noise is low it will not affect the speech signal but if the noise is high then speech will get distorted and loss intelligibility. So to remove the noise we have two techniques i.e. speech degradation and speech enhancement. In this paper we use speech enhancement technique that enlightens upon the major use Speech Degradation technique i.e. removal of Gaussian noise from the original speech wave.

In this technique firstly the degraded signal i.e. original signal mixed with Gaussian noise is first converted to the frequency domain with the help of FFT tool in MATLAB Programming. Then higher frequency noise components are then removed with the help of 3rd order Butterworth low pass filter. The reason to choose Butterworth filter here because it has the capability to filter the Gaussian noise more closely & approximates an ideal low pass filter as the order, n , is increased. This methodology is referred as Spectral Subtraction Method. In this method, the noise spectrum is estimated during speech pauses, and is subtracted from the noisy speech spectrum to estimate the clean speech.

Consider a noisy signal which consists of the clean speech degraded by statistically independent additive noise as,

$$y[n] = s[n] + d[n] \quad (1)$$

Where $y[n]$, $s[n]$ and $d[n]$ are the sampled noisy speech, clean speech, and additive noise, respectively. It is assumed that additive noise is zero mean and uncorrelated with the clean speech. Because the speech signal is non-stationary and timevariant, the noisy speech signal is often processed frame-by-frame. Their representation in the short-time Fourier transform (STFT) domain is given by

$$Y(\omega, k) = S(\omega, k) + D(\omega, k) \quad (2)$$

Where k is a frame number. Throughout this paper, it is assumed that the speech signal is segmented into frames, hence for simplicity, we drop k . Since the speech is assumed to be uncorrelated with the background noise, the Short-term power spectrum of $y[n]$ has no cross-terms.

Hence,

$$|Y(\omega)|^2 = |S(\omega)|^2 + |D(\omega)|^2 \quad (3)$$

The speech can be estimated by subtracting a noise estimate from the received signal.

$$|S(\omega)|^2 = |Y(\omega)|^2 - |D(\omega)|^2 \quad (4)$$

The estimation of the noise spectrum $|D(\omega)|^2$ is obtained by averaging recent speech pauses frames, where M is the number of consecutive frames of speech pauses (SP). If the background noise is stationary, it converges to the optimal noise power spectrum estimate as a longer average is taken. The spectral subtraction can also be looked at as a filter, by manipulating such that it can be expressed as the product of the noisy speech spectrum and the spectral subtraction filter (SSF) as:

$$|S(\omega)|^2 = |H(\omega)|^2 |Y(\omega)|^2 \quad (5)$$

Design of 32x32 Reversible Unsigned Multiplier Using Dadda Tree Algorithm

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Abstract

Multipliers are essential parts of every processor or computer. Microcontrollers and digital signal processors typically measure their performance on how many multiplications they can execute in a given amount of time. As a result, better multiplier designs are sure to increase system efficiency. A reversible Dadda multiplier is one such possible approach. The Dadda tree technique is used to construct two 32x32 reversible unsigned multipliers in this paper. The TG and FG gates are accustomed to create the partial product circuit in the first design. The PG and TG are utilized to create a partial product circuit in the second design. For adding partial products, the PG and reversible full adder gates are used. The design is implemented using Xilinx ISE 14.7 design suite.

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IOT based Agri-Bot for Seed Sowing, Smart Leaf Infection Identification and Fertilizer Spray

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Abstract: In agriculture there is need for a technology that is more easily understood, implemented and used by the farmers. Hence, to reduce the burden of farmers, robotization in the field of farming is necessary. Autonomous robots built with less maintenance and these are portable as well as customizable according to the requirements might serve the purpose. Thus, this project presents the design of a four-wheel drive robot that does the work of seed sowing in ploughed agricultural land avoiding the human effort. This project attempts to develop an automated system that detects the presence of disease in the plants. An automated disease detection system is developed using sensors like temperature, humidity and color based on variation in plant leaf health condition. Here, IoT comes into picture to supply semi-automated or fully-automated frameworks. After detecting the disease, the required fertilizer will be sprayed on to the crops. The crop will be monitored by robot using Blynk App. MATLAB along with EMBEDDED are the technologies used for “IoT Based Agri-bot for Seed Sowing, Smart Leaf Infection identification and Fertilizer Spray”.

Keywords— Agri-bot, Automated Robot, Leaf Infection Identification.

1. INTRODUCTION

The Discovery of Agriculture is the first big step towards civilized life. And the agriculture sector has been under pressure in keeping pace with rising demand and shortage of man-power. Farmers have been following traditional methods like manually opening of furrows by a country plough and dropping seeds by hand, and dropping seeds in the furrow through a bamboo/meta funnel attached to a country plough (Pora). For sowing in small areas dibbling i.e., making holes or slits by a stick or tool and dropping seeds by hand is practiced. In the current generation most of the countries do not have sufficient skilled man power specifically in agricultural sector and it affects the growth of developing countries.



DATA TRANSMISSION THROUGH LI-FI IN UNDERWATER

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Abstract: In the present scenario for various industrial, scientific and underwater applications high speed wireless communication is desirable. The existing underwater communication technique such as acoustic communication method has high latency and suffer low data rates, whereas RF frequency communication have high attention of signal underwater. The emerging optical wireless communication techniques have offered high data rates in Gbps and visible light promises low attenuation of signal strength which provides high data density. The proposed method deals with the transmission of data underwater through visible light communication. The proposed method designs data transmission model where it transmits text, audio, image through water. The hardware used in this model are Arduino Nano and the transmitter part in the model is the laser light, whereas the receiver part is made of laser receiver. The transmitter follows On Off Keying (OOK) modulation technique where the blinking of laser on determine 1's and off as 0's in this way the data is transmitted via line of sight to the receiver underwater. Li-Fi implementation can be executed to achieve rapid information move. In future, the capacity can be increased as per the requirement to transmit high quality image audio using higher range lasers and photodiodes.

IndexTerms - Arduino Nano, laser transmitter, laser receiver, OOK modulation, Li-Fi, visible light communication, underwater optical wireless communication.

I. INTRODUCTION

In the recent years where technology has been ruling the world with its high-speed internet services, optical wireless communication can play a crucial role in this sector. Optical wireless communication is capable of providing high data rates with low power and mass requirement and is used in various industrial, space and underwater communication applications. Underwater optical wireless links are less explored as it is more challenging where various physical parameters are to be considered for the data transmission as the underwater environments vary from shallow water bodies to deep oceans. The present technology using acoustic waves for underwater communication links has limited performance due to low bandwidth, high transmission losses, time varying multipath propagation, high latency and doppler spread. These factors lead to temporal and spatial variation of acoustic channel which in turn limits the available bandwidth of the system [1]. It can support data rate up to tens of kbps for long distances (ranging in kms) and up to hundreds of kbps for short distances (few meters). All this has led to the conception of underwater optical wireless communication (UOWC), as it provides higher data rates than the traditional acoustic communication systems with significantly lower power consumption and simpler computational complexities for short-range wireless links [2]. UOWC has different potential applications ranging from deep oceans to coastal waters.

Light Fidelity (Li-Fi) is the most reliable means of underwater communication for data transmission. This paper determines the better model for underwater data transmission. This model uses visible light source such as LEDs or laser are used as transmitter and photodiodes like LDR or laser receiver are used as a receiver. The visible light source used in this model is the laser transmitter module and laser receiver on the receiver part. The data to be transmitted is processed through Arduino into 1's and 0's and it follows On Off Keying (OOK) modulation [3]. The blinking of laser on determines 1's and off as 0's, in this way the data is transmitted via line of sight to the receiver underwater. Once the data is received is processed to get the information which can be a text, audio or image. This can be a feasible means of communication between the submarines, autonomous underwater vehicles (AUV) and unmanned underwater vehicles (UUV) as it provides high data rates in the range of Gbps.

II.LITERATURE SURVEY

In the recent years, optical wireless communication is being preferred for terrestrial communications, underwater communications for different applications in various fields due to its high-speed data transfer and low equipment requirement. Acoustic waves are widely used for the underwater communication links [4]. Though acoustic communication has improved over the years for better communication in underwater for long distances but it's relatively low data rates, highly varying multipath and propagation delay makes acoustic networks less reliable [5]. The Radio Frequency (RF) communication has high data rates in the terrestrial links. The RF communication in underwater is not preferable as the RF waves get absorbed in the water and the signal gets attenuated [6]. These

COMPARATIVE ANALYSIS OF TCP CONGESTION CONTROL ALGORITHMS USING NETSIM

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(for Women).

Abstract

Congestion is a situation where the number of packets that a network can carry exceeds the capacity of the Network, which results in message traffic and thus slows down the data transmission rate. Congestion control is one of the most important issue in computer networks. There is a chance of network collapse if we do not use the proper congestion control algorithm. Therefore, congestion control is an effort to readjust the network performance to fluctuations in the traffic load without adversely affecting the user's perceived service quality. TCP controls the congestion by maintaining a congestion window, which indicates the maximum amount of data that can be sent into the network without being acknowledged. The main purpose of this paper is to analyze and compare the different congestion control algorithms Network Simulator tool (NetSim-Version 12).

Key Words: Congestion, Throughput, Delay, QoS.

Introduction

A computer network is a system in which multiple computers are connected to each other to share information and resources. During the last years, computer networks have experienced tremendous growth. More and more computers get connected to both private and public networks, the most common protocol stack used being TCP. Nowadays it is difficult to identify the congestion control algorithms that are currently implemented by various machines in Internet. The TCP header does not provide any information about them. Congestion control is an effort to readjust the performance of a network to fluctuations in the traffic load without adversely affecting the user's perceived service quality.

TCP controls the congestion by maintaining a congestion window, which indicates the maximum amount of data that can be sent into the network without being acknowledged. There are different congestion control algorithms for TCP protocols namely: Tahoe, Reno, BIC, CUBIC. All the algorithms suggest mechanisms for determining when to retransmit a packet and how it should update the congestion window.

SMART QUEUE MONITORING BOT

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ABSTRACT

Social distancing is of key importance during the current pandemic. It helps limit the spread of COVID-19 by observing distance between disease spreading individuals. Now it is not possible to station a person 24×7 at each queue to monitor social distancing violations at Banks, Public Offices, Malls, Schools, Theatres etc., usually see long queues for hours every day. To ensure social distancing in queues we hereby design a Smart Queue Monitoring BOT. The BOT we are proposing instantly makes buzzer sound, if it finds any individuals with less than 3 feet distance between them. If the violation persists, it sends alert messages of these violations along with a camera picture to Gmail account using Wi-Fi over IOT to inform the higher authorities/head office to update them about violations with proof so instant disciplinary action can be taken. The robot consists of a 3 wheel design system used to drive the robotic vehicle and uses Raspberry pi for programming the BOT. It makes use of Raspbian OS, VNC viewer software in order to move to and fro along the queue. It uses ultrasonic sensing to sense distance violations. Thus, the BOT allows automatic maintaining of social distancing in queues which helps to prevent spread of the COVID-19. Hardware and Software requirements are Raspberry Pi, Raspberry pi Camera Module, L298n Motor Driver, Buzzer, Ultrasonic sensor, Raspbian OS, VNC viewer software.

I.Introduction

The BOT is used to monitor social distance in a queue. When an individual violates social distancing norms it instantly gives alerting buzzer sound. If violation persists then the BOT sends alert messages to official mail id with attached photograph. Social distancing is of key importance during the current pandemic. It helps limit the spread of covid by observing distance between disease spreading individuals. Now it is not possible to station a person 24×7 at each queue to monitor social distancing violations. At Banks, Public Offices, Malls, Schools, Theatres etc., usually see long queues for hours every day. To ensure social distancing in queues we hereby design a Smart Queue Monitoring BOT.

II.Existing System

There are few already existence methods are available such as Lidl Ireland: chatbot says the quietest time to shop, Italy: app indicates queue time, Aldi Suisse: automated traffic light queuing system.

Aldi Suisse: automated traffic light queuing system: Aldi Suisse added electronic crowd monitoring systems at 110 of its busiest stores at the beginning of April. The crowd monitor system is located at stores' entrances and exits. It automatically counts the number of shoppers entering and leaving. It acts as a traffic light: the green light turns red when the maximum capacity of 100 has been reached. A message displayed on screen asks shoppers to wait before entering. As soon as a shopper

HIGH-SECURITY LOCKING SYSTEM USING ARDUINO**N. Harini, P.Lavanya, GVNSK Sravya**

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ABSTRACT

Security and Authentication of individuals are necessary for our daily lives especially, in restricted areas and Residential Safe lockers. A smart digital door lock system for the locker is equipment that uses digital information like a user's data, voice detection, and face recognition because the method for authentication with in the system. With in the past, a Password-based locking system was used for the fashionable electronic lock system where the password is employed because the verification factor. Then comes the following electronic lock system which is an RFID- based system, where RFID value acts because the authentication factor. As these methods of security are more prone to security breaches, advanced technology should be used. For encountering the real-time challenges with in the "security" arena and enhancing the present criteria by designing a sophisticated technology. We have got proposed an answer. The proposed system consists of 4 layers of security. They're Face Authentication, OTP generation and validation, Voice Authentication, and Password Authentication. After the user successfully unlocks all four security layers, he/she gets access to the secured place. Even one failure in unlocking any of the four layers access is denied to the user and should start from the face recognition. The most number of unsuccessful attempts is three, if a user exceeds them, he/she should await 300 seconds to start out the authentication process again.

I INTRODUCTION

As years passed and with tremendous development people started earning money, property, jewelry, and plenty of more precious things. With huge development, people felt a desire to secure their earnings. In today's, man's life money security is very important aspect as he earns the cash by his diligence. It's not enough to own these accessories, but the safety of this is often vital. On the opposite hand, authorized access is required into secured and restricted areas for confidentiality and integrity. As technology is increasing rapidly, breaches into such areas by hacking are getting a chunk of cake for intruders. To strengthen the above-stated security problems, we've come up with a High- Security



An Enhancing health care with Li-Fi Kit Using Internet of Things (IoT)

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Abstract This manuscript shows the patient inspection framework utilizing Li-Fi innovation. Li-Fi represents Light Fidelity. Li-Fi innovation planned via the German Physicist Harold Haas, gives broadcast of information through enlightenment by sending information through fluctuates power quicker than natural eye can follow. Li-Fi is a bidirectional, fast as well as entirely organized remote optical correspondence and is a sort of apparent light correspondence. The planned replica aides in patient observing in medical clinic and should be possible via utilizing the idea of Li-fi rather than Wi-Fi innovation to keep away as of recurrence obstruction through human body. Sensors, for instance, temperature, heartbeat, movement are utilized in replica to fill its split roles. These sensors gather the information as of human body plus convert keen on computerized structure utilizing the simple to advanced converter. The consequence of these sensors is specified to microcontroller. The microcontroller to is utilized here is AVR microcontroller. The outcome as of the microcontroller is taken care of to the Li-Fi module which communicate the information as light plus the beneficiary end gather this information plus this information of enduring is to portable.

Keywords: Li-Fi, VLC, LED, Heartbeat sensor, Temperature sensor, IOT.

I. Introduction

In the period of arising innovation, it is significant to track down enhanced answer for each movement. These days medical care expenses are increasing as well as to lessen this expenses it is expected to encompass an innovation based medical care frameworks. Patient observes must be possible in an tremendously effective way utilize the Li-Fi innovation. Patient scrutiny alludes to "rehash or consistent perception otherwise estimation of patient, his/her physiological capability, as well as capacity of life support gear, to direct administration choices, including when to make therapeutics intercessions, and evaluation of those mediation" (Hudson, 1985,). Patient observing done via the Wi-Fi is more slow when contrasted through the Li-Fi plus it additionally has less statistics relocate capacity. Unwavering superiority is preferable in Li-Fi over Wi-Fi. Since broadcast of information via Wi-Fi is through RF waves, there is a elevated chance to these waves could influence the human body. The obligation of these signs might be cancer causing as well as this has been specified via the World Health Organization. To take care of this issue, Li-Fi (light loyalty) innovation is utilized for sound environment. Light loyalty is broadcast of statistics through optical remote medium. Sensors, for instance, heartbeat, temperature, as well as movement sensor be utilized sent through the Li-Fi module. Quick heartbeats be produced as 0s and 1s. Photograph diode is utilized at recipient end. Glimmering of light happen at the pace of many megabits per second. By utilizing Bluetooth, the recipient is associated through versatile. The statistics got in versatile can be shown in portable through an application. The scope of Li-Fi innovation is 10m and gotten correspondence is conceivable. The broadcast of statistics via light through remote is named as Visible Light Communication (VLC).

Horn Shaped SIW Antenna for 5G Applications

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Abstract: Substrate Integrated Waveguide (SIW) is the promising technology for mm wave frequency band due to low loss, high Q, compact size and low cost. It also allows the integration of all the components on the same substrate. Over the last decade the demand for high data rates has increased exponentially due to rapid growth in telecommunication sector. To overcome the need of high data rates 5G wireless systems are introduced as next-generation cellular systems. These systems take advantage of mm wave frequency band due to larger bandwidth and increased channel capacity. At these frequencies, 24GHz is particularly in focus due to high transmission rate through atmospheric barriers, which makes it appropriate for high data rates and high-resolution imaging applications. This work consists of planar SIW horn shape antenna design for mm wave frequency band. The proposed antenna is designed at a frequency of 24 GHz with a substrate of ROGERS RT/DUROID 5870 and its thickness is 1.6 mm. The proposed antenna improves the performance characteristics like Gain, Impedance matching and Radiation efficiency makes it suitable for numerous 5G wireless systems. This antenna can be used in wireless communications, particularly in the area of, 5G RF front end and 5G Applications MIMO.

Index Terms—SIW horn shape; Gain; Impedance matching; Radiation efficiency

INTRODUCTION

Horn antennas have been widely used at microwave and milli-meter frequencies as feeder of the reflector antenna systems. The size of horns made with metallic waveguides are massive, so horn structures using low profile are selected in planar form which is practically applicable in communication systems [1]. The planar horn antennas are compatible with microwave and milli-meter wave circuits and provide convenient way in many applications. The rectangular shaped horn antennas [2] are mostly used in a number of applications because horn antennas provide exceptional radiation properties like symmetry patterns, high gain, easy fabrication, and more bandwidth but their implementation in planar form seems to be difficult due to the bulky geometry and especially the 3D horn sizes. These difficulties can be overcome by SIW technology [3]. To improve the radiation efficiency and directivity of the beam, the wave guide should be provided with an extended aperture to make the abrupt discontinuity of the wave into a gradual transformation. So that all the energy in the forward direction gets radiated. This can be termed as Flaring. Now, this can be done using a horn antenna. The horn antenna has a distinctive shape and is unlike many other forms of antenna and is used at microwave frequencies [4].

The horn antenna can be considered to be a waveguide that has been widened out in the form of a horn. As a result, it finds many applications in areas where waveguides are used [5]. Shaped like a horn and this antenna forms a smooth transition between the waveguide and free space whilst also directing the radio waves in a beam [6].

The horn antenna may be considered as an RF transformer or impedance match between the waveguide feeder and free space which has an impedance of 377 ohms [7]. By having a tapered or having a flared end to the waveguide the horn antenna [8] is formed and this enables the impedance to be matched. Although the waveguide will radiate without a horn antenna, this provides a far more efficient match. In addition to the improved match provided by the horn antenna, it also helps suppress signals travelling via unwanted modes in the waveguide from being radiated [9] [10].

The designed horn shaped SIW antenna is utilized for 5G applications. The proposed antenna represents the horn antenna using SIW Technology for 24GHz applications, with improved gain. This has resulted in high bandwidth, low return loss, which made the antenna suitable for 5G applications. SIW Horn antenna is the integration of rectangular waveguide and horn antenna. Due to compact structure, fabrication easiness and more reliability SIW configurations are applied in this design. It shows that the horn antenna is created with the use of metallic vias (It connects top and bottom plane of the structure). It gives the benefits of non-planar features and other features also namely, small size, low cost, light weight, easy to manufacture using PCB technique and other planar processing technologies, and also being easily connected to coplanar waveguide utilizing a wideband and uniplanar transition. SIW horn shaped antenna is shown in Fig. 1.


I. ANTENNA STRUCTURE AND DESIGN

The horn shaped SIW antenna is developed in this work has a width (W) = 24.5mm and length (L) = 35.5mm. The Fig. 1 presents the geometrical structure of SIW based horn shaped antenna here.

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Blockchain-based conditional privacy-preserving authentication scheme in VANETs

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[Multimedia Tools and Applications](#) **82**, 24155–24179
(2023)

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Abstract

In vehicular ad hoc networks (VANETs), a vehicle must be authenticated to ensure its messages' correctness. The authentication mechanism should be privacy-preserving to protect the vehicle's real identity. However, an authenticated vehicle may

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these difficulties, we propose a hybrid blockchain-based conditional privacy-preserving authentication (BCPPA) scheme in VANETs. In BCPPA, vehicles obtain pseudo-identities from the trusted authority that manages the network. A vehicle uses the received pseudo-identities to achieve anonymous authentication and communicate with other network members. The pseudo-identities with encrypted, real identities are both saved into the blockchain to ensure conditional privacy and member revocation. A receiver can verify the sender's pseudo-identity using the proposed privacy-preserving authentication mechanism. We evaluate the scheme's performance using the Ethereum blockchain and computing platform. The security analysis and experimental results show that the proposed scheme is effective in providing authentication and privacy and has reduced computation overhead as compared to existing schemes.

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Data Availability

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

References

1. Akinyele JA, Garman C, Miers I, Pagano MW, Rushanan M, Green M, Rubin AD (2013) Charm: a framework for rapidly prototyping cryptosystems. *J Cryptogr Eng* 3(2):111–128

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3. Ali I, Gervais M, Ahene E, Li F (2019) A blockchain-based certificateless public key signature scheme for vehicle-to-infrastructure communication in VANETs. *J Syst Archit* 99:101636

4. Aloqaily M, Otoum S, Al Ridhawi I, Jararweh Y (2019) An intrusion detection system for connected vehicles in smart cities. *Ad Hoc Networks*

5. Alrawais A, Alhothaily A, Mei B, Song T, Cheng X (2018) An efficient revocation scheme for vehicular ad-hoc networks. *Procedia Comput Sci* 129:312–318

6. Azees M, Vijayakumar P, Deboarh LJ (2017) EAAP: efficient anonymous authentication with conditional privacy-preserving scheme for vehicular ad hoc networks. *IEEE Trans Intell Transp Syst* 18(9):2467–2476

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transactions in IoT. *IEEE Internet Things J*
6(3):4650–4659

9. Canetti R, Shahaf D, Vald M (2016) Universally composable authentication and key-exchange with global PKI. In: *Public-Key Cryptography–PKC 2016*. Springer, pp 265–296

10. Cui Z, Xue F, Zhang S, Cai X, Cao Y, Zhang W, Chen J (2020) A hybrid blockchain-based identity authentication scheme for multi-WSN. *IEEE Transactions on Services Computing*

11. Dorri A, Steger M, Kanhere SS, Jurdak R (2017) Blockchain: a distributed solution to automotive security and privacy. *IEEE Commun Mag* 55 (12):119–125

12. Han Y, Xue N-N, Wang B-Y, Zhang Q, Liu C-L, Zhang W-S (2018) Improved dual-protected

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environments. IEEE Internet of Things
Journal

14. Kondareddy Y, Di Crescenzo G, Agrawal P (2010) Analysis of certificate revocation list distribution protocols for vehicular networks. In: 2010 IEEE Global Telecommunications Conference GLOBECOM 2010. IEEE, pp 1–5

15. Kumar P, Sharma V (2018) On the security of certificateless aggregate signature scheme in vehicular ad hoc networks. In: Soft computing: theories and applications. Springer, pp 715–722

16. Lai Y, Xu Y, Yang F, Lu W, Yu Q (2019) Privacy-aware query processing in vehicular ad-hoc networks. Ad Hoc Networks, 101876

17. Li YJ (2010) An overview of the DSRC/WAVE technology. In: International conference on

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-
19. Lu Z, Qu G, Liu Z (2018) A survey on recent advances in vehicular network security, trust, and privacy. *IEEE Trans Intell Transp Syst* 20(2):760–776
-
20. Lu Z, Wang Q, Qu G, Zhang H, Liu Z (2019) A blockchain-based privacy-preserving authentication scheme for VANETs. *IEEE Trans Very Large Scale Integr (VLSI) Syst* 27(12):2792–2801
-
21. Mundhe P, Verma S, Venkatesan S (2021) A comprehensive survey on authentication and privacy-preserving schemes in VANETs. *Comput Sci Rev* 41:100411
-
22. Mundhe P, Yadav VK, Singh A, Verma S, Venkatesan S (2020) Ring signature-based conditional privacy-preserving authentication in VANETs. *Wirel Pers Commun* 114(1):853–881

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-
24. Nakamoto S, et al. (2008) Bitcoin: a peer-to-peer electronic cash system

 25. Rajput U, Abbas F, Eun H, Oh H (2017) A hybrid approach for efficient privacy-preserving authentication in VANET. IEEE Access 5:12014–12030

 26. Sakiz F, Sen S (2017) A survey of attacks and detection mechanisms on intelligent transportation systems: VANETs and IoV. Ad Hoc Netw 61:33–50

 27. Shao J, Lin X, Lu R, Zuo C (2016) A threshold anonymous authentication protocol for VANETs. IEEE Trans Veh Technol 65(3):1711–1720

 28. Vijayakumar P, Azees M, Changri V, Deborah J, Balamurugan B (2017) Computationally efficient privacy preserving authentication

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29. Vijayakumar P, Azees M, Kannan A, Jegatha Deborah L (2016) Dual authentication and key management techniques for secure data transmission in vehicular ad hoc networks. *IEEE Trans Intell Transp Syst*, 1015–1028

30. Vijayakumar P, Azees M, Kozlov SA, Rodrigues JJ (2021) An anonymous batch authentication and key exchange protocols for 6G enabled VANETs. *IEEE Transactions on Intelligent Transportation Systems*

31. Vijayakumar P, Chang V, Deborah LJ, Balusamy B, Shynu P (2018) Computationally efficient privacy preserving anonymous mutual and batch authentication schemes for vehicular ad hoc networks. *Futur Gener Comput Syst* 78:943–955

32. Yang X, Chen C, Ma T, Li Y, Wang C (2018) An improved certificateless aggregate signature

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-
34. Zhang Y, Deng RH, Liu X, Zheng D (2018) Blockchain based efficient and robust fair payment for outsourcing services in cloud computing. *Inform Sci* 462:262–277
-
35. Zhang L, Li C, Li Y, Luo Q, Zhu R (2017) Group signature based privacy protection algorithm for mobile ad hoc network. In: 2017 IEEE international conference on information and automation (ICIA). IEEE, pp 947–952
-
36. Zhang L, Luo M, Li J, Au MH, Choo K-KR, Chen T, Tian S (2019) Blockchain based secure data sharing system for internet of vehicles: A position paper. *Veh Commun* 16:85–93
-
37. Zhang L, Meng X, Choo K-KR, Zhang Y, Dai F (2018) Privacy-preserving cloud establishment and data dissemination scheme for vehicular

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Ethics declarations

Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Development of A Novel Block Design Based Key Agreement Protocol for Cloud Environment to Improve Efficient Performance and Security

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ABSTRACT

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Cloud computing is one of the recent emerging technologies. Heavy data sharing among multiple users is an open issue. Data sharing in cloud computing enables multiple participants to freely share the group data, which improves the efficiency of work in cooperative environments and has widespread potential applications. However, how to ensure the security of data sharing within a group and how to efficiently share the outsourced data in a group manner are formidable challenges. In this paper we focused on security issues with the help of key agreement protocols to perform efficient data sharing in cloud environment. We proposed a novel block design based key agreement method in support of symmetric balanced incomplete block design (SBIBD). The main objective of this method is to supports multiple participants, which can flexibly extend the number of participants in a cloud environment according to the structure of the block design. Based on the proposed group data sharing model, we present general formulas for generating the common conference key K for multiple participants. In addition, the fault tolerance property of our protocol enables the group data sharing in cloud computing to withstand different key attacks, which is similar to Yi's protocol.

Keywords : Key agreement protocol, symmetric balanced incomplete block design (SBIBD), data sharing, cloud computing.

I. INTRODUCTION

Cloud computing and cloud storage have become hot topics in recent decades. Both are changing the way we live and greatly improving production efficiency in some areas. At present, due to limited storage

resources and the requirement for convenient access, we prefer to store all types of data in cloud servers, which is also a good option for companies and organizations to avoid the overhead of deploying and maintaining equipment when data are stored locally. The cloud server provides an open and convenient

storage platform for individuals and organizations, it also introduces security problems. For instance, a cloud system may be subjected to attacks from both malicious users and cloud providers. In these scenarios, it is important to ensure the security of the stored data in the cloud. In [1], several schemes were proposed to preserve the privacy of the outsourced data. The above schemes only considered security problems of a single data owner. However, in some applications, multiple data owners would like to securely share their data in a group manner. Therefore, a protocol that supports secure group data sharing under cloud computing is needed. A key agreement protocol is used to generate a common conference key for multiple participants to ensure the security of their later communications, and this protocol can be applied in cloud computing to support secure and efficient data sharing. Since it was introduced by Diffie-Hellman in their seminal paper [4], the key agreement protocol has become one of the fundamental cryptographic primitives. The basic version of the Diffie-Hellman protocol provides an efficient solution to the problem of creating a common secret key between two participants. In cryptography, a key agreement protocol is a protocol in which two or more parties can agree on a key in such a way that both influence the outcome. By employing the key agreement protocol, the conferees can securely send and receive messages from each other using the common conference key that they agree upon in advance. Specifically, a secure key agreement protocol ensures that the adversary cannot obtain the generated key by implementing malicious attacks, such as eavesdropping. Thus, the key agreement protocol can be widely used in interactive communication environments with high security requirements (e.g., remote board meetings, teleconferences, collaborative workspaces, radio frequency identification [5], cloud computing and so on).

The Diffie-Hellman key agreement [4] provides a way to generate keys. However, it does not provide an authentication service, which makes it vulnerable to man-in-the-middle attacks. This situation can be addressed by adding some forms of authentication mechanisms to the protocol, as proposed by Law et al. in [6]. In addition, the Diffie-Hellman key agreement can only support two participants. Subsequently, to solve the different key attacks from malicious conferees, who attempt to deliberately delay or destroy the conference, Yi proposed an identity-based fault-tolerant conference key agreement in [7]. Currently, many researches have been devoted to improving the security and communication efficiency of the key agreement protocol, which is covered in the literature [8]. Note that in Chung and Bae's paper [12] and Lee et al.'s paper [13], block design is utilized in the design of an efficient load balance algorithm to maintain load balancing in a distributed system. Inspired by [12] and [13], we introduce the symmetric balanced incomplete block design (SBIBD) in designing the key agreement protocol to reduce the complexity of communication and computation. As far as we know, the work to design the key agreement protocol with respect to the SBIBD is novel and original.

II. MAIN CONTRIBUTIONS

In this paper, we present an efficient and secure block design-based key agreement protocol by extending the structure of the SBIBD to support multiple participants, which enables multiple data owners to freely share the outsourced data with high security and efficiency. Note that the SBIBD is constructed as the group data sharing model to support group data sharing in cloud computing. Moreover, the protocol can provide authentication services and a fault tolerance property. The main contributions of this paper are summarized as follows.

1. Model of group data sharing according to the structure of the SBIBD is constructed. In this paper, a group data sharing model is established based on the definition of the SBIBD, which can be used to determine the way of communication among the participants. Regarding mathematical descriptions of the structure of the SBIBD, general formulas for computing the common conference key for multiple participants are derived.

2. Fault detection and fault tolerance can be provided in the protocol. The presented protocol can perform fault detection to ensure that a common conference key is established among all participants without failure.

Moreover, in the fault detection phase, a volunteer will be used to replace a malicious participant to support the fault tolerance property. The volunteer enables the protocol to resist different key attacks [7], which makes the group data sharing in cloud computing more secure.

3. Secure group data sharing in cloud computing can be supported by the protocol. According to the data sharing model applying the SBIBD, multiple participants can form a group to efficiently share the outsourced data.

Subsequently, each group member performs the key agreement to derive a common conference key to ensure the security of the outsourced group data. Note that the common conference key is only produced by group members. Attackers or the semi-trusted cloud server has no access to the generated key. Thus, they cannot access the original outsourced data (i.e., they only obtain some unintelligible data). Therefore, the proposed key agreement protocol can support secure and efficient group data sharing in cloud computing. Notably, the above contributions substantially widen the field of applications of the key agreement protocol by applying an SBIBD with high security and

flexibility. Moreover, the communication complexity is reduced without introducing extra computational complexity.

III. LITERATURE SURVEY

F. Chen, T. Xiang, Y. Yang, and S. S. M. Chow [2] had designed a general construction of secure cloud storage protocol based on any secure network coding protocol. However, it is not known if a secure network coding protocol can be constructed from a secure cloud storage protocol. It is an interesting future work to consider under what condition this can be done.

D. He, S. Zeadally, and L. Wu[3] had discussed Cloud-assisted WBANs, which are the integration of a cloud computing platform and WBANs, could bring major benefits (as we discussed earlier) over traditional WBANs. One of the major challenges of a cloud-assisted WBAN is to ensure the integrity of the medical data stored at a cloud server. The auditing technique is an efficient tool for checking the integrity of the data stored remotely. However, previous auditing schemes suffer from key management and key escrow problems. To address these challenges, they proposed a new CLPA scheme. Compared with previously proposed schemes, our CLPA scheme not only can address the security problems in TPKC-based public auditing schemes and ID-based public auditing schemes but also yields better performance. In addition, their proposed CLPA scheme is provably secure in a strong security model, making CLPA very suitable for use in cloud-assisted WBANs.

L. Law, A. Menezes, M. Qu, J. Solinas, and S. Vanstone, [6] shows the comparison includes the basic two-pass protocols. The computational requirements are indicated by counting the number of exponentiations computed by each principal in protocol run and this is the complexity. Also

H.Elkamchouchi, M.Eldefrawy works by computing and exchanging two vectors but the new one works and exchanges one value.

In [14] and [15], based on symmetric-key cryptography, several schemes were proposed to enable efficient encryption of the outsourced data. However, encryption keys should be transmitted in a secure channel, which is not possible in practice, particularly in the open cloud environment.

In [16], it was introduced that resistance to compromised keys has been taken into consideration, which an important issue in the context of cloud is computing.

Cloud storage auditing with verifiable outsourcing of key updates paradigm was proposed by Yu et al. in [17] to achieve resistance to compromised keys. In this paradigm, the third party auditor (TPA) takes responsibility for the cloud storage auditing and key updates. In particular, the TPA is responsible for the selection and distribution of the key. The key downloaded from the TPA can be used by the client to encrypt files that he will upload to the cloud. In contrast, the generation and distribution of the key is based on a centralized model in [17], which not only imparts a burden to the TPA but also introduces some security problems.

In [18], a key agreement algorithm was exploited by De Capitani di Vimercati et al. to achieve data access when data are controlled by multiple owners. Therefore, the key agreement protocol can be applied in group data sharing to solve related security problems in cloud computing. Following the first pioneering work for key agreement [4], many works have attempted to provide authentication services in the key agreement protocol.

In [19], a public key infrastructure (PKI) is used to circumvent man-in-the-middle attacks. However, these protocols are not suitable for resource-

constrained environments since they require executions of time-consuming modular exponentiation operations.

Key agreement protocols that use elliptic curve cryptography (ECC) have been proposed in [20]. These protocols are more efficient than the protocols that resort to the PKI because point additions or multiplications in elliptic curves are more efficient compared with the modular exponentiation. Moreover, based on the difficulty of solving the elliptic curve discrete logarithm problem (ECDLP), protocols that use ECC are more secure.

To avoid the requirement of the public key certificate, in 1984, identity-based cryptography (IBC) was proposed by Shamir. However, it was not until 2001 that the first practical IBC scheme was proposed by Boneh and Franklin. Due to the strict security proof and high efficiency, this scheme has received widespread recognition in academic fields.

Motivated by the above observation, the key agreement protocol is applicable to support data sharing in cloud computing for the following reasons.

1. The generation of a common conference key is performed in a public channel, which is suitable for cloud computing environments.
2. The key agreement protocol can support and provide secure data sharing for multiple data owners within a group, where the data sharing follows a many-to-many pattern. Compared with the one-to-many pattern, the many-to-many pattern in group data sharing provides higher efficiency in the environment of cooperative storage.
3. The key agreement protocol is based on a decentralized model, where a trusted third party is not required. This means that every data owner in a group fairly contributes and determines the common

conference key such that the outsourced data are controlled by all the data owners within a group.

Therefore, this research design a block design-based key agreement protocol for data sharing in cloud computing. First, proposed an algorithm to construct the $(v, k + 1, 1)$ -design. Then, with respect to the mathematical description of the structure of the $(v, k+1, 1)$ -design, general formulas for generating the common conference key K for multiple participants are derived. Namely, the proposed protocol supports multiple participants

IV. RELATED WORKS

It is well known that data sharing in cloud computing can provide scalable and unlimited storage and computational resources to individuals and enterprises. However, cloud computing also leads to many security and privacy concerns, such as data integrity, confidentiality, reliability, fault tolerance and so on. Note that the key agreement protocol is one of the fundamental cryptographic primitives, which can provide secure communication among multiple participants in cloud environments. In [14] and [15], based on symmetric-key cryptography, several schemes were proposed to enable efficient encryption of the outsourced data.

However, encryption keys should be transmitted in a secure channel, which is not possible in practice, particularly in the open cloud environment. Since it was introduced in [16], resistance to compromised keys has been taken into consideration, which is an important issue in the context of cloud computing. Note that cloud storage auditing with verifiable outsourcing of key updates paradigm was proposed by Yu et al. in [17] to achieve resistance to compromised keys. In this paradigm, the third party auditor (TPA) takes responsibility for the cloud storage auditing and key updates. In particular, the TPA is responsible for the selection and distribution of the key.

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In [18], a key agreement algorithm was exploited by De Capitani di Vimercati et al. to achieve data access when data are controlled by multiple owners. Therefore, the key agreement protocol can be applied in group data sharing to solve related security problems in cloud computing. Following the first pioneering work for key agreement [4], many works have attempted to provide authentication services in the key agreement protocol. In [19], a public key infrastructure (PKI) is used to circumvent man-in-the-middle attacks. However, these protocols are not suitable for resource-constrained environments since they require executions of time-consuming modular exponentiation operations. Key agreement protocols that use elliptic curve cryptography (ECC) have been proposed in [21].

These protocols are more efficient than the protocols that resort to the PKI because point additions or multiplications in elliptic curves are more efficient compared with the modular exponentiation. Moreover, based on the difficulty of solving the elliptic curve discrete logarithm problem (ECDLP), protocols that use ECC are more secure. To avoid the requirement of the public key certificate, in 1984, identity-based cryptography (IBC) was proposed by Shamir. However, it was not until 2001 that the first practical IBC scheme [10] was proposed by Boneh and Franklin. Due to the strict security proof and high efficiency, this scheme has received widespread recognition in academic fields. In the same year, a popular proof model for group key establishment was proposed by Bresson et al. [23].

