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VOICE AND GESTURE BASED HOME AUTOMATION SYSTEM

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ABSTRACT

It is now common to control home appliances and electronic gadgets through an Infrared remote control. These tasks can also be done more easily. The primary motive of proposing a new system of hand gesture control is to eliminate the need for the elderly/disabled people to use a physical remote but rather use simple gestures. Gesture means a movement of part of body. Gesture Recognition is the technology that is used to identify physical actions. It recognizes hand, arms, head or any part of the body. So the goal is to provide a human interface to the computer. The devices can be controlled not only by using gestures but also by using voice commands as well. Smart assistant such as Google assistant can be used for this purpose

Keywords: *IoT, Arduino, Flex, Google Assistant, Gesture and Voice commands.*

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ENGROSSMENT OF STREAMING DATA WITH AGGLOMERATION OF DATA IN ANT COLONY

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ABSTRACT

A data stream is an ongoing process to appear a series of data and clustering data streams essential supplementary analysis to standard clustering. A stream is possible unlimited, data points appear online and each data point can be surveyed only once. This inflicts constraints on accessible memory and processing time. Moreover, streams can be strident and the number of clusters in the data and their statistical estate can change over time. This operation presents an online approach to clustering energetic data streams. A stochastic method is employed to find these rough clusters; this is shown to crucially speeding up the data with only a minor cost to performance, as compared to a deterministic approach. The rough clusters are then filtered using a method inspired by the discover sorting behavior of ants. Ants pick-up and drop items based on the correlation with the surrounding items. Artificial ant sort clusters by probabilistically picking and dropping micro clusters based on local density and local similarity in these operations.

Keywords: *Data Stream, Local Density, Ants, Clusters and Data Points.*

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DATA MINING TECHNIQUES FOR MANURE RECOMMENDATION

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ABSTRACT

Agriculture plays a vital role in India. More than 60% people are in agriculture field. India is the second largest worldwide in farm outputs. A good deal of agriculture productivity is based on infrastructure, soil quality, micro-climates and local resources. Soil is a main resource to successful agriculture. The original source of the nutrients in the soil to grow crops. Many farmers are facing the problem to choose approximate amount of Manure depends on the soil and climate condition. This paper provides recommendation to increase the productivity by applying data mining techniques in agriculture. Manure Recommendation is based on minerals of soil parameter like Nitrogen, Phosphorus and Potassium by using K-mean clustering, The Nearest neighbor and decision tree and neural network algorithm.

Keywords: *Agriculture, Soil Fertility, Manure Recommendation, Data Mining, Clustering,Classification, Neural Network.*

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LITERATURE REVIEW ON ENHANCED SECURITY OF AADHAR BASED BIOMETRIC VOTING MACHINE

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ABSTRACT

Bangladesh is one of the countries in which introduced voting system in parliamentary and assembly polls. Electronic voting system is very popular nowadays. E- Voting system consists of electronic data which is recorder and processed in a secure manner. E-Voting system is very popular method but low security mechanisms are implementer in this method. The use of finger print in a voting system for registration and authentication application has it's limitation. Limitations are mismatches caused by disparity in finger print trait and templates of voters taken at the point of registration and authentication, aging, variations in user interaction (i.e. pressure on the scanner), environmental changes and injuries are few of the factors that can cause these disparities. The iris is more resistant tothis factors that cause disparity in biometric. A mismatch denies the voter access the voting system. In every election, the election commission is facing a lot of troubles and various types of problems throughout the election. The most familiar issue faced by the election commission is improper confirmation with respect to the arrangement of casting the votes, duplication or illegal casting of votes. In this paper, a secure and new voting system is developed to improve the existing voting system using iris recognition. Iris is one of the most secure biometric of person identification. This implemented iris recognition technology drastically reduces the chances of mismatches for genuine voters and denies imposters in the voting system due to its reliability and robustness .The main goal of this article is to avoid the duplication of casting votes.