In this protocol, to manage the complexity of definitions and proofs for the authenticated group Diffie-Hellman key exchange, a formal model was presented, where two security goals of the group Diffie-Hellman key exchange were addressed. However, some security properties are missing in [23], which are essential for preventing malicious protocol participants.

Note that all the above protocols have been proven and analyzed for security, but some of them can only be applied to the key agreement between two entities and need a large amount of resources to perform calculations. Recently, an identity-based authenticated key agreement protocol was proposed by Shen et al. in [9], which improves the efficiency of the conference key agreement and provides entity authentication services. However, there are some obstacles in Shen et al.'s protocol in real applications. One is that the protocol only discusses a specific situation when the number of conferees is exactly 7. The other is that the protocol does not discuss the general situation and does not provide the key agreement process for multiple participants, which makes the protocol lack flexibility and practicability. Motivated by the above observation, the key agreement protocol is applicable to support data sharing in cloud computing for the following reasons.

1. The generation of a common conference key is performed in a public channel, which is suitable for cloud computing environments.
2. The key agreement protocol can support and provide secure data sharing for multiple data owners within a group, where the data sharing follows a many-to-many pattern. Compared with the one-to-many patterns, the many-to-many pattern in group data sharing provides higher efficiency in the environment of cooperative storage.

3. The key agreement protocol is based on a decentralized model, where a trusted third party is not required. This means that every data owner in a group fairly contributes and determines the common conference key such that the outsourced data are controlled by all the data owners within a group.

It is widely known that data sharing in cloud computing can offer scalable and limitless storage and computational sources to people and enterprises. However, cloud computing additionally ends in many protections and privateers' concerns, together with records integrity, confidentiality, reliability, fault tolerance and so on. Note that the key agreement protocol is one of the essential cryptographic primitives, which could offer stable communication amongst a couple of members in cloud environments.

V. GROUP DATA SHARING

Cloud computing is said to be the service-oriented computing technology, which are affordable and flexible over the internet. In past few years the cloud has become more matured and provided many services, one of the primary services is data sharing in Group, where the data can be easily shared from one member to another. However, while sharing the data security is one of the primary concerns. In past several methodologies have been proposed. However, these methods lacked from the feasibility. Hence, in this paper we have propose methodology is based on the selection scheme. Here General Group Key is generated and moreover General Key agreement protocol is decentralized based model where the data are controlled by the owner within the same group. Moreover, the proposed methodology is evaluated by analyzing the comparative analysis based on the various number of parameter. Result Analysis suggest that our methodology simply outperforms the existing one.

In recent decades as the concept of cloud computing rises, cloud storage is said to be the one of the hotspots of the storage of information. It basically refers to a model, which refers to the model that provides the data storage. Here, CSP (cloud service provider) is directly responsible for making data available as well as accessible according to the requirement of use. Storage capacity is either bought or leased from provider to store the data by the individual or organization. This service can easily be accessed through the API or the application, which utilizes the API such as cloud storage gateway. Moreover, in the past few years, it has been observed that the demand of cloud storage has been phenomenal in accordance with the use of personal as well as business purpose, since it is highly based on the virtualized infrastructure and much more flexible in terms of multi-tenancy, scalability and availability.

They are typically known as object storage such as Microsoft Azure, Amazon S3 and Oracle Cloud Storage [4]. Since the cloud computing gives us the feature of pay as you go service, the organization wants to pay only for the service they use, and cloud service provides exactly the same. Business using the CS can actually reduce up to 70% of energy consumption. CSP is totally responsible for the maintenance of the data and as well as the other tasks such as buying the additional storage capacity. Since the backup of the data are located in several places in the globe, it can also be applicable as the proof backup of natural disaster. Meanwhile, cloud storage is one service, which is not referred to the physical device, but it is the aggregation of many server and storage for its users.

The dynamic broadcast encryption technique allows data owners to securely share their data files with other users within the group including newly joined users. Unfortunately, each user has to compute revocation parameters to protect the confidentiality from the revoked users in the dynamic broadcast

encryption scheme such that revoked users cannot access the data after their revocation from the group. This results in both computations overhead of the encryption and the size of the cipher-text increases with the number of revoked users. Thus, the heavy overhead and large cipher-text size may hinder the adoption of the broadcast encryption to the limited users. The group manager is allowed to compute the revocation parameters, which includes the list of revoked users and make this revocation list available to public by migrating them into the cloud. Each time when users request for the data cloud service provider verifies the revocation list and provide access to data only to active users in the group. Such a design can significantly reduce the computation overhead of users to encrypt files and the cipher-text size.

VI. SYSTEM MODEL

The system model of our group data sharing scheme in cloud computing is illustrated. A TPA, cloud and users are involved in the model, where the TPA is responsible for cloud storage auditing, fault detection and generating the system parameters. The cloud, who is a semi-trusted party, provides users with data storage services and download services. Users can be individuals or staff in a company. To work together, they form a group, upload data to the cloud server and share the outsourced data with the group members. In practice, users can be mobile Android devices, mobile phones, laptops, nodes in underwater sensor networks and so forth.

Moreover, the group data sharing model is based on the SBIBD, where a trusted third party is not required. With respect to this model, all the participants exchange messages from intended entities according to the structure of the SBIBD to determine a common conference key. In addition to participants, volunteers and adversaries are also included in the presented protocol, and all of them run as a

probabilistic polynomial time Turing machine. Two types of adversaries may be involved in the protocol: passive adversaries and active adversaries. A passive adversary is a person who attempts to learn information about the conference key by eavesdropping on the multicast channel, whereas an active adversary is a person who attempts to impersonate a participant or disrupt a conference. Note that the generation and update of the key are accomplished by the participants.

Moreover, with the fault tolerance property of our protocol, the participants are able to ascertain the correctness of the common conference key. Since the storage auditing can follow the state of the art auditing protocols, we only focus on the design of group data sharing scheme in cloud computing in the paper. The adversary model determines the capabilities and possible actions of the attacker. Similar to [12], the adversary model is defined as follows.

The adversary reveals a long-term secret key of a participant in a conference and then impersonates others to this participant.

1. The adversary reveals some previous session keys and then learns the information about the session key of a fresh participant. Consequently, the adversary can impersonate the fresh participant with the session key to others.

2. The adversary reveals the long-term keys of one or more participants in the current run. Then, the adversary attempts to learn the previous session key.

3. A malicious participant chooses different sub keys, generates different signatures and broadcasts the messages to the corresponding participants, which makes the conference key derived by different participants distinct.

The construction of the group data sharing model to support a group data sharing scheme for multiple participants applying an SBIBD, we design an algorithm to construct the $(v, k + 1, 1)$ -design. Moreover, the constructed $(v, k + 1, 1)$ -design requires some transformations to establish the group data sharing model such that v participants can perform the key agreement protocol. 4.1 Construct the $(v, k + 1, 1)$ -design in our group data sharing model, the parameters of the SBIBD have some specific meanings. In a $(v, k+1, 1)$ -design, v denotes the number of participants and the number of blocks. Every block embraces $k + 1$ participant, and every participant appear $k + 1$ times in these v blocks. Furthermore, every two participants appear simultaneously in exactly one of the v blocks. Following papers [12] and [13], Algorithm 1 is designed to construct the structure of a $(v, k + 1, 1)$ -design. First, a prime number k is selected. Then, the number of participants is determined by the value of k , which is computed as $v = k^2 + k + 1$. Finally, according to Definition 3, $V = \{0, 1, 2, \dots, v - 1\}$ represents the set of v participants, whereas $B = \{B_0, B_1, B_2, \dots, B_{v-1}\}$ implies v blocks constituted by these v participants. Note that the block is defined as $B_i = \{B_{i,0}, B_{i,1}, B_{i,2}, \dots, B_{i,k}\}$, which means each block embraces $k + 1$ participants, and $B_{i,j}$ denotes which participant is contained in the j th column of the i th block.

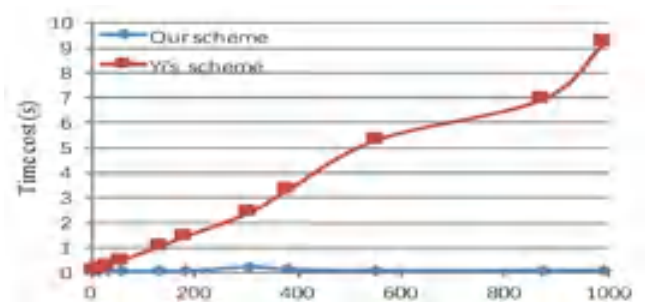


Fig 1. Efficiency comparison at initial phase

VII.METHODS

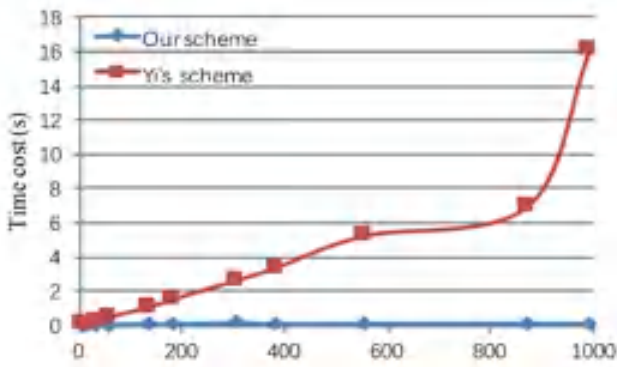


Fig 2. Efficiency comparison at key agreement phase

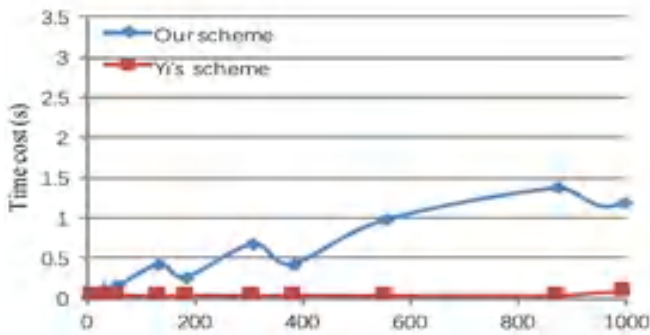


Fig 3. Efficiency comparison at authentication phase

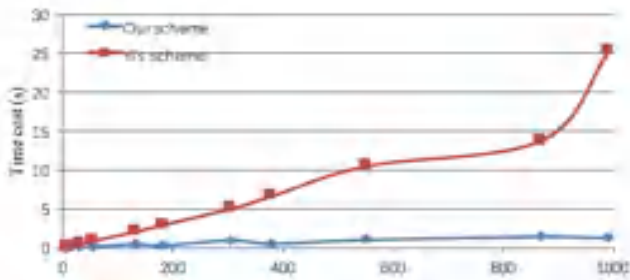


Fig 4. Efficiency comparison for multiple users

Sometimes we will consider blocks organized as a matrix in which column j is composed by elements $B_{i,j}$, j for $i = 0, 1, 2, \dots, K$ and row i is composed by elements $B_{i,j}$ for $j = 0, 1, 2, \dots, k$. The structure of the $(v, k + 1, 1)$ -design is constructed by Algorithm 1, which outputs numbers $B_{i,j}$ for $i = 0, 1, \dots, k_2 + k$ and $j = 0, 1, \dots, k$. In Algorithm 1, the notation MOD_k represents the modular operation that takes the class residue as an integer in the range $0, 1, 2, \dots, K - 1$. Based on Algorithm 1, we can create the structure of a $(v, k + 1, 1)$ -design that involves v participants. Moreover, Algorithm 1 can directly determine which participant should be involved in each block. For example, taking the $(13, 4, 1)$ -design into consideration, where 13

participants are involved in this structure, we can decide which participant should be contained in the 3rd column of the 8th block by computing $B_{7,2} = jk + 1 + \text{MOD}_k(i - j + (j - 1) b(i - 1)/kc) = 2 \cdot 3 + 1 + \text{MOD}_3(7 - 2 + (2 - 1) b(7 - 1)/3c) = 7 + \text{MOD}_3(5 + 1 \cdot 2) = 7 + 1 = 8$. Therefore, from the above calculation, it is concluded that participant 8 is contained in the 3rd column of the 8th block. Here, participant represents the I th participant.

```

Algorithm: Generation of a  $(v, k+1, 1)$ -design
for  $i = 0; i \leq k; i++$  do
for  $j = 0; j \leq k; j++$  do
if  $j == 0$  then
 $B_{i,j} = 0;$ 
Else
 $B_{i,j} = ik + j;$ 
end if
end for
end for
for  $i = k + 1; i \leq k_2 + k; i++$  do
for  $j = 0; j \leq k; j++$  do
if  $j == 0$  then
 $B_{i,j} = b(i - 1) / kc;$ 
else  $B_{i,j} = jk + 1 + \text{MOD}_k(i - j + (j - 1) b(i - 1)/kc);$ 
end if
end for
end for
    
```

Algorithm is an optimization of the algorithm in [12] and the proof of the correctness follows the same lines than the proof in [12] and [13]. The structure created by Algorithm 1 can be proven to satisfy the conditions of the $(v, k + 1, 1)$ -design, which means that each participant of V appears exactly $k + 1$ times in B and that each pair of participants of V appears exactly once in B . These properties can be utilized to design the group data sharing model, which can diminish the communication cost of the proposed protocol.

VIII. CONCLUSION

As a development in the technology of the Internet and cryptography, group data sharing in cloud computing has opened up a new area of usefulness to computer networks. With the help of the conference key agreement protocol, the security and efficiency of group data sharing in cloud computing can be greatly improved. Specifically, the outsourced data of the data owners encrypted by the common conference key are protected from the attacks of adversaries. Compared with conference key distribution, the conference key agreement has qualities of higher safety and reliability. However, the conference key agreement asks for a large amount of information interaction in the system and more computational cost. To combat the problems in the conference key agreement, the SBIBD is employed in the protocol design. In this paper, we present a novel block design-based key agreement protocol that supports group data sharing in cloud computing. Due to the definition and the mathematical descriptions of the structure of a $(k, l; 1, 1)$ -design, multiple participants can be involved in the protocol and general formulas of the common conference key for participants are derived. Moreover, the introduction of volunteers enables the presented protocol to support the fault tolerance property, thereby making the protocol more practical and secure. In our future work, we would like to extend our protocol to provide more properties (e.g., anonymity, traceability, and so on) to make it applicable for a variety of environments.

IX. REFERENCES

- [1]. L. Zhou, V. Varadharajan, and M. Hitchens, "Cryptographic rolebased access control for secure cloud data storage systems," *IEEE Trans. Inf. Forensics Secur.*, vol. 10, no. 11, pp. 2381–2395, Nov. 2015.
- [2]. F. Chen, T. Xiang, Y. Yang, and S. S. M. Chow, "Secure cloud storage meets with secure network coding," in *Proc. IEEE Conf. Comput. Commun.*, 2014, pp. 673–681.
- [3]. D. He, S. Zeadally, and L. Wu, "Certificateless public auditing scheme for cloud-assisted wireless body area networks," *IEEE Syst. J.*, vol. PP, no. 99, pp. 1–10, 2015, doi: 10.1109/JSYST.2015.2428620.
- [4]. Q. Huang, Y. Yang, and J. Fu, "Secure data group sharing and dissemination with attribute and time conditions in Public Clouds," *IEEE Transactions on Services Computing*, 2018.
- [5]. J. M. Such and N. Criado, "Resolving multi-party privacy conflicts in social media," *IEEE Trans. on Knowledge and Data Engine*, vol. 28, no. 7, pp. 1851–1863, 2016.
- [6]. K. Seol, Y. Kim, E. Lee, Y. Seo, and D. Baik, "Privacy-preserving attribute-based access control model for XML-based electronic health record system," *IEEE Access*, vol. 6, pp. 9114–9128, 2018.
- [7]. X. Yi, "Identity-based fault-tolerant conference key agreement," *IEEE Trans. Depend. Secure Computation.*, vol. 1, no. 3, pp. 170–178, Jul.–Sep. 2004.
- [8]. Ravindra Changala, "Development of Predictive Model for Medical Domains to Predict Chronic Diseases (Diabetes) Using Machine Learning Algorithms and Classification Techniques", *ARNP Journal of Engineering and Applied Sciences*, VOL. 14, NO. 6, MARCH 2019, ISSN 1819-6608.
- [9]. J. Shen, S. Moh, and I. Chung, "Identity-based key agreement protocol employing a symmetric balanced incomplete block design," *J. Commun. Netw.*, vol. 14, no. 6, pp. 682–691, 2012.
- [10]. B. Dan and M. Franklin, "Identity-based encryption from the weil pairing," *SIAM J. Comput.*, vol. 32, no. 3, pp. 213–229, 2003.
- [11]. K. Xue, W. Chen, W. Li, J. Hong, and P. Hong, "Combining data owner-side and cloud-side access control for encrypted cloud storage," *IEEE Transactions on Information Forensics*

- and Security, vol. 13, no. 8, pp. 2062–2074, 2018.
- [12]. I. Chung and Y. Bae, “The design of an efficient load balancing algorithm employing block design,” *J. Appl. Mathematics Comput.*, vol. 14, no. 1, pp. 343–351, 2004.
- [13]. O. Lee, S. Yoo, B. Park, and I. Chung, “The design and analysis of an efficient load balancing algorithm employing the symmetric balanced incomplete block design,” *Inf. Sci.*, vol. 176, no. 15, pp. 2148–2160, 2006.
- [14]. Ravindra Changala, “A Survey on Development of Pattern Evolving Model for Discovery of Patterns In Text Mining Using Data Mining Techniques” in *Journal of Theoretical and Applied Information Technology in 31st August 2017*. Vol.95. No.16, ISSN: 1817-3195, pp.3974-3987.
- [15]. N. Cao, C. Wang, M. Li, K. Ren, and W. Lou, “Privacy-preserving multi-keyword ranked search over encrypted cloud data,” *IEEE Trans. Parallel Distrib. Syst.*, vol. 25, no. 1, pp. 222–233, Jan. 2014.
- [16]. J. Yu, K. Ren, C. Wang, and V. Varadharajan, “Enabling cloud storage auditing with key-exposure resistance,” *IEEE Trans. Inf. Forensics Secur.*, vol. 10, no. 6, pp. 1167–1179, Jun. 2015.
- [17]. L. Xu, C. Jiang, N. He, Z. Han, and A. Benslimane, “Trust-based collaborative privacy management in online social networks,” *IEEE Transactions on Information Forensics and Security*, vol. 14, no. 1, pp. 48–60, 2019.
- [18]. H. Cui, X. Yi, and S. Nepal, “Achieving scalable access control over encrypted data for edge computing networks,” *IEEE Access*, vol. 6, pp. 30049–30059, 2018.
- [19]. Ravindra Changala, "Retrieval of Valid Information from Clustered and Distributed Databases" in *Journal of innovations in computer science and engineering (JICSE)*, Volume 6, Issue 1, Pages 21-25, September 2016. ISSN: 2455-3506.
- [20]. Z. Tan, “An enhanced three-party authentication key exchange protocol for mobile commerce environments,” *J. Commun.*, vol. 5, no. 5, pp. 436–443, 2010.
- [21]. Y. M. Tseng, “An efficient two-party identity-based key exchange protocol,” *Informatica*, vol. 18, no. 1, pp. 125–136, 2007.
- [22]. A. Shamir, “Identity-based cryptosystems and signature schemes,” in *Proc. Workshop Theory Appl. Cryptographic Techn.*, 1985, vol. 21, no. 2, pp. 47–53.
- [23]. Ravindra Changala, "Data Mining Techniques for Cloud Technology" in *International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)*, Volume 4, Issue 8, Pages 2319-5940, ISSN: 2278-1021, August 2015.
- [24]. O. Hasan, L. Brunie, E. Bertino, and N. Shang, “A decentralized privacy preserving reputation protocol for the malicious adversarial model,” *IEEE Trans. Inf. Forensics Secur.*, vol. 8, no. 6, pp. 949–962, Jun. 2013.
- [25]. L.-K. Hua, *Introduction to Number Theory*. Berlin, Germany: Springer, 2012.
- [26]. R. Barua, R. Dutta, and P. Sarkar, “Extending Joux’s protocol to multi party key agreement (extended abstract),” in *Proc. 4th Int. Conf. Cryptology India*, 2003, pp. 205–217.
- [27]. R. Curtmola, J. Garay, S. Kamara, and R. Ostrovsky, “Searchable symmetric encryption: Improved definitions and efficient constructions,” *J. Comput. Secur.*, vol. 19, no. 5, pp. 79–88, 2011.
- [28]. H. Guo, Z. Li, Y. Mu, and X. Zhang, “Cryptanalysis of simple three-party key exchange protocol,” *Comput. Secur.*, vol. 27, no. 1/2, pp. 16–21, 2008.
- [29]. B. Lamacchia, K. Lauter, and A. Mityagin, “Stronger security of authenticated key exchange,” in *Proc. Int. Conf. Provable Secur.*, 2007, pp. 1–16.

- [30]. Ravindra Changala, Evaluation And Analysis Of Discovered Patterns Using Pattern Classification Methods In Text Mining, ARPN Journal of Engineering and Applied Sciences, Vol3, Issue 11.
- [31]. Dr. Mahesh K, "A Survey on Predicting Uncertainty of Cloud Service Provider Towards Data Integrity and Economic" 2019 IJSRST | Volume 6 | Issue 1 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X.

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A Novel Model Selection Framework for Forecasting Agricultural Commodity Prices using Time Series Features and Forecast Horizons

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ABSTRACT

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The oscillations of agricultural commodity prices have abundant impact on people's daily lives and also the inputs and outputs of agricultural production. To take proper decisions one should require an accurate forecast of commodity prices. Accuracy of crop price forecasting techniques is important because it enables the supply chain planners and government bodies to take appropriate actions by estimating market factors such as demand and supply. In emerging economies such as India, the crop prices at marketplaces are manually entered every day, which can be prone to human-induced errors like the entry of incorrect data or entry of no data for many days. In addition to such human prone errors, the fluctuations in the prices itself make the creation of stable and robust forecasting solution a challenging task. To forecast prices more adaptively, this study proposes a novel model selection framework which includes time series features and forecast horizons. Twenty-nine features are used to depict agricultural commodity prices and three intelligent models are specified as the candidate forecast models; namely, artificial neural network (ANN), support vector regression (SVR), and extreme learning machine (ELM). Both random forest (RF) and support vector machine (SVM) are applied to learn the underlying relationships between the features and the performances of the candidate models. Additionally, a minimum redundancy and maximum relevance approach (MRMR) is employed to reduce feature redundancy and further improve the forecast accuracy. The trial that's what results exhibit, firstly, the proposed model determination system has a superior figure execution contrasted and the ideal competitor model and basic model normal; besides, highlight decrease is a useful way to deal with further work on the exhibition of the model determination structure; and thirdly, for bean and pig grain items, various disseminations of the time series highlights lead to an alternate determination of the ideal models.

Keywords : Time series analysis data, crop prediction model, agricultural commodity, price forecasting, forecast horizons.

I. INTRODUCTION

India is an agriculture-based country where 54.6% of the total workforce is engaged in agricultural and allied sector activities, accounting for 17.1% of the country's Gross Value Added (GVA). Hence, it becomes important for the government bodies associated with agriculture to estimate market factors and take suitable actions to benefit the farmers. Therefore, having a robust automated solution, especially in developing countries such as India, not only aids the government in taking decisions in a timely manner but also helps in positively affecting the large demographics. The price of crops is one such market factor that requires the attention of the government. Accurate crop price forecasting can be useful for the government to take proactive steps and decide various

policy measures such as adjusting MSP (Minimum Support Price) so that farmers get a decent price for their produce, restricting the export price by imposing an MEP (Minimum Export Price), so that exporters are forced to sell locally, thus bringing down the crop prices. At the same time, it will also be useful for the farmer for making better decisions like when to sell their produce or when to harvest the crop. The crop prices are affected due to several factors such as the area under cultivation for a particular crop, supply projection, government policies, consumer demands, supply chain aspects of producers for agriculture-based products, etc. Additionally, weather conditions also play an important factor since the majority of agricultural production in India is rainfed. Therefore, the study of fluctuations in agricultural crop prices is interesting as well as an important problem to solve from the government's perspective. Apart from the above-stated reasons, agricultural crop price forecasting is quite challenging due to many factors

such as data quality issues, unreliability in future weather predictions, high fluctuation present in the historical crop price, crop price variations across neighboring marketplaces, etc. Moreover, the manually recorded data is prone to human-induced errors such as no data or wrong data entered for a certain day. Considering ML/DL based models, with a new price data arrival every day, updating the models might cause stability issues because of quality issues associated with the crop price data. Since the 1990s, feature-based model selection has been applied to time series forecasting. For instance, Prudêncio and Ludermir [8] used decision tree to select between two models to forecast stationary time series.

II. LITERATURE SURVEY

This section presents all the relevant methodologies belonging to three main domains, statistical, machine learning, and deep learning, applied in the prediction of agricultural prices. Dairi et al. (2021) state that in this era, many advances have been seen in artificial intelligence (AI), especially in deep learning (DL), an important part of AI. DL extracts relevant characteristics of the data automatically.

Table 1. Forecasting agricultural commodity prices using intelligent models

Commodity	Forecast Model	Authors
Xu, et al. [8]	Sugar	BP Neural Network
Jha, et al. [9]	Oilseed	Time delay Neural Network
Zhang, et al. [10]	Tomato	Wavelet Neural

		Network
Xiong, et al. [11]	Cotton, Corn	VECM-MSVR, SSVR
Ayankoya, et al. [12]	Grain commodities	BP Neural Network
Cai, et al [13]	Pork	EMD-SVR
Adya, et al. [6]	Sugar, cotton, corn, soyabean, coffee	MSS-ANN
He, et al. [14]	Soyabean	APSO-SVR
Li, et al. [15]	Potato	Dynamic Chaotic Neural Network
Wang, et al. [16]	Corn	SSA-ELM
Xiong, et al. [5]	Cabbage, pepper, cucumber, green bean and tomato	STL-ELM, TDNN, SVR-ELM

As the deep learning-driven methods do not depend on feature engineering, it benefits other ML methods. Nassar et al. (2020), while comparing the achievement of deep learning price prediction models with eight statistical as well as bench mark machine learning models, on the time series datasets of Vegetables, Fruits and Flowers, demonstrated that deep learning models, LSTM and CNN-LSTM are efficient in precise prediction of Fresh Produce prices for up to three weeks advance. Sabu and Kumar (2020) used time-series and machine learning models for predicting the monthly prices of are cannot in Indian Kerala state and found that LSTM neural network was good. Weng et al. (2019), while finding the suitability of ARIMA and Deep Learning models on different data sets, daily, weekly, and monthly, identified the deep learning method as the standard agricultural goods prices forecast. In the context of development of effective models, authors Ribeiro, M. H. D. M, & dos

Santos Coelho (2019) used RF, GBM, and XGB while adopting SVR, MLP and KNN as baseline models and ranked the models as 1. XGB, 2.GBM, 3. RF, 4.MLP, 5. SVR and 6. KNN and finally concluded that that the ensemble approach was found to be doing good in the investigation of price sequences data.

The literature provides a number of methods to forecast the prices of agricultural commodities, including statistical methods and intelligent methods. Statistical methods are the most popular methods for forecasting a time series. For instance, Darekar and Reddy [1] predicted the cotton price of major producing states in India with auto-regressive integrated moving average model (ARIMA). Xu et al. [2] used an exponential smoothing model (ETS) to forecast the carrot price in China. Evans and Nalampang [3] employed a multivariate regression model to forecast the price trend of U.S. avocado. In recent years, as agricultural commodity price series become more volatile, powerful AI models with favorable self-learning capability have emerged to handle with the complex price forecasting task.

III. RELATED WORK

In another study by Chen et al. (2019), the noise of the cabbage data was reduced using Wavelet Analysis (WA). LSTM model then was applied on the fine-tuned normalized data which was found to be producing better results in achieving accuracy. While providing a concise summary of major deep learning techniques, Zhu et al. (2018) showed that DL methods such as CNN, RNN and GAN, are gaining momentum to help researchers in agriculture price forecast. Rasheed et al. (2021) analysed the wheat prices dataset with LSTM technique. Their study presented that LSTM was performing significantly when compared to other conventional machine learning and statistical time series models. The study also stated that deep learning is fairly a new direction in agriculture.

Table 2. Related works

Name of the authors	Name of the commodities	Deep Learning Models used for prediction	Results
R L et al. (2021)	Cottonseed, Castor seed, Rape mustard seed, Guar seed, soybean seed	LSTM Base line models: ARIMA, TDNN	The LSTM model provided a better forecast.
Ouyang et al. (2019)	Cotton, Sugar, bean, bean II, soya bean oil, cardamom, strong Wheat, Corn, Coffee, cocoa, Frozen orange juice	LSTNet Base Line Models: CNN, RNN, ARIMA, VAR	The LSTNet performed better results over the r baseline methods on average.
Kurumatani K. (2020)	Cabbage, Tomato, Lettuce	LSTM (Recurrent neural network)	The LSTM performed the best result.
Jin et al. (2019)	Chinese cabbage, Radishes	LSTM	The optimum performance was obtained by the LSTM.
Prakash & Farzana, (2019)	Tomato	LSTM	The LSTM is one of the most effective models for dealing with nonlinear patterns in prediction.
Chen et al. (2021)	Chicken, Chili, Tomatoes	LSTM Baseline models: ARIMA, SVR, Prophet, XGBoost	Among the five baseline models, the LSTM was forecasted to produce the best results.

To the best of our knowledge, forecast models perform differently at each forecast horizon; hence horizon is an important factor in choosing the optimal forecast model. However, this factor is seldom

considered in previous studies. Moreover, the datasets used in previous studies were mainly M3, NN3, and NN5, which contain few agricultural time series. Therefore, there is still a research gap in constructing a model selection framework for forecasting agricultural commodity prices.

It can be seen from Table 2 that various kinds of models are widely used for different agricultural

commodity forecasting tasks. According to the 'no free lunch' theory [7], there is no single model suitable for all the commodities. When facing a new type of agricultural commodity, it is not easy for people to identify which is the optimal model for this specific forecasting task. Of course, decision makers can compare the performance of several commonly used forecasting techniques

and configure out the most favorable one. However, training various models is a time-consuming process. Obviously, a fast and automatic algorithm is needed to identifying the most suitable forecasting method for agricultural commodities. In the past 30 years, the model selection approach has been used extensively for choosing the optimal model for various types of input data. That is to say, the underlying relationships between the features of the input data and the performance of a candidate algorithm will be discovered by learners through numerous training samples.

IV. PROPOSED WORK

To the best of our knowledge, forecast models perform differently at each forecast horizon; hence horizon is an important factor in choosing the optimal forecast model. However, this factor is seldom considered in previous studies. Moreover, the datasets used in previous studies were mainly M3, NN3, and NN5, which contain few agricultural time series. Therefore, there is still a research gap in constructing a model selection framework for forecasting agricultural commodity prices. In this study, we propose a model selection framework which involves both time series features and forecast horizons for forecasting agricultural commodity prices. Within this framework, twenty-nine features are extracted according to the periodicity, nonlinearity, and complexity of agricultural commodity price time series. Intelligent forecast models (i.e., ANN, SVR, and ELM) are specified as the candidate models. The relationships between these features and the

performances of the candidate models are learned by classifiers, which include RF and SVM. Feature reduction (the minimum redundancy and maximum relevance method) is also utilized to reduce feature redundancy and improve the forecast accuracy of the model selection framework. We test the effectiveness of considering the forecast horizon as the input feature and apply the feature reduction strategy to improve the performance of the classifier. Finally, we use principal component analysis to analyze the relationship between different commodities and the corresponding optimal forecast models.

The main contributions of this study are as follows. We propose a model selection framework for forecasting agricultural commodity price time series based on time series features and forecast horizons. We verify that the minimum redundancy and maximum relevance method can effectively reduce the redundancies between the features and is a workable approach to improving the performance of the classifier.

V. MODEL SELECTION

Meta-learning has been employed for algorithm recommendation tasks for some time and, since 2004, it has also been investigated in the area of time series forecasting [8]. In this special case of meta-learning, the aspect of interest is the relationship between data features and algorithm performance [32]; a classifier is usually applied to learn that relationship. Three main steps are involved in this research; namely, feature extraction, feature selection, and classification.

In Step 1, twenty-nine time series features are extracted, including complexity features, linearity features, and stationarity features. The optimal forecast model for the time series is specified by comparing the forecast errors of the three candidate models at each horizon. Hence, both horizon information (horizon features) and the optimal model

for the corresponding horizon will be recorded in the classification sample.

In Step 2, feature reduction is performed using an MRMR approach, with the aim of reducing feature redundancy and improving the generalization capability of the classifier. The ranking of the Mutual Information (MI) values of all the features will be obtained by the MRMR algorithm, and the ultimate features selected will be generated by the backward search method.

In Step 3, the classifiers proposed in the study are constructed by two popular machine learning approaches; i.e., SVM and RF. Additionally, there are different schemes or developing the model selection framework, which involve a naïve classifier (abbreviated as MSN), a classifier with forecast horizon features (abbreviated as MSH), and a classifier with the reduced features (abbreviated as MSH-FR). Therefore, we have a total of five competing classifiers in this study; i.e., MSN-SVM, MSN-RF, MSH-SVM, MSH-RF, and MSH-FR-RF. Details of these classifiers (including the reason for excluding MSH-FR-SVM) are provided. The forecast performance of the model selection framework is subsequently evaluated by two criteria; i.e., the mean absolute percent error (MAPE) and the improvement ratio (IR). The classification performance is estimated by classification accuracy (ACC). Finally, principal component analysis is applied to analyze the relationship between commodities and the optimal forecast model.

The implications of the selected features are shown as follows.

- 1) Complexity features quantify chaos and measure the long-range dependence in a time series.
- 2) Linearity features are important to determine the selection of models.
- 3) Stationarity features measure the stationarity of a time series.
- 4) Periodicity features provide indications on periodicity and seasonality of time series.
- 5) Model-based features, which characterize a time series by cutting a forecast model, are the parameters in the exponential smoothing model.
- 6) In other features, peak and trough capture oscillating behavior of time series. Spikiness captures the oscillating behavior of the residue of a time series by STL. Trend features characterize a time series by its degree of trend.
- 7) Horizon features are four binary numbers related to forecast horizons. They are marks for the corresponding optimal models at four forecast horizons.

VI. FORECAST MODEL

Due to the complexity and nonlinearity features of an agricultural commodity price time series, three workable and widely used AI models in agricultural commodity price forecasting are considered as the forecast models in this paper: artificial neural network (ANN); support vector regression (SVR); and extreme learning machine (ELM). The details are as follows.

Table 3. Statistical description of features of time series

Feature	Mean	Standard deviation	Minimum	Maximum
entropy	0.5166	0.0957	0.4119	0.9278
trend	0.9541	0.0671	0.4793	0.9996
spike	<0.0001	<0.0001	<0.0001	0.0006
linearity	11.9004	3.3175	-3.5354	14.5444
curvature	-1.2943	2.5414	-7.3815	9.9994
x_acf1	0.5132	0.2032	-0.1416	0.8261
x_acf10	0.4758	0.3017	0.0097	1.1692
seasonality	0.2363	0.1564	0.0631	0.7934
peak	6.2414	3.5058	1.0000	12.0000
trough	5.4522	2.5288	1.0000	12.0000
lumpiness	0.0465	0.3184	<0.0001	6.2433
stability	0.9519	0.1177	0.5253	1.0567
hurst	0.9973	0.0130	0.7774	1.0000
minroot_lppe	3.4473	1.0446	0.1323	4.4699
minroot_gp	-7.1257	11.7038	-150.8649	0.9997
nonlinearity	0.5168	0.3131	0.0006	6.0814
x_acf1	0.9607	0.0598	0.3962	0.9940
x_acf5	4.1279	0.7502	0.6259	4.7992
diff1_acf1	0.0687	0.2885	-0.5432	0.6454
diff1_acf5	0.1384	0.1258	0.0013	0.9829
diff2_acf1	-0.4133	0.1779	-0.7716	0.0638
diff2_acf5	0.2601	0.1400	0.0593	0.9266
seas_acf1	0.7122	0.2070	-0.2120	0.9091
x_pacf3	0.9940	0.1088	0.2805	1.2651
diff1x_pacf5	0.1386	0.1128	0.0013	0.5100

ANNs are data-driven flexible models which are capable of approximating a large class of nonlinear problems. One of the classic neural networks is the back-propagation neural network (BPNN), which includes feedforward and backpropagation. It is well known for its error learning algorithm in adjusting weights and bias. In general, a BPNN with a single hidden layer can generate the desired accuracy for a time series forecasting application [4]. SVR is originally proposed by Vapnik and based on the structured risk minimization principle. It performs nonlinear mappings through the application of kernels, which include nonlinear and linear kernels. It has been applied to forecast complex time series in industry, agriculture and aviation. ELM is a single hidden layer feedforward neural networks proposed by. Unlike traditional learning algorithms in feedforward neural network, where parameters are tuned iteratively, the Moore-Penrose generalized inverse is applied to determine the output weights in ELM [6], thus requiring little time for training. This advantage has been applied to classification tasks and regression tasks in numerous studies.

Table 4. The reserved features after feature reduction

Category	Features
Periodicity features	x_acf5, seas_pacf, x_acf1, diff1x_pacf5, x_pacf5, seas_pacf, seasonality, diff2_acf5
Stability features	minroot_gp, stability, minroot_lppe, lumpiness
Linearity features	linearity, curvature, nonlinearity
Complexity features	hurst
Model-based features	alpha, beta
Horizon features	h1, h3, h6, h12
Other features	trend, peak, trough

Table 5. Forecast performance of the MSN in terms of MAPE.

	h=1	h=3	h=6	h=12	average
ANN	3.4988	7.7901	10.5496	12.8591	8.6744
SVR	4.1948	10.0278	12.9542	14.6353	10.4530
ELM	4.2058	8.1399	10.6749	14.6674	9.4230
SMA	3.6617	8.0175	10.4539	12.6093	8.6856
MSN-RF	3.7114	7.8813	10.3578	12.7169	8.6673
MSN-SVM	3.7969	7.8901	10.3106	13.0068	8.7511

Table 6. Forecast performance of the MSH and MSH-FR in terms of MAPE.

	h=1	h=3	h=6	h=12	average
ANN	3.4985	7.7772	10.5083	12.8583	8.6731
SVR	4.1918	10.0144	12.9646	14.6332	10.451
ELM	4.2061	8.1293	10.6854	14.6664	9.4218
SMA	3.6610	8.0038	10.4634	12.6104	8.6847
MSH-RF	3.4901	7.4729	9.8113	12.6254	8.3499
MSH-SVM	3.5738	7.5456	10.1229	12.5543	8.4994
MSH-FR-RF	3.4877	7.4733	9.8148	12.5562	8.3330

Statistical descriptions of all the features are listed in Table 4. These statistical values indicate that the features have different magnitudes; thus, normalization should be employed before classification. The correlation diagram based on mutual information (MI) is shown in Figure 4. The dark point at the top right-hand corner represents the maximum MI value of all the twenty-nine features. After feature reduction, twenty-five features including twenty-one time series features and four horizon features remained. In general, the average MI of each pair of two features has been reduced by 7.45%. The details of the selected features are listed in Table 5. Four horizon features have been retained, which demonstrates that the forecast horizon features are important for the performance of the classifier.