Keywords— *Biometric, Voting system, Iris recognition*

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RENI THE AI ONE

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ABSTRACT

In the developing field of technology the role of artificial intelligence is vital today but all AI does not solve the user requirements till now. To solve this we have developed an AI Engine. ReNi: The powerful AI Engine and smart assistant which we developed. It converts all speech into actions and behaves like a human assistant. The main feature of this AI engine is it detects calls and answers like a human to other end user like Google Duplex, book tickets when you ask, power control and system control of all devices, and also has a services of Google, Facebook, Whatsapp, and YouTube.This AI Engine also have Intelligence of Hacking and Skill set that are used to get authentication access of Google, Facebook, Whatsapp, of targeting user and also provide camera access ,location access and so on many information it can provide. It's very useful for Cyber Crime Department.The Advantage of this AI Engine is it can communicate to all nearby devices and all third party applications.The main goal of this presentation is to explain how ReNi works and the reason it was constructed and how it is automating all the tasks and responding faster like other AI, what are all the key components and ideas behind. We have working prototype to explain and demonstrate the AI Engine's functionality too.

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IOT INTEGRATED FOREST FIRE DETECTION AND PREDICTION USINGNODEMCU

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ABSTRACT

Forest fires in Riau Province Indonesia is issues that regularly happen with affected the length and breadth of Indonesia. The effects forest fire and of haze on human health as reported in that particular year were about 20 million people have suffered from respiratory problems and serious deterioration in overall health in Riau community. This research proposes development of Wireless Sensor Network (WSN) for detection of forest fire in Riau province for the region that high risk forest fire in dry session, with WSN technology data be able to collect from the sensor deploy in the forest area. The deployment of sensors will be located at several locations that has badly impacted in previous case and forecast location with potential fire happen. Mathematical analysis is used in this case for modelling number of sensor required to deploy and the size of forest area represented overall of Riau Province. An early indication of forest fires is needed for quick prevention before they become uncontrollable and overwhelming. The design and development of WSN sensors give high feasibility to overcome current issues in Riau Province because of forest fire. The development of this system used WSN highly applicable for early warning and alert to representative institution for action taken.

Index Terms — WSNs, Forest Fire, Sensors, Detection

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LEAF DISEASES DETECTION AND MEDICATION

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ABSTRACT

India is fast developing country and agriculture is the back bone for the countries development in the early stages. Now a day's technology plays vital role in all the fields but till today we are using some old methodologies in agriculture. Identifying plant disease wrongly leads to huge loss of yield, time, money and quality of product. Identification of plant disease is very difficult in agriculture field. Leaf disease detection requires huge amount of work, knowledge in the plant diseases, and also require the more processing time. The objective of this research is to make use of significant features and prediction is done using computer vision technique. This method mainly download the image from the server then it converts the image into a gray-scale by calculating its pixels and it shows out only the defected parts of the leaf. This approach can significantly support an accurate detection of leaf disease. We can extend this approach by using image processing technique. It displays the output in graphical view that is X and Y coordinates. The user can also view the output in mobile application by retrieving the result from the server.

Keywords—Natural Language Processing, Gray scale image, *Maximum Likelihood Estimation,Machine Learning.*

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PREDICTION OF BREAST CANCER STAGES USING MACHINE LEARNING

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ABSTRACT

Disease is the normal issue for all individuals on the planet with various kinds. Especially, Breast Cancer is the most regular ailment as a disease type for ladies. Along these lines, any advancement for analysis and expectation of malignant growth illness is capital significant for a solid life. AI methods can cause a colossal to contribute on the cycle of early analysis and expectation of disease. In this paper, two of the most mainstream AI methods have been utilized for characterization of Wisconsin Breast Cancer (Original) dataset and the arrangement execution of these procedures have been contrasted and each other utilizing the estimations of exactness, accuracy, review and ROC Area. The best exhibition has been acquired by Support Vector Machine strategy with the most elevated exactness.

Keywords— machine learning; breast cancer; classification; early diagnosis.