The model selection experiments for forecasting agricultural commodity prices were conducted using the research design described above. Accordingly, the forecast performances of all the candidate models and the model selection frameworks were evaluated using the two accuracy measures MAPE and IR, and the classification performance was estimated using ACC. Table 6 and Table 7 show the forecast performances in terms of MAPE. The last column labeled "average" shows the average performances of the models across all four forecast horizons. In order to illustrate intuitively the advantage of the model selection framework, we compare the performance of each selection framework to the optimal single model ANN. The results are shown in Table 8. Table 9 shows the classification performances of the three model selection frameworks in terms of ACC.

Table 7. Forecast performance of MSN, MSH and MSH-FR in terms of IR.

		h=1	h=3	h=6	h=12	average
MSN	RF	-0.0149	1.1702	1.6187	1.0605	0.0318
	SVM	-3.5193	-1.3833	2.2655	-1.1482	-1.1467
MSH	RF	0.2453	3.9126	7.0746	1.8711	3.7259
	SVM	2.1213	0.7066	1.1141	1.3611	2.0009
MSH-FR	RF	0.0089	3.9078	7.0417	2.3499	3.9212

Table 8. Classification performance of the MSN, MSH and MSH-FR in terms of ACC.

	RF	SVM
MSN	55.78%	53.90%
MSH	61.39%	56.49%
MSH-FR	61.85%	_____

Focusing on the model selection framework, Table 6 shows that the average forecast error of MSN-RF is 8.6673 compared to 8.6744 for ANN. This result demonstrates the superiority of the model selection framework, which can reduce effectively the risk in model selection, thus yielding a smaller forecast error. Regarding the two strategies used for improving the

performance of MSN, Table 7 shows the performance of MSH and MSH-FR. Both MSH-RF and MSHSVM perform well across four forecast horizons compared to ANN. This may indicate that the performance of MSH is better than that of MSN. As for MSH-RF, the average forecast error is 8.3499, yielding a smaller forecast error compared with MSH-SVM. It can be seen from Table 8 that the average IR of MSH-RF is 3.7259, which is greater than that of MSN. Moreover, it can also be seen from Table 8 that the classification accuracy of MSH-RF is higher than that of MSN. These results verify the superiority of using different forecast horizons as the input features of the classifier. This method can not only improve the forecast accuracy of model selection by using the data on forecast model performance at different forecast horizons, but can also improve the classification performance of the model selection.

It can be seen from Table 6 that the average MAPE of SMA is 8.6856, which is only on average larger than the optimal candidate model (ANN,8.6744). That is to say, SMA can avoid performing the worst result of forecasting and reduce the risk of model selection. Compared to SMA, MAPEs of MSN-RF and MSN-SVM are lower at h=3 and h=6, which indicates that the model selection framework is competitive for SMA. It can also be seen from Table 7 that the average MPAE of SMA is 8.6847 which is only larger than ANN. The MAPEs of MSH-RF and MSH-SVM are almost lower than SMA at each forecast step. It demonstrates the superiority of the model selection framework, which is more effective than SMA in reducing the risk of model selection.

Table 1. A summary of the forecast results for several benchmark forecasting methodologies

Models	Forecast Horizon	RMSE*	MAPE (%)
Proposed Method	Yearly	14.37	4.12
ARIMA	Yearly	60.25	33.45
EMD-ARIMA	Yearly	35.23	25.12
ANFIS	Yearly	24.09	16.35
Persistence	Yearly	68.23	51.15
Proposed Method	Monthly	08.03	3.12
ARIMA	Monthly	45.35	12.19
EMD-ARIMA	Monthly	22.23	8.59
ANFIS	Monthly	14.17	8.51
Persistence	Monthly	55.34	18.24

In order to verify this assumption, we perform a principal component analysis (PCA), following the method proposed by Kang [56]. The first two principal components of the bean and pig grain price time series are plotted into a feature space as shown in Figure 6. The x-axis refers to the first principal component and the y-axis refers to the second principal component. The red points represent the bean price time series which take ELM as the optimal model across all the forecast horizons. The blue points represent the pig grain price time series which identifies SVR as the optimal model across all the forecast horizons. It can be seen that the zone of red points is separated from the zoo of blue points. This phenomenon indicates that the features of those two categories are quite different from each other. Therefore, different distributions of the time series features can be regarded as the main reason for the different model selection results.

VII. CONCLUSION

In this paper, we proposed a model selection framework for forecasting agricultural commodity prices using both time series features and forecast horizons. Generally, three main steps were involved in the proposed model selection framework, i.e., feature extraction, feature reduction and classification. By and large, three primary advances were engaged with the proposed model selection framework, i.e., include extraction, highlight decrease and arrangement. First and foremost, we separated 29 time series highlights of agrarian product costs. Besides, we utilized the base overt repetitiveness and greatest importance technique to decrease highlight overt repetitiveness and work on the presentation of the model determination structure. At long last, five classifiers were built to confirm the exhibitions of various model choice systems. Also, the connection between various products and the ideal model was assessed by head part investigation. Comparative with existing examinations, this study shifts the adequacy of the model determination system in picking the most reasonable gauging models. With rural ware cost series as exploration tests, a few intriguing ends can be made in view of the exact outcomes. First and foremost, taking into account the figure skyline as one of the elements can work on the presentation of both grouping and conjecture, which exhibits the gauge skyline ought to be considered as a significant calculate model determination task. Besides, MRMR can additionally work on the exhibition of the model choice system, which shows a useful element decrease technique ought to be taken advantage of in model determination for expanding the speculation capacity of classifiers.

The proposed model selection framework could be improved according to the accompanying viewpoints. In the first place, the proposed strategy could be utilized as a compelling model determination apparatus for other figure objects. Second, a few

strong classifiers, for example, AdaBoost and Bayesian organizations could be used to additionally further develop the grouping capacity. Third, this concentrate just considers three well known estimate models in the space of gauging rural product costs; notwithstanding, different strategies could likewise be acquainted with make the structure more functional.

VIII. REFERENCES

- [1]. Liwen Ling, "Forecasting Agricultural Commodity Prices Using Model Selection Framework with Time Series Features and Forecast Horizons", VOLUME 8, 2020, IEEE Access.
- [2]. P. Wu and Z. M. Li, "Forecast research on China's pork price based on the ARIMA-GM-RBF hybrid model," *Price, Theory Pract.*, no. 1, pp. 75-78, Apr. 2019.
- [3]. Ravindra Changala, "Evaluation and Analysis of Discovered Patterns Using Pattern Classification Methods in Text Mining" in *ARPN Journal of Engineering and Applied Sciences*, Volume 13, Issue 11, Pages 3706-3717, ISSN:1819-6608, June 2018.
- [4]. Ravindra Changala, "A Survey on Development of Pattern Evolving Model for Discovery Of Patterns In Text Mining Using Data Mining Techniques" in *Journal of Theoretical and Applied Information Technology*, 31st August 2017. Vol.95. No.16, ISSN: 1817-3195, pp.3974-3987.
- [5]. T. Xiong, C. Li, and Y. Bao, "Seasonal forecasting of agricultural commodity price using a hybrid STL and ELM method: Evidence from the vegetable market in China," *Neurocomputing*, vol. 275, pp. 2831-2844, Jan. 2018.
- [6]. M. Adya and E. J. Lusk, "Development and validation of a rule-based time series complexity scoring technique to support design of adaptive forecasting DSS," *Decis. Support Syst.*, vol. 83, pp. 70-82, Mar. 2016.
- [7]. Y. Xu, S. Shen, and Z. Chen, "Research on forecast of sugar price based on improved neural network," in *Proc. 2nd Int. Symp. Intell. Inf. Technol. Secur. Inform.*, 2009, pp. 23-25.
- [8]. G. K. Jha and K. Sinha, "Time-delay neural networks for time series prediction: An application to the monthly wholesale price of oilseeds in India," *Neural Comput. Appl.*, vol. 24, nos. 3-4, pp. 563-571, Mar. 2014.
- [9]. J. H. Zhang, F. T. Kong, J. Z. Wu, M. S. Zhu, K. Xu, and J. J. Liu, "Tomato prices time series prediction model based on wavelet neural network," *Appl. Mech. Mater.*, vols. 644-650, pp. 2636-2640, Sep. 2014.
- [10]. T. Xiong, C. Li, Y. Bao, Z. Hu, and L. Zhang, "A combination method for interval forecasting of agricultural commodity futures prices," *Knowl.-Based Syst.*, vol. 77, pp. 92-102, Mar. 2015.
- [11]. K. Ayankoya, A. P. Calitz, and J. H. Greyling, "Real-time grain commodities price predictions in South Africa: A big data and neural networks approach," *Agrekon*, vol. 55, no. 4, pp. 483-508, Oct. 2016.
- [12]. C. M. Cai, L. W. Ling, C. Niu, and D. B. Zhang, "Integration prediction of domestic pork market price based on empirical mode decomposition and support vector machine," *Chin. J. Manage. Sci.*, vol. 24, pp. 845-851, 2016.
- [13]. Q. Duan, L. Zhang, F. Wei, X. Xiao, and L. Wang, "Forecasting model and validation for aquatic product price based on time series GA-SVR," *Trans. Chin. Soc. Agricult. Eng.*, vol. 33, no. 1, pp. 308-314, Jan. 2017.
- [14]. L. Zhemin, X. Shiwei, and C. Ligu, "Prediction study based on dynamic chaotic neural network: Taking potato timeseries prices as an example," *Syst. Eng.-Theory Pract.*, vol. 35, no. 8, pp. 2083-2091, 2015.

- [15]. J. Wang, C. Qi, and M. F. Li, "Prediction of commodity prices based on SSA-ELM," Syst. Eng.-Theory Pract., vol. 37, no. 8, pp. 2004-2014, 2017.
- [16]. Ravindra Changala, "Development of Predictive Model for Medical Domains to Predict Chronic Diseases (Diabetes) Using Machine Learning Algorithms and Classification Techniques", ARPN Journal of Engineering and Applied Sciences, VOL. 14, NO. 6, March 2019, ISSN 1819-6608.

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A Novel Model Selection Framework for Forecasting Agricultural Commodity Prices using Time Series Features and Forecast Horizons

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ABSTRACT

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The oscillations of agricultural commodity prices have abundant impact on people's daily lives and also the inputs and outputs of agricultural production. To take proper decisions one should require an accurate forecast of commodity prices. Accuracy of crop price forecasting techniques is important because it enables the supply chain planners and government bodies to take appropriate actions by estimating market factors such as demand and supply. In emerging economies such as India, the crop prices at marketplaces are manually entered every day, which can be prone to human-induced errors like the entry of incorrect data or entry of no data for many days. In addition to such human prone errors, the fluctuations in the prices itself make the creation of stable and robust forecasting solution a challenging task. To forecast prices more adaptively, this study proposes a novel model selection framework which includes time series features and forecast horizons. Twenty-nine features are used to depict agricultural commodity prices and three intelligent models are specified as the candidate forecast models; namely, artificial neural network (ANN), support vector regression (SVR), and extreme learning machine (ELM). Both random forest (RF) and support vector machine (SVM) are applied to learn the underlying relationships between the features and the performances of the candidate models. Additionally, a minimum redundancy and maximum relevance approach (MRMR) is employed to reduce feature redundancy and further improve the forecast accuracy. The trial that's what results exhibit, firstly, the proposed model determination system has a superior figure execution contrasted and the ideal competitor model and basic model normal; besides, highlight decrease is a useful way to deal with further work on the exhibition of the model determination structure; and thirdly, for bean and pig grain items, various disseminations of the time series highlights lead to an alternate determination of the ideal models.

Keywords : Time series analysis data, crop prediction model, agricultural commodity, price forecasting, forecast horizons.

I. INTRODUCTION

India is an agriculture-based country where 54.6% of the total workforce is engaged in agricultural and allied sector activities, accounting for 17.1% of the country's Gross Value Added (GVA). Hence, it becomes important for the government bodies associated with agriculture to estimate market factors and take suitable actions to benefit the farmers. Therefore, having a robust automated solution, especially in developing countries such as India, not only aids the government in taking decisions in a timely manner but also helps in positively affecting the large demographics. The price of crops is one such market factor that requires the attention of the government. Accurate crop price forecasting can be useful for the government to take proactive steps and decide various

policy measures such as adjusting MSP (Minimum Support Price) so that farmers get a decent price for their produce, restricting the export price by imposing an MEP (Minimum Export Price), so that exporters are forced to sell locally, thus bringing down the crop prices. At the same time, it will also be useful for the farmer for making better decisions like when to sell their produce or when to harvest the crop. The crop prices are affected due to several factors such as the area under cultivation for a particular crop, supply projection, government policies, consumer demands, supply chain aspects of producers for agriculture-based products, etc. Additionally, weather conditions also play an important factor since the majority of agricultural production in India is rainfed. Therefore, the study of fluctuations in agricultural crop prices is interesting as well as an important problem to solve from the government's perspective. Apart from the above-stated reasons, agricultural crop price forecasting is quite challenging due to many factors

such as data quality issues, unreliability in future weather predictions, high fluctuation present in the historical crop price, crop price variations across neighboring marketplaces, etc. Moreover, the manually recorded data is prone to human-induced errors such as no data or wrong data entered for a certain day. Considering ML/DL based models, with a new price data arrival every day, updating the models might cause stability issues because of quality issues associated with the crop price data. Since the 1990s, feature-based model selection has been applied to time series forecasting. For instance, Prudêncio and Ludermir [8] used decision tree to select between two models to forecast stationary time series.

II. LITERATURE SURVEY

This section presents all the relevant methodologies belonging to three main domains, statistical, machine learning, and deep learning, applied in the prediction of agricultural prices. Dairi et al. (2021) state that in this era, many advances have been seen in artificial intelligence (AI), especially in deep learning (DL), an important part of AI. DL extracts relevant characteristics of the data automatically.

Table 1. Forecasting agricultural commodity prices using intelligent models

Commodity	Forecast Model	Authors
Xu, et al. [8]	Sugar	BP Neural Network
Jha, et al. [9]	Oilseed	Time delay Neural Network
Zhang, et al. [10]	Tomato	Wavelet Neural

		Network
Xiong, et al. [11]	Cotton, Corn	VECM-MSVR, SSVR
Ayankoya, et al. [12]	Grain commodities	BP Neural Network
Cai, et al [13]	Pork	EMD-SVR
Adya, et al. [6]	Sugar, cotton, corn, soyabean, coffee	MSS-ANN
He, et al. [14]	Soyabean	APSO-SVR
Li, et al. [15]	Potato	Dynamic Chaotic Neural Network
Wang, et al. [16]	Corn	SSA-ELM
Xiong, et al. [5]	Cabbage, pepper, cucumber, green bean and tomato	STL-ELM, TDNN, SVR-ELM

As the deep learning-driven methods do not depend on feature engineering, it benefits other ML methods. Nassar et al. (2020), while comparing the achievement of deep learning price prediction models with eight statistical as well as bench mark machine learning models, on the time series datasets of Vegetables, Fruits and Flowers, demonstrated that deep learning models, LSTM and CNN-LSTM are efficient in precise prediction of Fresh Produce prices for up to three weeks advance. Sabu and Kumar (2020) used time-series and machine learning models for predicting the monthly prices of are cannot in Indian Kerala state and found that LSTM neural network was good. Weng et al. (2019), while finding the suitability of ARIMA and Deep Learning models on different data sets, daily, weekly, and monthly, identified the deep learning method as the standard agricultural goods prices forecast. In the context of development of effective models, authors Ribeiro, M. H. D. M, & dos

Santos Coelho (2019) used RF, GBM, and XGB while adopting SVR, MLP and KNN as baseline models and ranked the models as 1. XGB, 2.GBM, 3. RF, 4.MLP, 5. SVR and 6. KNN and finally concluded that that the ensemble approach was found to be doing good in the investigation of price sequences data.

The literature provides a number of methods to forecast the prices of agricultural commodities, including statistical methods and intelligent methods. Statistical methods are the most popular methods for forecasting a time series. For instance, Darekar and Reddy [1] predicted the cotton price of major producing states in India with auto-regressive integrated moving average model (ARIMA). Xu et al. [2] used an exponential smoothing model (ETS) to forecast the carrot price in China. Evans and Nalampang [3] employed a multivariate regression model to forecast the price trend of U.S. avocado. In recent years, as agricultural commodity price series become more volatile, powerful AI models with favorable self-learning capability have emerged to handle with the complex price forecasting task.

III. RELATED WORK

In another study by Chen et al. (2019), the noise of the cabbage data was reduced using Wavelet Analysis (WA). LSTM model then was applied on the fine-tuned normalized data which was found to be producing better results in achieving accuracy. While providing a concise summary of major deep learning techniques, Zhu et al. (2018) showed that DL methods such as CNN, RNN and GAN, are gaining momentum to help researchers in agriculture price forecast. Rasheed et al. (2021) analysed the wheat prices dataset with LSTM technique. Their study presented that LSTM was performing significantly when compared to other conventional machine learning and statistical time series models. The study also stated that deep learning is fairly a new direction in agriculture.

Table 2. Related works

Name of the authors	Name of the commodities	Deep Learning Models used for prediction	Results
R L et al. (2021)	Cottonseed, Castor seed, Rape mustard seed, Guar seed, soybean seed	LSTM Base line models: ARIMA, TDNN	The LSTM model provided a better forecast.
Ouyang et al. (2019)	Cotton, Sugar, bean, bean II, soya bean oil, cardamom, strong Wheat, Corn, Coffee, cocoa, Frozen orange juice	LSTNet Base Line Models: CNN, RNN, ARIMA, VAR	The LSTNet performed better results over the r baseline methods on average.
Kurumatani K. (2020)	Cabbage, Tomato, Lettuce	LSTM (Recurrent neural network)	The LSTM performed the best result.
Jin et al. (2019)	Chinese cabbage, Radishes	LSTM	The optimum performance was obtained by the LSTM.
Prakash & Farzana, (2019)	Tomato	LSTM	The LSTM is one of the most effective models for dealing with nonlinear patterns in prediction.
Chen et al. (2021)	Chicken, Chili, Tomatoes	LSTM Baseline models: ARIMA, SVR, Prophet, XGBoost	Among the five baseline models, the LSTM was forecasted to produce the best results.

To the best of our knowledge, forecast models perform differently at each forecast horizon; hence horizon is an important factor in choosing the optimal forecast model. However, this factor is seldom

considered in previous studies. Moreover, the datasets used in previous studies were mainly M3, NN3, and NN5, which contain few agricultural time series. Therefore, there is still a research gap in constructing a model selection framework for forecasting agricultural commodity prices.

It can be seen from Table 2 that various kinds of models are widely used for different agricultural

commodity forecasting tasks. According to the 'no free lunch' theory [7], there is no single model suitable for all the commodities. When facing a new type of agricultural commodity, it is not easy for people to identify which is the optimal model for this specific forecasting task. Of course, decision makers can compare the performance of several commonly used forecasting techniques

and configure out the most favorable one. However, training various models is a time-consuming process. Obviously, a fast and automatic algorithm is needed to identifying the most suitable forecasting method for agricultural commodities. In the past 30 years, the model selection approach has been used extensively for choosing the optimal model for various types of input data. That is to say, the underlying relationships between the features of the input data and the performance of a candidate algorithm will be discovered by learners through numerous training samples.

IV. PROPOSED WORK

To the best of our knowledge, forecast models perform differently at each forecast horizon; hence horizon is an important factor in choosing the optimal forecast model. However, this factor is seldom considered in previous studies. Moreover, the datasets used in previous studies were mainly M3, NN3, and NN5, which contain few agricultural time series. Therefore, there is still a research gap in constructing a model selection framework for forecasting agricultural commodity prices. In this study, we propose a model selection framework which involves both time series features and forecast horizons for forecasting agricultural commodity prices. Within this framework, twenty-nine features are extracted according to the periodicity, nonlinearity, and complexity of agricultural commodity price time series. Intelligent forecast models (i.e., ANN, SVR, and ELM) are specified as the candidate models. The relationships between these features and the

performances of the candidate models are learned by classifiers, which include RF and SVM. Feature reduction (the minimum redundancy and maximum relevance method) is also utilized to reduce feature redundancy and improve the forecast accuracy of the model selection framework. We test the effectiveness of considering the forecast horizon as the input feature and apply the feature reduction strategy to improve the performance of the classifier. Finally, we use principal component analysis to analyze the relationship between different commodities and the corresponding optimal forecast models.

The main contributions of this study are as follows. We propose a model selection framework for forecasting agricultural commodity price time series based on time series features and forecast horizons. We verify that the minimum redundancy and maximum relevance method can effectively reduce the redundancies between the features and is a workable approach to improving the performance of the classifier.

V. MODEL SELECTION

Meta-learning has been employed for algorithm recommendation tasks for some time and, since 2004, it has also been investigated in the area of time series forecasting [8]. In this special case of meta-learning, the aspect of interest is the relationship between data features and algorithm performance [32]; a classifier is usually applied to learn that relationship. Three main steps are involved in this research; namely, feature extraction, feature selection, and classification.

In Step 1, twenty-nine time series features are extracted, including complexity features, linearity features, and stationarity features. The optimal forecast model for the time series is specified by comparing the forecast errors of the three candidate models at each horizon. Hence, both horizon information (horizon features) and the optimal model

for the corresponding horizon will be recorded in the classification sample.

In Step 2, feature reduction is performed using an MRMR approach, with the aim of reducing feature redundancy and improving the generalization capability of the classifier. The ranking of the Mutual Information (MI) values of all the features will be obtained by the MRMR algorithm, and the ultimate features selected will be generated by the backward search method.

In Step 3, the classifiers proposed in the study are constructed by two popular machine learning approaches; i.e., SVM and RF. Additionally, there are different schemes or developing the model selection framework, which involve a naïve classifier (abbreviated as MSN), a classifier with forecast horizon features (abbreviated as MSH), and a classifier with the reduced features (abbreviated as MSH-FR). Therefore, we have a total of five competing classifiers in this study; i.e., MSN-SVM, MSN-RF, MSH-SVM, MSH-RF, and MSH-FR-RF. Details of these classifiers (including the reason for excluding MSH-FR-SVM) are provided. The forecast performance of the model selection framework is subsequently evaluated by two criteria; i.e., the mean absolute percent error (MAPE) and the improvement ratio (IR). The classification performance is estimated by classification accuracy (ACC). Finally, principal component analysis is applied to analyze the relationship between commodities and the optimal forecast model.

The implications of the selected features are shown as follows.

- 1) Complexity features quantify chaos and measure the long-range dependence in a time series.
- 2) Linearity features are important to determine the selection of models.
- 3) Stationarity features measure the stationarity of a time series.
- 4) Periodicity features provide indications on periodicity and seasonality of time series.
- 5) Model-based features, which characterize a time series by cutting a forecast model, are the parameters in the exponential smoothing model.
- 6) In other features, peak and trough capture oscillating behavior of time series. Spikiness captures the oscillating behavior of the residue of a time series by STL. Trend features characterize a time series by its degree of trend.
- 7) Horizon features are four binary numbers related to forecast horizons. They are marks for the corresponding optimal models at four forecast horizons.

VI. FORECAST MODEL

Due to the complexity and nonlinearity features of an agricultural commodity price time series, three workable and widely used AI models in agricultural commodity price forecasting are considered as the forecast models in this paper: artificial neural network (ANN); support vector regression (SVR); and extreme learning machine (ELM). The details are as follows.

Table 3. Statistical description of features of time series

Feature	Mean	Standard deviation	Minimum	Maximum
entropy	0.5166	0.0957	0.4119	0.9278
trend	0.9541	0.0671	0.4793	0.9996
spike	<0.0001	<0.0001	<0.0001	0.0006
linearity	11.9004	3.3175	-3.5354	14.5444
curvature	-1.2943	2.5414	-7.3815	9.9994
x_acf1	0.5132	0.2032	-0.1416	0.8261
x_acf10	0.4758	0.3017	0.0097	1.1692
seasonality	0.2363	0.1564	0.0631	0.7934
peak	6.2414	3.5058	1.0000	12.0000
trough	5.4502	2.5288	1.0000	12.0000
lumpiness	0.0465	0.3184	<0.0001	6.2433
stability	0.9519	0.1177	0.5253	1.0567
hurst	0.9973	0.0130	0.7774	1.0000
mlroot_lppe	3.4473	1.0446	0.1323	4.4699
mlroot_gp	-7.1267	11.7038	-150.8649	0.9997
nonlinearity	0.5168	0.3131	0.0006	6.0814
x_acf1	0.9607	0.0598	0.3962	0.9940
x_acf5	4.1279	0.7502	0.6259	4.7992
diff1_acf1	0.0687	0.2885	-0.5432	0.6454
diff1_acf5	0.1384	0.1258	0.0013	0.9829
diff2_acf1	-0.4133	0.1779	-0.7716	0.0638
diff2_acf5	0.2601	0.1400	0.0593	0.9266
seas_acf1	0.7122	0.2070	-0.2120	0.9091
x_pacf3	0.9940	0.1088	0.2805	1.2651
diff1x_pacf5	0.1386	0.1128	0.0013	0.5100

ANNs are data-driven flexible models which are capable of approximating a large class of nonlinear problems. One of the classic neural networks is the back-propagation neural network (BPNN), which includes feedforward and backpropagation. It is well known for its error learning algorithm in adjusting weights and bias. In general, a BPNN with a single hidden layer can generate the desired accuracy for a time series forecasting application [4]. SVR is originally proposed by Vapnik and based on the structured risk minimization principle. It performs nonlinear mappings through the application of kernels, which include nonlinear and linear kernels. It has been applied to forecast complex time series in industry, agriculture and aviation. ELM is a single hidden layer feedforward neural networks proposed by. Unlike traditional learning algorithms in feedforward neural network, where parameters are tuned iteratively, the Moore-Penrose generalized inverse is applied to determine the output weights in ELM [6], thus requiring little time for training. This advantage has been applied to classification tasks and regression tasks in numerous studies.

Table 4. The reserved features after feature reduction

Category	Features
Periodicity features	x_acf5, seas_pacf, x_acf1, diff1x_pacf5, x_pacf5, seas_pacf, seasonality, diff2_acf5
Stability features	mlroot_gp, stability, mlroot_lppe, lumpiness
Linearity features	linearity, curvature, nonlinearity
Complexity features	hurst
Model-based features	alpha, beta
Horizon features	h1, h3, h6, h12
Other features	trend, peak, trough

Table 5. Forecast performance of the MSN in terms of MAPE.

	h=1	h=3	h=6	h=12	average
ANN	3.4988	7.7901	10.5496	12.8591	8.6744
SVR	4.1948	10.0278	12.9542	14.6353	10.4530
ELM	4.2058	8.1399	10.6749	14.6674	9.4230
SMA	3.6617	8.0175	10.4539	12.6093	8.6856
MSN-RF	3.7114	7.8813	10.3578	12.7169	8.6673
MSN-SVM	3.7969	7.8901	10.3106	13.0068	8.7511

Table 6. Forecast performance of the MSH and MSH-FR in terms of MAPE.

	h=1	h=3	h=6	h=12	average
ANN	3.4985	7.7772	10.5083	12.8583	8.6731
SVR	4.1918	10.0144	12.9646	14.6332	10.451
ELM	4.2061	8.1293	10.6854	14.6664	9.4218
SMA	3.6610	8.0038	10.4634	12.6104	8.6847
MSH-RF	3.4901	7.4729	9.8113	12.6254	8.3499
MSH-SVM	3.5738	7.5456	10.1229	12.5543	8.4994
MSH-FR-RF	3.4877	7.4733	9.8148	12.5562	8.3330

Statistical descriptions of all the features are listed in Table 4. These statistical values indicate that the features have different magnitudes; thus, normalization should be employed before classification. The correlation diagram based on mutual information (MI) is shown in Figure 4. The dark point at the top right-hand corner represents the maximum MI value of all the twenty-nine features. After feature reduction, twenty-five features including twenty-one time series features and four horizon features remained. In general, the average MI of each pair of two features has been reduced by 7.45%. The details of the selected features are listed in Table 5. Four horizon features have been retained, which demonstrates that the forecast horizon features are important for the performance of the classifier.

The model selection experiments for forecasting agricultural commodity prices were conducted using the research design described above. Accordingly, the forecast performances of all the candidate models and the model selection frameworks were evaluated using the two accuracy measures MAPE and IR, and the classification performance was estimated using ACC. Table 6 and Table 7 show the forecast performances in terms of MAPE. The last column labeled "average" shows the average performances of the models across all four forecast horizons. In order to illustrate intuitively the advantage of the model selection framework, we compare the performance of each selection framework to the optimal single model ANN. The results are shown in Table 8. Table 9 shows the classification performances of the three model selection frameworks in terms of ACC.

Table 7. Forecast performance of MSN, MSH and MSH-FR in terms of IR.

		h=1	h=3	h=6	h=12	average
MSN	RF	-0.0149	1.1702	1.6187	1.0605	0.0318
	SVM	-3.5193	-1.3833	2.2655	-1.1482	-1.1467
MSH	RF	0.2453	3.9126	7.0746	1.8711	3.7259
	SVM	2.1213	0.7086	1.1141	1.3611	2.0015
MSH-FR	RF	0.0889	3.9078	7.0417	2.3499	3.9212

Table 8. Classification performance of the MSN, MSH and MSH-FR in terms of ACC.

	RF	SVM
MSN	55.78%	53.90%
MSH	61.39%	56.49%
MSH-FR	61.85%	_____

Focusing on the model selection framework, Table 6 shows that the average forecast error of MSN-RF is 8.6673 compared to 8.6744 for ANN. This result demonstrates the superiority of the model selection framework, which can reduce effectively the risk in model selection, thus yielding a smaller forecast error. Regarding the two strategies used for improving the

performance of MSN, Table 7 shows the performance of MSH and MSH-FR. Both MSH-RF and MSHSVM perform well across four forecast horizons compared to ANN. This may indicate that the performance of MSH is better than that of MSN. As for MSH-RF, the average forecast error is 8.3499, yielding a smaller forecast error compared with MSH-SVM. It can be seen from Table 8 that the average IR of MSH-RF is 3.7259, which is greater than that of MSN. Moreover, it can also be seen from Table 8 that the classification accuracy of MSH-RF is higher than that of MSN. These results verify the superiority of using different forecast horizons as the input features of the classifier. This method can not only improve the forecast accuracy of model selection by using the data on forecast model performance at different forecast horizons, but can also improve the classification performance of the model selection.

It can be seen from Table 6 that the average MAPE of SMA is 8.6856, which is only on average larger than the optimal candidate model (ANN,8.6744). That is to say, SMA can avoid performing the worst result of forecasting and reduce the risk of model selection. Compared to SMA, MAPEs of MSN-RF and MSN-SVM are lower at h=3 and h=6, which indicates that the model selection framework is competitive for SMA. It can also be seen from Table 7 that the average MPAE of SMA is 8.6847 which is only larger than ANN. The MAPEs of MSH-RF and MSH-SVM are almost lower than SMA at each forecast step. It demonstrates the superiority of the model selection framework, which is more effective than SMA in reducing the risk of model selection.

Table 1. A summary of the forecast results for several benchmark forecasting methodologies

Models	Forecast Horizon	RMSE*	MAPE (%)
Proposed Method	Yearly	14.37	4.12
ARIMA	Yearly	60.25	33.45
EMD-ARIMA	Yearly	35.23	25.12
ANFIS	Yearly	24.09	16.35
Persistence	Yearly	68.23	51.15
Proposed Method	Monthly	08.03	3.12
ARIMA	Monthly	45.35	12.19
EMD-ARIMA	Monthly	22.23	8.59
ANFIS	Monthly	14.17	8.51
Persistence	Monthly	55.34	18.24

In order to verify this assumption, we perform a principal component analysis (PCA), following the method proposed by Kang [56]. The first two principal components of the bean and pig grain price time series are plotted into a feature space as shown in Figure 6. The x-axis refers to the first principal component and the y-axis refers to the second principal component. The red points represent the bean price time series which take ELM as the optimal model across all the forecast horizons. The blue points represent the pig grain price time series which identifies SVR as the optimal model across all the forecast horizons. It can be seen that the zone of red points is separated from the zoo of blue points. This phenomenon indicates that the features of those two categories are quite different from each other. Therefore, different distributions of the time series features can be regarded as the main reason for the different model selection results.

VII. CONCLUSION

In this paper, we proposed a model selection framework for forecasting agricultural commodity prices using both time series features and forecast horizons. Generally, three main steps were involved in the proposed model selection framework, i.e., feature extraction, feature reduction and classification. By and large, three primary advances were engaged with the proposed model selection framework, i.e., include extraction, highlight decrease and arrangement. First and foremost, we separated 29 time series highlights of agrarian product costs. Besides, we utilized the base overt repetitiveness and greatest importance technique to decrease highlight overt repetitiveness and work on the presentation of the model determination structure. At long last, five classifiers were built to confirm the exhibitions of various model choice systems. Also, the connection between various products and the ideal model was assessed by head part investigation. Comparative with existing examinations, this study shifts the adequacy of the model determination system in picking the most reasonable gauging models. With rural ware cost series as exploration tests, a few intriguing ends can be made in view of the exact outcomes. First and foremost, taking into account the figure skyline as one of the elements can work on the presentation of both grouping and conjecture, which exhibits the gauge skyline ought to be considered as a significant calculate model determination task. Besides, MRMR can additionally work on the exhibition of the model choice system, which shows a useful element decrease technique ought to be taken advantage of in model determination for expanding the speculation capacity of classifiers.

The proposed model selection framework could be improved according to the accompanying viewpoints. In the first place, the proposed strategy could be utilized as a compelling model determination apparatus for other figure objects. Second, a few

strong classifiers, for example, AdaBoost and Bayesian organizations could be used to additionally further develop the grouping capacity. Third, this concentrate just considers three well known estimate models in the space of gauging rural product costs; notwithstanding, different strategies could likewise be acquainted with make the structure more functional.

VIII. REFERENCES

- [1]. Liwen Ling, "Forecasting Agricultural Commodity Prices Using Model Selection Framework with Time Series Features and Forecast Horizons", VOLUME 8, 2020, IEEE Access.
- [2]. P. Wu and Z. M. Li, "Forecast research on China's pork price based on the ARIMA-GM-RBF hybrid model," *Price, Theory Pract.*, no. 1, pp. 75-78, Apr. 2019.
- [3]. Ravindra Changala, "Evaluation and Analysis of Discovered Patterns Using Pattern Classification Methods in Text Mining" in *ARPN Journal of Engineering and Applied Sciences*, Volume 13, Issue 11, Pages 3706-3717, ISSN:1819-6608, June 2018.
- [4]. Ravindra Changala, "A Survey on Development of Pattern Evolving Model for Discovery Of Patterns In Text Mining Using Data Mining Techniques" in *Journal of Theoretical and Applied Information Technology*, 31st August 2017. Vol.95. No.16, ISSN: 1817-3195, pp.3974-3987.
- [5]. T. Xiong, C. Li, and Y. Bao, "Seasonal forecasting of agricultural commodity price using a hybrid STL and ELM method: Evidence from the vegetable market in China," *Neurocomputing*, vol. 275, pp. 2831-2844, Jan. 2018.
- [6]. M. Adya and E. J. Lusk, "Development and validation of a rule-based time series complexity scoring technique to support design of adaptive forecasting DSS," *Decis. Support Syst.*, vol. 83, pp. 70-82, Mar. 2016.
- [7]. Y. Xu, S. Shen, and Z. Chen, "Research on forecast of sugar price based on improved neural network," in *Proc. 2nd Int. Symp. Intell. Inf. Technol. Secur. Inform.*, 2009, pp. 23-25.
- [8]. G. K. Jha and K. Sinha, "Time-delay neural networks for time series prediction: An application to the monthly wholesale price of oilseeds in India," *Neural Comput. Appl.*, vol. 24, nos. 3-4, pp. 563-571, Mar. 2014.
- [9]. J. H. Zhang, F. T. Kong, J. Z. Wu, M. S. Zhu, K. Xu, and J. J. Liu, "Tomato prices time series prediction model based on wavelet neural network," *Appl. Mech. Mater.*, vols. 644-650, pp. 2636-2640, Sep. 2014.
- [10]. T. Xiong, C. Li, Y. Bao, Z. Hu, and L. Zhang, "A combination method for interval forecasting of agricultural commodity futures prices," *Knowl.-Based Syst.*, vol. 77, pp. 92-102, Mar. 2015.
- [11]. K. Ayankoya, A. P. Calitz, and J. H. Greyling, "Real-time grain commodities price predictions in South Africa: A big data and neural networks approach," *Agrekon*, vol. 55, no. 4, pp. 483-508, Oct. 2016.
- [12]. C. M. Cai, L. W. Ling, C. Niu, and D. B. Zhang, "Integration prediction of domestic pork market price based on empirical mode decomposition and support vector machine," *Chin. J. Manage. Sci.*, vol. 24, pp. 845-851, 2016.
- [13]. Q. Duan, L. Zhang, F. Wei, X. Xiao, and L. Wang, "Forecasting model and validation for aquatic product price based on time series GA-SVR," *Trans. Chin. Soc. Agricult. Eng.*, vol. 33, no. 1, pp. 308-314, Jan. 2017.
- [14]. L. Zhemin, X. Shiwei, and C. Ligu, "Prediction study based on dynamic chaotic neural network: Taking potato timeseries prices as an example," *Syst. Eng.-Theory Pract.*, vol. 35, no. 8, pp. 2083-2091, 2015.

- [15]. J. Wang, C. Qi, and M. F. Li, "Prediction of commodity prices based on SSA-ELM," *Syst. Eng.-Theory Pract.*, vol. 37, no. 8, pp. 2004-2014, 2017.
- [16]. Ravindra Changala, "Development of Predictive Model for Medical Domains to Predict Chronic Diseases (Diabetes) Using Machine Learning Algorithms and Classification Techniques", *ARPJ Journal of Engineering and Applied Sciences*, VOL. 14, NO. 6, March 2019, ISSN 1819-6608.

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Energy efficient service placement in fog computing

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ABSTRACT

The Internet of Things (IoT) concept evolved into a slew of applications. To satisfy the requests of these applications, using cloud computing is troublesome because of the high latency caused by the distance between IoT devices and cloud resources. Fog computing has become promising with its geographically distributed infrastructure for providing resources using fog nodes near IoT devices, thereby reducing the bandwidth and latency. A geographical distribution, heterogeneity and resource constraints of fog nodes introduce the key challenge of placing application modules/services in such a large scale infrastructure. In this work, we propose an improved version of the JAYA approach for optimal placement of modules that minimizes the energy consumption of a fog landscape. We analyzed the performance in terms of energy consumption, network usage, delays and execution time. Using iFogSim, we ran simulations and observed that our approach reduces on average 31% of the energy consumption compared to modern methods.