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NOVEL METHOD OF REAL TIME FIRE DETECTION AND VIDEO ALERTING SYSTEM USING OPEN-CV TECHNIQUES

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ABSTRACT-

Fire detectors play a very important role. It helps in detecting fire at an early stage. Commercial fire detecting systems usually have an alarm signaling, with the help of a buzzer. In this paper, computer vision-based fire detection is used. In the proposed model a webcam is used as an alternative of surveillance camera for monitoring the interiors of buildings. The video is processed using open CV techniques using fire detection (Hue, Saturation, Value (HSV)) algorithms and if a fire is detected, a short duration of the live video is sent to the security or the higher officials followed by an alert message. Thus the number of peoples stuck in the fire blazing area can be rescued. In the existing system, MATLAB tool is used for processing. While in the proposed system, Open CV techniques are used for processing. Open CV has more functions for computer vision and its processing time is less. Using this project, fire can be detected at early stage without any false alarming strategies and peoples can be rescued thereby.

Index Terms- Open CV, Capturing the video, Fire detection, Alert to the user.

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PUBLIC KEY INTEGRITY VERIFICATION AGAINST THIRD PARTY AUDITORS

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ABSTRACT:

The sending of distributed storage administrations has critical advantages in overseeing information for clients. Be that as it may, it likewise causes numerous security concerns, and one of them is information uprightness. Open check methods can empower a client to utilize an outsider evaluator to confirm the information honesty for the benefit of the organization, while existing open confirmation plans are defenseless examiners who may not perform confirmations clearly. In this paper we propose a third- party auditor delegated for the background verification process which is done on the part of every organization. In our project a novel way of verification introduced which implements the block chain technology. By usage of block chain each and every data about the candidate which is available in the database will remains secured. We use this technology to access the related previous data about a candidate who is going to be verified by the auditor, by providing a unique identity for the each entity involved in the verification process. After the process gets over, the auditor will update the results status into the database and then the candidate will be available to the organization for further process. By the usage of this block chain technology the background details of the persons will stored in a confidential manner.

Keywords : Block chain , Unique Key

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SECURE ONLINE TRANSACTION WITH USER AUTHENTICATION

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ABSTRACT:

Online transaction process is secure with one-time password (OTP). Generating OTP has many factorsthat can make OTP unique for every time it is generated. In this paper we implement user Identificationusing Face Recognition to verify the user. In case of emergency situation, the login can be done using OTP and also the person image is captured and Mail to the Account Holder. Thus, our system has improved security compared to existing System.

Keywords: Face Recognition, Internet of Things

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SMART TICKET SYSTEM MISTREATMENT QR CODE IN MECHANICAL MAN APPLICATION

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ABSTRACT

In this paper, we have a tendency to square measure proposing QR reader for ticket. Users will scan QR reader rather than price tag. during this app, once registration profile completed, we've to connect our bank details through this app. Whenever we have a tendency to square measure happening in bus, we've to pick from and to location. Then it'll generate quantity details per head. afterward we've provided traveler details. Passenger's details mean count. Then we will scan QR code. Therefore, directly cash can transfer from our bank details. Then we will get SMS alert for price tag payment proof. Then admin (Conductor) facet, they calculate quantity details through mistreatment net application. Then they will calculate per day quantity details for ticket data. To boost the quality of bus service, an amount system which will monitor and predict the rider Flow of the running buses is helpful. Here, rider Flow denotes the quantity of on-board passengers of a bus that varies over time and house. The rider flow can partially mirror the collective human quality on a route and thus the standard of utility in term of comfort.

Keywords: *QR Code, E-Ticket, Price tag, Travelling Amount, Traveler's Detail, Payment, Application.*

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MULTI-SCRIPT-ORIENTED TEXT DETECTION AND RECOGNITION IN VIDEO/SCENE/BORN-DIGITAL IMAGES

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ABSTRACT

Scene text is one of the most common objects in nature, which frequently appears in many practical scenes and contains important information for many applications such as navigation, scene understanding, autonomous driving, etc. Using advanced neural network technology, we detect those texts from the captured image for easier image processing. In this proposed system we use to detect text by directly predicting word bounding boxes with a neural network that is end-to-end trainable. If the input images are color images means we need to convert grayscale from that color images. The binary conversion is applied to the grayscale image it means that the grayscale image turns into black and white. The filter is applied to remove the noise from the image. The Region of Interest (ROI) is applied to the filtered image. It means that it will crop the word by word automatically and chooses the maximum MSB plane. To the output of the ROI module, a deep neural network is applied. It will check the cropped image with a database image and finally, the accuracy is shown in the output.

Index Terms— ROI,OCR,CNN, CRF

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SUPERVISION OF AIR TOXINS

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ABSTRACT

Air pollution affects our day to day activities and the quality of life. The gases present in the air are highly flammable and affect the human health to a great extent. It poses a threat to the ecosystem and the quality of life on the planet. We aim at using IOT and Android software along with mobile computing to make the services real-time and faster. The level of each hazardous pollutant is monitored at periodic intervals. The Air Quality Index (AQI) for the observed pollutants is determined and awareness is created among the public through an android app which displays the level of each observed pollutant and also the air quality index in that particular location. The quality of air in an area can be understood by the public by viewing the concentration of the gases in both numerical and graphical format. Allowing the public to register themselves in an application which pushes weekly or monthly air quality report through message which reaches the user as a notification that is more comfortable in access. This prediction of air quality determines if life is feasible or not in terms of research activities.

***Index Terms*— PPM ,CO,AQI,DHT**

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SMART STRETCHER AND INTEGRATED MEDICAL INTELLIGENCE SYSTEMS FOR UNCONSCIOUS PERSON

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Abstract— India is one of the most populous countries of the world. Due to over population, ignorance of health have been remained the major problems in India. For every one minute a death swoops in because of unpredictable and unexpected accidents. To save a life is auspicious as well as precious. The idea here is to provide an intelligent smart health system using some sensors and micro controllers which are implemented in stretcher. The aim of this system is to save many human lives by preparing intensive care unit in hospital, as their physical parameters are updated to hospital before their arrival to hospital.

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WOMEN AND CHILD SAFETY SYSTEM USING RASPBERRY PI

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ABSTRACT

Children and women are facing many security problems nowadays. So in such cases they feel handicap and need help to protect them. Hence there must be a system which can protect them in such difficult situation. This paper suggests a new technology for a women safety with one touch system using GSM & GPS so that women never feel helpless while facing such social problems or challenges. Here we introduce a device which ensures the protection of women. The problems we have overcome here using RASPBERRY Pi 3 model B, RASPBERRY Pi CAMERA, GSM, GPS, PULSE SENSOR, BUZZER and PUSH BUTTON. Anytime when women or child sense danger, then they can press the button or with help of pulse sensor on the device. In such case GPS tracks the location of the women or child and RASPBERRY Pi CAMERA captures the accuse image then sends emergency message using GSM to saved contacts & police control room.

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ENHANCEMENT OF AN OBJECT DIMENSIONS ESTIMATION IN 2D IMAGES BASED ON MULTI-OBJECTIVE RECOGNITION STRATEGY

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ABSTRACT

In this paper, the multi-objective recognition algorithm has introduced to enhance the quality of object dimension measurement. It is carried out by the following constraints such as to determine the weight of an object using 2 dimensional images. It employs Haar like features and cascade classifiers to detect objects. After object detection, the proposed method employs the use of a reference object to find the Conversion Factor (CF), which is used to map the image dimensions (in pixels) to the actual dimensions. Then the true dimensions of the required object are computed. To accomplish the last task, the proposed model uses conventional 3D models like sphere, cuboid, cone, cylinder etc for objects having regular shape. For objects which do not have regular shape, like human beings, other methods are used to estimate the weight depending on the application. The proposed model employs a Haar cascade classifier to extract key patterns defining the object in an image for object recognition. To find the actual size of the object, two views of an object and a onetime calibration technique for each view has been used. Separate methods have been described in the paper for the volume and weight estimation of regular objects and irregular objects. The accuracy of the proposed method of weight calculation is approximately 94% for men's half hand dress, 97% for full hand dress, 93% for ¾ women churidar dress, and 90% for women churidar tops dress a glass of orange juice. Hence, the overall accuracy of the proposed method is 93.69%. By using a better shape recognition method where actual 3D shape of the object can be recognized, the performance of the proposed system can be improved.