Subjects Adaptive and Self-Organizing Systems, Algorithms and Analysis of Algorithms, Emerging Technologies, Internet of Things

Keywords Fog computing, Service placement, Energy consumption, Internet of Things

INTRODUCTION

Cloud computing has gained more popularity as there is more exchange of data and information. The Internet of Things (IoT), a major tech trend, causes connecting devices to become more ubiquitous in business, government, and personal spheres. The Internet of Things (IoT) is an accolade by cloud computing with high quality caching and high-definition capabilities that enable everything to be brought online. More data is being produced by bringing in all things online (*Xu et al., 2018*), This data will be processed on the cloud. Cloud data centres are often located distant from IoT devices. This placement results in a high communication delay, but most IoT applications require low latency. The concept of fog computing enables storage, computation, and networking on the fog nodes that are closer to the IoT devices. Fog nodes can be placed anywhere between the IoT devices and the cloud path. By bringing the cloud closer to where data is created and used, fog computing with hierarchical architecture can effectively deal with latency-sensitive IoT applications. Rather than storing and processing the data on a cloud, its fog computing allows processing to be done at fog nodes in the network. In this way, information from the

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IoT devices can be processed separately (*Mijuskovic et al., 2021*). As the processing takes place hierarchically, total latency is decreased.

Fog computing is a novel approach with several advantages, like low cost, network bandwidth and low latency. Fog resources allow local computing and network for end-user applications. The flexibility and scalability of cloud computing will make it easier for fog computing to meet the growing need for computation-intensive and large scale applications when fog computing processing energy is insufficient.

Fog computing has several applications, including health services, surveillance, smart buildings, connected cars, and manufacturing. Fog nodes are positioned near the customer applications to keep latency and response times low. Despite advantages, there are also several challenges associated with fog computing. Managing resources properly is paramount since it will prevent downtime and energy costs.

This research focuses on one of the major fog computing challenges: module/services placement. The fog nodes are resource-constrained, so we should properly assign the modules to a fog node. Without proper allocation, the applications will starve. Proper allocation of the resources to each module can solve this issue. In the literature, various optimization techniques like Ant Colony Optimization (ACO), Particle Swarm Optimization (PSO) and genetic algorithm were used. But these algorithms fall within local optimum and are sensitive to the initial population.

In the proposed algorithm, we introduced a new operator in the JAYA algorithm called Levy flight, which produces a random walk following probability distribution. We use the proposed approach for module placement in the cloud-fog environment. The Levy flight escape the locally optimal solution, resulting in an efficient placement of the modules in the fog landscape. The proposed Levy flight based JAYA(LJAYA) approach led to a fair trade-off between utilization of fog landscape and energy consumption for running applications in fog landscape.

The following are the major contributions of this research:

- Formulated service/module placement problem to minimize energy consumption.
- A new Levy flight based JAYA algorithm is proposed to solve the module/service placement problem in the fog landscape.
- Experiments for performance analysis are conducted by varying loads considering the said metrics. The results conclude that the proposed placement approach significantly optimizes the module/service placement and reduces energy consumption.

RELATED WORKS

With the continuous development of fog computing technology, resource management has become a difficult task (*Tadakamalla & Menasce, 2021*). This section presents the existing resource management techniques with their advantages and limitations. A quick overview of some of these proposed module/service placement approaches is provided below. Fog computing deals with computationally intensive applications at the edges of the network. There exist various challenges to complex resource allocation and communication resources under QoS requirements. The issue of task scheduling and resource allocation

for multi-devices in wireless IoT networks is being investigated. *Li et al. (2019)* proposed a non-orthogonal multiple access approach. The use of various computing modes would impact the energy consumption and average delay. So the proposed method would make the optimal decision of choosing a suitable computing mode that offers good performance. The optimization issue is composed of a mixed-integer nonlinear programming problem that helps reduce energy consumption. The authors used an Improved Genetic Algorithm (IGA) to resolve this nonlinear problem. *Zhu et al. (2018)* proposed Folo, which is aimed to reduce the latency and comprehensive quality loss while also facilitating the mobility of vehicles. A bi-objective minimization problem for a task allocation to fog nodes is introduced. The vehicular network is widely adopted as a result of the imminent technologies in wireless communication, inventive manufacturing so on. *Lin et al. (2018)* investigated the resource allocation management in vehicular fog computing that aims to reduce the energy consumption of the computing nodes and enhance the execution time. A utility model is also built that follows two steps. In the beginning, all sub-optimal solutions counting on the Lagrangian algorithm are given to resolve this problem. Then, the proposed optimal solution selection procedure. QoS might get degraded for the battery-energy mobile devices due to a lack of energy supply.

Chang et al. (2020) proposed a technology of Energy Harvesting (EH) that helps the devices to gain energy from the environment. The authors proposed reducing the execution cost through the Lyapunov optimization algorithm. *Huang et al. (2020)* solved the energy-efficient resource allocation problem in fog computing networks. To increase the network energy efficiency, they proposed a Fog Node (FN) based resource allocation algorithm and converted it into Lyapunov optimization. Due to the immense volume of data transmissions, communication issues were increased by big data. So, fog computing has been implemented to resolve the communication issue. However, a limitation in resource management due to the amount of accessible heterogeneous computing relied on fog computing. *Gai, Qin & Zhu (2020)* addresses the problem by proposing an Energy-Aware Fog Resource Optimization (EFRO) approach. EFRO considers three components such as cloud, fog and edge layers. This approach would integrate the standardization and smart shift operations that also reduce energy consumption and scheduling length. To reduce the delays due to the inefficiency of task scheduling in fog computing, *Potu, Jatoth & Parvataneni (2021)* had proposed an Extended Particle Swarm Optimization (EPSO) that would help optimize a task scheduling problem. Load balancing techniques associated with fog computing follow two ways: dynamic load balancing and static load balancing. *Singh et al. (2020)* compared various load balancing algorithms and found a fundamentally easy round-robin load-balancing algorithm. *Jamil et al. (2020)* proposed QoS relied load balancing algorithm, the custom load method. This algorithm aims to increase the use of fog devices in a specific area while reducing energy consumption and latency. When it comes to resource optimization, linear programming is a popular approach. *Arkian, Diyanat & Pourkhalili (2017)*, in their work, suggested a mixed-integer programming approach that took into account the bottom station association as well as task distribution. *Skarlat et al. (2017)* have introduced fog colonies and used a Genetic Algorithm (GA) to decide where the services have to be placed within the colonies.

Time Cost Aware Scheduling was proposed by [Binh et al. \(2018\)](#). The algorithm distributes jobs to the client as well as the fog layer based on overall response time, data centre costs, and processing time. However, there is no dynamic allocation of resources, and the proposed approach allocates the resources before the processing time. [Alelaiwi \(2019\)](#), have taken this a leap forward using deep learning to optimize the response time for critical tasks in the fog landscape.

[Chen, Dong & Liang \(2018\)](#) and [Varshney, Sandhu & Gupta \(2021\)](#) focused on how a user's independent computing tasks are distributed between their end device, computing access point and a remote cloud server. To reduce the energy consumption of the above components, they employ semi-definite relaxation and a randomization mapping method. [Varshney, Sandhu & Gupta \(2020\)](#) prospered Applicant Hierarchy Processing (AHP) method for distributing applications to suitable fog layer. The suggested framework assures end-user QoE. The suggested method is evaluated for storage, CPU cycle, and processing time.

Improving the algorithm for mapping application modules/services to the fog nodes is a good research method. In the literature, module placement algorithms were proposed, but still, there is a scope for improving the optimal solution. Most of the existing solutions focused on minimizing latency in the fog landscape. This paper proposes an enhanced module placement algorithm using Levy flight. Our goal is to reduce energy consumption, network utilization and execution time.

PROBLEM FORMULATION

The fog-cloud design takes advantage of both edge and cloud computing capabilities. Low-latency processing is carried out at lower-level fog nodes that are distributed geographically while leveraging centralized cloud services.

Architecture of fog computing

Fog computing is a type of computing that takes place between the end node and the cloud data centre. The cloud, fog, and IoT sensors are the three layers of fog architecture. Sensors capture and emit the data but do not have the computation or storage capability. Along with sensors, we have actuators to control the system and react to the changes in the environment as detected by sensors.

Fog nodes are devices with little computing capability and network-connected devices such as smart gateway and terminal devices. This layer collect data from sensors and perform data processing before sending it to the upper layers. Fog computing is suitable for low-latency applications. As shown in [Fig. 1](#), we extend the basic framework of fog computing in [Bonomi et al. \(2014\)](#) and [Gupta et al. \(2017\)](#) by allowing service/module placement in both the fog and cloud. For this, we introduce two levels of control: (i) cloud-fog controller and (ii) fog orchestration controller(FOC). Cloud-fog controller controls all fog nodes. Fog orchestration controllers are a special kind of fog node used to run the IoT applications without any involvement of the cloud. A fog orchestration controller is responsible for all the nodes connected to it, called a fog colony. Our fog architecture

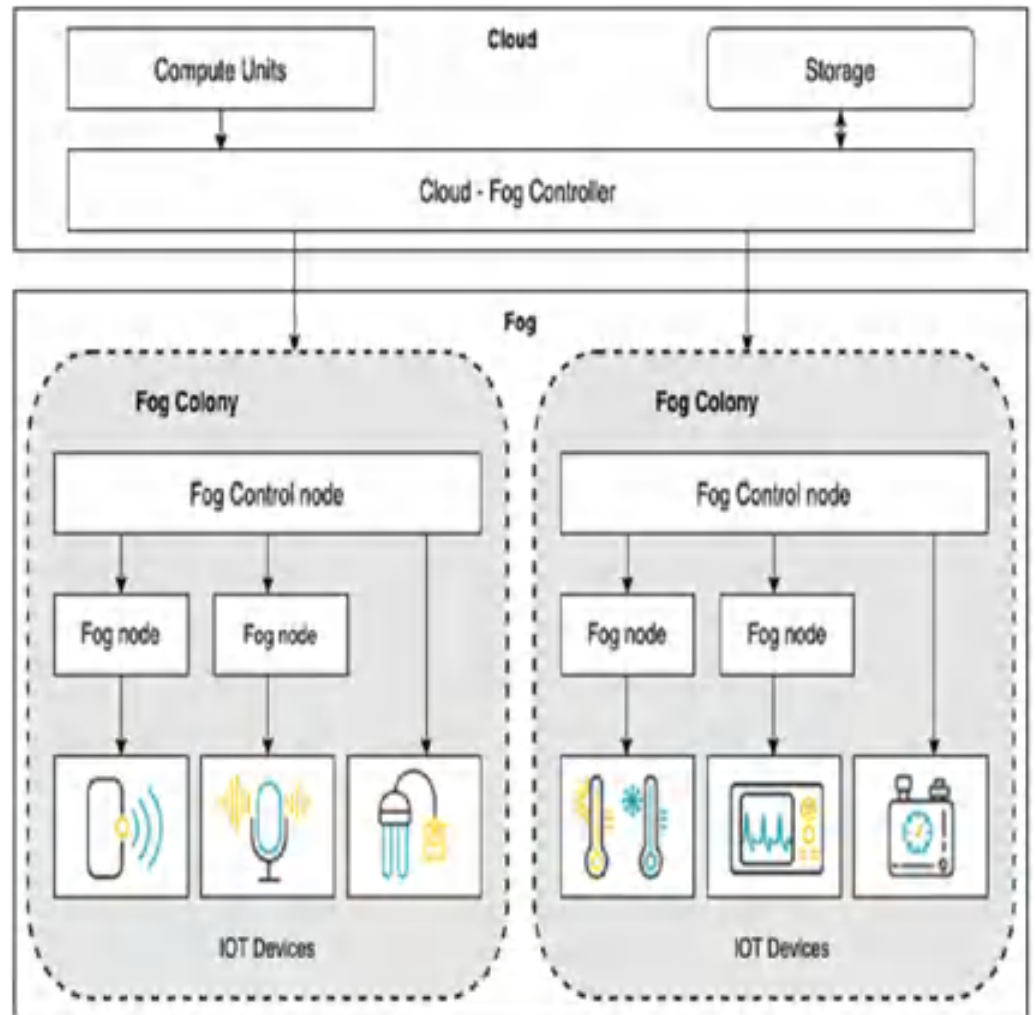


Figure 1 Architecture for fog computing.

Full-size DOI: [10.7717/peerjcs.1035/fig-1](https://doi.org/10.7717/peerjcs.1035/fig-1)

supports a hierarchy with the cloud-fog controller, fog orchestration controller, fog nodes, and the sensor/IoT devices at the bottom layer.

The controller nodes need to be provided with the information to analyze the IoT application and place the respective modules onto virtualized resources. For example, the fog orchestration controller is provided with complete details about its fog colony and the state of neighbourhood colonies. With this information, the scheduler develops a service placement plan and accordingly places the application modules on particular fog resources.

Fog landscape consist of set of fog nodes (f_1, f_2, \dots, f_n) . These fog nodes are split into colonies, with a FOC node in charge of each colony. Each Fog node f_j is equipped with sensors and actuators. Each fog node f_j can be indicated with a tuple $\langle id, R_j, S_j, Cu_j \rangle$ where id is the unique identifier, R_j is the RAM capacity, S_j is the storage capacity and Cu_j is the CPU capacity of the fog node. FOC node controls all the communication within a

colony. We define a non-negligible delay d_j between the FOC node and each fog node f_j in that colony.

IoT applications and services

Let W denote a set of different IoT apps. The Distributed Data Flow (DDF) deployment approach is used for the IoT application, as stated in [Giang et al. \(2015\)](#). Each of these applications (W_k) is made up of several modules, where each module $m_j \in W_k$ is to be executed on the fog/cloud resources. All the modules that belong to an application (W_k) need to be deployed before W_k starts execution. Once the application executes, modules will communicate with each other, and data flows between modules. The application response time r_A is calculated as shown in [Eq. \(1\)](#).

$$r_A = \text{makespan}(W_k) + \text{deployment}(W_k) \quad (1)$$

where $\text{makespan}(W_k)$ is the sum of the makespan duration of each module $m_j \in W_k$ and the execution delays. The $\text{makespan}(m_j)$ is the total time spent by the module from start to its completion. $\text{deployment}(W_k)$ is the sum of the current deployment time $\text{deployment}_{W_k}^t$ and the additional time for propagation of the module to the closest neighbour colony. We assume that the application's deployment time includes administrative tasks such as module placement. Each module m_j is defined by a tuple $\langle \text{CPU}_{m_j}, R_{m_j}, S_{m_j}, \text{Type} \rangle$ where these are the demands of CPU, main memory, and storage. The service type indicates specific kinds of computing resources for a module m_j . Our goal is to utilize the fog landscape to the maximum extent, and the placement of modules must reduce the total energy consumption of the fog landscape. This issue is referred to as Module Placement Problem (MPP) in fog landscape. The controllers monitor all the fog nodes. Each fog node f_i has fixed processing power CPU_i and memory R_i . Let $m_1, m_2, m_3, \dots, m_p$ be the modules that need to be placed on to the set of fog nodes (f_1, f_2, \dots, f_n) . This work addresses the MPP to reduce the delay in application processing and the total energy consumption of the fog landscape. A levy-based JAYA (LJAYA) algorithm for mapping modules and fog nodes has been developed. In the proposed approach, each solution is modelled by an array. This array consists of integer numbers (unique identifiers of fog nodes) corresponding to the fog node on which the modules $m_1, m_2, m_3, \dots, m_p$ will be placed.

$$\text{Solution}_i = (f_3, f_9, \dots, f_i, \dots, f_6).$$

This solution places the m_1 onto f_3 , m_2 onto f_9 etc.

Energy consumption model

An efficient placement strategy can optimize fog resources and minimize energy consumption. Most of the previous placement algorithms have focused on enhancing the performance of the fog landscape while ignoring the energy consumption. The energy consumption by a fog node/controller can be accurately described as a linear relationship of CPU utilization ([Reddy et al., 2021](#); [Beloglazov & Buyya, 2012](#)). We define energy consumption of a computing node (P_i) considering idle energy consumption and CPU utilization (u), given in [Eq. \(2\)](#):

$$P_i(u) = k * P_{max} + (1 - k) * P_{max} * u \quad (2)$$

P_{max} is the energy consumption of a host running with full capacity (100% utilization), k represents the percentage of power drawn by an idle host. The total energy consumption of fog landscape with n nodes can be determined using Eq. (3) (Lee & Zomaya, 2012).

$$E = \sum_{i=1}^n P_i(u). \quad (3)$$

Module placement using Levy based JAYA algorithm

The wide spectrum of bio-inspired algorithms, emphasizing evolutionary computation & swarm intelligence, are probabilistic. An important aspect of obtaining high performance using the above algorithms depends highly on fine-tuning algorithm-specific parameters. Rao (2016) implemented the JAYA algorithm with few algorithm-specific parameters to tackle this disadvantage. JAYA algorithm updates each candidate using the global best and worst solutions and moves towards the best by avoiding the worst particle. This algorithm updates the solution according to Eq. (4). We have to update the population until the optimal solution is found or maximum iterations are reached.

$$Solution_{i+1} = Solution_i + r_1 * (B_i - Solution_i) - r_2 * (W_i - Solution_i) \quad (4)$$

where $Solution_i$ is the value at i th iteration, and $Solution_{i+1}$ is the updated value. r_1, r_2 are random numbers and W_i, B_i are the worst and best according to the fitness value.

We modified the JAYA algorithm by introducing a new operator that searches the vicinity of each solution using a Levy flight (LF). Levy flight produces a random walk following heavy-tailed probability distribution. Levy flight steps are distributed according to Levy distribution with several small steps, and some rare steps are very long. These long jumps help the algorithm's global search capability (Exploration). Meanwhile, the small steps improve the local search capabilities (Exploitation). The updating in our approach is as follows:

$$Solution_{i+1} = Solution_i + LF(Solution_i) + r_1 * (B_i - Solution_i) - r_2 * (W_i - Solution_i) \quad (5)$$

where

$$LF(Solution_i) = 0.01 * \frac{u}{v^{1/\beta}} * (Solution_i - B_i) \quad (6)$$

where u and v are two numbers drawn from normal distributions, B_i is the best solution and $0 < \beta < 2$ is an index.

Figure 2 shows the steps involved in the improved JAYA algorithm for module/service placement and are described as follows:

If the condition is true the input for next level is the updated particle, which we got after applying Eqs. (6) and (7) to the original particle. But if the condition is false then the input for next level is the original particle.

Step 1: Initial solution

Each solution/candidate is a randomized list where each entry specifies the fog node that satisfies the requirement of a given module. For example, the second module request will

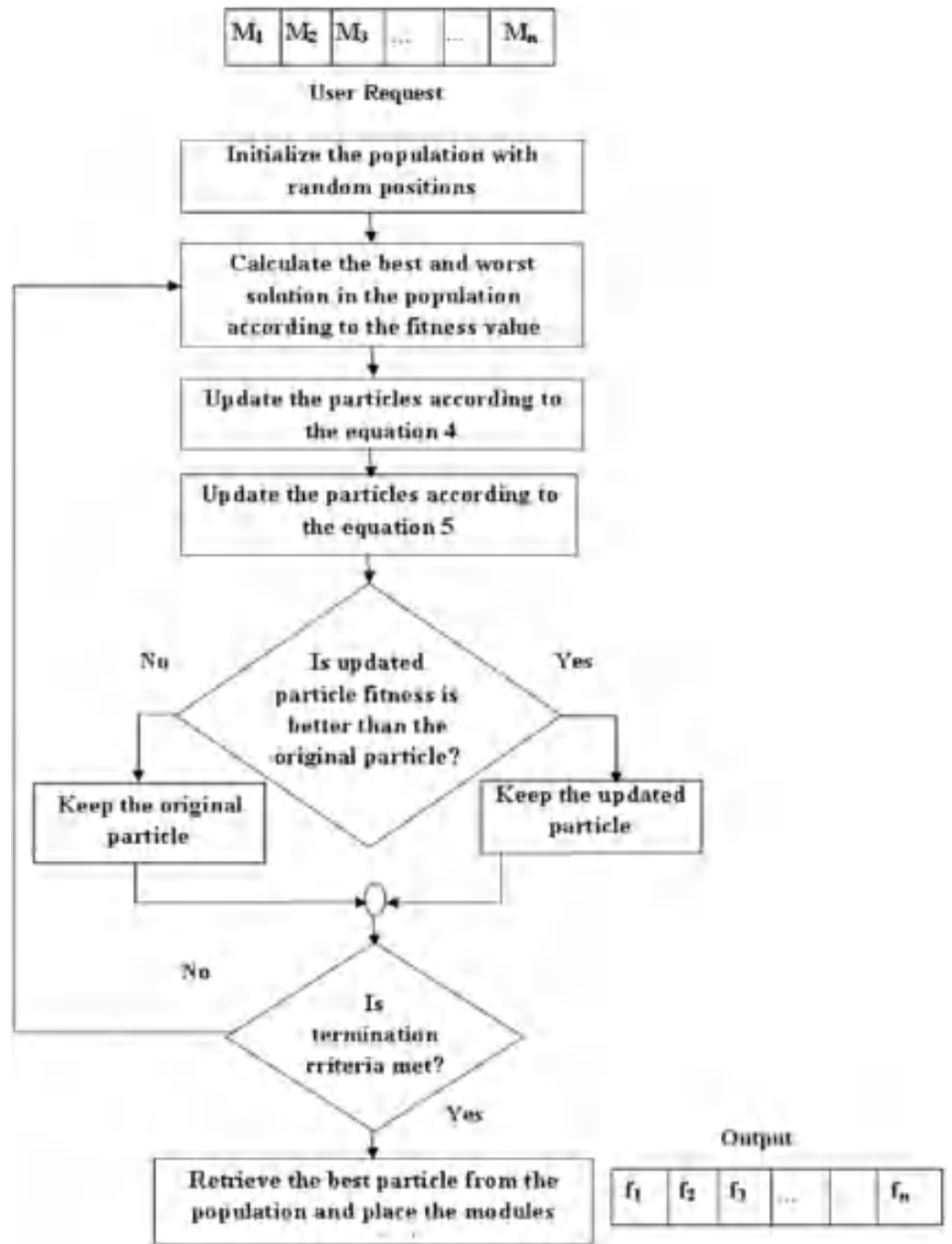


Figure 2 Steps involved in the proposed algorithm.

Full-size  DOI: 10.7717/peerjcs.1035/fig-2

be placed on the fog node given as the second element of the list. Then the fitness for each solution is calculated as shown in Eq. (3).

Step 2: Updation

Calculate the fitness of each candidate and select the solutions that lead to higher and lower fitness (energy consumption in our case) values as the worst and best candidates. The movement of all the candidates is revised using the global best and worst according to Eq. (4). This equation changes the candidate's direction to move towards better solution areas.

Step 3: Spatial dispersion

To improve the exploration and exploitation of the particles we add the Levy distribution to the updated particles, as shown in Eq. (5). We keep $Solution_{i+1}$, if it is the promising solution than the $Solution_i$. In the next iteration, we apply these operations to the updated population. During this process, all candidates move towards optimal solutions keeping away from the worst candidate.

Step 4: Final selection

All the particles are updated until the global optimum is found or the number of iterations is over. Finally, the solution with the highest fitness value is selected, and modules are placed on the respective fog nodes.

PERFORMANCE EVALUATION

We simulated a cloud-fog environment using iFogSim (Gupta et al., 2017). It is a generalized and expandable system for simulating various fog components and real time applications. iFogSim allows simulation and the evaluation of algorithms for resource management on fog landscape. iFogSim has been used by most universities and industries to evaluate resource allocation algorithms and for energy-efficient management of computing resources. So, we also used the iFogSim to simulate our experiments. We analyzed the proposed approach concerning energy consumption, delays, execution time, network usage, etc. We have considered Intelligent Surveillance through Distributed Camera Networks (ISDCN) for our work. Smart camera-based distributed video surveillance has gained popularity as it has lot a of applications like linked cars, security, smart grids, and healthcare. However, multi-site video monitoring manually makes the surveillance quite complex. Hence we need video management software to analyze the feed from the camera and provide a complex solution such as object detection and tracking. Low-latency connectivity, handling large amounts of data, and extensive long-term processing are all required for such a system (Gupta et al., 2017).

When motion is detected in the smart camera's Fields Of View (FOV), it begins delivering a video feed to the ISDCN application. The target object is identified by the application and located in its position in each frame. Moving object tracking is accomplished by adjusting camera parameters from time to time. ISDCN application comprises five modules, as shown in Fig. 3. The first module is Object Detector which identifies an object in a given frame. The second module is for Motion Detection, and the third module tracks the identified object over time by updating the pan-tilt-zoom (PTZ) control parameters. The user interface is to display the detected object. A detailed description of these modules is

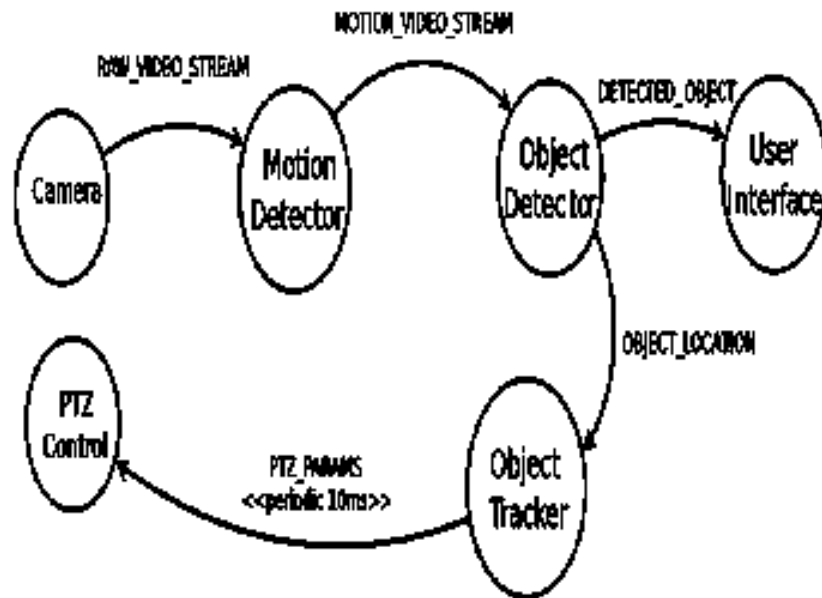


Figure 3 Modelling of the ISDCN application.

Full-size DOI: [10.7717/peerjcs.1035/fig-3](https://doi.org/10.7717/peerjcs.1035/fig-3)

given in *Gupta et al. (2017)*. The application will take the feed from the number of CCTV cameras, and after processing these streams, the PTZ control parameters are adjusted to track the object. The edges connect the modules in the application and these edges carry tuples. [Table 1](#) lists the properties of these tuples.

[Table 2](#) shows the different types of fog devices employed in the topology and their configurations. Here, the cameras serve as sensors and provide input data to the application. On average, the sensors have 5-millisecond inter-arrival times, which require 1000 MIPS and a bandwidth of 20,000 bytes. The physical topology is modelled in iFogSim using the FogDevice, Sensor and Actuator classes.

Results and Discussion

This section presents the results of the proposed module placement algorithm for the ISDCN application and compares them with state-of-the-art approaches in terms of energy, latency, and network utilization. We compared the proposed module placement approach with the approaches like EPSO (*Potu, Jatoth & Parvataneni, 2021*), PSO (*Mseddi et al., 2019*), JAYA (*Rao, 2016*), and Cloud Only (*Gupta et al., 2017*). To compare the performance of these approaches, we perform several experiments using the same physical topology of the ISDCN application and varying the number of areas.

The proposed approach is evaluated on ISDCN application by varying the number of areas with four cameras. All the cameras are connected to the cloud *via* a router in a cloud-only approach.

Table 1 Details of the edges in the ISDCN application.

Tuple type	MIPS	Network bandwidth
OBJECT LOCATION	1000	100
RAW VIDEO STREAM	1000	20000
PTZ PARAMS	100	100
MOTION DETECTION	2000	2000
DETECTED OBJECT	500	2000

Table 2 Characteristics of the Fog devices used for ISDCN.

	CPU MIPS	RAM (MB)	Uplink Bw (MB)	Downlink Bw (MB)	Level	Rate per MIPS	Busy power (Watt)	Idle power (Watt)
Cloud	44800	40000	100	10000	0	0.01	16*103	16*83.25
Proxy	2800	4000	10000	10000	1	0	107.3	83.43
Fog	2800	4000	10000	10000	2	0	107.3	83.43

Energy consumption analysis

Figure 4 shows the superior performance of the proposed LJAYA algorithm in terms of the energy consumption for all the configurations measured in Kilo Joules (kJ). A lot of energy is consumed by the cameras to detect the objects' motion in frames. Total energy consumption was significantly less in the LJAYA method than in JAYA, EPSO, PSO, and Cloud Only. For instance, the total energy consumption with EPSO, JAYA, PSO and Cloud Only is 509.12 kJ, 523.39 kJ, 689.48 kJ, and 1915.10 kJ. In comparison, the LJAYA method was 480.10 kJ for ten areas. When the number of areas is increased, the total energy consumption also increases with all the approaches. The proposed approach can find the optimal solution in all the cases. The analysis of the energy consumption for various configurations demonstrated that the proposed LJAYA approach reduces energy consumption up to 31% on average compared to modern methods.

Execution time analysis

Figure 5 shows the execution time (in milliseconds) of various topologies and input workloads. From Fig. 5, it is clear that the proposed LJAYA approach can complete the execution faster than the other approaches. On average, the proposed approach reduced the execution time up to 7%, 15%, 22%, and 53% over EPSO, JAYA, PSO, and Cloud Only approach, respectively.

Network usage analysis

The network usage will increase if traffic is increased toward the cloud. At the same time, the network usage decreases when we have a dedicated fog node in each area. The network usage is calculated using Eq. (7) (Gupta et al., 2017).

$$\text{Networkusage} = \text{Latency} * \delta, \quad (7)$$

where $\delta = \text{tupleNWSize}$.

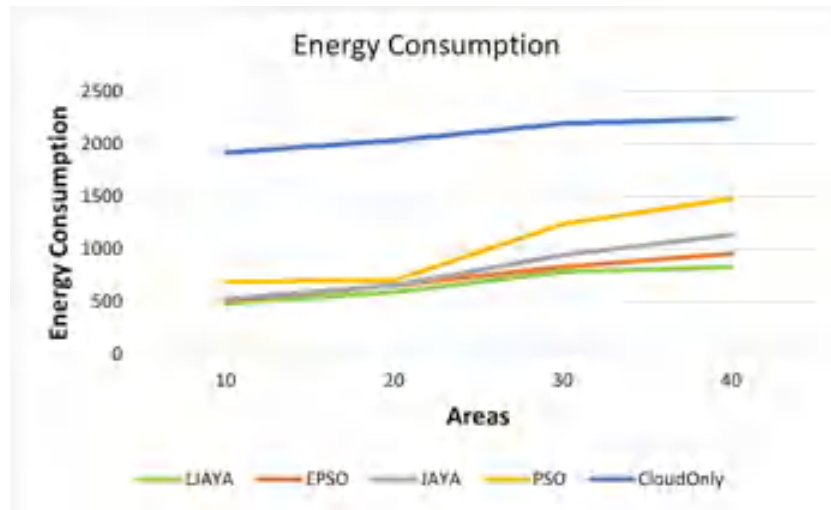


Figure 4 Energy consumption of all devices in fog landscape.

Full-size DOI: 10.7717/peerjcs.1035/fig-4



Figure 5 Execution time analysis.

Full-size DOI: 10.7717/peerjcs.1035/fig-5

Experimental results in terms of the network usage in bytes are shown in Table 3. Network usage is high with the cloud-only approach because all processing happens in a cloud server. But, with the proposed approach, processing occurs at efficient fog nodes, reducing the network usage. Considering 40 areas, the network usage with the proposed LJAYA, EPSO, JAYA, PSO, and CloudOnly are 2,483,404 bytes, 2,485,275 bytes, 2,485,814 bytes, 2,487,663 bytes, and 2,991,055, respectively. We can reduce the network usage by up to 16% using the proposed approach when compared to the CloudOnly approach.

Table 3 Total network usage in bytes.

Areas	LJAYA	EPSO	JAYA	PSO	CloudOnly
10	1466620	1466806	1466804	1467504	1474585
20	1972125	1972196	1972271	1974304	1980075
30	2478204	2480074	2482234	2482234	2485565
40	2483404	2485275	2485814	2487663	2991055

Table 4 Latency analysis in ms.

Areas	LJAYA	EPSO	JAYA	PSO	CloudOnly
10	1.1	2.2	2.2	20.899	105.999
20	2.16	3.3	4.3	30.9	105.999
30	2.89	3.3	7.015	31.7	105.999
40	3.2	5.4	19.9	32.6	105.999

Latency analysis

Real-time IoT applications need high performance and can achieve this only by reducing latency. The latency is computed using Eq. (8) (Gupta et al., 2017).

$$\text{Latency} = \alpha + \mu + \theta \quad (8)$$

where α is the delay incurred while capturing video streams in the form of tuples and μ is the time to upload and perform motion detection. Finally, θ is the time to display the detected object on the user interface.

Experimental results in terms of latency are showed in Table 4. All application modules are placed in the cloud in a cloud-only placement algorithm, causing a bottleneck in application execution. This bottleneck causes a significant increase (106 ms) in the latency. On the other hand, the proposed placement approach can maintain low latency (1.1 ms) as it places the modules close to the network edge. Compared with the other algorithms, the proposed LJAYA approach shows superior performance in minimizing execution time, latency and energy consumption.

CONCLUSION

Cloud and fog computing oversee a model that can offer a solution for IoT applications that are sensitive to delay. Fog nodes are typically used to store and process data near the end devices, which helps to reduce latency and communication costs. This article aims to provide an evaluation framework that minimizes energy consumption by optimally pacing the modules in a fog landscape. An improved nature-inspired algorithm LJAYA was used with levy flight and evaluated the performance in various scenarios. Experimental results demonstrated that the LJAYA algorithm outperforms the other four algorithms by escaping from the local optimal solutions using levy flight. With the proposed algorithm, we can reduce the energy consumption on average by up to 31% and execution time up to 53%. In the future, we plan to consider different applications and propose an efficient resource provisioning technique by considering the application requirements.

ADDITIONAL INFORMATION AND DECLARATIONS

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The authors declare there are no competing interests.

Author Contributions

- Usha Vadde conceived and designed the experiments, performed the experiments, analyzed the data, performed the computation work, prepared figures and/or tables, authored or reviewed drafts of the article, and approved the final draft.
- Vijaya Sri Kompalli conceived and designed the experiments, authored or reviewed drafts of the article, and approved the final draft.

Data Availability

The following information was supplied regarding data availability:

The code is available in the [Supplementary File](#).

Supplemental Information

Supplemental information for this article can be found online at <http://dx.doi.org/10.7717/peerj-cs.1035#supplemental-information>.

REFERENCES

- Alelaiwi A. 2019.** An efficient method of computation offloading in an edge cloud platform. *Journal of Parallel and Distributed Computing* **127**:58–64 DOI [10.1016/j.jpdc.2019.01.003](https://doi.org/10.1016/j.jpdc.2019.01.003).
- Arkian HR, Diyanat A, Pourkhalili A. 2017.** Mist: Fog-based data analytics scheme with cost-efficient resource provisioning for IoT crowdsensing applications. *Journal of Network and Computer Applications* **82**:152–165 DOI [10.1016/j.jnca.2017.01.012](https://doi.org/10.1016/j.jnca.2017.01.012).
- Beloglazov A, Buyya R. 2012.** Optimal online deterministic algorithms and adaptive heuristics for energy and performance efficient dynamic consolidation of virtual machines in cloud data centers. *Concurrency and Computation: Practice and Experience* **24**(13):1397–1420 DOI [10.1002/cpe.1867](https://doi.org/10.1002/cpe.1867).
- Binh HTT, Anh TT, Son DB, Duc PA, Nguyen BM. 2018.** An evolutionary algorithm for solving task scheduling problem in cloud-fog computing environment. In: *Proceedings of the ninth international symposium on information and communication technology*. 397–404.
- Bonomi F, Milito R, Natarajan P, Zhu J. 2014.** Fog computing: a platform for internet of things and analytics. In: *Big data and internet of things: a roadmap for smart environments*. Cham: Springer, 169–186.
- Chang Z, Liu L, Guo X, Sheng Q. 2020.** Dynamic resource allocation and computation offloading for IoT fog computing system. *IEEE Transactions on Industrial Informatics* **17**(5):3348–3357.

- Chen M-H, Dong M, Liang B. 2018.** Resource sharing of a computing access point for multi-user mobile cloud offloading with delay constraints. *IEEE Transactions on Mobile Computing* 17(12):2868–2881 DOI [10.1109/TMC.2018.2815533](https://doi.org/10.1109/TMC.2018.2815533).
- Gai K, Qin X, Zhu L. 2020.** An energy-aware high performance task allocation strategy in heterogeneous fog computing environments. *IEEE Transactions on Computers* 70(4):626–639.
- Giang NK, Blackstock M, Lea R, Leung VC. 2015.** Developing iot applications in the fog: a distributed dataflow approach. In: *2015 5th international conference on the internet of things (IOT)*. Piscataway: IEEE, 155–162.
- Gupta H, Vahid Dastjerdi A, Ghosh SK, Buyya R. 2017.** iFogSim: a toolkit for modeling and simulation of resource management techniques in the Internet of Things, Edge and Fog computing environments. *Software: Practice and Experience* 47(9):1275–1296.
- Huang X, Fan W, Chen Q, Zhang J. 2020.** Energy-efficient resource allocation in fog computing networks with the candidate mechanism. *IEEE Internet of Things Journal* 7(9):8502–8512 DOI [10.1109/JIOT.2020.2991481](https://doi.org/10.1109/JIOT.2020.2991481).
- Jamil B, Shojafar M, Ahmed I, Ullah A, Munir K, Ijaz H. 2020.** A job scheduling algorithm for delay and performance optimization in fog computing. *Concurrency and Computation: Practice and Experience* 32(7):e5581.
- Lee YC, Zomaya AY. 2012.** Energy efficient utilization of resources in cloud computing systems. *The Journal of Supercomputing* 60(2):268–280 DOI [10.1007/s11227-010-0421-3](https://doi.org/10.1007/s11227-010-0421-3).
- Li X, Liu Y, Ji H, Zhang H, Leung VC. 2019.** Optimizing resources allocation for fog computing-based internet of things networks. *IEEE Access* 7:64907–64922 DOI [10.1109/ACCESS.2019.2917557](https://doi.org/10.1109/ACCESS.2019.2917557).
- Lin F, Zhou Y, Pau G, Collotta M. 2018.** Optimization-oriented resource allocation management for vehicular fog computing. *IEEE Access* 6:69294–69303 DOI [10.1109/ACCESS.2018.2879988](https://doi.org/10.1109/ACCESS.2018.2879988).
- Mijuskovic A, Chiumento A, Bemthuis R, Aldea A, Havinga P. 2021.** Resource management techniques for cloud/fog and edge computing: an evaluation framework and classification. *Sensors* 21(5):1832 DOI [10.3390/s21051832](https://doi.org/10.3390/s21051832).
- Mseddi A, Jaafar W, Elbiaze H, Ajib W. 2019.** Joint container placement and task provisioning in dynamic fog computing. *IEEE Internet of Things Journal* 6(6):10028–10040 DOI [10.1109/JIOT.2019.2935056](https://doi.org/10.1109/JIOT.2019.2935056).
- Potu N, Jatoth C, Parvataneni P. 2021.** Optimizing resource scheduling based on extended particle swarm optimization in fog computing environments. *Concurrency and Computation: Practice and Experience* e6163.
- Rao R. 2016.** Jaya: a simple and new optimization algorithm for solving constrained and unconstrained optimization problems. *International Journal of Industrial Engineering Computations* 7(1):19–34.
- Reddy VD, Nilavan K, Gangadharan G, Fiore U. 2021.** Forecasting energy consumption using deep echo state networks optimized with genetic algorithm. In: *Artificial intelligence, machine learning, and data science technologies*. CRC Press, 205–217.