keyword: *Body Mass Index, Conversion Factor, Histogram of oriented gradients and camera calibration*

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AUTOMATION OF LEVEL CROSSING SYSTEM USING ARDUINO UNO

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ABSTRACT

The objective of this project is to control the railway accident due to carelessness of manual operation. So, we design an Automatic control of railroad crossing system using Arduino UNO (Microcontroller), Ultrasonic sensor, Speaker, LED, Buzzer and Servo motor, in order to control the gate. We design the project for dual line level crossings. i.e., the train can arrive either in forward or reverse direction on any of the tracks, the sensor detects and sends the control signal to the microcontroller by which, the opening and closing operation of the gates are being controlled. The sensors are designed to monitor the activity 24/7. If any malfunction occurs, it is sensed by the feedback loop and we can fix the problem successfully. The Sensors, Speaker, LED, Buzzer are implemented on basis of the calculated range to alert the approaching of train.

Keywords— Arduino UNO, Ultrasonic sensors, Servomotors, Speaker, LED's, Buzzer, GSM Module.

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SMART HOME ENERGY METER USING INTERNET OF THINGS

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ABSTRACT

Enhancement of technology makes the human daily life easier with the help of newly developed smart systems. This paper comprise the details about A Smart Electricity Energy meter using Arduino and ESP8266 Wi-Fi module through which a SMS/E mail is forwarded to the user. The energy used can be monitored at any time and from anywhere through a mobile application (energy meter app).An IFTTT platform is used to link the Wi-Fi and to send SMS/E-mail notifications. MQTT Dashboard Android App is to monitor our Energy uses. In addition to this we can set a threshold value as the level of our daily consumption and when the value is reached, we receive an alert. This helps us in managing our monthly budget.

Index Terms— IOT ,IFTT, MQTT, ESP8266

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WATER QUALITY ANALYSER USING IOT

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ABSTRACT

In the modern world, Water pollution is one of the major causes for various types of water-borne diseases such as dengue, cholera and malaria etc., for human beings. 40% of deaths in worldwide are caused by water pollutions. So, the quality of the drinking water needs to be measured in real time while it is supplied to consumers. In this article, author offered a design and expansion of a real time water quality measuring system at reduced cost using Internet of Things (IoT). To compute the physical and chemical parameters of the water such as water flow, water leak detector used. The centralized system receives the measured values from various sensors over a period of time. Thorough the Wi-Fi system, the sensor output data is sent to the concern authority for further steps to improve the water quality. These sensor values are continuously uploaded into cloud using Wi-Fi module. The water quality test carried out in the samples collected from various parts of the Coimbatore district.

Index Terms— IOT ,IFTT, MQTT, ESP8266

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ABSTRACT

A vehicle identification and drivers authentication system as a part of smart city devolopment. It consist of a TCP/IP where centralized database of authorized vehicles is stored and also it has RFID vehicle tags, RFID tag reader and RFID tag writer. The RFID tag is placed in a vehicle. The RFID tag reader is used to get the data from the RFID tags. For programming the RFID tags, the RFID tag writer is used. By reading the serial number in the RFID tag. Vehicle identification can be easily done. Driving license system is a huge task for the government to monitor. The crime will be done by both the side (people and police). To overcome that problem by implementing one more portable fingerprint sensor module that is given to the traffic police, which is integrated in database where the person license information is stored. If the person places his finger on the sensor then the device will tell you whether they have license or not. This can be done by interlinking the vehicle details by using IoT.

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PLANT LEAF DISEASE DETECTION AND AUTOMATICFERTILIZATION USING ARDUINO CONTROLLER

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ABSTRACT:

Terrace gardening is the modern implementation in city side. City people may not aware of inflected plants. This paper is to explore the leaf disease detection. Plant diseases can be detected by image processing technique. We propose an enhanced k-mean clustering algorithm to predict the infected area of the leaves. Disease detection involves steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification. The main challenge is to detect the disease and improve the quality and quantity of the product by giving correct pesticide and its name.

***Keywords*: K-mean clustering, image acquisition, image preprocessing, image segmentation, classification**

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MAGNETIC INDUCTIONBASED WIRELESS UNDER GROUND SENSOR NETWORKS(WUSN)COMMUNICATION

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1. ABSTRACT

Wireless Underground Sensor Networks (WUSNs) constitute one of the promising application areaof the recently developed wireless sensor networking techniques. WUSN is a specialised kind of WSN that mainly focuses on the use of sensors at the subsurface region of the soil. For a long time, this region has been used to bury sensors, usually targeting irrigation and environment monitoring applications without wireless communication capability. In recent years, the communication in mining places has been suffering interferences. This project is mainly focused in providingcommunication reducingthose interferences. The proposed method provides communication through the underground soil medium. The methodology comprising of MI probes helps in transmission and reception of data (text).

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IOT BASED AUTOMATIC VEHICLE ACCIDENT DETECTION AND RESCUE SYSTEM

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ABSTRACT:

The Rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. In this project, an IoT based vehicle accident detection and rescue information system is developed in order to detect vehicle accident and send the location information of the accident place to vehicle owner, nearest hospital and police station through message service. The accident is detected through impact and ultrasonic sensors.The rise in technology has increased the rate of road accidents which causes huge loss of life. The poor emergency facilities available in our country just add to this problem. Our project is going to provide a solution to this problem. According to our project when a vehicle meets with an accident, a sensor situated on the vehicle will detect it immediately and send a message to the microcontroller. The microcontroller then sends the alert message to a police control room or rescue team which will include the location with the help of GPS. Also the alert message containing the location of accident will be send to the relatives of the victim. In case there is no casualty the driver can terminate the alert message by a switch provided in the vehicle.

***Keywords*: IoT, Impact sensors, Ultrasonic sensors, GPS module.**

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INTERFERENCE LIMITED UNDERLAY CR-NOMA NETWORKS

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***Abstract*— In this paper we consider downlink underlay cognitive radio non-orthogonal mutliple access (CR-NOMA) system. CR and NOMA are both efficient spectrum utilization techniques. The major challenge in combining both CR and NOMA is to address effect of interferences caused by both. Underlay CR-NOMA network is interference limited system due to the fact that both the primary and secondary transmits simultaneously to its corresponding users. The effect of intra-network interference and inter-user interference is analysed and new architecture is proposed for underlay CR-NOMA to combat the intra-network interference. It is shown that proposed architecture provides greater system throughput than the traditional underlay CR-NOMA network.**

***Keywords*—CR, NOMA, spectrum utilizations, interferences**

I. INTRODUCTION

Non-orthogonal Multiple Access (NOMA) has been identified as one of the promising techniques for the upcoming fifth generation (5G) mobile networks [1]. In NOMA multiple signal are superimposed the base station transmitter side and successive interference cancellation is employed at the receiver to decode its corresponding signal. Users near to the transmitter are allocated less power and cell edge users with power. The power allocation for the users are based channel quality between the transmitter and user. NOMA has been recently been incorporated into various standardizations for example, multi-user superposition transmission (MUST) in 3rd-generation partnership project long-term evolution (3GPP-LTE) and layered division multiplexing (LDM) in digital TV standard ATSC 3.0 [2]. Advantages of NOMA over orthogonal multiple access (OMA) schemes are discussed in [3,4].

Cognitive Radio (CR) has been known for more efficient use of wireless spectrum. In CR, secondary users (SUs) try to adapt their operations to access band which has been already occupied by the primary users (PUs) either in an opportunistic or collaborative manner [5,6]. Research activities so far have exploited CR technology to support other emerging applications such as CR based full-duplex, device-to-device and multiple-input multiple-output (MIMO) to further increase spectrum efficiency. Existing research om the combination of CR and NOMA [7-11] has shown the possibility to meet the 5G requirements such as massive connectivity, low latency and high throughput. Three CR architecture is present up-to-date [5].

1. Underlay: Primary and secondary transmission occur simultaneously under the condition that interference from secondary network to primary network should be lower than the controllable level.
2. Overlay: A Secondary user (SU) acts as relay to the primary network while transmitting its own signal.
3. Interweave: A SU transmits only in the absence of PU in the licensed spectrum.