- Singh SP, Kumar R, Sharma A, Nayyar A. 2020.** Leveraging energy-efficient load balancing algorithms in fog computing. *Concurrency and Computation: Practice and Experience* e5913.
- Skarlat O, Nardelli M, Schulte S, Borkowski M, Leitner P. 2017.** Optimized IoT service placement in the fog. *Service Oriented Computing and Applications* **11(4)**:427–443 DOI [10.1007/s11761-017-0219-8](https://doi.org/10.1007/s11761-017-0219-8).
- Tadakamalla U, Menasce DA. 2021.** Autonomic resource management for fog computing. *IEEE Transactions on Cloud Computing*.
- Varshney S, Sandhu R, Gupta P. 2020.** QoE-based multi-criteria decision making for resource provisioning in fog computing using AHP technique. *International Journal of Knowledge and Systems Science (IJKSS)* **11(4)**:17–30.
- Varshney S, Sandhu R, Gupta PK. 2021.** QoE-based resource management of applications in the fog computing environment using AHP technique. In: *2021 6th international conference on signal processing, computing and control (ISPCC)*. 669–673 DOI [10.1109/ISPCC53510.2021.9609479](https://doi.org/10.1109/ISPCC53510.2021.9609479).
- Xu R, Wang Y, Cheng Y, Zhu Y, Xie Y, Sani AS, Yuan D. 2018.** Improved particle swarm optimization based workflow scheduling in cloud-fog environment. In: *International conference on business process management*. Springer, 337–347.
- Zhu C, Tao J, Pastor G, Xiao Y, Ji Y, Zhou Q, Li Y, Ylä-Jääski A. 2018.** Folo: latency and quality optimized task allocation in vehicular fog computing. *IEEE Internet of Things Journal* **6(3)**:4150–4161.

MANAGING THE ACCESS OF SEARCH ON DATA IN CLOUD COMPUTING

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ABSTRACT:

Search encryption allows the cloud server to search for keywords on records encrypted by data users without knowing the basic plain text. However, most existing search encryption schemes are more effective for single or combined keyword searches. In contrast, a few different schemes that can perform impressive keyword searches are computationally ineffective because they are made up of similarities. This article advocates for an impressive public keyword search encryption scheme in first-order agencies, which combines keyword search rules (i.e., prediction, right of entry into the structure), immovable, or any integration. Allows to display from Booleans have significantly improved performance compared to formulas and existing schemes. We define its safety and indicate that it is selectively comfortable within the preferred model. In addition, we implemented the proposed scheme using high-speed prototyping tools and several behavioral experiments to evaluate its performance. The results show that our scheme is far more efficient than those made by composite order firms.

Keywords: — *Searchable encryption, cloud computing, expressiveness, attribute-based encryption*

1. INTRODUCTION:

Consider cloud-based healthcare data tools that host outsourced PHRs from multiple healthcare companies. PHRs are encrypted to comply with privacy guidelines such as HIPAA. It is particularly acceptable to have a Search Encryption (SE) scheme that allows the cloud provider to review

encrypted PHRs by authorized clients (including medical researchers or physicians) to facilitate the use and sharing of data. Allows taking, without knowing, the basic plain text data. Note that the context we are considering supports private data sharing between data companies and multiple analytics users. Therefore, SE schemes within the private key collection [1], [2], [3],

which assume that a user is searching for and retrieving their data, are not appropriate. On the other hand, the Non-Public Records Recovery (PIR) protocol [4], [5], [6] allows clients to retrieve a positive information object from a database without recording the information element in the database. Publicly stores Administrators, too, are not appropriate, as they require information to be publicly available. To address the keyword search problem in the cloud-based complete sanitary data device scenario, we turn to Public Encryption with Keyword Search Schemes (PEKS), which for the first time [7], I was once suggested. In the PEKS scheme, a cipher text content of keywords called "PEKS cipher extension" is attached to an encrypted PHR. To retrieve all encrypted PHRs that contain the keyword, say "diabetes," the user sends the cloud provider a "trap" attached to the search query on the keyword "diabetes," which is the key to all PHRs. Selects encrypted files that contain the keyword "Diabetes .""And return them to the person without reading the basic PHRs. However, the solutions in [7], in addition to other existing PEKS schemes that improve [7], help in the simpler questions of equation [8]. Intersection and meta1 keywords [9], [10] can be used to search for conjunctive

keywords. At the same time, the technique that uses meta keywords requires 2 million meta words to deal with them all. M Possible common keyword queries. Therefore, schemes of [11] and [12] are suggested within the public key position. Or any of the key phrases can be used as a Boolean 2 formula. In the above cloud-based healthcare system, to find out the relationship between diabetes and age or weight, a medical researcher should use the structure. Search queries with input (ie prediction) ("disease = diabetes") and ("age = 30) can also cause problems. "Or" weight = 150-two hundred ")).] [8], [13], [14], [15] introduced SE schemes, which unfortunately helped the keywords to express themselves, [Schemes in 13] are increasingly complex. 16], while schemes in [8], [14], [15] are based entirely on inefficient two-liner matching on composite order firms [17], although there are techniques for changing matchmaking schemes from composite order agencies. [17] Suitable for keyword searches in encrypted records. Multiple data clients, including cloud-based. Fully healthcare data appliance that hosts outsourced PHRs from multiple healthcare companies.

2 Literature survey:

2.1 Software protection and simulation on oblivious RAMs

Software protection is one of the most important issues regarding laptop exercise. Many heuristics and ad hoc protection strategies exist, but the overall frustration is no longer the theoretical treatment it deserves. In this article, we present a theoretical solution to the security of software programs. We reduce the hassle of software security with the hassle of efficient simulation in foreign RAM. A device forgets if the configuration in which it accesses memory locations equals any input with the same traversal time. For example, an unconscious twisting machine is one in which the movement of the heads on the taps is the same for each calculation. (Thus, motion is independent of the actual input.) What is the reduction in a machine's running time if it takes miles to be unaware? In 1979, Pippenger and Fischer demonstrated how a two-tape alien touring machine could replicate online a single-tap touring machine with a logarithmic reduction in running time. We show a similar result for the random-access machine (RAM) computing model. Specifically, we show how to simulate arbitrary RAM online with potential foreign RAM with a poly logic reduction in walk

time. In contrast, we show that logarithmic degradation is a low threshold.

2.2 Practical techniques for searches on encrypted data

It is suitable for storing information on data storage servers, including mail servers and registry servers, in encrypted form to minimize security and privacy risks. But that usually means that one has to sacrifice functionality for safety. For example, suppose a client wants to retrieve the simplest document containing a few words. In that case, it is not known at first how the data warehouse server was allowed to search and answer the query without losing the confidentiality of the record. We explain our cryptographic schemes for the problem of finding encrypted records and offer security tests for the resulting cryptographic systems. Our techniques have many important advantages. First, they are more likely to be comfortable: they offer a testable secret to encryption. The unreliable server cannot detect anything about the plain text when it is only ciphered text. Third, they provide query isolation for searches, which means unreliable servers cannot check anything other than the final search results about plain text. They offer controlled search, so unreliable servers cannot search arbitrary

words without the person's permission. In addition, they help with hidden queries, so the person can ask the untrusted server to search for a mysterious word without revealing the word on the server. The algorithms offered are simple and fast (for long n documents, encryption and search algorithms require only $O(n)$ stream cipher and block cipher operations). They have almost no area or verbal exchange. So they are practical to implement.

3. RELATED WORK

After Boneh et al., Public keyword encryption testing began with Keyword Search (PEKS), and several PEKS frameworks were proposed using other techniques or with unique scenarios in mind.

They aim to solve two cruces in PEKS:

- (1) How to protect PEKS from offline keyword-guessing attacks;
- (2) How to get expressive search predictions in PEKS. In terms of offline keyword-guessing attacks, which require that no adversary (including the cloud search server) be able to test a given trap keyword, in our experience, Even security assurances can be very difficult. Configuring the public key.

In the non-public key SE setup, a person uploads their private data to a remote database and retains the private database administrator's private statistics. Private Key SE allows the person to retrieve all records containing a special keyword remotely from the database.

KPABE schemes are not designed to maintain the privacy of ciphertext attributes (passphrases).

Traps is a situation of offline keyword attack attacks.

They are not effective enough to be followed in the real world.

Private Key SE responds to practice only when data owners and clients are completely different.

4 PROPOSED PERSONALIZATION SCENARIOS

The main idea of our scheme is to replace an encryption scheme based on key coverage features (KP-ABE) consisting of two liner pairs on first order organizations. Without the loss of generality, we can selectively use the large-scale Universe KP-ABE scheme in the preferred model.

First, to keep keywords private in the access structure, we use a method to divide each

keyword into a common name and keyword value. Because keyword values are more sensitive than standard keywords, keyword values in form login do not appear on the cloud server, while a form login partially structures with the simplest key. Hides Word names are hidden in a trap door and sent to the cloud server.

We equip this specific server with a pair of public and private keys. The public key will be used in the trap door generation so that retrieving keyword data from the trap door is computationally inaccessible to anyone. The process is.

We support the first express SE scheme in public key layout with two liner pairs in high order groups. As such, our scheme is not only always able to search for expressive keywords but is even greener than existing schemes built on compound order agencies.

Our scheme uses a randomness splitting approach to protect against keyword-guessing attacks that have nothing to do with cypher texts. Also, to evaluate fraudulent attacks to keep keyword phrases private from offline keyword vocabulary, we divide each keyword into keyword call and keyword value and search on your product. Assign a designated cloud server to perform the operations.

In addition to hiding keywords in cipher texts, we also want to keep keywords private in a trap door that has access to the structure as an issue.

We formalize the security definition of the expressive SE and formally indicate that our proposed expressive SE schema is selectively welcomed within the known version.

We implemented our scheme using an unexpected prototyping tool called Charm and conducted extensive experiments to evaluate its performance. Our results confirm that the proposed scheme is green enough to be implemented in practice.

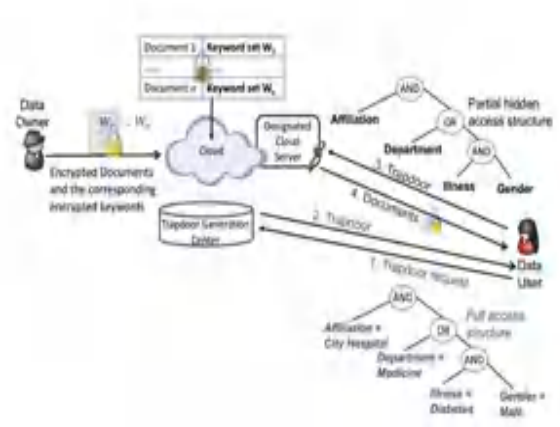


Figure 1: Architecture of the System and Security Model

The structure of our keyword search engine is shown in Figure 1, which consists of 4 entities: a trusted trap door technology

centre that publishes system parameters and has domain non-public key and machine data. Responsible for trap door technology. Owners who outsource encrypted information to the public cloud, users who have the privilege of finding and accessing encrypted statistics, and a select cloud server that provides keywords for information users. Statistics owners include each encrypted report with encrypted keywords to allow the cloud server to review encrypted entries. A recorder issues a trap request by sending a keyword access form to the Trap Generation Center, which develops and returns a trap similar to the access structure. We assume that the Trap Generation Center has a separate authentication procedure for verifying each data user and issuing relevant traps. After receiving the TrapDore, the informant sends the TrapDore and its associated hidden partial access form (i.e., access structure without keyword values) to the actual cloud server. The latter performs testing operations between each ciphertext content and its private key usage trap door and sends matching ciphertexts to the statistics user. As mentioned above, the cipher text content created by the data owner consists of two components: an encrypted record created using an encryption scheme and an encrypted file created using our SE

scheme. Keywords. From now on, we will only consider the last part of the encrypted record and ignore the first part because it is beyond the scope of this document. In summary, we have four design goals for the SE scheme.

TRAPDOOR GENERATION

Setup. This algorithm takes the security parameter $1/\lambda$ as input. It randomly chooses a group G of prime order p , a generator g and random group elements $u, h, w \in G$. Also, it randomly chooses $\alpha, d_1, d_2, d_3, d_4 \in \mathbb{Z} * p$, and computes $g_1 = g^{d_1}, g_2 = g^{d_2}, g_3 = g^{d_3}, g_4 = g^{d_4}$. Finally, it publishes the public parameter $\text{pars} = (H, g, u, h, w, g_1, g_2, g_3, g_4, e^{\wedge}(g, g)^{\alpha})$, where H is a collision-resistant hash function that maps elements in G^1 to elements in G , and keeps the master private key $\text{msk} = (\alpha, d_1, d_2, d_3, d_4)$.

- **sKeyGen.** This algorithm takes the public parameter pars as input. It randomly chooses $\gamma \in \mathbb{Z} * p$, and outputs the public and private key pair $(\text{pks}, \text{sks}) = (g^{\gamma}, \gamma)$ for the server.

- **Trapdoor.** This algorithm takes the public parameter pars , the server public key pks , the master private key msk and an LSSS access structure $(M, \rho, \{W_{\rho(i)}\})$ as input, where M is an $l \times n$ matrix over \mathbb{Z}_p , the

function ρ associates the rows of M to generic keyword names, and $\{W_{\rho(i)}\}$ are the corresponding keyword values. Let M_i be the i -th row of M for $i \in \{1, \dots, l\}$, and $\rho(i)$ be the keyword name associated with this row by the mapping ρ . It randomly chooses a vector $\vec{y} = (y_1, y_2, \dots, y_n) \in \mathbb{Z}_p^n$ where $y_1, \dots, y_n \in \mathbb{Z}_p$, $r, r_0 \in \mathbb{Z}_p$, $t_{1,1}, t_{1,2}, \dots, t_{l,1}, t_{l,2} \in \mathbb{Z}_p$, computes $T = g^r$, $T_0 = g^{r_0}$, and outputs the trapdoor $TM_{M,\rho} = (M, \rho), T, T_0, \{T_{i,1}, T_{i,2}, T_{i,3}, T_{i,4}, T_{i,5}, T_{i,6}\}_{i \in [1,l]}$ as $T_{i,1} = g^{v_i w_{d1d2t_{i,1} + d3d4t_{i,2}}}$, $T_{i,2} = H(\hat{e}(pks, T_0)^r) \cdot g^{d1d2t_{i,1} + d3d4t_{i,2}}$, $T_{i,3} = ((u_{W_{\rho(i)}})^{t_{i,1}})^{-d2}$, $T_{i,4} = ((u_{W_{\rho(i)}})^{t_{i,1}})^{-d1}$, $T_{i,5} = ((u_{W_{\rho(i)}})^{t_{i,2}})^{-d4}$, $T_{i,6} = ((u_{W_{\rho(i)}})^{t_{i,2}})^{-d3}$, where $v_i = M_i \cdot \vec{y}$ is the share associated with the row M_i of the access matrix M . Note that only (M, ρ) is included in the trapdoor $TM_{M,\rho}$.

• **Encrypt.** This algorithm takes the public parameter pk and a keyword set W (each keyword is denoted as $N_i = W_i$, where N_i is the generic keyword name and W_i is the corresponding keyword value) as input. Let m be the size of W , and $W_1, \dots, W_m \in \mathbb{Z}_p^b$ the values of W . It randomly chooses $\mu, s_{1,1}, s_{1,2}, \dots, s_{m,1}, s_{m,2}, z_1, \dots, z_m \in \mathbb{Z}_p$, and outputs a cipher text.

With this need for protection, we want to solve the problems in our construction. First, the keywords related to the hatch should be hidden from the access form. We deal with this problem by separating each keyword into a common call and keyword value, meaning that each keyword has a "standard call = keyword rate" and a partially hidden answer. The entire structure input with the input in the form, i.e. the values of the deleted keywords, is trapped and delivered to a separate cloud server. Second, the entire hatch should be resistant to attacks that estimate the value of offline keywords. In our SE, we have turned to a weak security perception for not disclosing data about keyword values within ciphertext to an adversary other than a TrapDoor cloud server. We assign a designated cloud server to search and equip it with a pair of public and private keys. Because the components of the trap door are connected to the server's public key, only the specialized cloud server with the corresponding private key can learn the values of the keywords hidden inside the trap door by attacking from outside.

Keyword Value Guessing Attacks on Trapdoors.

5. CONCLUSION

To allow a cloud server to search encrypted records without reading the basic plain text inside a public key, place a cryptographic primitive called Public Encryption (PEKS) with the keyword search. Since then, various searchable encryption structures have been introduced to improve the quality of verbal exchange overhead, search quality, and security, for example, with special needs in practice. - However, only a few public-key search encryption systems help with the search terms for keywords, and they are all built on dysfunctional compound order companies. This article focuses on the design and evaluation of the public key search encryption framework in top-ranking agencies that can be used to search for more than one keyword in express search formulas. Based on an encryption scheme based on a key core attribute of a larger universe, we offer an expressive encryption tool in a high-level organization that supports expressive access to the systems described in any monotone boolean formula. Is. In addition, we test its safety within the general model and analyze its effectiveness using portable simulations.

REFERENCES:

[1] O. Goldreich and R. Ostrovsky, "Software protection and simulation on

oblivious rams," J. ACM, vol. 43, no. 3, pp. 431–473, 1996.

[2] D. X. Song, and A. Perrig, 2000, "Practical techniques for searches on encrypted data," pp. 44–55.

[3] E. Goh, "Secure indexes," 2003, IACR Cryptology ePrint Archive, vol. 2003, p. 216.

[4] C. Cachin, and M. Stadler, 1999, "Computationally private information retrieval with polylogarithmic communication," pp. 402–414.

[5] G. D. Crescenzo, and R. Ostrovsky, 2000, "Single database private information retrieval implies oblivious transfer," pp. 122–138.

[6] W. Ogata and K. Kurosawa, "Oblivious keyword search," J. Complexity, vol. 20, no. 2-3, pp. 356–371, 2004.

[7] D. Boneh, and G. Persiano, 2004, "Public key encryption with keyword search," pp. 506–522.

[8] J. Lai, X. Zhou, and K. Chen, 2013, "Expressive search on encrypted data," pp. 243–252.

[9] Prasadu Peddi (2021), "Deeper Image Segmentation using Lloyd's Algorithm", ISSN: 2366-1313, Vol 5, issue 2, pp:22-34.

[10] D. J. Park, and P. J. Lee, 2004, "Public key encryption with conjunctive field keyword search," pp. 73–86.

- [11] Y. H. Hwang and P. J. Lee, 2007, “Public key encryption with conjunctive keyword search and its extension to a multi-user system,” , pp. 2–22.
- [12] B. Zhang and F. Zhang, 2011, “An efficient public key encryption with conjunctive-subset keywords search,” pp. 262–267, 2011
- [13] Prasadu Peddi (2019), Data Pull out and facts unearthing in biological Databases, International Journal of Techno-Engineering, Vol. 11, issue 1, pp: 25-32. [14] Z. Lv, and D. Feng, 2014, “Expressive and secure searchable encryption in the public key setting,” pp. 364–376.
- [15] J. Shi and J. Weng, 2014, “Authorized keyword search on encrypted data,” pp. 419–435.

INTELLIGENT AUTOMATED TRAFFIC MANAGEMENT SYSTEM

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ABSTRACT.

In today's world, the traffic congestion is a major concern. The traffic congestion is mostly caused by signal delays and various other factors. The time deferment of each light is previously fixed in the traffic light and is independent of the actual traffic. The probability of traffic jams due to the traffic lights can be reduced by using this system. The developing software used for the system is established on microcontroller. It determines and updates the traffic light delays are constructed on the traffic density. Based on the density of traffic, the microcontroller designates particular ranges for the delays and updates subsequently. The recorded data sent is to the system for appropriate analysis via communication between arduino microcontroller and the CPU, and then the correct signal will be sent to the LED lights. This system can help notify people about the various traffic conditions in different places beforehand in the future. In this paper the survey is done on many methods and technologies used to perform the objectives. The literature focuses on the technologies which are being used presently to control the congestion and easy passage of ambulance through the traffic.

Keywords: *Traffic Management, IoT, Arduino Microcontroller, IR sensors, LED lights.*

1 INTRODUCTION

The existing traffic control signal has a huge disadvantage because of its fixed time method used. The traffic signal will not change based on the real time traffic on road near the intersection of two or more roads. Due to this the traffic congestion cannot be handled efficiently and the road utilization cannot be done to its maximum capacity. In country like India, the no of vehicles on road is increasing day by day, due

to which congestion is a major problem. Traffic congestion leads to long waiting time, fuel loss and also the wastage of money. Congestion results in high pollution levels which affect the living. Indian traffic is non-lane based and chaotic, so better congestion control should be provided. Due to this congestion it is difficult for the emergency vehicles like ambulance and fire brigade to reach its destination on time which may cost the precious lives of people.

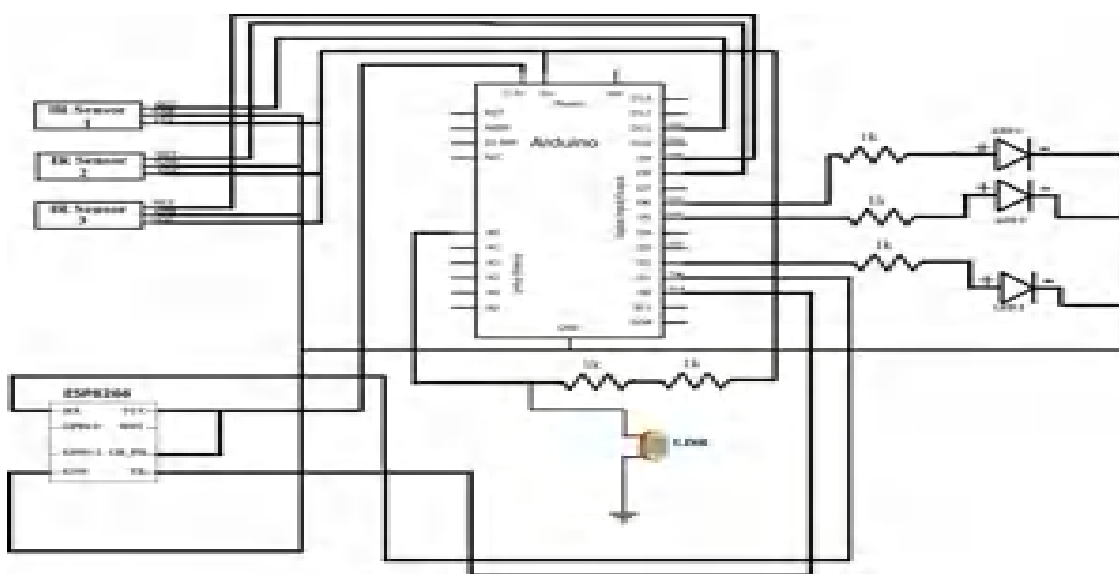


Fig. 1: Block Diagram



Fig. 2: Power Supply

2 Literature Survey

EXISTING APPROACHES

The exiting traffic system is generally controlled by the traffic police. The main drawback of this system controlled by the traffic police is that the system is not smart enough to deal with the traffic congestion.

Even if traffic lights are used the time interval for which the vehicles will be showed

green or red signal is fixed. Therefore, it may not be able to solve the problem of traffic congestion.

DRAWBACKS IN EXISTING SYSTEM

- i) Traffic congestion
- ii) No means to detect traffic congestion
- iii) Number of accidents are more
- iv) It cannot be remotely controlled
- v) It requires more manpower
- vi) It is less economical

1. IoT based dynamic road traffic management for smart cities (IEEE,2015)

Author: Syed Misbahuddin .

All metropolitan cities face traffic congestion problems especially in the downtown areas. By utilizing information and communication technologies, ordinary cities can be turned into "smart cities" (ICT). The Internet of Things (IoT) paradigm has the potential to play a significant role in the development of smart cities. This study provides IoT-based traffic management solutions for smart cities, in which traffic flow can be dynamically regulated by onsite traffic cops via their smart phones, or can be monitored and controlled centrally over the Cyber Sever. We utilized the holy city of Makkah in Saudi Arabia as an example, where traffic behavior alters dynamically due to constant pilgrim visits throughout the 12 month. As a result, in addition to the existing traffic control systems, Makkah city requires special traffic control algorithms. However, the proposed approach is generic and can be implemented in any Metropolitan city without losing its generality.

2. IOT Based Network traffic prediction(IEEE,2019)

Author: Ali R Abdellah

Internet of Things (IoT) is a network of interconnected devices, such as sensors and Smart gadgets with processing, sensing, and communication capabilities, as well as the ability to transfer data to each other and a central console through the Internet.

For any data network, network traffic prediction is a critical operational and management function. In today's increasingly complex and diversified networks, it plays a critical function. For IoT networks to deliver dependable connectivity, network traffic prediction is also more crucial. The artificial neural network (ANN) has been used to predict traffic with great success. In this paper, we use Time Series NARX Feedback Neural Networks to anticipate IoT traffic time series using a multistep ahead prediction method. The estimation error of a prediction approach has been evaluated using the performance functions MSE, SSE, and MAE, besides, another measure of prediction accuracy the mean absolute percent of error.

3. Integrated Smart Transportation using IOT at Jakarta(IEEE,2019)

Author: Septia Redisa Sriratnasari

Summary: reviewed incorporated visitors control in Jakarta Various strategic techniques had been explored and carried out, inclusive of odd-even registration code visitors coverage in Jakarta. Its carried out earlier than Asian Games 2018 and prolonged since January 2nd,2019. The end result for the primary 3 months after the implementation became given wonderful touse public transportation. The use of public transportation enhancement is one approach to create Jakarta as a clever town. Smart town improvement may be supported with the aid of using growing a clever transportation gadget. The time period clever town is a city improvement primarily based totally on statistics era thru involvement with the aid of using citizen and stakeholder. Other addition, clever towns are city regions which have incorporated statistics and communicate era in every day governance, with the purpose of improving efficiency, enhancing public services, and enhancing people's welfare.

Rani et al. proposed that IOT devices need to capture the road traffic conditions like speed, flow, and density for a particular section of road.

K Pangbourne, D Stead, M Mladenović in 2018 analyzing the recent concept of smart mobility referred to as Mobility as a Service (MaaS). MaaS signifies a hybrid innovation technology which combined with a business model for conveying cohesive access to transport services for better road traffic management

Schimbinschi et al. used the loop detectors for the analysis of traffic data using visual exploratory analysis technique. Though, with the help of loop detectors, it is not fully possible to develop moving vehicles trajectories as such sensors only detect vehicle movement but not summarize the individually recognizing vehicles capabilities

Djahel et al. proposed adaptive TMS emergency scenarios of three levels. They used a set of controllers, sensors and connected vehicle system for the changes in traffic policy system. On the basis of related work, the study is summarized as traffic flow control using IoT is the most prominent field for research now a days, the road traffic conditions, smart mobility service for better traffic management, loop detectors for vehicles trajectories, analysis of vehicle trajectory using GPS data, visual analysis system approaches are used to analyze the urban traffic, and adaptive TMS to analyze emergencies in road traffic etc

3. PROPOSED SYSTEM

The current framework is based on a pre-set "time," in which each active signal in the framework is given a specific amount of time. The lights work in every junction, as indicated by that particular "period." However, when all vehicles are passed in one lane (L1) but vehicles are still stuck in another lane (L2) because time is not up, the signal turns red. These frameworks are incredibly wasteful because they are incapable of dealing with a variety of simple situations that arise throughout the day. A significant disadvantage is that time is wasted. The proposed framework aims to prevent the potential outcomes of roads turning into parking lots as a result of the light signal, in part by defraying the vehicles on the street with the highest vehicle density. In which fewer vehicles are held up and tediousness is reduced. Furthermore, our system gives us the flexibility to prioritise emergency vehicles if they appear. For example, a fire emergency, a rescue vehicle emergency, and so on.

The following steps can be used to categorise the Intelligent Automated Traffic Management System:

1. LED Lights: A single stack often has three lights: a green light at the bottom to indicate traffic may proceed, yellow light in the middle to notify vehicles

to slowdown and prepare to stop, and a red light at the top to indicate traffic must stop. LED lights are utilised to display these lights.

2. IR Sensor: IR sensors are being used as motion detectors and vehicle detectors. Near every lane, alongside the traffic lights, IR sensors are installed. The time delay in the traffic is based on the density of vehicles on the roads.
3. Arduino: Arduino is an open-source electronics platform that uses simple hardware and software to make things easy to use. Arduino boards can read inputs, such as light from a sensor, and convert them to outputs, such as turning on an LED in this case. The Arduino Integrated Development Environment (IDE) has been written in embedded C and is used to programme your Arduino.

Advantages of Proposed System

1. Minimizes number of accidents.
2. Reduces fuel cost and saves time.
3. Low budget.
4. Easy implementation and maintenance.
5. Remotely controllable.

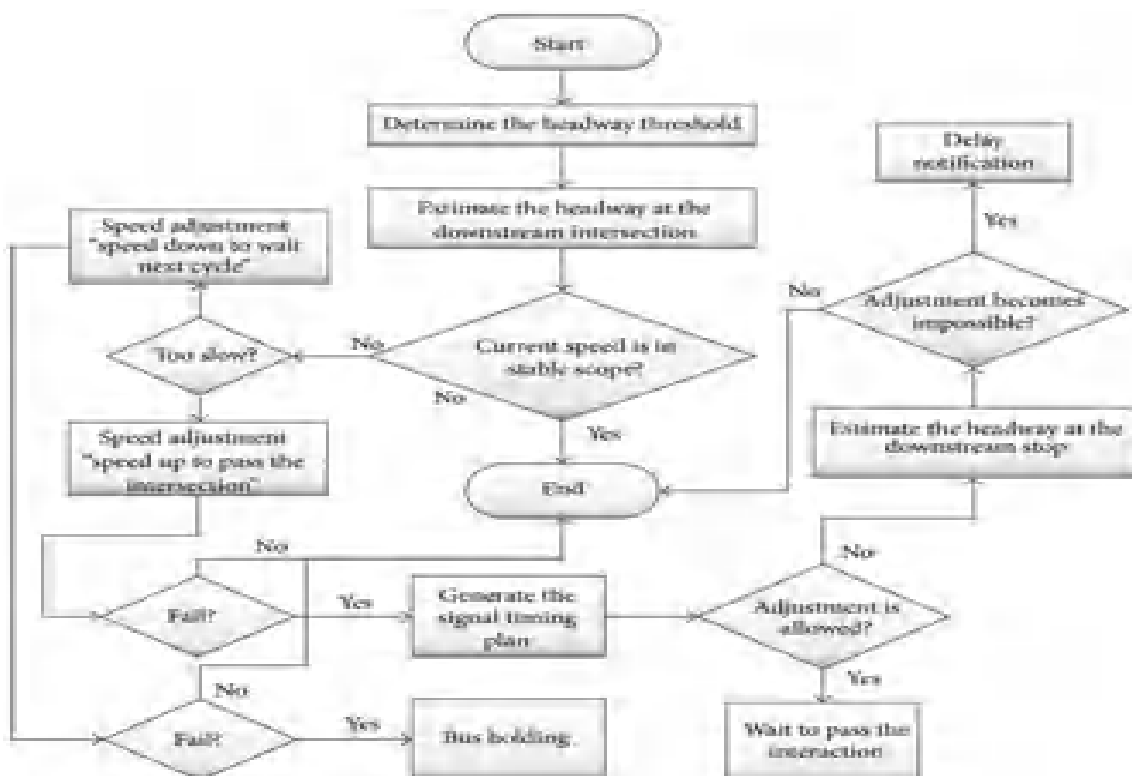


Fig 3: Traffic Flow Control System Execution

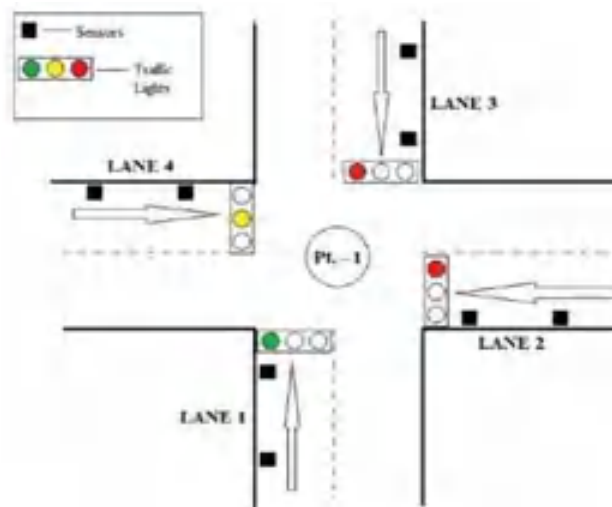


Fig 4: View of signals

4.Experimental Results

The proposed system helps in better time based monitoring and thus has certain advantages over the existing system like minimizing number of accidents, reducing fuel cost and is remotely controllable etc. The proposed system is designed in such a way that it will be able to control the traffic congestion.

Smart traffic management system has given the best results to with waiting & travelling time of a passenger has been reduced and emergency vehicles can move without obstacles or barriers. The pollution rate can be reduced by implementing this smart traffic management system in all prime locations.

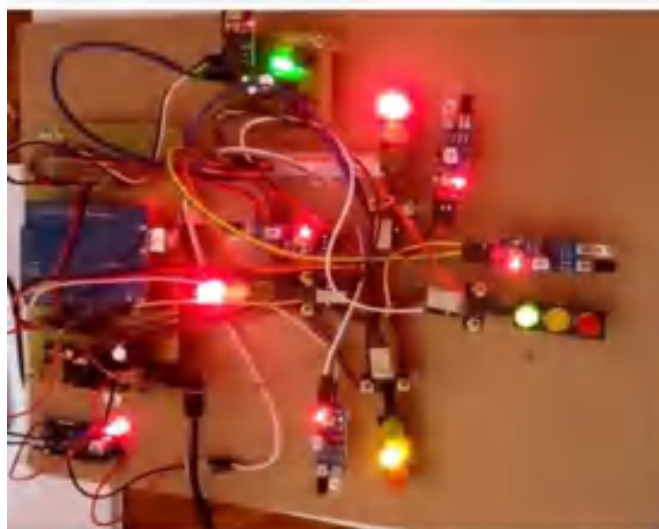


Fig. 4: Iot Device

**Fig. 5: Output**

5. CONCLUSION

Autoamted Traffic Management System has been developed by using multiple features of hardware components in IoT. Traffic optimization is achieved using IoT platform for efficientutilizing allocating varying time to all traffic signal according to available vehicles count in road path. Smart Traffic Management System is implemented to deal efficiently with problemof congestion and perform re-routing at intersections on a road. This research presents an effective solution for rapid growth of traffic flow particularly in big cities which is increasing day by day and traditional systems have some limitations as they fail to manage current traffic effectively. Keeping in view the state of the art approach for traffic management systems, a smart traffic management system is proposed to control road traffic situations more efficiently and effectively. It changes the signal timing intelligently according to traffic density on the particular roadside and regulates traffic flow by communicating with local server more effectively than ever before. The decentralized approach makes it optimized and effective as the system works even if a local server or centralized server has crashed. The system also provides useful information to higher authorities that can be used in road planning which helps in optimal usage of resources. The suggested traffic management system can be implemented in all metropolitan cities as it is most suitable and reliable for the day.

REFERENCES

1. Aasif Attar, PurvaDhuri and et.al (2015), "Intelligent Traffic Management System/International Education & Research Journal [IERJ]", Vol. 1, Issue. 4, pp. 1-3.
2. AnshuAdwani, RohitHande and et.al (2015), "Smart Highways Systems for Future Cities", Vol. 3. Issue. 7, pp. 7292-7298.
3. D.Jayakumar, J.Omana, M.Sivakumar, B.Senthil, "A safe guard system for mineworkers using wireless sensor networks", International Journal of Applied Engineering Research , vol.10, no.8, pp.21429-21441,2015.
4. Bilal Ahmed Khan and NaiShyan Lai (2014), "An Advanced Fuzzy Logic based Traffic Controller", Vol. 5, Issue. 1, pp.31-40.
5. Dinesh Rotake¹ and SwapniliKarmore (2012), "Intelligent Traffic Signal Control System using Embedded System — Innovative Systems Design and Engineering", Vol. 3, Issue. 5, pp. 11-20.
6. FahriSoylemezgiller (2013), "A Traffic Congestion Avoidance Algorithm with Dynamic Road Pricing for Smart Cities", pp. 2571-2575.
7. K. Vidhya and A. BazilaBanu (2014), "Density based Traffic Signal System", Vol. 3, Issue. 3, pp. 2218 – 2223.
8. L. Qi, M. Zhou, and W. Luan, "A two-level traffic light control strategy for preventing incident-based urban traffic congestion," IEEE transactions on intelligent transportation systems, vol. 19, no. 1, 2018, pp. 13-24.2.
9. Y. J. Zhang, A. A. Malikopoulos, and C.G. Cassandras, "Optimal control and coordination of connected and automated vehicles at urban traffic intersections," In 2016 American Control Conference (ACC), 2016, pp.6227-6232.3.
10. R. Sundar, S. Hebbar, and V. Golla, "Implementing intelligent traffic control system for congestion control, ambulance clearance, and stolen vehicle detection," IEEE Sensors Journal, vol. 15, no. 2, 2015, pp.1109-1113.4.
11. M. Keyvan-Ekbatani, M. Papageorgiou, and V. L. Knoop, "Controller design for gating traffic control in presence of time-delay in urban road networks," Transportation Research Procedia, vol. 7, 2015, pp. 651-668.5.
12. A. A. Zaidi, B. Kulcsár, and H. Wymeersch, "Back-pressure traffic signal control with fixed and adaptive routing for urban vehicular networks," IEEE Transactions on Intelligent Transportation Systems, vol.17, no. 8, 2016, pp. 2134-2143.6.
13. Prasadu Peddi (2018), "A STUDY FOR BIG DATA USING DISSEMINATED FUZZY DECISION

TREES", ISSN: 2366-1313, Vol 3, issue 2, pp:46-57.