CR and NOMA aims to achieve efficient spectrum utilization from different perspectives. In CR the secondary users performs operations in an opportunistic manner i.e., underlay mode or overlay mode or collaborative mode. On the other hand NOMA enables simultaneous multiple users transmission by differentiating users power levels. Thus, the combination of CR and NOMA aims to provide more intelligent spectrum utilization in a constructive way. CR NOMA provides improved spectrum efficiency, massive connectivity [9], low latency [2] and better quality of service [9]. Considering the merits of these two technologies, incorporating CR with NOMA needs to address the challenging issues in practice, because both CR

and NOMA are interference limited, and thus coexistence of inter-network interference between primary and secondary users needs to be addressed.

II. RELATED WORKS

In [12], the authors proposed CR-aided multiple-input single-output NOMA simultaneous wireless information and power transfer. They have designed robust beamforming and power splitting control ratio jointly to achieve minimum transmission power. A NOMA assisted cooperative spectrum sharing framework is proposed in [13] to exploit multiuser diversity. Here, one SU acts a relay to decode the primary signal and then superimpose it with the secondary signal for NOMA transmission. In [14], a novel NOMA-based cooperative transmission scheme for spectrum-sharing CR networks has been proposed. The primary network (PN) shares its available spectrum with the secondary networks (SN). In the exchange for its cooperation the secondary transmitter is willing to transmit the primary message as well as its messages with employing NOMA. Their proposed system model outperforms the conventional OMA based schemes.

A dynamic cooperative multicast CR-NOMA scheme is proposed in [15]. In order to improve the performance of both primary and secondary networks multicast secondary users serve as relays. The performance of proposed system is evaluated for both networks. In [16], a multiple-objective resource optimization problem was formulated for NOMA-CR networks which employs swift. The performance achieved by non-linear energy harvesting model is better than that of linear energy harvesting model. Spectrum resource optimization for NOMA-based CR networks in discussed in [17]. Here, the secondary users (SUs) have access to multiple sub-channels both in the presence and absence of primary users (PUs). The simulation results shows significant transmission performance of the proposed NOMA-based CR networks. A two-stage cooperation based CR-NOMA is proposed in [17]. One of its SU is selected as relay based on proposed relay selection criteria to relay the information to PU. In this letter [19], the performance of cooperative CR-NOMA is better than the non-cooperative CR-NOMA scheme. The author aims to exploit maximal spatial density for cooperative downlink CR-NOMA.

In [20] the author applied NOMA for large scale underlay CR networks for randomly deployed users. The performance of proposed system is evaluated for two different scenarios where the first one has fixed primary transmission power and the other has transmit power proportional to that of the secondary users.

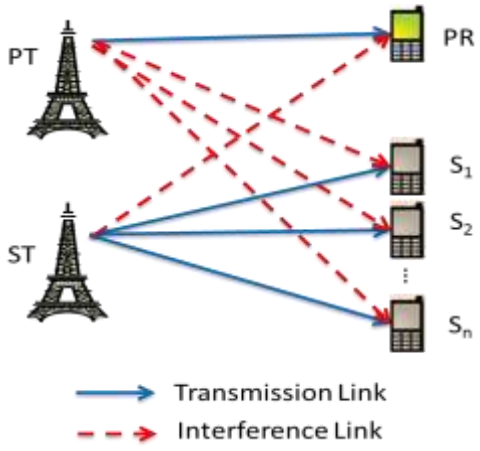

Figure 1: Traditional Underlay CR-NOMA network

The survey paper[21] discuss about different types of CR-NOMA network architecture and their key operational principles. Several challenging issues related to CR-NOMA have been outlined for the readers. A dual-hop decode-and-forward (DF) Cooperative underlay CR-NOMA networks over Nakagami channels is considered in [22] and outage performance has been studied. To optimize the energy efficiency (EE) of the generalised CR inspired NOAM scheme an efficient algorithm is proposed based on the sequential convex approximation (SCA) method is proposed in[23]. The EE of CR-NOMA is superior ot that of conventional OMA scheme.