14. M. Gulić, R. Olivares, and D. Borrajo, "Using automated planning for traffic signals control," *PROMET-Traffic&Transportation*, vol. 28, no. 4, 2016, pp. 383-391.7.
15. P. Maheshwari, P. Kachroo, A. Paz, and R. Khaddar, "Development of control models for the planning of sustainable transportation systems," *Transportation Research Part C: Emerging Technologies*, vol.55, 2015, pp. 474-485.8.
16. C. Ledoux, "An urban traffic flow model integrating neural networks," *Transportation Research Part C: Emerging Technologies*, vol. 5, no. 5, 1997, pp. 287-300.9.
17. Prasadu Peddi (2019), *Data Pull out and facts unearthing in biological Databases*, *International Journal of Techno-Engineering*, Vol. 11, issue 1, pp: 25-32.
18. A. H. Chow, R. Sha, "Performance analysis of centralized and distributed systems for urban traffic control," *Transportation Research*, vol.2557, no. 1, 2016, pp. 66-76

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EFFECTIVE TRAINING AT NEURAL CLIR BY BRIDGING THE TRANSLATION GAP

Dr. L. Smitha* & S. Vaishnavi

Keywords: Effective, Training, Neural, CLIR, Bridging, Translation, Gap, Dialects, Demonstrate, Factual, Machine, Interpretation.

ABSTRACT

The current examinations in cross-language data recovery (CLIR) for the most part depend on broad message portrayal models (e.g., vector space model or inert semantic investigation). These models are not advanced for the objective recovery task. In this paper, we follow the progress of brain portrayal in regular language handling (NLP) and foster a clever message portrayal model in light of ill-disposed realizing, which looks for an errand explicit inserting space for CLIR. Antagonistic learning is executed as an interaction between the generator cycle and the discriminator cycle. To adjust antagonistic figuring out how to CLIR, we plan three limitations to coordinate portrayal realizing, which are (1) a matching imperative catching fundamental qualities of cross-language positioning, (2) an interpretation requirement connecting language holes, and (3) an ill-disposed limitation compelling both language and source invariant to be arrived at all the more proficiently and successfully. Through the cooperative double-dealing of these imperatives in an ill-disposed way, the hidden cross-language semantics pertinent to recovery undertakings are better safeguarded in the inserting space. Standard CLIR tests show that our model altogether beats cutting edge ceaseless space models and approaches the solid machine interpretation and monolingual baselines. We lead outward assessments of a scope of CLE techniques utilizing CLIR execution, contrast them with brain and factual machine interpretation frameworks prepared on similar interpretation information, and show a huge hole in adequacy. Our examinations on standard CLIR assortments across four dialects demonstrate that Smart Shuffling fills the interpretation hole and gives essentially worked on semantic matching quality. Having such a portrayal permits us to take advantage of profound brain (re-)positioning techniques for the CLIR task, prompting significant improvement with up to 21% increase in MAP, moving toward human interpretation execution. Assessments on bilingual vocabulary acceptance show a tantamount improvement.

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IoT Dialectical and Security Threats

A cybernated inquisition schema for IoT systems

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Abstract: Security challenges, risks, and assaults related to the Internet of Things (IoT) have been highlighted as a potential and challenging study field. As a result, a forensics approach for detecting IoT-related crime will become necessary in the future. Forensics investigators, on the other hand, face several obstacles as a result of the Internet of Things.

These include the vast amount and diversity of information available, as well as the blurred borders between networks, with private networks progressively blending into public networks. We wanted to investigate and expand the link to help with digital investigations of IoT devices and to address new issues in digital forensics. Concerning IoT devices, we stress numerous measures for digital forensics. Furthermore, the integration of a large number of objects in IoT forensic interest, as well as the relevance of recognised and gathered devices, complicates IoT forensics. This paper's goal is to propose a framework and security threats for IoT forensics.

Keywords; Digital Dialectical; IoT Asylum; Defense aperture; Foreboding;

1. INTRODUCTION

The emergence of a very complex and hard area of the Internet of Things – IoT – resulted from recent improvements in

sensing capabilities and networking of electrical items. Using several standardised communication protocols, all gadgets in this idea are connected to the Internet. These IoT devices are frequently operated remotely in a fairly straightforward manner.

The number of networked gadgets is increasing. and are becoming increasingly frequently the target of numerous assailants. Standardized protocols and IoT devices are used in IoT equipment. There is a big market for commercial firmware and software. the number of flaws that are exploited by hackers and cybercriminals.” Typically, hackers will attempt to launch a DDoS assault on IoT devices to paralyse key infrastructure.

Hackers are a serious threat to every company, regardless of its size or industry. The attackers are attempting to disrupt or hinder the target organization's everyday operations by targeting various assets. The attackers' main goal is to use every tactic they can to exploit available weaknesses in the victims' electronic equipment. Because the current security measures aren't 100 percent effective, exploitation is still conceivable. The danger dynamic is quite high, with new vulnerabilities or exploits being revealed on a regular, if not hourly, basis.

Infrastructures, processes, and even everyday life are all under threat. Hackers

perform exploitation on IoT devices and utilise them as a portal to deeper layers of a network, gathering sensitive information, altering or deleting data, or destroying the entire system. Thingbots, RFID, Wearables, Smart Plugs, Traffic Lights, Cameras, Automobiles, Airplanes, Digital Locks, Pacemakers, Rifles, Digital Weapons, Thermostats, and other electronic devices are among the most common targets for hackers. The issue occurs owing to the employment of \sophisticated technological gadgets and processes, which give the attacker the potential of masking the identity.

When it comes into contact with IoT devices, the procedure gets more complicated. The presence of such equipment in a network design facilitates the attacker's task. Analysis of such crimes after they occur is critical as a line of defence to prevent recurrence and establish suitable protective measures. The most important piece of a large puzzle is digital evidence, which assists the investigator in drawing appropriate conclusions about the suspected crime. The admissibility of a judicial case is also ensured by collecting proper and viable digital evidence, especially in cyber-related offences.

The most serious concern emerges when hackers get access to sensitive information such as credit card numbers, health information, or system passwords. The attackers can use this information to commit identity theft or other cybercrimes, which are far more difficult to uncover than ordinary criminal operations. Investigators can use network forensic procedures, protocols, and tools that have already been created. Unfortunately, due to the complex and heterogeneous nature of IoT devices, these techniques are insufficient to conduct a reliable analysis. This is why, to acquire an

effective and productive digital investigative process and to gather even deteriorating digital evidence with accuracy and speed, a great deal of attention is necessary for this field.

To conduct a digital forensic analysis of an IoT device, it is necessary to first understand the features of these devices, as well as their responses to security breaches. Furthermore, the presence of a practically endless number of IoT devices from diverse manufacturers in networked infrastructures makes digital inquiry more difficult. Furthermore, the data produced by IoT devices are personal and large in volume, necessitating prompt analysis to properly identify dangers throughout the forensic phase. Analyzing such sensitive and large amounts of data promptly is a difficult undertaking in and of itself.

It is considered that it is not difficult to come across potential proof of a crime in networked devices. The availability of extensive network logs, numerous chat logs, predictable emails, and social networking chats supports the assertion. The proprietary data formats, protocols, and physical interfaces that come across the technique of evidence extraction, on the other hand, inquire about challenges in IoT. Because of the immature security procedures available to guard against possible attacks, IoT devices are significantly more vulnerable and susceptible to networks.

2. INTERRELATED OBLIGATION

Although much work has been done in digital forensics, the volume of work done in IoT forensics has been quite restricted as of the date of authoring this article. There are a few works in cloud forensics that have parallels with IoT digital forensic. In this

part, we will look at some of the most current developments in IoT forensics.

Numerous issues and ways to IoT forensics in reference. The IoT network has been segmented into three zones: internal network, middle layer, and external network. They've also proposed a Next-Best-Thing Triage (NBT) Model to go along with the three-zone method. Their suggested device is said to function as a beacon for emergency responders. It also improves the efficiency and efficacy of IoT-related research.

The difficulties that digital forensics encounter in IoT. The authors developed a digital investigation deployment paradigm in a cloud computing environment. The study includes a broad review, potential solutions, and a system structure. They have not, however, proposed a mechanism for implementing their suggestion.

IoT security enhancement in terms of forensics. The writers have demonstrated the distinctions between conventional inquiry and the present forensic investigation situation. Some limitations for IoT forensics research for smart devices were discovered. In addition, the authors predicted mobility forensics trends based on smart device advances. Their idea highlights the importance of sensor-based activities and data collection. Their suggested model has not been applied or evaluated in real-world settings.

The obstacles and prospects in the realm of IoT security and forensics. They have reviewed significant security and forensics topics for the security and forensics difficulties briefly. They concentrated on the difficulties of privacy, security, and forensics in the IoT ecosystem.

The issues of IoT forensics on the Internet of Anything age. In this IoT context, they have noted issues in data capture (both logical and physical), extraction, and analysis of data. To explore and design a support system for digital investigations and address increasing issues in digital forensics, the authors recommended a mix of cloud-native forensics and client-side forensics (Forensics for companion devices). They advocated the creation of digital forensic standards that may be used in court.

3. IoT SECURITY THREATS

The security threat is a complicated system that includes interdependent components necessary to complete the operation of the system under study. It may include both living and non-living entities and items that are linked and function together. To the best of our knowledge, there are no security threats for IoT forensics.

The provided ecology, however, is not comprehensive and may require additional exploration. Our primary goal is to identify and enumerate the many components and potential techniques of evidence collecting for investigating an IoT-based crime.

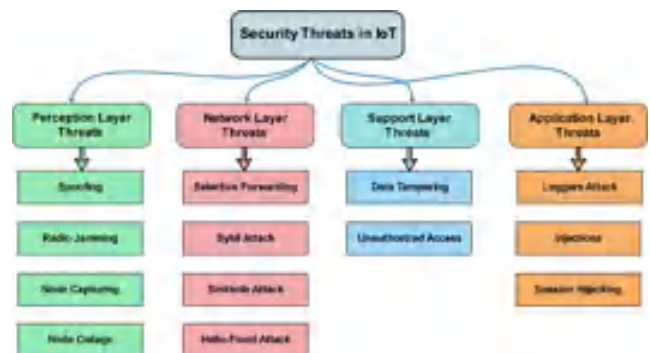


Figure 1. Security, Threats, and Digital Forensic

In Figure 1 Manifest's Security Threats in for IoT. Four stacks are shown in parallel. In the first stack it is the Perception layer, The physical layer, which contains a sensor for perceiving and receiving information about the surroundings, is the perception layer. It detects some physical factors or recognises other intelligent items in the environment. (ii)The network layer is in charge of connecting smart objects, network devices, and servers.

The IoT perception layer influences the integrity of data read by sensors; it provides a method to safeguard the integrity of system data to enable correct analytics and processing. We concentrated on threat models in which insiders alter physical features about which data is gathered and communicated, fooling sensors into interpreting incorrect data. As a first step toward solving the problem, we created a framework that combines Ethereum blockchain with edge computing to run checks and ensure the integrity of incoming sensor data before it is analysed, processed, and stored.

The Network Layer Threat, The network layer is thought to include all network activities and their effects. The use of the internet, smart devices, data storage, data collection or retrieval, security and privacy problems, prospective use of social media, and privacy concerns are initially Evaluated by collecting and analysing operation logs and gathering suspicious evidence from them. It is also feasible to gather time-based information, such as the start and finish time of an occurrence. It is vital to collect the source and destination addresses, as well as any malicious programming information, at the network layer.

The network type, routing information, attack vectors, specifics of the

current firewall, details of the existing network architecture, and equipment can all be provided Support layer threats has two modules which are Data tampering is the purposeful modification (destruction, manipulation, or alteration) of data via unauthorised channels. Data can be in one of two states: in transit or at rest. In both circumstances, data might be intercepted and tampered with. Data transport is important to digital communications.

For instance, if data packets are sent unencrypted, a hacker can intercept the packet, alter its contents, and change its destination address. A system application can suffer a security breach when data is at rest, and an unauthorised intruder can deploy malicious code that corrupts the data or underlying computer code. In both cases, the infiltration is malevolent, and the consequences for the data are invariably disastrous. It is one of the most serious security concerns that any application, programme, or organisation may face.

Along with unauthorized Access, Many IoT devices come with default passwords that allow users to access the software environments included within the devices. Attackers with lists of default IoT passwords can exploit them to obtain unauthorised access to a device and its network if users do not update these passwords, which many do not do.

The last layer is the Application layer, which ensures data integrity, confidentiality, and authenticity. The application layer protocols define the application interface with the lower layer protocols for data transmission over the network. Ports are used by application-layer protocols to facilitate process-to-process communications. Among the application layer protocols are HTTP, CoAP, web socket, MQTT, XMPP, DDS, and AMQP.

4. IoT DISPUTATIVE STAIRCASE

In Figure 2 depicts the stages required for digital forensics and subsequent issues in an IoT scenario. We are stressing the functions of end devices (sensors or smart equipment) and the difficulties in assessing their security. As discussed in earlier parts of this article, forensic methods designed to analyse traditional computers or edge devices can be employed to some extent in the case of IoT systems. Activity analysis in such devices is extremely challenging since only a limited amount of information is kept owing to the low processing capacity in end devices.

A search and seizure is an essential part of any forensic inquiry. The most difficult component is identifying IoT or smart devices in a network or IoT environment because they are physically on the nanoscale or microscopic size and are passively automated. Evidence of cybercrime is difficult to acquire in the case of IoT devices that are part of bigger networks, due to a lack of equipment and professional expertise, as well as faulty or insufficient documentation.

When an attack occurs, hackers employ all of their talents to cover their tracks and conceal their identity. To gain some proof of the illegal activities The forensic investigator should attempt to study the logs, which are important in this procedure. In addition, a global perspective of the target system, attack technique, and likely attacker motive is required.



Figure 2. Provocation in forensic of IoT system

The preservation of the entire digital crime scene is the most difficult task for forensics in the Internet of Things contexts. It is not an easy process to gather data from a highly dynamic environment that has heterogeneous hardware and software architectures as well as changing resources (computing power, memory, storage space). When certain devices are turned off, all logs are destroyed, making the job of a forensic investigator nearly difficult.

Another extremely difficult issue is the lack of adequate tools for setting up A to Z crime scenes and preserving information received from sensors. The massive volume of data, including often needless data, is also interfering with preservation capacity. Hackers are now employing the most effective abilities and technologies to conceal their identities. Because of this log, they are not being updated and are displaying a fictitious route or identity. Most IoT nodes do not save any metadata, including time information, making determining the origin of evidence difficult for investigators. The correlation of pieces of evidence acquired from multiple IoT devices becomes very difficult in the event of changed data or missing temporal data.

In a Conclusion, if all five forensics stages are successful in gathering and collecting evidence, then conducting a proper crime scene presentation will be simple and beneficial.

5. CONCLUSION

A framework for IoT forensics is presented in this paper. The authors introduced the forensic ecosystem that helps investigators in the information gathering process. The steps for the forensic gathering were identified along with probable challenges in acquiring evidence from the crime scene. This work is an overview of the forensic investigation procedure and it should help in producing meaningful evidence in IoT crime. To solve the issues mentioned in this study, future research should focus on developing a framework for IoT forensics based on the correlation of data and metadata from IoT nodes.

REFERENCES

- [1] M. Dlamini, M. Eloff, "Internet of Things: Emerging and future scenarios from an information security perspective", SATNAC Intl. Conf. Proceedings, Swaziland, 2009.
- [2] J.Liu, "IoT Forensics: Issues and Challenges", at 12th IDF Annual Conference, 15th December 2015.
- [3] E. Fleisch, "What is the Internet of Things? An economic perspective." Economics, Management and Financial Market, 2010.
- [4] S. Khan, "The Role of Forensics in the Internet of Things: Motivations and requirements", in IEEE Internet Initiative eNewsletter, July 2017
- [5] P. Sundresan, N. M. Norwawi, V. Raman, " Internet of Things (IoT) digital forensic investigation model Top-Down approach methodology," 5th Intl. Conf. e on Digital Information Processing and Communications (ICDIPC), 2015, Sierre, pp.19-23
- [6] S. Zawoad, R. Hasan, "FAIoT: Towards Building a Forensics Aware Eco System for the Internet of Things," 2015 IEEE International Conference on Services Computing, New York, NY, 2015, pp. 279-284.
- [7] M. Conti, A. Dehghantanha, K. Franke, S. Watson "Internet of Things security and forensics: Challenges and opportunities" Editorial in Future Generation Computer Systems, 78 (2018) pp 544 – 546
- [8] A. MacDermott, T. Baker, Q. Shi, "Iot Forensics: Challenges for the IoT Era," 2018 9th IFIP International Conference on New Technologies, Mobility and Security (NTMS), Paris, 2018, pp. 1-5.
- [9] M. Banday, "Enhancing the security of IoT in forensics," 2017 International Conference on Computing and Communication Technologies for Smart Nation (IC3TSN), Gurgaon, 2017, pp. 193-198.
- [10] E. Oriwoh, D. Jazani, G. Epiphaniou, P. Sant, "Internet of Things Forensics: Challenges and approaches," 9th IEEE International Conference on Collaborative Computing:

- Networking, Applications, 2013, pp. 608-615.
- [11] M. Harbawi, A. Varol, "The role of digital forensics in combating cybercrimes," 2016 4th International Symposium on Digital Forensic and Security (ISDFS), 2016, pp. 138-142.
- [12] R. Hegarty, D.Lamb A Attwood, "Digital evidence challenges in the internet of things" Proc. of the 9th Int. Workshop on Digital Forensics and Incident Analysis, 2013, pp. 163-172.



Assorted Word Search on Cloud Data With Support For Active Operations

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ABSTRACT

Cloud computing is a prominent technique in the last year to store personal information for economic savings and management flexibility. The sensitive data, however, must be encrypted for privacy consideration before being outsourced to the cloud servers, which makes it difficult to search with plaintext keywords for some traditional use functions. A multi-keyword search system is utilised for solving the problem over encrypted cloud data that efficiently supports dynamic operations. The vector space model, together with the TF \times DF and cosine similarity measure, is used by this approach to produce the multi keyword search classification. Traditional solutions must nonetheless be subject to significant calculation expenses. This technique introduces the Bloom Filter to create a search index tree to accomplish the sub-linear search time. In addition, this scheme can effectively and correctly handle the dynamic operation on the Bloom filter property, meaning that the cost of upgrading this scheme is cheaper than other systems. The fundamental system that is safe under the known ciphertext model is initially given. The improved method is afterwards submitted to ensure security also under the known backdrop model. The real-world data set trials indicate the excellent performance of our proposed methods.

Keywords: Cloud computing, Dynamic search encryption, Bloomfilter, Trapdoor.

INTRODUCTION

As distributed computers are improved, an ever more numerous persons understands the benefits that they may get from them. In the course of this time of data explosion, however, individuals need to handle a great deal of information, which might increase administration and reduce productivity. In order to address this issue, individuals, companies or groups are able to use distributed computing which can enable the network's admission to a shared pool of customizable processing assets on request [1]. More precisely, data owners may reassess their information in cloud workers so that they can get admission as they require. Distributed computing clearly takes for us the financial investment capital and the agility of managers. However, for most information owners, their information cannot be stored in the cloud because of the security of information, especially in respect of some sensitive information such as monetary documents or single communications. The cloud worker is semi-confident, which might spill safety of information. So information owners must scratch their reassessed information. It's vital. Encryption can tragically decrease the efficiency of information usage, especially in the case of some authorities that depend on plaintext catchphrase search. For the aforementioned questions, accessible encryption can provide cloud administrations some useful processes on the basic part of the search word. Accessible encryption allows customers to get crucial data through the encoded material. Song et al. suggested the main accessible encryption [2]. Their strategy is encoded with two layers, which allows for the correctness of the disguised access. Although this strategy is shown to be safe, it is based on a fragile safety concept. Some innovative accessible encryption strategies were proposed [3][10] to overcome the disadvantages of Song et al.[2]. These designs build encoded records in order to seek straightforwardly for jumbled data instead. Curtmola and others [4] have provided the first two unwanted accessible encryption models, CKA1, and flexible attacks in the selected term (CKA2). Usually, they are used as standard definitions to date. In addition, CKA1 and CKA2 are suggested with two independent security designs. Kamara et al. [10] have implemented a strong symmetry encryption which is accessible. Their strategy is capable of meeting the suggested needs of the stricter definition of security and support for dynamic action, making the search more flexible. The aforementioned available encryption plans can nonetheless aid just with precise single search term, which limits the breadth of the arrangements' use. In contrast to a search of the term, the information proprietor appreciates multimedia and the earlier one may work on the precise hunting. The quest for many motors was then extensively studied late. The present search planning can include various search capabilities connected to several catch phrases, such as conjunctive watchword search, disjunctive catchphrase search, subset search and other features It proposes two different search strategies, based on

Shamir's distinct secret sharing and bi-lined pairs, which only return the records containing each of the searched. Their strategy in the conventional model is shown to be safe. Furthermore, in the subsequent search plot disjunctive watch worth has been suggested to retrieve documents having the subset of inquiry words. In the interim encryption planning, conjunctive search phrases and disjunctive watchword search were also introduced. As should be clear, the multi-catchphrase search strategies cannot maintain positioned searches, implying that the cloud workers should return the most relevant documents rather than all major records. The search positioning is quite desirable in the worldview of the "pay-as-you-use" cloud since it may work on precision and competence of the inquiry. The early search plans can only aid searching a single keyword. Also, the first search plot positioned with multi watch words (MRSE). Their plan employed the "inward proximity" to process the corresponding scores. In any event, in the MRSE season, the amount of records in the information collection is almost direct, since one key score has to be included on each document, but these documents contain no records which have been looked at in the watch word. In addition, a tree-based design was created for the full information index and the vector space model was misused with the cosine measure to analyse the similarity of the survey productivity. Despite the fact that the hunt proficiency of their plan is improved in fact, the inquiry exactness is decreased partially. Since the information is encoded, refreshing the informational index is troublesome, and loads of file structure can't uphold elements. Refreshing information progressively is a test. As of now, numerous analysts are given to the unique exploration of accessible encryption plans introduced an equivalent based multi catchphrase positioned search plot. This plan can accomplish more exact item and backing equivalent question. Be that as it may, the refreshing expense of the above plans is unreasonable. For example, if a data owner must add a record to its information collection, the individual concerned must restructure the accessible listing tree and the entire encoded listing vector to make sure the cloud worker works regularly. A multifaceted search package that supported distinct activities was developed to handle this issue. In any event, the data hubs must be coded as leaf hubs in this scheme by the owner who can induce a large calculation and refreshing deficit. The effective multi-speech search technology has been positioned with minimal updating expenses. Blossom can select whether a component really is a person from the set and certain accessible encryption planning's have been used. presented an incorrect, accessible encryption conspiracy and consolidated its plan to consolidate the bloom channel and LSH (slick hazing) to complete a buggy point, the Bloom channel is used to interpret the string into the Bloom channel and aid to seek for a similarity. The expression search plot was suggested by utilising the space efficiency of Bloom channel. In addition, their scheme demands a low cost contrast and the present search strategies for expression. However, such plans cannot carry out a search positioned with multi-watchwords. This article offers a safe and sustainable search plot positioned with multi-watchwords that can efficiently assist updating chores. In order to further increase the productivity of the search, the file tree depending on Bloom canal should. Furthermore, for each document in the re-evaluation information collection, our strategy employs a vector space model. The cosine comparability measurement is used to determine the proximity of the pursuit question by a single document and the weight $TF = IDF$ will be used to enhance the query accuracy further. Our plan may explicitly update our activities and the cooling cost of our plan is cheap due to Bloom's characteristics. Basically, under two different risk models, we will provide two secure strategies to fulfil the requirements for protection. Under the known ciphertext paradigm, the essential plan is secure while the improvement plan is safe in the known foundation mode. The following are our commitments summarized:

- (1) In order to develop the pursuit effectiveness, we plan a file tree based on the Bloom channel. The sub straight time can be accomplished with our plans. Moreover, both the productivity of our plan and the skills of file tree construction are better to the other comparable plans.
- (2) We present our multi-watchword search plans, which are able to properly maintain dynamic tasks and which make dynamic activities more successful in our plans.
- (3) Examination of our information gathering on this existing actuality shows that it is pleasing to provide our recommended ideas.

RELATED WORK

The clients are empowered to save the encrypted information in the cloud and to do an online search keyword in the figure text field. Due to the variety of cryptography natives, accessible encrypting schemes may be developed using the main symmetric accessible encryption (SSE) proposed publicly-cleared or symmetrical key based encryption and the hunt season of their plan shall be straight up to SSE's proposed formal security definitions and a Bloom-specific plan schemes. The Goh's plan's survey season is $N(n)$, where n lies within the record range of two plans (SSE-1 and SSE-2) suggested to fulfil the perfect hunting period. Your SSE-1 is a safe plan for selected watchword aggression (CKA1) and SSE-2 against multiple selected catch phrases (CKA2). These early works are single Boolean survey designs, that are very simple to utilize. Later abundant studies under distinct models of risk were presented to achieve varied hunting usability such as single watchword search, proximity search. Boolean multi-catch phrase track search and multi-catchphrase search

positioned A boolean multi-catch sentence inquiry allows customers to incorporate multiple query sentences for appropriate archiving requirements. Among these efforts, conjunctive sentence search charts deliver only reports that contain all the sentences in the query. Disjunctive watchword search plans return the completeness of the reports including a subset of the investigation sentences. Predicate search plans to assist pursue both conjunctivity and disjunction are presented. Each of these multi-task search strategies retrieves things based on a watchword presence that cannot offer sufficient use to the results placement. Positioned search can quickly enable the most important information to be obtained. The sending of only the most relevant reports can decrease network traffic appropriately. Some early efforts understand the positioning of the search with the help of requests, but they are planned separately. Cao et al. [26] understood primary protection of multiwatch search conspirators which deal with reports and queries as vectors of word reference size. The records are positioned by the "organisational coordination" by the quantities of co-ordinated sentences. Nevertheless, Cao et al approaches doesn't consider and hence isn't adequately accurate the meaning of the numerous catchphrases. Moreover, using a secure, multi-control plot which upholds comparability based location, the hunting efficiency of the plan is straight with the archive range's cardinality. The developers created an accessible file tree that depended on the vector space model and used cosine measurements in combination with TF dioxide to produce positioning results. Sun et al .s. search computation performs better than straightforward hunting skills however causes accuracy. The protected multi-catch search technique presented that leveraged the capacity of the neighborhood touchy hash (LSH) to bundle comparable reports. The LSH computation is suitable for comparison searches, however a proposal to handle a safe multi-speech search within a multi-proprietor model cannot offer a cautious placement. Different information owners use varied mystery keys in this scheme for scrambling their records and sentences, while approved information customers can ask without knowing the key of these different information owners. To get the most important list elements, the authors developed a 'added substance order conservation function.' These works do not, however, support dynamic tasks. Essentially, when the cloud worker transfers the product range, the data owner may need to update the archive range. This is the method SE plans are based to enable the report to be included and cancelled. Moreover, several powerful accessible encryption options are available. In the formulation of each report, the group of terms is taken into consideration and is mentioned individually. The strategy maintains direct updating chores however a proposal to generate a sublist (Bloom channel) for every archive that is dependent on catchphrases is present. Then, the unique jobs may be recognised simply by refreshing a Bloom channel next to the comparative record. However, Goh's strategy includes a direct investigation time and fake good experiences. In 2012 an encoded changed record was created that can handle dynamic data efficiently. However, this strategy cannot be executed unpredictably. In this way, another investigation, depending on a tree-based list, offered for improvement, that may cope with dynamic archive information updates made in leaf hubs.. However, their approach is intended for a single keyword The boolean inquiry has added a watchword/character tuple "TSet" information structure. At this stage, the evolution of free T-Sets can then be handled. In view of this architecture, a strong accessible encryption package was proposed. Recently added tuples are added to a different cloud-based data set and removed tuples are documented in a disclaimer's list. This last item is achieved in the disavowal list by removing tuples from those that were recovered from single and new tuples. Cash et al's dynamic investigation conspire doesn't grasp the usefulness of the multi-phrase search.

PROPOSED METHODOLOGY

The recommended plan is first explained. First, a fundamental technique, safe under the existing cypher text model, will be given. However, the fundamental schema under the strong Threat Model can include some important frequency information. So eventually we'll provide an improved strategy. The improved system can ensure the security of a known background model that is stronger than known cypher text models. The ratings that were utilised in our plan.

1. Bloom Filter

Bloom filter is a space-efficient data structure, which is used to decide whether an element is really the member of the set. Assume that there is a set $S = \{x_1, x_2, \dots, x_n\}$, and the set S can be represented as a Bloom filter, which is an array of b bits initialized with 0. Generally, the generating algorithm of Bloom filter utilizes r independent hash functions $h_i (i = 1, 2, \dots, r)$, where $h_i: \{0, 1\}^* \rightarrow [1, b]$. With the hash functions, every element x can be mapped to r random numbers $h_1(x), h_2(x), \dots, h_r(x)$ by computing $h_i(x)$ and the corresponding bits at this positions should be set to 1. When we want to test whether the element x is contained in the set S , we just only check whether the bits at the positions $h_1(x), h_2(x), \dots, h_r(x)$ are equal to 1. If any of the bits in such places are 0, it absolutely does not appear in the set. If not, x is regarded as in the set. However, a positive mistake can occur which implies that the element x has to be determined, but it does not actually occur. Fortunately, the positive false rate may be minimal if the settings and hash functions are configured correctly. As we mentioned, our programmes use the Bloom Filter to create the search index tree, thus in the next sections we will examine its accuracy and safety.

2. BuildIndexTree(DC, Kh, b)

1: For each document $d_i (i= 1, 2, \dots, m)$ in the document set, generate a corresponding leaf node for it as following procedures:

- Generate a unique identifier for d_i and set this identifier as the FID of this leaf node.
- Generate the index vector D_{d_i} according to the key word dictionary $W = \{w_1, w_2, \dots, w_n\}$, where the length of D_{d_i} is the size of keyword dictionary and each dimension $D_{d_i} [j]$ is the normalized of TF value of w_j in the document d_i
- Generate a Bloom filter BF_{d_i} for d_i . Assume the generating algorithm of Bloom filter utilize hash functions h_{sk} , where $h_{sk} : \{0, 1\}^* \rightarrow [1, b]$. So for every keyword w in the document d_i , the positions of BF_{d_i} at $hK_1(w), hK_2(w), \dots, hK_r(w)$ will be set.

2: Generate a search index tree I whose leaf nodes are the m nodes generated in the above step. The FID, D_u and BF_u of the internal node u are set to null initially.

3: Update the Bloom filter of every internal node. For each internal node u , BF_u can be computed according to the Bloom filters of its left and right child node recursively. More specifically, $BF_u [i] = BF_l [i] \text{ or } BF_r [i]$, where “or” is the Boolean OR operator.

4: Output the search index tree.

3. Search Index Tree (BFq, IndexTreeNode u)

1. if u is an internal node then

2. Initialize count to 0;

for $i = 1$ to the length of BF_q do

if ($BF_q[i] == 1$ and $BF_u[i] == 1$) then

count ++;

3. End if

End for

if (count \geq $\lceil r/a \rceil$) then

Search Index Tree (BFq, u.l);

Search Index Tree (BFq, u.r);

End if

Else

4. Return the current node u ;

5. End if

4. Trapdoor unlink ability

During the age of the hidden entrance, a few components of the pursuit list vector might be spilt into two arbitrary numbers. Thus, a similar pursuit file vector will be scrambled to various secret entrances. For the inquiry Bloom channel BF_q , we just arbitrarily chose r/a situations for a question word and set the comparing places of BF_q to 1. Accordingly, a similar inquiry

catchphrase set will be created diverse Bloom channels. Subsequently, our essential plan fulfills the necessities of secret entrance unlikability in the known ciphertext model.

KEYWORD PRIVACY

The preceding study demonstrate that no information about keywords can be found on the cloud server without additional information from the indexes and trapdoors. And in the known text model of the chip, the cloud server cannot deduce relevant information. So under the known text chip paradigm, our simple approach may provide confidentiality with the keyword. However, given the known background model, the cloud severe will have more knowledge as a TF keyword distribution. Thus, by studying the TF distribution, the cloud server may derive keyword information. Therefore, under the given background model, our simple system can leak keyword information.

SECURITY ANALYSIS OF ENHANCED SCHEME

In our system, the cloud server should search the Top-K results using a bloom filter. The server must calculate the relevant scores of each file throughout the search process. It can disclose some information about the data; however, data sets are encrypted, and when we encrypt them multiple times we can obtain various ciphertext for one file. Therefore, the server cannot understand the details of the top-k list files. Under a familiar backdrop paradigm, our system is secure.

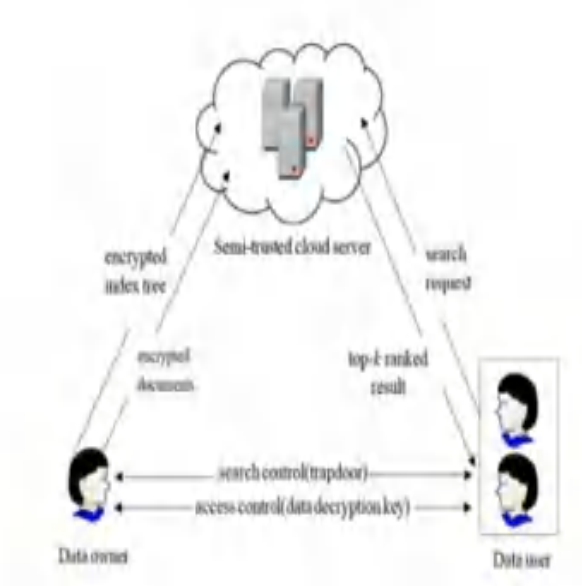


FIG.1: systemarchitecture

As indicated in Fig.1 our suggested plans. The data controller is the entity such as persons, firms and corporations, which wishes the Economic savings and management freedom to output the DC document collection in the cloud. However, in order to preserve the privacy and confidentiality of data the data owner must encrypt DC in the encrypted C form. Meanwhile, the search index tree for encrypted data should also be created to realize the search capacity. The owner of the data is then outsourced to the remote cloud server via the encrypted set C and matching search index tree. The user should obtain the corresponding trapdoor T via search control mechanisms if the authorized data user wishes to search the correspondents' documents from the cloud server using query keywords. The cloud server will pass through the search index bar and will compute the parallel results with the appropriate documents when the request trapdoor T has been received. The cloud server will then provide the most relevant encrypted documents to the data user in the k parameter given by the data user with the trapdoor.

As we mentioned, our system can safely and efficiently achieve multi-keyword search that supports dynamic operation. Thus, our plan's design aims are the following.

- **Search efficiency.** The temporal complexity of the search should be sublinear to the size of the document in our plans. And search efficiency should be higher than existing systems.

- **Dynamic.** Dynamic operation entails deletion and insertion within our suggested scheme and should exceed the present schemes in terms of the efficiency of dynamic operation.
- **Privacy goals.** The cloud server can only learn the search results from our suggested arrangement. Then our scheme should comply with the following data protection criteria.

RESULT ANALYSIS

To generate the trapdoor, the assorted keyword search techniques uses a encryption mechanism that incorporates the split operation of the question vector and two multiplications of the $n \times n$ invertible matrices. The time cost of trapdoor generation varies on the amount of keywords present and hence the amount of keywords is the most important factor. With each step of the time cost, the total amount of words in the dictionary grows exponentially. The amount of terms in the query request has a minor impact on the time it takes to create the trapdoor. This feature is beneficial in assorted keyword search technique. The time cost in basic system is slower than the upgraded scheme.

CONCLUSION

A safe, efficient, multi-keyword, encrypted cloud-data search system. Furthermore, our system allows more efficiently dynamic processes containing document removals or insertions. Our approach uses the vector space model paired with the $TF \times IDF$ rule and the cosine similitude measure to analyse the similarity of documents and requests to do a search with multi-keyword rankings. A search index tree based on the Bloom filter is created to determine the corresponding documents to increase the search effectiveness. Furthermore, due to the characteristics of the Bloom filter, the search index tree can also minimise dynamic transaction costs. Finally, the test results demonstrate that our system is successful and efficient in achieving the design aims.

REFERENCES

- [1]. C. Guo, R. Zhuang, C. Chang and Q. Yuan, "Dynamic Multi-Keyword Ranked Search Based on Bloom Filter Over Encrypted Cloud Data," in IEEE Access, vol. 7, pp. 35826-35837, 2019, doi: 10.1109/ACCESS.2019.2904763.
- [2]. X. Ding, P. Liu and H. Jin, "Privacy-Preserving Multi-Keyword Top- k Similarity Search Over Encrypted Data," in IEEE Transactions on Dependable and Secure Computing, vol. 16, no. 2, pp. 344-357, 1 March-April 2019, doi: 10.1109/TDSC.2017.2693969.
- [3]. T. Peng, Y. Lin, X. Yao and W. Zhang, "An Efficient Ranked Multi-Keyword Search for Multiple Data Owners Over Encrypted Cloud Data," in IEEE Access, vol. 6, pp. 21924-21933, 2018, doi: 10.1109/ACCESS.2018.2828404.
- [4]. Z. Fu, K. Ren, J. Shu, X. Sun and F. Huang, "Enabling Personalized Search over Encrypted Outsourced Data with Efficiency Improvement," in IEEE Transactions on Parallel and Distributed Systems, vol. 27, no. 9, pp. 2546-2559, 1 Sept. 2016, doi: 10.1109/TPDS.2015.2506573.
- [5]. H. Cui, Z. Wan, R. H. Deng, G. Wang and Y. Li, "Efficient and Expressive Keyword Search Over Encrypted Data in Cloud," in IEEE Transactions on Dependable and Secure Computing, vol. 15, no. 3, pp. 409-422, 1 May-June 2018, doi: 10.1109/TDSC.2016.2599883.
- [6]. C. Chen et al., "An Efficient Privacy-Preserving Ranked Keyword Search Method," in IEEE Transactions on Parallel and Distributed Systems, vol. 27, no. 4, pp. 951-963, 1 April 2016, doi: 10.1109/TPDS.2015.2425407.
- [7]. Z. Ying, H. Li, J. Ma, J. Zhang and J. Cui, "Adaptively secure ciphertext-policy attribute-based encryption with dynamic policy updating", Sci. China Inf. Sci., vol. 59, no. 4, pp. 042701:1-042701:16, 2016.
- [8]. J. Tang, Y. Cui, Q. Li, K. Ren, J. Liu and R. Buyya, "Ensuring security and privacy preservation for cloud data services", ACM Comput. Surveys, vol. 49, 2016.
- [9]. B. Wang, S. Yu, W. Lou, and Y. T. Hou, "Privacy-preserving multikeyword fuzzy search over encrypted data in the cloud," in IEEE INFOCOM, 2014.
- [10]. Z. Xia, X. Wang, X. Sun and Q. Wang, "A secure and dynamic multi-keyword ranked search scheme over encrypted cloud data", IEEE Trans. Parallel Distrib. Syst., vol. 27, no. 2, pp. 340-352, Jan. 2016.

SIMULATION AND ANALYSIS OF GRID CONNECTED SYSTEM USING MULTI-LEVEL INVERTER

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Abstract:

For the economic growth and social development of the country energy plays a vital role in every aspect. All the traditional energy production methods require non-renewable resources for the change of form of energy. But, if we continue to use non-renewable resources, once and for all they will become extinct for the future generations. Therefore, renewable energy has become an alternative solution for power generation in the day to day life. The energy from renewable sources is clean, eco friendly, efficient and reliable. Renewable energies have been initiated with the wind power and then followed by the solar power. Wind and solar energy are becoming popular owing to abundance, availability and ease of harnessing of the electrical power generation.

In this paper we aim to develop a grid connected hybrid power generation System using solar and wind energies in MATLAB/Simulink software. The model is designed based on the availability of solar irradiance, temperature, wind speed and direction. The focal point of the paper is to evaluate grid tied power generation system which makes use of solar PV and Wind turbine to produce electricity which uses battery as an energy storage device, using a multi-level inverter which can efficiently reduce the harmonics in the system when compared with the conventional inverter.

Keywords: Solar Photovoltaic array (PV), Wind energy conversion system (WECS), Maximum Power Point Tracking (MPPT), State of Charge (SOC), Battery energy Storage System (BESS), direct and quadrature axis (d-q), Cascaded h-bridge (CHB).

I. INTRODUCTION

The rapid growth in industrialization and population is raising worries about environmental issues and energy demands on a worldwide scale. The world

has witnessed a significant shift in the use of renewable sources of energy in an effort to find new methods of energy generation that should either eradicate air pollution or lower it as much as feasible. Solar, wind, biogas, and energy from waste are a few of the different methods for producing electricity from renewable resources. The fastest-growing sources of electricity production among all of these resources are wind and solar, due of its special characteristics, including the presence of wind and solar rays on the earth's surface, and primarily because of its incredibly low pollution level. Utilizing solar photovoltaic (PV) arrays and wind turbine generating sets makes it simple to capture these energies. Uncertainty in the solar energy's availability due to the earth's rotation (inclination impact) and environmental factors like the passage of clouds, weather conditions like change in temperature, wind speed and directions are some of the major drawbacks of solar PV and wind systems. In order to address these problems, maximum power point tracking algorithms have been developed. These algorithms enable the system to be continuously tuned to draw the maximum amount of power from the system, independent of the load or the weather.

In this paper we are taking both solar and wind renewable energy resources into consideration as we can use them alternately during the course of a 24-hour day for generating power. Numerous maximum power point tracking (MPPT) techniques, such as perturb and observe (P&O), incremental conductance, a numerical approach-based algorithm, and Direct Torque Control (DTC), Tip Speed Ratio (TSR) technique, Power Signal Feedback (PSF) control, Optimal Control Torque (OTC), Load Angle Control etc., have been developed in the literature for the extraction of maximum power. Since wind and solar energy are both included in this paper, both outputs must be integrated. Therefore, in order

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Abstract

In recent years, renewable energy generation, storage, and transmission has been the focus of research. Extraction of power from renewable energy sources is increasing rapidly. Progressively more wind farms are being fastened to the power grid. Large-scale merging of wind farms into electrical power grid presents a few challenges like voltage stability, system operation and control, and power quality due to usage of power electronic converters presenting a major bottleneck. This paper elucidates various types of wind power plant technologies, consequences of power electronic converters and reviews various types of system strength determination methods.



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References

Abo-Khalil AG (2013) Impacts of wind farms on power system stability. In: Muyeen SM, Al-Durra A, Hasaniien HM (eds) *Modelling and Control Aspects of Wind Power Systems*. Rijeka: IntechOpen, pp.133–151.

[Google Scholar](#)

Akhmatov V, Knudsen H, Nielsen AH (2002) Advanced simulation of windmills in the electrical power supply. *International Journal of Electrical Power and Energy Systems* 22(6): 421–434.

[Crossref](#)

[Google Scholar](#)

Aldaoudeyeh AM (2019) *Weak power grid analysis for renewable energy sources integration*. Dissertation submitted to North Dakota State University, June.

[Google Scholar](#)

Amjady N, Ansari MR (2008) Small disturbance voltage stability assessment of power systems by modal analysis and dynamic simulation. *Energy Conversion and Management* 49(10): 2629–2641.

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Ananth DVN, Kumar GN (2016) Fault ride-through enhancement using an enhanced field oriented control technique for converters of grid connected DFIG and STATCOM for different types of faults. *ISA Transactions* 62: 2–18.

[Crossref](#)

[PubMed](#)

[Google Scholar](#)

Ashabani M, Yasser ARIM, Mirsalim M, et al. (2015) Multivariable droop control of synchronous current converters in weak grids/microgrids with decoupled dq-axes currents. *IEEE Transactions on Smart Grid* 6(4): 1610–1620.

[Crossref](#)

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Atallah AM, Abdelaziz AY, Ali M, et al. (2015) Reliability assessment and economic evaluation of offshore wind farm using stochastic probability. In: International conference on

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Enhancement of Power Quality in Distribution System on Dual p-q Theory Based Energy Optimization using Dynamic Voltage Restorer

G. Sujatha, Venkata Padmavathi .S

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Abstract

Because of intricacy of force framework organization, voltage droop/expand turned into the significant power quality issue influencing the end shoppers and ventures; It frequently occurs and causes significant losses. Using a Dynamic Voltage Restorer (DVR), it addresses voltage-related power quality issues affecting critical loads. Direct power flow control can be used to generate instantaneous reference voltages to compensate for load voltages using a generalized control algorithm based on dual P-Q theory. Energy storage requirements are reduced as a result of the proposed algorithm's adaptation of energy optimized series voltage compensation. The proposed DVR control plan can uphold the heap from voltage related power quality issues independent of the heap current profile. The three-phase, three-leg split capacitor inverter injects series compensation voltage into the appropriate phases of the system via each leg. By using MATLAB/Simulink, the simulation model has been designed.

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Babaei, E., & Kangarlu, M. F. (2011). Voltage quality improvement by a dynamic voltage restorer based on a direct three-phase converter with fictitious DC link. IET generation, transmission & distribution, 5(8), 814-823.

Vilathgamuwa, M., Perera, A. R., & Choi, S. S. (2002). Performance improvement of the dynamic voltage restorer with closed-loop load voltage and current-mode control. IEEE Transactions on Power electronics, 17(5), 824-834.

Woodley, N. H., Morgan, L., & Sundaram, A. (1999). Experience with an inverter-based dynamic voltage restorer. IEEE Transactions on Power Delivery, 14(3), 1181-1186.

Ho, C. N. M., Chung, H. S., & Au, K. T. (2008). Design and implementation of a fast dynamic control scheme for capacitor-supported dynamic voltage restorers. IEEE Transactions on Power Electronics, 23(1), 237-251.

Chang, C. S., Yang, S. W., & Ho, Y. S. (2000, January). Simulation and analysis of series voltage restorers (SVR) for voltage sag relief. In 2000 IEEE Power Engineering Society Winter Meeting. Conference Proceedings (Cat. No. 00CH37077) (Vol. 4, pp. 2476-2481). IEEE.

Li, Y. W., Blaabjerg, F., Vilathgamuwa, D. M., & Loh, P. C. (2007). Design and comparison of high performance stationary-frame controllers for DVR implementation. IEEE Transactions on Power Electronics, 22(2), 602-612.

Ryan, M. J., Brumsickle, W. E., & Lorenz, R. D. (1997). Control topology options for single-phase UPS inverters. IEEE Transactions on industry Applications, 33(2), 493-501.

INFORMATION

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Two Inductor Non-Isolated Chopper Fed to Diode Clamped Multi-Level Inverter

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Abstract

An alternative non-isolated circuit breaker with a high voltage boost function fed to different levels of diode clamped multi-level inverter is proposed and THD'S at different levels are compared. The proposed topology of two inductors non-Isolated chopper Demonstrates the deserves of a better and wider variety of step-up voltage advantage whilst in comparison with the latest topologies. A diode clamped multi-stage inverter that offers excessive performance due to the essential frequency used for all the switching gadgets and this easy technique of again-to-again energy switch systems is fed with a non- isolated DC-DC converter. The efficient and compact design of multilevel inverters motivates various applications such as solar PV and electric vehicles. The total harmonic distortion was measured concerning various values of sinusoidal input in the PWM modulation scheme for each inverter.

Keywords- Two inductors non-Isolated dc-dc converter, Diode clamped multi-level inverter (DCMLI), Sinusoidal pulse width modulation (SPWM).

I. INTRODUCTION

The utilization of renewable electricity reasserts is growing each day to resolve the ever-growing electricity disaster for a sustainable future. The low output voltages and intermittency traits of renewable electricity reasserts may be alleviated with the aid of using the use of diverse step-up DC-DC converters. DC-DC converter presented in [1] for renewable energy conversion applications. The presented converter operated in closed-loop control. in [2] various kinds of inverter circuits were demonstrated explained. In [3]-[5] advanced z-source inviters were implemented for renewable energy conversion applications and reducing ripples in the DC supply side.

Boost converters are extensively being used in Solar PV systems as the solar PV generates a small amount of voltage, with numbers of cells connected in series, it will be able to generate 200-230V under the best possible operating conditions. In conditions like summer, its open-circuit voltage will drop in PV but when comes to the proposed two inductor chopper it gives a voltage gain of 20%. Thus boost converters are extensively utilized to meet the load requirements irrespective of the prevailing conditions.[3-4]

With the call for growth within side the necessities of high- electricity first-class in commercial packages and sun PV systems, the traditional inverters in assembly the preferred situations like a natural sine-wave output and much less harmonic distortions is a tough task.

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Research article

Machine learning assessment of IoT managed microgrid protection in existence of SVC using wavelet methodology

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In the last decade, research has been started due to accelerated growth in power demand has mainly concentrated on the large power production and quality of power. After the digital revolution, non-conventional energy sources, many state-of-art equipment, power electronics loads, reactive power compensating devices, sophisticated measuring devices, etc., entered the power industry. The reactive power compensating devices, connected electrical equipment, renewable energy sources can be anticipated/unanticipated action can cause considerable reactions may be failure issues to power grids. To deal with these challenges, the power sector crucially needs to design and implement new security systems to protect its systems. The Internet-of-Things (IoT) is treated as revolution technology after the invention of the digital machine and the internet. New developments in sensor devices with wireless technologies through embedded processors provide effective monitoring and different types of faults can be detected during electric power transmission. The wavelet (WT) is one of the mathematical tools to assess transient signals of different frequencies and provides crucial information in the form of detailed coefficients. Machine learning (ML) methods are recommended in the power systems community to simplify digital reform. ML and AI techniques can make effective and rapid decisions to improve the stability and safety of the power grid. This recommended approach can contribute critical information about symmetrical or asymmetrical faults through machine learning assessment of IoT supervised microgrid protection in the presence of SVC using the wavelet approach covers diversified types of faults combined with fault-inception-angles (FIA).

Keywords: distributed generator, SVC, microgrid, machine learning, wavelet transform, fault- detection, Internet-of-Things (IoT)

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- Efe Francis Orumwense, Khaled Abo-AI-Ez . Internet of Things for smart energy systems: A review on its applications, challenges and future trends. AIMS Electronics and Electrical Engineering, 2023, 7(1): 50-74. doi: 10.3934/electreng.2023004 (/article/doi/10.3934/electreng.2023004)
- Manisha Bangar, Prachi Chaudhary . A novel approach for the classification of diabetic maculopathy using discrete wavelet transforms and a support vector machine. AIMS Electronics and Electrical Engineering, 2023, 7(1): 1-13. doi: 10.3934/electreng.2023001 (/article/doi/10.3934/electreng.2023001)
- Lawrence O. Aghenta, M. Tariq Iqbal . Design and implementation of a low-cost, open source IoT-based SCADA system using ESP32 with OLED, ThingsBoard and MQTT protocol. AIMS Electronics and Electrical Engineering, 2020, 4(1): 57-86. doi: 10.3934/ElectrEng.2020.1.57 (/article/doi/10.3934/ElectrEng.2020.1.57)
- Olayanju Sunday Akinwale, Dahunsi Folasade Mojisola, Ponnle Akinlolu Adediran . Mitigation strategies for communication networks induced impairments in autonomous microgrids control: A review. AIMS Electronics and Electrical Engineering, 2021, 5(4): 342-375. doi: 10.3934/electreng.2021018 (/article/doi/10.3934/electreng.2021018)
- B Naresh Kumar, Jai Sukh Paul Singh . Intelligence-based optimized cognitive radio routing for medical data transmission using IoT. AIMS Electronics and Electrical Engineering, 2022, 6(3): 223-246. doi: 10.3934/electreng.2022014 (/article/doi/10.3934/electreng.2022014)



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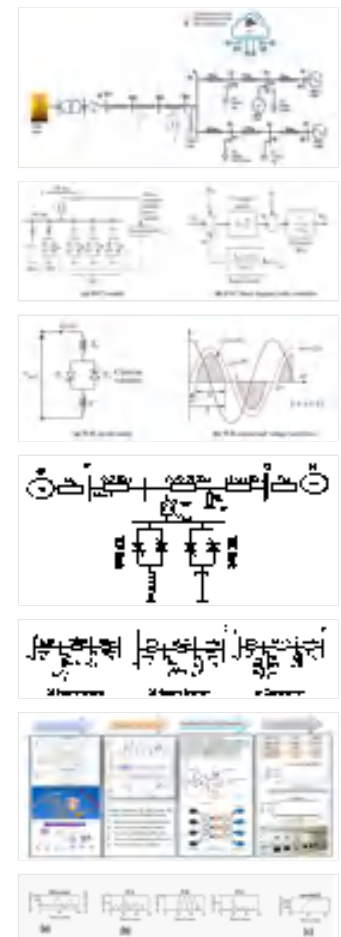
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Figures and Tables



Modelling Of Grid Connected PV System with Constant Current Controller

K. Krushna Murthy¹, Dr.P.V.Bala Subramanyam²

1. Assistant Professor, G.Narayanamma Institute of Technology & Science, Hyderabad
2. Professor, CPRI(Retired), Hyderabad

ABSTRACT

The Solar Energy has huge potential for the electrical Energy Protection in recent days. The PV System is developing very fast as compared to its counterparts of the renewable energies. This Paper proposes Modelling and Design of Grid integrated PV system with Constant Current Controller. The DC voltage generated by the PV system is increased by the DC-DC Boost converter. The utility grid is incorporated with the PV Solar Power Generator through the 3- ϕ PWMDC-AC inverter, whose control is provided by a constant current controller. This controller uses a 3- ϕ phase locked loop (PLL) for tracking the phase angle of the utility grid and reacts fast enough to the changes in load or grid connection states, as a result, it seems to be efficient in supplying to load the constant voltage without phase jump. The complete mathematical model for the grid connected PV system is developed and simulated using MATLAB/SIMULINK.

Keywords – PLL, Boost Converter, MATLAB/SIMULINK.

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I. INTRODUCTION

The continuous increase in the electrical energy with the clean environment needs the decentralized renewable energy production. The increasing energy consumption may overload the distribution grid as well as power station and may cause the negative impact on power availability, security and quality. The only solution to overcome this problem is integrating the utility grid with the renewable energy systems like solar, wind or hydro. The grid can be connected to the renewable energy system as per the availability of renewable energy sources. Renewable energy is expected to make up 30 percent of the world's energy by 2024, according to the International Energy Agency, and most of this is driven by solar and wind projects that continue to be rolled out at a starting pace. Recently the solar power generation systems are getting more attention because solar energy is abundantly available, more efficient and more environment friendly as compared to the conventional power generation systems such as fossil fuel, coal or nuclear. The PV systems are still very expensive because of higher manufacturing cost of the PV panels, but the energy that drives them the light from the sun is free, available almost everywhere and will still be present for millions of years, even all non-renewable energy sources might be depleted. One of the major advantages of PV technology is that it has no moving parts. Therefore, the PV system is very robust, it has a long lifetime and low maintenance requirements. And, most importantly, it is one solution that offers environmentally friendly power generation. The disadvantage of the PV system is that it can supply the load only in sunny days. Therefore, for improving the performance and supplying the power in all day, it is necessary to hybrid the PV system into another power generation systems or to integrate with the utility grid. The integration of the PV system with the utility grid requires the solar inverter for interfacing the utility grid and results some interface issues. Due to this the inverter may produce distorted output which can affect the loads [1].

The inverters suitable for the PV system are central inverters, string inverters, Module integrated or module oriented inverters, multistring PV inverter. If these solar inverters are connected with the grid, the control of these inverters can be provided such that Constant Current is maintained [2], [3]. Power electronic systems can also be used for controlling the solar inverter for interfacing the Solar Power Generation system with the grid [4], [5]. In this paper, a model is proposed to control the output of solar inverter through constant current controller such that the output of solar inverter interfaces with grid voltage in terms of phase and magnitude and supply constant current to the loads in all conditions.

ANALYSIS OF REAL TIME WEATHER MONITORING SYSTEM USING THINGSPEAK

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Abstract. Global warming has led to drastic changes in precipitation, temperature and wind patterns across the globe, leading to unpredictable weather. This necessitates the need to observe and analyze climatic changes and thus enable accurate prediction of weather patterns. A low cost and user-friendly Real Time Weather Monitoring System (RTWMS) has been designed and developed that monitors and analyzes the environmental parameters like temperature and humidity, atmospheric pressure, rain, atmospheric gasses and wind speed using DHT11, BME280, Raindrop sensor, MQ02 and wind speed sensors respectively. MicroPython is the software interface for the sensors connected to the ESP32 board and the data thus acquired is posted to the cloud using ThingSpeak. Thus, users have access to real-time weather data across the globe. The system, realized successfully, is a solution for remote weather monitoring that uses multiple sensors and Internet of Things (IoT) and facilitates remote access to data from equipment deployed in geographical areas that are out of bounds for a civilian.

1. Introduction

The unprecedented growth of industries and vehicular traffic has an adverse effect on the air quality, climate and environment [4]. Thus, it is essential to monitor various weather parameters on real time basis in order to predict and analyze the trends in weather changes. In this real time weather monitoring system, key weather parameters like temperature, humidity, pressure, wind speed, rain, gases like carbon monoxide, LPG and smoke are measured using appropriate sensors. Existing weather monitoring system have a few limitations viz. dependency on remote Power supply source, manual transfer of acquired data, high cost of installation and maintenance [5].

Hence, there is a need to have a low cost and reliable real time weather monitoring system which utilizes a wide range of sensors, to monitor all relevant parameters, periodically transfer the data to shareable platform without human intervention, analyze and display the data, offline analysis to monitor trends in climatic conditions.

This paper aims to realize a low cost and efficient RTWMS with the following objectives:

- To collect data regarding various weather parameters such as temperature, humidity, rain, pressure and Carbon monoxide (CO) levels in the air using sensors.
- To design and implement an efficient real time weather monitoring system by sending the collected data to cloud through ThingSpeak platform.
- To create visualizations on the live data using MATLAB Analysis available in ThingSpeak and share the same with users across the globe.

The proposed concept can be used as a portable solution for creating a smart home and thereby a smart community which taps the potential of broadband networking and IoT [8].

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Original Paper | [Published: 15 November 2022](#)

A 12-element 360° azimuth plane scanning circular antenna array for THz wireless devices

[Anveshkumar Nella](#) , [Anitha Vulugundam](#), [Sumathi Kumarasamy](#) & [Sandeep Kiran Vattiprolu](#)

[Wireless Networks](#) **29**, 1145–1159 (2023)

168 Accesses | [Metrics](#)

Abstract

This work presents a 12-element 360° azimuth plane scanning planar circular antenna array for compact THz wireless devices. Proposed array comprises of 12 bow-tie Yagi-Uda directional antennas, operating within 0.235–0.322 THz band where each antenna achieves a maximum radiation beam for an angle of around 30°, arranged in a circular fashion to cover 360°. Individual antennas are stamped on a silicon dioxide (SiO₂) dielectric substrate having compact dimensions of 1.35 mm × 1 mm × 0.06 mm and employ gold material of thickness 5 μm as a conducting material in the top and bottom planes.

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Azimuth plane **Bow-tie Yagi-Uda antenna**

Circular array **High directional** **Scanning**

THz wireless devices

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An optimized deep networks for securing 5g communication system

[Ambidi Naveena](#) , [Maddala Vijaya Lakshmi](#) & [Meeniga Vijaya Lakshmi](#)

[Cluster Computing](#) (2022)

39 Accesses | [Metrics](#)

Abstract

Nowadays, cellular applications rule the digital world with their betterment. However, security is the primary concern for a better communication range during the communication process. If the messages are hacked, data overhead and collisions occur. So, the present research work has aimed to design the novel Buffalo-based Autoencoder Security Framework (BbASF) developed in the Orthogonal-Frequency-Division- Multiplexing (OFDM) channel. Consequently, the function of the designed model is checked with the Denial of Service (DoS)-CICIDS dataset. The planned model is tested in the python environment. After that, the communication

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Cellular communication **Malicious user**

Confidential rate **Energy consumption**

Packet loss **Throughput ratio**

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Original Paper | [Published: 17 November 2022](#)

A heuristic deep feature system for energy management in wireless sensor network

[Ambidi Naveena](#)  & [Meeniga Vijaya Lakshmi](#)

[Wireless Networks](#) **29**, 1161–1174 (2023)

113 Accesses | [Metrics](#)

Abstract

The Wireless-Sensor-Network (WSN) has been employed in all digital applications for several purposes like sensing, storing, and sharing information. However, managing energy consumption is more critical because of the movable environment. Several existing models have addressed these energy management issues. Still, those models lack in optimizing the energy usage of the WSN during the collision environment. This has motivated to find the best solution for energy optimization with an intelligent model. So, the present research article aims to develop the novel Buffalo-based Deep Belief Energy Management Framework (BDBEMF) for the

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Abstract

Multiple Carrier Code Division Multiple Access (MC-CDMA) system performances are evaluated with the MMSE (Minimum Mean Square Error) equalization algorithm in this framework. The system's performance is augmented with the assistance of meta-heuristic optimization algorithms. Nature-inspired Krill Herd algorithm with an oppositional-based learning method (OKH) is used to improve performance. And the system was also implemented using Kinetic Gas Molecule Optimization (KGMO) algorithm. KGMO is also a metaheuristic-based process that operates with the concept of thermodynamics. Procuring wireless channel details is a difficult task in mobile wireless systems. Both algorithms help in obtaining channel information. Multiple inputs and multiple outputs (MIMO) are primary in existing and ensuing wireless communications. Space-time coding (STC) is integral to multi-antenna operations, mainly concerned with integrity. The proposed optimisation algorithms based on the multi-carrier CDMA system using space-time coding are implemented, and the BER parameter is evaluated. 2 transmitting and 1 receiving antennae are considered in the proposed system. Simulations are done in Rayleigh fading channel.

Keywords

CDMA, MC-CDMA, MIMO, OFDM, Optimization Algorithm.

Reference

[1] Nagaradjane, Prabagarane & Muthu, Tamilarasi, "Performance of Relay-Aided Multi-Carrier-CDMA using Preprocessing based on Quantized Feedback," *Computers & Electrical Engineering*, vol. 48, pp.187-202, 2015.

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[Published: 15 November 2022](#)

An optimized deep networks for securing 5g communication system

[Ambidi Naveena](#) , [Maddala Vijaya Lakshmi](#) & [Meeniga Vijaya Lakshmi](#)

[Cluster Computing](#) (2022)

39 Accesses | [Metrics](#)

Abstract

Nowadays, cellular applications rule the digital world with their betterment. However, security is the primary concern for a better communication range during the communication process. If the messages are hacked, data overhead and collisions occur. So, the present research work has aimed to design the novel Buffalo-based Autoencoder Security Framework (BbASF) developed in the Orthogonal-Frequency-Division-Multiplexing (OFDM) channel. Consequently, the function of the designed model is checked with the Denial of Service (DoS)-CICIDS dataset. The planned model is tested in the python environment. After that, the communication parameters were validated and compared with other schemes. The presented approach

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Cellular communication

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Confidential rate

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Packet loss

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Analysis of PAPR and BER Reduction in MIMO-OFDM using Hybrid Moth Flame-Improved Firefly Algorithm

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Abstract: The hybrid innovation of Orthogonal Frequency Division Multiplexing (OFDM) through Multiple-Input Multiple-Output (MIMO) delivers a feasible substitute to increase the Quality of Service (QoS) to accomplish better data rate and spectral efficiency for the transmission network. An extraordinary Peak-to-Average Power Ratio (PAPR) and Bit Error Rate (BER) are the important parameters that can be considered in the analysis of the MIMO-OFDM network. Partition Transmit Sequences (PTSs) is one of the capable procedures and direct methods to attain a reasonable PAPR performance. However, it needs a serious restoration process to discover the vital features that produce a computational multi-layered design with sub-blocks. Here, a reduced computational complexity PTS scheme is proposed which is completely depends on the hybrid procedure named as Moth Flame Optimization with Improved Firefly Algorithm (MFO-IFFA). The simulation outcomes demonstrated the capability of the proposed MFO-IFFA approach decreases the PAPR reduction up to 3.6 dB. Similarly, the proposed MFO-IFFA overcomes the significant evolutionary procedures mentioned in the existing works such as Additive Signal Mixing (ASM), Adaptive Simplified Optimized Iterative Clipping and Filtering (ASOICF) and Hybrid Independent Component Analysis (HICA).

Keywords: Bit error rate, Improved firefly algorithm, Multiple-input multiple-output, Moth flame optimization, Orthogonal frequency division multiplexing, Peak-to-average power ratio, Partial transmit sequences.

1. Introduction

For the past few years, OFDM is a promising guideline/radio entrée plan for future distant correspondence systems because of its inborn protection from multipath deterrent on account of a low picture rate, the usage of a cyclic prefix and its tendency to different transmission approaches [1, 2]. One of the significant drawbacks of the OFDM signal considering multicarrier transmission is the PAPR of the transmission signal which reduces the magnitude of OFDM signal transmission [3]. OFDM signal requires a broad commitment setup which results in unproductive power change [4]. MIMO-OFDM is an appealing system for high data rate, yet it shows a significant reduction in PAPR because of the nonlinear region of the High Power Amplifier and degradation of Bit Error Rate (BER) [5]. To

overcome this, a high power amplifier should be worked with broad power back-offs and efficient developments in transmitter power [6].

In the MIMO-OFDM network, Selective Mapping (SLM) and Partial Transmit succession (PTS) is considered as one of the generally utilized probabilistic strategies to solve the PAPR performances [7]. The standard of probabilistic methodology depends on diminishing the probability of high PAPR by making a couple of OFDM pictures passing on similar information and choosing the one having the most insignificant PAPR. However, the MIMO-OFDM [8, 9] offers countless benefits, yet the top signs move into the speaker submersion region with some errors. In [10, 11], different traditional crossover methods and hybrid strategies have been proposed for diminishing the PAPR of the MIMO-OFDM system. Each conventional plan has

Lifetime Enhancement of WSN using Evolutionary Computing Algorithms

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Abstract— The continuous development and advancement of wireless communication and Wireless Sensor Network technology has gradually made it an appealing technology that improves people's lives. Because of the widespread use of WSNs, extending WSN lifetime access to real time data and operational information has become critical. This project employs evolutionary computing (EC) algorithms to extend and extend the life of a wireless sensor network (WSN). Numerical simulations are used to investigate the benefits and drawbacks of various evolutionary algorithms for modelling. Evolutionary computing (EC) algorithms create a time-consuming model for WSNs. Comparison and discussion can provide guidance on how to use EC.

Keywords—Evolutionary Computing, Wireless Sensor Networks (WSN), Lifetime Enhancement, Mobile Wireless Sensor Networks (MWSN), Genetic Algorithm

I. INTRODUCTION

All developing and progressing at a rapid pace will provide network technology, Wireless communication technology, and sensor network technology and microprocessor technology. WSNs have gradually grown in popularity as a desirable technology for improving people's lives. In light of their interesting strategy for getting data, WSNs give a clever procedure to get data through constant ecological checking. WSNs are utilized in an assortment of ventures including military safeguard, science, keen home advances, industry, and farming. Since the limit of the hub's battery is confined, the hubs' working life expectancy is significant. The network's overall performance is directly influenced by the WSN's duration.

MWSNs are a type of distributed network that consists of a large number of sensor nodes that may be moved across a monitoring region. Wireless communication technology allows it to build a self-organizing network[5]. In MWSNs, network architecture is dynamic due to sensor or sink node mobility, which is uncommon in static WSNs. As a result, when it comes to developing mobile networks, there are more difficulties to consider than when it comes to designing static WSNs[4].

Studies on the lifetime of MWSNs [6] found that MWSNs with mobility sink nodes had the longest lifetime. According to study [7], the trade-off between exploration and exploitation was investigated, and several strategies were compared. For channel transmission power control, Thompson examining and the remarkable weight calculation activity segment are solid strategies. Solar energy harvesting is used to increase the lifetime of WSNs.

A protocol for multi-gateway wireless networks that is both safe and efficient has been presented. The amount of network links shows that the schedule is scalable. Proposed optimization formulations for machine-to-machine communication are used to extend the lifetime of WSNs. The contribution of the project is as follows:

- A. The essential objective of the MWSNs model is to limit the remaining and burned-through energies, everything being equal. Diminishing lingering energies is useful in keeping hubs from biting the dust rapidly. Limiting burned-through energies can assist hubs with enduring longer. To accomplish the MWSN model's objective, residuals and energies are joined.
- B. The MWSN model is settled utilizing EC calculations in this undertaking. MWSN models have generally been compelled to raised advancement issues [4, 14]. The issues would then be able to be settled utilizing well known raised advancement solvers. This undertaking utilizes EC calculations, which don't need the MWSN model to have a raised property.
- C. The properties of five EC calculations are examined and talked about. The outcomes give valuable clue to addressing MWSN or WSNs models.

An MWSN lifetime model is presented in this research. Five EC approaches are discussed in this work. The lifespan of wireless sensor networks is then investigated using five EC algorithms in this project. The ideal EC calculation is acquired under indicated boundaries dependent on the reproduction test of the framework model, allowing the MWSN's lifetime to be increased.

Sensors are used to improve communication and data processing. A sensing circuit turns the signals from the sensors into an electric signal. These factors are calculated based on the surrounding environment. The base station should be forever introduced in the organization's area to gather information from the sensor nodes. To diminish transmission costs, the most elevated energy hub fills in as a passage, gathering information from all sensor hubs and sending it to the base station.



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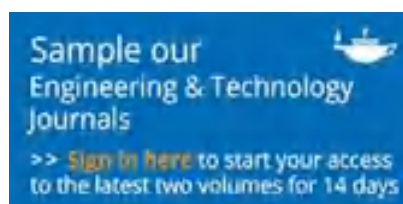
Research Articles

Nano Co-Fe-prussian blue analogue as a reusable catalyst for the thiocyanation of aromatic and heteroaromatic compounds in presence of NH_4SCN under acid free solvothermal and solvent free conditions

Vijay Shekar Pulusu, Chinna Rajanna Kamatala , Umesh Kumar Utkoor, Srinivas Pasnoori, Shanti Muppa & Anil Kumar Mardhanpally

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 Full Article

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Abstract

Co-Fe-Prussian blue analogue (Co-Fe-PBA) is developed as a reusable nano catalyst and characterized by XRD, SEM, TEM, and BET SA-PSD methods. It is used for the thiocyanation of aromatic and heteroaromatic compounds in presence of NH_4SCN under acid free solvothermal and solvent-free conditions. Observed Reaction times are dramatically reduced from solvothermal (15 to 20 hr) to sonication reactions (25

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Title FORAMATION CONSTANTS OF CHARGE TRANSFER COMPLEX OF PQ WITH CABIDOPA

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FORAMATION CONSTANTS OF CHARGE TRANSFER COMPLEX OF PQ WITH CABIDOPA

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ABSTRACT

Molecular complexes of paraquat (PQ) with a Carbidopa drug in alkaline medium, has been studied spectrophotometrically. The entire complexes exhibit one charge transfer band each in the region where neither of the components have any absorption. The stoichiometry of each complex is found to be 1:1 from Job's method. The ionization potentials of the donors (drugs) have been determined from the position of CT band of PQ – drug complex. The stability constants of the complexes have been determined from Rose-Drago method. Extinction coefficients (ϵ), oscillatory strengths (f) and transition dipole moments (D) of CT complexes have also been determined. For a given complex the extinction coefficients, the oscillatory strengths and the dipole moments are found to be almost independent of temperature. The constancy of ϵ , f and D over the temperature range studied rules out the possibility of existence of the complexes other than 1:1 stoichiometry.

KEYWORDS: Paraquate Carbidopa drugs, CT complexes.

INTRODUCTION

Paraquat (PQ) is an important biologically active molecule. It was proved to be herbicide and a weedicide either independently or mixed with other activating compounds. It is a chief component in the commercial herbicides (grammaxone) and weedol. Paraquat is a di-cation and possesses a strong electron acceptor character with an electron affinity.^[1] 1.24 eV. Although the biological activity of paraquat is known for a long time, its property of forming CT complexes, for the first time, was reported by Nakahara and Wang^[2], using inorganic anions and anionic metal complexes as donors.^[3-6] Later, the electron donor-acceptor interaction between some neutral organic donors and paraquat has been carried out by White.^[1] Subsequently paraquat attracted the attention of many researchers in the field of molecular





complexes and it has been shown to form CT complexes with a variety of electron donors.^[7-14] The CT complexes of anilines, phenyl hydrazones, crown ethers, phenolates and purinates with PQ have already been reported.^[15,16] The formation of molecular complex of PQ with thiafulvalenes was reported by Rahman et al.^[17] Continuing our studies on drugs chemistry, PQ as an acceptor has been tested for the formation of CT complexes. The successful results are reported in the present paper.

EXPERIMENTAL PROCEDURE

Paraquat dichloride was prepared by the dimerisation of pyridine to 4,4'-bipyridyl, followed by quarternization with methyl chloride and isolation as the dihydrate¹. Alternatively PQ dichloride was extracted from the commercial herbicide (grammaxone) by repeated recrystallization




Synthesis, Cytotoxicity and Molecular Docking Studies of Chalcone Incorporated 1,2,3-Triazol-1,3,5-Triazin-Quinazoline as Anti-Cancer Agents

Sujana Oggu^{a, b}, Bala Divya Mallavarapu^c, Pradeep Natarajan^d, Srimannarayana Malempati^a  , Rambabu Gundla^a  

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Abstract

Chalcone derived 1,2,3-Triazol-1,3,5-Triazin-Quinazoline acts as an anti-cancer agent. It has widespread applications in the medicinal field. We have designed and prepared a novel series of different substituted chalcone derivatives of 1,2,3-triazol-1,3,5-triazin-quinazoline (**13a-j**). Their chemical structures of chalcone derivatives were further confirmed by spectroscopic techniques (Mass, ¹H and ¹³C NMR). Further, these compounds (**13a-j**) were screened for their cytotoxic profiles against four different human cancerous cell lines such as PC3 (prostate cancer), A549 (lung cancer), MCF-7 (breast cancer), and DU-145 (prostate cancer) using MTT assay, etoposide acts as a positive control and the cytotoxicity profiles were expressed in IC₅₀ μM values. All the synthesized compounds exhibited good to moderate cytotoxicity activities. Out of all the compounds, specifically 13a compound exhibits good cytotoxicity values in four different cell lines with IC₅₀ values of 0.0071 μM, 0.0094 μM, 0.0083 μM and 0.086 μM respectively. We conclude that 13a displayed good anti-cancerous activity among all the compounds (13b-j). In order to predict the binding interactions between the active site of the tubulin complexed with colchicine as a reference ligand, molecular docking was performed between the compound 13a, into the crystal structure of the tubulin complex with PDB ID: 1SA0 using Maestro 8.5 (Schrodinger's LLC, installed in RHEL 5.0 platform. Maestro 10.1). The molecule 13a showed strong interactions due to H bonding, pi-pi interaction and hydrophobic interactions with active site amino acids. With these results, we conclusively validated the selected structural analogues can act as potential anti-cancerous agents.

Introduction

Nitrogen-based heterocyclic chemistry is an important and unique class among the applied branches of organic chemistry. Many N-heterocyclic compounds that are broadly distributed in nature, possess physiological and pharmacological properties and are constituents of many biologically important molecules, including many vitamins, nucleic acids, pharmaceuticals, antibiotics, dyes and agrochemicals, amongst many others [1]. Generally, nitrogen containing heterocycles had greater significance as therapeutic agents in medicinal chemistry. These nitrogen-containing heterocyclic molecules with distinct characteristics and applications have gained prominence in the rapidly expanding fields of organic and medicinal chemistry and the pharmaceutical industry. The N-heterocyclic skeletons feature significantly various classes of therapeutic applications and are used as the building blocks of a number of new drug candidates, due to the ability of the nitrogen atom to easily form hydrogen bonding with biological targets. A review on recent advances in nitrogen-containing molecules and their biological applications [1]. The small heterocyclic ring of the 1,2,3-triazole is present in a broad variety of compounds has both biological as well as industrial significance. An immense versatility of biological properties is possessed by 1,2,3-triazole heterocyclic systems, and many strategies are screened for the synthesis of these rings. Notably, triazole rings exhibit various medicinal applications, such as usages as anticancer, antimalarial, antiplasmodial and anti-HIV agents [2].

Chalcone contains a ketone and an aldehyde (enone) that forms the central core of chalcones, which are most important compounds in biological field. Chalcones are one of the most important precursors for heterocyclic synthesis. Chalcones are chemical compounds having a wide range of biological activity used in agriculture to control weeds and undesired pests (Chalcones are industrially used as light stabilizing agent, sweetening agent, analytical reagent in amperometry, spectrometric reagent and synthetic reagent for the synthesis of pharmacologically active heterocyclic compounds [3]. Chalcones have preventive effects against many microorganisms and inhibit the microbes through their antioxidant properties. New chalcone derivatives as potential antimicrobial and antioxidant agent. More than 75% of drugs approved by the FDA and currently available in the market are nitrogen containing heterocyclic moieties. The number of novel N-heterocyclic moieties with significant physiological properties and promising applications in medicinal chemistry is ever growing [1]. Among them, quinazoline is a well-known N-heterocyclic structural skeleton, which occupied a unique place in the synthetic and

Biofuels – An Alternative Energy: Discussion on Basic Production Methods and Applications of Biofuels

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ABSTRACT

Unlike other renewable energy sources, biomass can be converted directly into liquid fuels, called "biofuels," to help meet transportation fuel needs. The two most common types of biofuels in use today are ethanol and biodiesel, both of which represent the first generation of biofuel technology. Biodiesel is a liquid fuel produced from renewable sources, such as new and used vegetable oils and animal fats and is a cleaner-burning replacement for petroleum-based diesel fuel. Biodiesel is nontoxic and biodegradable and is produced by combining alcohol with vegetable oil, animal fat, or recycled cooking grease. Here, In this paper we discussed about some methods and applications of biofuels.

Keywords: Biofuel, biodegradable, Animal fats , Liquid fuel.

I. INTRODUCTION

Like petroleum-derived diesel, biodiesel is used to fuel compression-ignition (diesel) engines. Biodiesel can be blended with petroleum diesel in any percentage, including B100 (pure biodiesel) and, the most common blend, B20 (a blend containing 20% biodiesel and 80% petroleum diesel). Biogas is a fuel used as domestic purpose which is obtained from cowmanure, fruits and vegetable waste. It is produced by the breakdown of organic waste by bacteria without oxygen anaerobic digestion. Basic are the two types of Anaerobic digestion. Mesophilic process – 25-38° C for 14-30 days .Thermophilic process - 50- 60°C for 12-14 days which are Produced from Anaerobic digestion to Anaerobic digesters (AD).

BIOFUEL CONVERSION PROCESSES:

DECONSTRUCTION

Producing advanced biofuels (e.g., cellulosic ethanol and renewable hydrocarbon fuels) typically involves a multistep process. First, the tough rigid structure of the plant cell wall—which includes the biological molecules cellulose, hemicellulose, and lignin bound tightly together—must be broken down. This can be accomplished in one of two ways: high temperature deconstruction or low temperature deconstruction.

High-Temperature Deconstruction

High-temperature deconstruction makes use of extreme heat and pressure to break down solid biomass into liquid or gaseous intermediates. There are three primary routes used in this pathway:

- Pyrolysis
- Gasification
- Hydrothermal liquefaction.

During pyrolysis, biomass is heated rapidly at high temperatures (500°C–700°C) in an oxygen-free environment. The heat breaks down biomass into pyrolysis vapor, gas, and char. Once the char is removed, the vapors are cooled and condensed into a liquid “bio-crude” oil.



Basic studies on cyanobacteria and Micro algae: A Review

Radhika Ikkurti*, Ch. Arathi

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Abstract

Cyanobacterial lipids and profiling have become a tremendous demand due to its applicability for production of biofuels. They also act as maker for identification of isolates. Cyanobacteria possess different photosynthetic pigments like chl-a, phycobili proteins and carotenoids which have substantial commercial applications. Phycobili proteins are the major photosynthetic adjunct pigments of cyanobacteria.

Keywords: Phycobilli, Cyanobacteria, Algae.

INTRODUCTION

Chlorophyll-a is a pigment commonly found in cyanobacteria that participates directly in the light requiring reactions of photosynthesis. Chlorophyll-a has one of the functional groups bonded to the porphyrin (CH₃ group). Chlorophyll a is a large molecule that has a “head” called a porphyrin ring with a magnesium atom at its center. Chl-a is generally used as an index of phytoplankton biomass (Falkowski et al., 1998). The phycobiliproteins have been classified into several groups viz. phycoerythrin, phycocyanin and allophycocyanin. Phycocyanin and allophycocyanin are universally present in cyanobacteria, while allophycocyanin B apparently occurs in most cyanobacteria (Glazer & Bryant, 1975; Swings & De Ley J, 1977). Many reports are available on the importance of carotenoids related to prevention of health disorders (Moeller et al., 2000). They are also being used as a natural colorant and for cosmetic properties (Cohen et al., 1988). It's Collection, Isolation and Identification of Cyanobacteria has been well explained in a paper (Singh et al., 2022). Simple plants which lack root, stems and leaves; mainly aquatic thallophytes having Chl-a as primary photosynthetic pigment is considered as algae, commonly called blue-green algae. It has been evolved about 3.5 billion years ago.

It Has Chl-a, (some also have b or d), phycobili proteins, glycogen as storage products. Its Cell wall containing amino sugars and amino acids which involves in Oxygen evolving photosynthesis.

The identification of the taxa was done by observing the morphological features and comparing these features with the literature. Desikachary, 1959; Komarek and Anagnostidis, 2005 (**Figure 1**).

Features of Cyanobacteria: The Important features include filaments shape; cell dimensions; presence/absence of sheath, thickness; shape, size and position of akinetes/heterocyst, if present etc. were observed under the microscope.

Importance and Industrial Value of Cyanobacteria

Agriculture: Biocontrol agents, Novel gene pool for crop improvement, Development of sustainable agriculture and ecosystem, Biofertilizer, Plant growth promoter (**Figure 2**).

Food: *Spirulina* has been eaten for centuries by *Kanembu* people, who live along the shores of Lake Chad in northcentral Africa. It has the highest protein of any natural food (65%). It is of current world algal production, 30% is sold for animal feed applications and over 50% of *Spirulina* is used as feed supplement (**Figure 3**).

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Importance and Industrial Value of Cyanobacteria

Agriculture: Biocontrol agents, Novel gene pool for crop improvement, Development of sustainable agriculture and ecosystem, Biofertilizer, Plant growth promoter (**Figure 2**).

Food: *Spirulina* has been eaten for centuries by Kanembu people, who live along the shores of Lake Chad in northcentral Africa. It has the highest protein of any natural food (65%). It is of current world algal production, 30% is sold for animal feed applications and over 50% of *Spirulina* is used as feed supplement (**Figure 3**).

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A New Paradigm Shift in Education with National Education Policy 2020

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Abstract

The National Education Policy 2020 is the first education policy of the 21st century and aims to address the many growing developmental imperatives of our country. This Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirational goals of 21st century education, including SDG4, while building upon India's traditions and value systems. The National Education Policy lays particular emphasis on the development of the creative potential of each individual. It is based on the principle that education must develop not only cognitive capacities - both the 'foundational capacities' of literacy and numeracy and 'higher-order' cognitive capacities, such as critical thinking and problem solving – but also social, ethical, and emotional capacities and dispositions.

The new education policy must provide to all students, irrespective of their place of residence, a quality education system, with particular focus on historically marginalized, disadvantaged, and underrepresented groups. Education is a great leveler and is the best tool for achieving economic and social mobility, inclusion, and equality. Initiatives must be in place to ensure that all students from such groups, despite inherent obstacles, are provided various targeted opportunities to enter and excel in the educational system.

Key Words: education, higher-order, 21st Century, cognitive capacities, imperatives, governance

Introduction:

Education is fundamental for achieving full human potential, developing an equitable and just society, and promoting national development. Providing universal access to quality education is the key to India's continued ascent, and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation. Universal high-quality education is the best way forward for developing and maximizing our country's rich talents and resources for the good of the individual, the society, the country, and the world.

India will have the highest population of young people in the world over the next decade, and our ability to provide high-quality educational opportunities to them will determine the future of our country.

Education is fundamental to maximizing human potential, developing equal and just societies, and promoting national development. Providing universal access to quality education will ensure India's continued rise on the world stage in terms of economic growth, social justice and equity, academic progress, national integration and cultural preservation. , is the key to leadership. Quality universal

IOT IN PRECISION FARMING FOR A SUSTAINABLE FUTURE

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Abstract

Precision farming strives to improve the quality and volume of the agricultural yield with the use of modern technology. Internet of Things (IoT) can radically improve farm management with the assistance of a network of sensors, data handling systems, decision making software and remote control of farm appliances. IoT can not only help provide tailored solutions for specific farm requirements, but also allows for the optimal use of water along with the minimal use of chemicals on the crop. The natural disasters affecting the field can be predicted well in advance and the precautionary measures can be taken to protect the crop from damage. The use of IoT automates the entire process of agriculture with negligible human intervention. IoT can be applied to every phase of precision farming leading to a sustainable way of fulfilling the world's food and fabric requirements. Although the capital investment and maintenance expenses involved in precision farming are high, they can be easily recovered by the improvement in profits within a very short period of time. Government initiatives to promote precision farming will propel more farmers to adopt this technologically advanced mode of farming to obtain greater yields and improved quality produce in an environmentally sustainable manner. Key Words: Precision Agriculture, IoT, Machine Learning, Agricultural Robots, GIS.

1. Introduction

The world population is growing at a rate of 1.05% per annum which apparently necessitates the increase in food production (Dániel Fróna, János Szenderák and Mónika Harangi-Rákos 2019). Agriculture is undeniably the strongest influencer of global economy. 67% of the world's populace is involved in agriculture and it accounts for 39.4% of the GDP (Neba Khanna and Praveen Solanki 2014). The Precision Farming Market has been valued at 5147.6 million USD in 2020 and is estimated to reach 10491.45 million USD by 2026. Unfortunately, the growth driven by agriculture and improvement in economic status is hampered by natural disasters, climatic changes, pests and avian intruders. The food safety is jeopardised due to the indiscriminate use of synthetic pesticides and fertilizers, threatening the lives of the farmers, the health of the consumers and the planet at large by generating unsustainably high levels of land, water and air pollution. On an average, one third of the agricultural produce is wasted in the form of post harvest loss. Therefore, the primary challenge of agricultural scientists is to increase the quantity of agricultural produce without causing a stress on the environment and maintaining a good soil ecosystem. Addressing the loss of food in the pre-harvest, harvest and post-harvest phases is vital to enhance food and nutrition safety in an environmentally sustainable way (Patricia Müller and Markus Schmid January 2019). Precision farming aims to address each of these significant concerns with the insightful use of modern technologies. The availability, accessibility, compatibility and simplicity of use offer multiple advantages of using microcontrollers for measurement and control. Internet of Things (IoT) integrates the microcontrollers with sensors and auxiliary components. IoT converges multiple technologies, artificial intelligence, real-time analytics, sensors with embedded systems for automation of farm equipment. It offers the additional advantage of privacy

Impacts on Climate Variations on Environment and Human Health-An Overview

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Abstract

Climate change possess major challenges to human society and to Earth systems, ecosystems and thereby affecting human health. Many climate change/variability and extreme weather- associated events, such as sea level rise, hurricanes, and storm surge, as well as other weather extremes, including extreme precipitation and heat waves, have direct and indirect impacts on Environment and human health. The main view of this study is describing health impacts of the climate change through projected trends in climate-change-related health. Vulnerability to the risks associated with Climate Change may exacerbate on going socio-economic challenges.

Key Words: Climate, Ecosystems, Human health, Environment

Introduction

Climate Change mainly a result of ozone layer depletion, is affected by human activities that release greenhouse gases that trap heat within the atmosphere. These human activities include increased use of fossil fuel, land use variation and agriculture¹. An increase in greenhouse gases leads to increased warming of the atmosphere and the Earth's surface. As the concentration of these gases in the atmosphere increases that the average surface temperature will rise by 1.1°C to 6.4 °C in the 21st century, with extremes potentially occurring beyond this range^{2,3}. Climate change can affect human health and comfort through a variety of mechanisms^{4,5,6}. Factors that lead to the difference of infectious agents are complex and dynamic, ranging from deforestation, irrigation, species competition, human and animal migration patterns, drug resistance and changing vector lifecycle due to variations in temperature and rainfall. Usually, the range of the vectors or reservoirs is delineated by temperature and sometimes availability of water bodies⁷. Projected changes in climate and climate impacts will have direct and indirect impacts on human health. Warming is predicted to increase or decrease the incidence of vector-borne diseases. The enhance frequency of droughts and flooding is in turn likely to increase the frequency and extent of epidemics of water-borne diseases, as well as to influence the



CAUSES OF EMPLOYEE ABSENTEEISM IN SELECT ENTERPRISES - A study of Warangal District

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1.1. Abstract

The purpose of the present research study is to understand the main causes of employee absenteeism. It focuses on the conceptual understanding of employee absenteeism, the causes and measure of employee absenteeism. Employee Absenteeism is the major and continuous challenge which reflects high impact on performance of organization. Employee attendance at work ensures high productivity, quality delivery and commitment towards improving the performance of organization in terms of efficiency and effectiveness of human resource management. Absenteeism is unpredictable in nature and serious workplace problem that occurs at the expenses of both employers and employees. The impact of absenteeism leads to not only financial losses but also goodwill of organization. This paper attempts to identify the causes of absenteeism and measures to overcome the high rate of absenteeism.

Keywords: Employee Absenteeism, Workplace problems, Performance, Organisation.

1.2. Introduction

Employee Absenteeism is a habitual pattern of absence from a duty or obligation. Traditionally, absenteeism has been viewed as an indicator of poor individual performance, as well as a breach of an implicit contract between employee and employer; it was seen as a management problem, and framed in economic or quasi-economic terms. In recent times it understands as an indicator of psychological, medical or social adjustment to work.

High absenteeism in the workplace may be indicative of poor morale, but absences can also be caused by workplace hazards or sick building syndrome. Many employers use statistics such as the Bradford factor that do not distinguish between genuine illness and absence for inappropriate reasons.

1.3. Meaning and Definition

The following are the definitions of Employee Absenteeism.

1. Webster's Dictionary defines, "Absenteeism is the practice or habit of being absent and an absentee is one who actually stays away".
2. Absenteeism has been defined in the Encyclopedia of Social Sciences as the time lost in industrial establishments by the avoidable or unavoidable absence of employees. The time lost in strikes and lockouts or by late coming amounting to hour is usually not included.
3. The United States Department coined the most commonly used definition of the term several years ago of labour bureau of labour statistics. Absenteeism in their views "is the failure of workers to report on duty or job when they are scheduled to work". It is a term, which is applied to time lost due to sickness or accidents, prevents a workers being on the job, as well as to time spent away from the job for other unauthorized reasons.
4. In the words of K.N. Vaid, "Unauthorized absence is the core of absenteeism measurement".

SIGNATURE VERIFICATION BY GRAPH THEORY

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Abstract:

Signature verification is playing an important role in user identification. Every individual has his or her individuality in handwriting style. This reality is exercised in various applications like signature verification. In signature verification system, it takes the input from a touch screen, electronic pen, scanner and paper documents to read, elaborate, and create features of the handwritten characters. System interacts with user by user-interface. System records signature main data and derives some new data. This data is then passed to the identification module which also requires data from data template storage. Identification module compares signatory data against all templates in the database, thus finding the best match by constructing mathematical graph of data. Person is identified if best match template satisfies certain predefined rules of identification.

Graph theory and angle-based verification system is used in authentication of signatures. Undirected weighted graphs are used to explain this. In computer science this is achieved by implementing light versions of Depth-First Search or Breadth-First Search algorithms which tell if they have searched through all the graph vertices. This is the main factor for the best match scoring in the identification process. In the identification process, calculated graph features of given signature have to be compared against all signature templates in database to find the best match. At the end of identification procedure for one potential user, statistical indicators of his or her results are obtained. The best match is found in the user whose results have the biggest arithmetic mean of all the results obtained. In this paper we explain the importance of Graph theory in signature verification using different algorithms.

Key Words: Graph Theory, Statistical methods

1. INTRODUCTION

Signatures are widely used as a means of personal identification and verification. In the modern age of information technology, user authentication is an important process for information security and IoT-based systems. Signature is socially accepted & extensively used means for authentication in our daily life.

We can say that personal signature is being used every day as a mean of giving our consent for an action or a set of actions that needs to be done. Authentication and verification of signatures is an important task in the present world.

There are few key factors our signature depends on:

RESEARCH ARTICLE | SEPTEMBER 08 2022

IMRT optimization approach based on genetic and firefly algorithm for lung cancer patients

Keshav Kumar K. ; N. V. S. L. Narasimham; A. Ramakrishna Prasad

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a) Corresponding author: keshav.mphil@gmail.comb) Electronic mail: nvsl_simham@yahoo.co.inc) Electronic mail: prof.prasadark@gmail.com*AIP Conf. Proc.* 2529, 020019 (2022)<https://doi.org/10.1063/5.0110321>

This paper presents a multi-objective model for scheduling Intensity Modulated Radiotherapy Treatment (IMRT) in patients with lung cancer, based on Genetic Algorithms (GA). The suggested approach is used to minimise the fitness function defined as the mean squared error by optimizing the weight between layers and biases. When compared to existing algorithms, the suggested GA-based Firefly Algorithm (FA) technique was shown to have the lowest mean squared error of 0.0014. The GA schedules, using real data acquired at the Cancer Center in collaboration, are effective. The suggested GA-based FA is discussed and assessment results are displayed.

Topics

[Evolutionary computation](#), [Algorithms and data structure](#), [Organs](#), [Radiation therapy](#)

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Artificial Intelligence-Based Breast Cancer Detection Using WPSO

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ABSTRACT

To detect breast cancer in the early stages, microcalcifications are considered a key symptom. Several scientific investigations were performed to fight against this disease for which machine learning techniques can be extensively used. Particle swarm optimization (PSO) is recognized as one among several efficient and promising approach for diagnosing breast cancer by assisting medical experts for timely and apt treatment. This paper uses weighted particle swarm optimization (WPSO) approach for extracting textural features from the segmented mammogram image for classifying microcalcifications as normal, benign, or malignant, thereby improving the accuracy. In the breast region, tumor part is extracted using optimization methods. Here, artificial intelligence (AI) is proposed for detecting breast cancer, which reduces the manual overheads. AI framework is constructed for extracting features efficiently. This designed model detects the cancer regions in mammogram (MG) images and rapidly classifies those regions as normal or abnormal. This model uses MG images obtained from hospitals.

KEYWORDS

Artificial Intelligence Tools, Breast Cancer, Convolutional Neural Networks, Data Analytics for Disease Prevention, Data Investigation, Mammogram, Microcalcifications

INTRODUCTION

Breast cancer is the most commonly found in women which causes deaths who are aged from 20 to 59. According to the Ministry of Health and Medical Education, it has become the most common disease in recent years in Iran (Ganggayah-Taib, et al., 2019). Today, 88% of women diagnosed with breast cancer have a life expectancy of 10 years. In the United States, it has been reported that about 12% of women were identified during their lifetime, and were referred to as the second cause of women's

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RESEARCH ARTICLE | SEPTEMBER 08 2022

IMRT optimization approach based on genetic and firefly algorithm for lung cancer patients

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This paper presents a multi-objective model for scheduling Intensity Modulated Radiotherapy Treatment (IMRT) in patients with lung cancer, based on Genetic Algorithms (GA). The suggested approach is used to minimise the fitness function defined as the mean squared error by optimizing the weight between layers and biases. When compared to existing algorithms, the suggested GA-based Firefly Algorithm (FA) technique was shown to have the lowest mean squared error of 0.0014. The GA schedules, using real data acquired at the Cancer Center in collaboration, are effective. The suggested GA-based FA is discussed and assessment results are displayed.

Topics

[Evolutionary computation](#), [Algorithms and data structure](#), [Organs](#), [Radiation therapy](#)

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Evaluation of software components used in Multimedia Labs: A critical study

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Abstract

Technology has become an integral part of the language classroom. More and more language teachers are adopting different CALL materials in their classrooms. Typically teachers' would want to assess the attitudes and perceptions of students in a learning environment that involves language learning. Therefore, language teachers are interested in the viability and effectiveness of various methodologies and strategies of CALL, often to refine and improvise. CALL materials include language learning software, websites, online courses, CMC tools, etc.; there is a wide range of methodologies starting from a simple checklist to survey to complex longitudinal studies that may involve qualitative and quantitative approaches, to evaluate these materials. Well known frameworks of Hubbard (1987, 1988, 1992, 1996) and Chappelle (2001) offer a sophisticated foundation for a principled approach to evaluation in CALL. This paper tries to understand and discuss these two frameworks in detail. Further, an

attempt is also made to identify the lacunae existing in these frameworks.

Keywords: CALL (Computer aided Language Learning), Evaluation, framework, Effectiveness.

To significantly enhance receptive language skills (listening & reading), multimedia language labs have been part of the curriculum for I B. Tech students at Jawaharlal Nehru Technological University since 2006. Colleges affiliated with the university were given the flexibility to choose from the different software components available. Most of the materials used in these labs are developed by the software vendors with little or no understanding of the pedagogy of material development. No attempt has been made to examine and analyze the software used by the colleges critically. Most of the teachers' have been using simple checklists to get feedback about these materials. Hence, the

Integrating Internet into classroom teaching

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Abstract:

Technology and its various applications have become an integral part of Language learning. The usage of computers in language learning has been in existence for the past few decades. Now, with the advent of the internet, an immense variety of materials is available for the practitioners of ELT. But, at the same time this also creates a problem of abundance, the sheer volume of materials can be overwhelming. In this paper, an attempt is made to classify and define the various aspects of the internet for teachers who want to integrate the internet into their teaching. The paper discusses how to move away from traditional ways of looking at internet and move towards a creative and challenging use of the same for better learning outcome. With so many lists and links available it is really challenging to be objective about the best sources to be used in the classrooms. This paper looks at some of resources that teachers can integrate in an innovative way. Websites such Read Write Think, ELLOetc are examined for their usefulness. Through the strategies discussed in the paper, the teachers can understand how to weave the web based activities into their pre-existing curricula in order to enhance the teaching learning process.

Keywords: Internet, technology, integrates.

Introduction:

With technology becoming all pervasive, in every walk of life it has also become an integral part of everyday language use. It is now difficult to imagine language learning without the use of technology. Internet in recent days has emerged as a powerful tool of technology. With Internet there is today access to host of different materials that can be used effectively by a resourceful teacher. But the usefulness of Internet is still considered with a lot of apprehension among the ELT practitioners. If one of the problems that most teachers face when it comes to the usage of resources on the web is the sheer volume of the web, the other problem is the lack of understanding or training as to how to integrate the Internet into a language classroom. 'Integrating Internet into the classroom' a course offered by University of Oregon has helped me understand that web based materials are an excellent way of weaving internet materials into pre-existing curricula for better learning outcomes. This paper is an



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Applications of Big Data in Healthcare

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Abstract

The healthcare industry has grown quickly in recent decades, and the amount of data associated with it has exploded. The creation of better healthcare for patients is critical in this instance. The pattern of better outcomes is due to the security of the complexity of various data sources and a variety of predictions on numerous diseases. The healthcare sector has been gradually implementing emerging technologies such as machine learning and data analytics that can move this field to a framework. Because of new treatments, expanded provider roles, and changes in legislation, payment methods, and healthcare information technology, health care will become more complicated. Stakeholders in the healthcare system must grasp the importance of big data and how to use it to construct pharmaceutical practice models.

Data from electronic health records to medical imaging can be handled by a variety of data analytical approaches, according to the present research, which includes the development and deployment of a specific framework for healthcare. The use of big data as a source of evidence in healthcare is being investigated. This necessitates the study of healthcare data in order to control and lower the rising expense of healthcare, as well as the search for evidence to enhance patient outcomes.

Due to storage concerns, the healthcare industry is having a difficult time storing patient information across many databases. Preprocessing techniques can be used in the data mining process across databases to retrieve patient information. However, as data grows at an exponential rate, data mining techniques are becoming obsolete due to constraints such as storage and speed. As a result, cost optimization has become one of the most important requirements in the health business, as storing enormous numbers of patient data using traditional databases is a big burden. Here, Big Data is critical for storing large volumes of patient data using storage methods like HDFS and HBase.

Key Words: Big data, Analytics, Hadoop, Healthcare, Framework, Methodology.

Introduction

A buzzword that has grabbed the maximum attention these days is Big Data. It is probably on everyone's mind for quite some time now. The truth is that Big Data is spreading like wildfire and is on the approach of overtaking the entire globe. It has not only taken over the IT business but

has also taken over other industries. Because of the advantages it provides to a variety of businesses, it has become a vital element for them. Big Data is gradually displacing earlier technologies, which is a major source of anxiety for those currently working in the field. Data is being generated in millions of ways and it is one



Research Methodology on Operations Research, Inventory Model and Supply Chain Analytics

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ABSTRACT: *The theoretical concepts that underlie this argument can be summarized in two ways. As social science has evolved, scholars have argued over different philosophical concerns that have influenced that growth. There are two sections to the various positions: One user's truth or may not be recognized by others, as per Easterby-Smith et al. (2015); the facts given are not independent of the observer's perspective. That is why it is possible that there are several truths, as opposed to just one, when it comes to presenting the findings of this study's empirical research. Relativism claims that there is no universally accepted truth. Instead, there is a distinct truth to each perspective. According to this study, events & interactions between people are the cause of the phenomenon being studied. In order to gain a better grasp on the ramifications of this phenomena, the researchers dug deeper into the events. Relativism is therefore the ontological perspective of this thesis because each interviewee's perspective and considerations will be different from those of the other interviewees. Because it is being socially created, the authors hypothesize that the events in interest between Supply Chain Analytics and the design process of Supply Chain Networks (SCNs) have taken place. Individuals believe that they create their own social reality, which is known as constructivism, through their beliefs and perceptions of the world around them. Taking a social constructivist epistemological view of Supply Chain Analytics will help the writers acquire a greater knowledge of the social connections between the phenomena and individuals involved by types of measures versus constructed interpretations depending on the interviewees selected. A researcher's strategy is a plan and technique that includes the steps of broad assumptions of detailed procedures of data collection, analysis, and interpretation, as per Ritchie, Lewis, McNaughton Nicholls and Ormston (2014) Deduction, induction, & abduction are three of the most common research methods used in this setting. One of the main differences between inductive and deductive reasoning is that inductive reasoning is based on observations of the world while deductive reasoning is based on theories and testing them against empirical evidence in order to gain insights into the world. The latter is a good way to get a sense of how people see the world and what they think about it. Third, abduction is a third option that incorporates components from both deductive or inductive reasoning into a single strategy (Ritchie et al., 2014). Inductive approach has been recognized and selected as the best appropriate research approach for the study's goal. Since the focus of this thesis is theoretical knowledge gathering empirical evidence, employing a logical approach is quite unrealistic. It was not picked because the study's specific objective demands the collection of theory and empirical data at the same time (Ritchie et al., 2014). For a qualitative research project to be successful, it must be capable of developing new hypotheses or refining old ones, based on empirical data. As a result of the wide range of businesses and industries involved in the SCA phenomenon as well as the special purpose of this study, this study is not constrained by a setting. No or several case studies have been considered as research methodologies other than qualitative research through interviews. SCA's strategic ramifications have been examined using qualitative methodologies. There have been very few qualitative investigations on this issue, and the most of them have used quantitative approaches.*

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Impact of Polycystic Ovary Syndrome- Approach with Machine Learning Algorithms

13 Pages

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Dr.S.Vasundhara S (https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=4056768)

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Date Written: May 19, 2022

Abstract

Polycystic Syndrome is one of the major endocrine related disorder in young age women. While one in every five women in India suffers from polycystic ovary (PCOS) most of the women unaware of it.

A National wide PCOS survey shows that a notable 25 percent of the Indian female population did not know about PCOs or PCOD while 65 percent not aware of the PCOS symptoms. This paper focuses on spreading awareness by developing a model based diagnosis of PCOS. PCOs crops up when a woman's ovaries or Adrenal glands produce more male hormones than normal symptoms include irregular menstrual periods, infertility pelvic pain Excess hair growth on face, chest, stomach or thighs weight gain, and patches of thickened skin. The model is built using the necessary factors that have a major effect on prediction of PCOs in early stages. Here the machine learning algorithms trained from a dataset has 16 attributes of women among which 10 are suffering from PCOS disease.

The factors that assists that examine if a woman is patient of PCOS or not, the first one is physical test that includes blood pressure, BMI body mass index, and waist size and check for extra hair growth ,acne, and discoloured skin next is taking blood test and checking levels of Follicle stimulating hormone (FSH) luteinizing harmonies(LH) and Estrozen other tests includes Human chorionic gonadotropin (HCG) and Anti –Mullerian hormone(AMH) We also consider key life style strategies for the effective management of overweight women with PCOS.

Note:


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Declaration of Interests: None.

Keywords: Machine Learning, Metabolism; Polycystic Ovary Syndrome, Obesity; K-means algorithm, Logistic Regression, PrincipleComponent Analysis, Life Style Intervention; Pathos physiology; Diagnostic Criteria.

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32 References

1. Cluster\$withinss # Within Cluster Sum of Squares
2. Cluster\$tot.withinss # Total Within Sum of Squares



Cover Page



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OVERVIEW OF SUPPLY CHAIN ANALYTICS AND OPERATIONS RESEARCH

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Abstract: Supply chain analytics helps business professionals to make data-driven decisions at both strategic and operation levels. The main purpose of supply chain analytics is to enhance operational efficiency and effectiveness of the industries. Supply chain analytics includes network design, inventory optimization and transportation optimization. Supply chain management is the management of flows between and among supply chain stages to maximize total profitability. Linear programming is a technique used to solve supply chain analytics problems. Linear programming is about solving conditional optimization problems. Supply chain is a great place to use analytics tools to look for a competitive advantage, because of its complexity and also because of prominent role supply chain place in a company's cost structure and profitability. Data science and data analytics are at the core of every modern globalized industry. Working in today's technology-centric workforce not only requires superior leadership skills, but the ability to translate data problems into the bigger picture for the organization. Many organizations generate solutions to their problems using analytics and innovation in many companies is driven by analytics. Data science is the most important component of analytics, it consists of statistical and Operations research techniques, machine learning and deep learning algorithms. Prescriptive Analytics is the highest level of analytics capability which is used for choosing optimal actions once an organization gains insights through descriptive and predictive analytics. In many cases, prescriptive analytics is solved as a separate optimization problem. Prescriptive analytics assists users in finding the optimal solution to problem or in making the right choice/decision among several alternatives.

O.R. is a scientific method of providing executive departments with a quantitative basis for decision regarding the operations under their control. Operations Research techniques form the core of prescriptive analytics. Inventory management is one of the problems that is most frequently addressed using prescriptive analytics. Samsung implemented a set of methodologies under the title-short life and low inventory in manufacturing (SLIM) to manage all the manu- facturing and supply chain problems. Supply Chain Analytics is helping to improve operational efficiency and effectiveness by enabling data-driven decisions at strategic, operational and tactical levels. Linear programming is one of the important techniques of Programming techniques (or O.R.) in Quantitative Techniques often used these days in business and industry. Linear programming technique is used in finding a solution for optimizing a given objective such as profit maximization or cost minimization under certain constrain.

Keywords: Supply Chain Analytics, Inventory Management, (O.R.) Operations Research Techniques, Linear Programming, Prescriptive Analytics and Supply Chain Management

INTRODUCTION: The name Linear programming is because of the fact that the model in such cases consists of linear equations indicating linear relationship between the different variables of the system. Linear programming technique solves product-mix and distribution problems of business and industry. It is a technique used to allocate scarce resources in an optimum manner in problems of scheduling, product-mix and so on. Key factors under this technique include an objective function, choice among several alternatives, limits or constraints (stated in symbols) assumed to be linear and the variables. OR (Operations Research) can be considered as being the application of scientific method by inter-disciplinary teams to solve problems involving the control of organized (man-machine systems) so as to provide solutions which best serve the purposes of the organization as a whole. In OR, problems are broken down into basic components and then solved in defined steps by mathematical analysis. For example, food, weapons, etc. in the most effective way possible to different military operations. OR aims to reduce muddy business problems into well-defined mathematical constructs, while also defining expected behaviour and goals (well rooted in computer science and analytics). **Supply chain analytics** helps business professionals to make data-driven decisions at both strategic and operation levels. The main purpose of supply chain analytics is to enhance operational efficiency and effectiveness of the industries. Supply chain is a great place to use analytics tools to look for a competitive advantage, because of its complexity and also because of prominent role supply chain place in a company's cost structure and profitability. Its essence is about transforming all the gathered historical data and incoming flow of current supply chain data insights for making better planning decisions. Data analytics is the art and science of teasing meaningful information and patterns out of large quantities of data. Supply Chain Analytics aims to improve operational efficiency and effectiveness by enabling data-driven decisions at strategic, operational and tactical levels. It encompasses virtually the complete value chain: sourcing, manufacturing, distribution and logistics. Lack of synchronization between planning and execution.

Artificial Intelligence in Accounting Practices

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Abstract: *AI-Artificial Intelligence is a breakthrough in the field of computing, in present day scenario AI has already established in every industry vertical and its applications are growing at rapid pace. AI is significantly contributing to Science & Computing, from drug discoveries to Biotechnology to Cyber security. Implementation of AI has contributed to a significant improvement in efficiency across all the sectors. These developments have obliged to adopt & embrace AI in the domain of accounting for better efficiencies. The domain of accounting/audit services/tax services/wealth management deals with significant amount data to analyze & complex processes to make decisions; this can be leveraged by implementation of AI to bringing efficiencies. This paper analyzes some of the areas of AI's implementations, barriers, and framework for the future efforts of inclusion of AI in accounting domain.*

Keywords: Artificial Intelligence, Machine learning, Accounting, Finance

1. Introduction

Artificial Intelligence is programming the computer to do what human minds can do. AI – Artificial Intelligence – The human quest for innovating and creating an artificial brain that can think and take the decision was a logical next step after inventing the computing machine. Thus, the human race was started figuring to answer, “Can a machine think and make decisions as humans do?” The exponential leaps in the technology have paved ways to create a computing machine that can think wise and take decisions or help in making decisions. The term Artificial Intelligence coined by John McCarthy along with Marvin Minsky (MIT), Claude Shannon (Bell Labs) and Nathaniel Rochester (IBM) in 1956.

1.1. Difference between AI & ML

Often these two terms are used invariably. However, Machine Learning is one of the ways to attain Artificial Intelligence. Machine deals with analysis large data sets to create algorithms or identifying & exploring patterns in the data. Artificial intelligence is the process of making computers/machines to perform certain tasks in SMART way, that until recently, we thought required human intelligence. AI is making quick roads in to our day-to-day routine and we have been using such applications without knowing them as AI products; “Spam filters” in email, virtual assistants like “Alexa & Siri”, “Chatbots”, “Car parking assistants”, “Driverless cars”, music recommendations of “Spotify” and “Google music” are few examples that we often use in our daily life.

1.2. AI Adoption

The adoption of AI depends primarily on two prominent drivers. 1. Technology 2. Business needs. The adoption of AI needs to efficiently deal with large sets of Data, which is structured and unstructured including but not limiting to Videos and Images and Text. To analyses such vast amounts of data and drawing meaning patterns, system needs high computing powers and efficient Central Processing Units (CPUs) and Graphics Processing Units (GPUs). The Cloud technology is already taken industry by storm. These massive computing powers when coupled with cloud

technologies, which enables the ease of access, the industry/business communities can implement them in Real-time leading to evolution of new pathways that benefit both the industry and the end user.

2. Scope of AI in Accounting

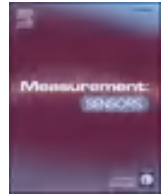
Several industry verticals, such as Aviation, Transportation, Online Services has undergone rapid changes with the introduction of new technologies, however the accounting process has not seen many path breaking changes in the way the Accounts are maintained, the double entry systems and financial statements are still seen as the only way in the way we deal with commerce and business. However, with the proven success of AI enabled services, this scenario is changing rapidly in accounting firms too. Several accounting firms in the world are quickly adopting and embracing this technology to streamline their accounting services. AI can help the accountants by automating several mundane processes, thus freeing up the time with the account managers to enable them to make more complex decisions and build client relations. Let us say a monthly revenue report is a deliverable for a client and as an accountant one must need to dig in to lot of spreadsheets, doing calculations, making tables, making graph and a presentation, highlight the data points that needs your attention. What if all these tasks are automated and a final PPT gets created by click of a button?? This is what exactly the AI intended to do, this will save more time for you as well as your client. This will free up a lot of time for accountants/finance auditors, which can be used in higher value skills such as building relations with stake holders and winning over the potential clients.

RPA (Robotic Process Automation) is the specialized technique that is used to automate repetitive tasks including document analysis and automated reports generation. The AI process can be applied and already making inroads in several areas of day-to-day accounting process such as automated bookkeeping, fraud and risk management, automated bills receivables and bills payables, mailers, automated procurement, invoice processing and reporting. There are several accounting processes that are completely getting automated and moving towards AI enabled services such as tax auditing, payroll process and online banking. As per Business Insider report implementation of AI can give



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Fault identification model using IIoT for industrial application

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ABSTRACT

To prevent substantial economic losses brought on by problems in rolling element bearings, Industrial revolution 4.0 detection methods have been revitalized by Artificial Intelligence (AI) and an Industrialized Internet of Things (IIoT). Strategies in final devices have been challenged because diagnostic systems receive a range of inputs that provide variances in the input space. Normally, a two-way cross-domain training strategy was used to solve this problem. For the final devices, the researchers provide a soft real-time defect diagnosis technology that utilizes a training strategy to adapt the domain. Deep Learning (DL) patterns develop concepts independently of the input dimension used in the survey. A comparative study was done on a dataset accessible to determine the effectiveness of the proposed methodology with an average accuracy of 88.08%. Experimental results showed in an IIoT ecosystem and our proposed system using a short-term memory system provides the most accurate bearing detecting results.

1. Introduction

Three industrial revolutions have taken place previously because of electricity, & digitalization improvements. At present, industry 4.0 is dominated by the Internet of Things (IoT) and 5G networks [1,2]. According to the McKinsey Global Institute, 5% of the more than 2000 occupational activities they examined could be completely automated, & 60% of those could be automated to some extent [3]. The IoT, 5G/B5G, & Machine Learning (ML) were designed in a symbiotic manner and also have the technology to execute mentally and physically industry tasks, increase the capacity, effectiveness, & security of manufacturing processes, reduced costs & mistakes, & enhance performance and effectiveness [4]. One way that IoT would benefit smart manufacturing would be growth in recent years through monitoring and implementation. By managing and monitoring products and machinery, IoT would improve supply chain operations in manufacturing industries. This would rapidly identify defects that could compromise the production process. IoT has been used in the coal industry to enhance the establishment, management, traceability, and accessibility of mining

operations [5]. In contrast, 5G networks would offer improved large-scale communications, ultra-reliable, low-latency interaction, and a mobile broadband communications infrastructure to enable a variety of smart manufacturing floor scenarios [6]. On factory floors, several Fieldbus & industry Ethernet types of technologies are being utilized to build islands of linked industrial machines, making it difficult for data to move between gadgets on various islands [7]. Private or local 5G networks are used shortly to remain connected to manufacturing equipment and reduce the need for cable communications technology. This would lower maintenance costs & limit people's exposure to potentially dangerous situations, enhance data flow & adjustability when trying to connect industrial machinery support smartphones such as smartphone robotics and autonomous-focused automobiles [8–10].

A key barrier to the use of ML in IIoT was the lack of labeled training data. However, many manufacturing machines contain built-in detectors for formally regular, and real-time surveillance, effective and high information from industrial areas is complicated and expensive to collect [11]. For security and efficiency reasons, IIoT would rely primarily on private deployments of automated technologies and

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DESIGN AND SPECIFICATION OF BUILDING INTEGRATED DC ELECTRICITY NETWORKS FOR LAPTOP AND MOBILE CHARGING

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ABSTRACT

The present paper deals with an outdoor environment of Laptop and Mobile Charging Station which provides a charging to the Laptop and Mobile with the help of Solar and Wind Energy & Vertical Windmill (power generators). The equipment has been developed based on the presentday scenario as the people usually run out of phone and laptop charging while travelling. At such times there is literally no way of charging your phone laptop in an outdoor environment, the solar and wind energy is used in order to collect the solar energy and convert it into the electrical energy and also the vertical windmill is used in order to observe the flow of wind and collect it. These two are intertwined together in the system, and the energy produced by both power generators is stored in a battery. This battery source is now available for use according to the inverter. The system provides 2 types of outputs. 4 USB outputs for charging for laptop and mobiles. The model is built in such a way that a common man can afford and this project model will lead a step ahead for economical utilization.

Keywords: Regulated Power Supply, DC motor, Polarity Corrector, MOSFET, Solar panel, Wind Turbine.

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