Most of the related works have been focusing on overlay CR-NOMA and NOMA assisted CR networks. The light spread on underlay CR-NOMA is very less. This lead to our work, where we focus on interference management on Underlay CR-NOMA networks. We analyse the effect of interference between primary and secondary network when the transmitter users random beamforming.

The rest of the paper is as follows: System model in Section III, Performance analysis in Section IV, Results in Section V and with conclusion at Section VI.

III. SYSTEM MODEL

The Figure.1 depicts a downlink communication in underlay CR NOMA network with one primary transceiver (PT, PR) and secondary transmitter (ST) and n secondary receivers (S_n) where, $n \in 1,2,\ldots,N$. The secondary network (SN) employs NOMA for downlink transmission at the transmitter side and successive interference cancellation (SIC) [25] at the receiver side.

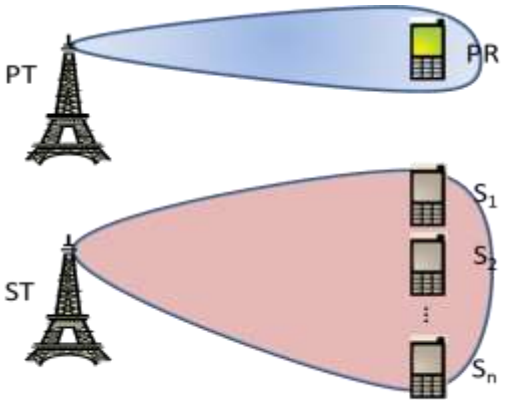

Figure 2: Proposed Underlay CR-NOMA network with random beamforming

As for the primary network, received signal at PR is given as

$$y_p = Pt_p h_p x_p + n_p + I_s \quad (1)$$

where, x_p is the message signal from PT to PR and h_p is the channel between the primary transceivers. Pt_p is the transmit power of PT and n_p is the additive white Gaussian noise (AWGN) of the PR with zero mean and unit variance $\sigma_p^2 = 1$. I_s is the interference caused by the secondary network.

The received signal at S_n is given below

$$y_n = Pt_n h_n X + n_n + I_p \quad (2)$$

where, h_s is the channel between ST and S_n. P_{tp} is the transmit power of ST and n_n is the additive white Gaussian noise (AWGN) of the S_n with zero mean and unit variance $\sigma_n^2 = 1$. I_p is the interference caused by the primary network. $X = \sum_{n=1}^{N} x_n$ is the superimposed message signal of all the users present in SN transmitted from the ST.

In order to decode the signals at SUs the channel gain order is employed. The SUs near the ST require low transmission power and have higher channel gain compared to the far SUs. Fig. 3 from [24] depicts an example of the decoding and cancellation procedure for three SU case under NOMA scheme which employs channel gain order. SIC is employed at the SUs terminal to cancel the interference from other SUs and cancellation at 3SUs under NOMA schemebased on the channel gain order $Y1 > Y2 > Y3$.

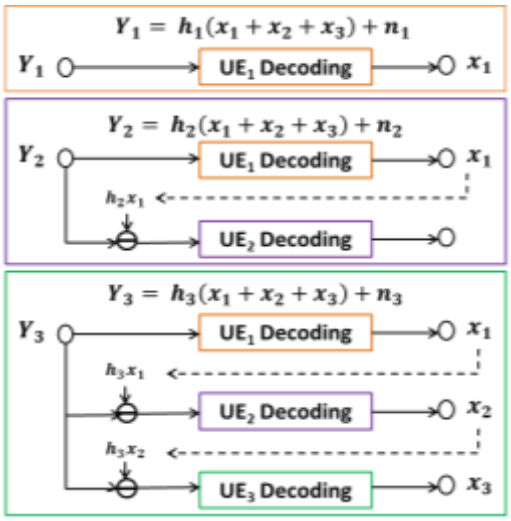

Figure 3: Illustration of symbol detection

IV. PERFORMANCE ANALYSIS

In order to achieve Shannon capacity we assume the SN users signals independently coded with Gaussian Codebook and optimal decoding is employed at the receiver side with known CSI.

A. Effect of interference from PN to SN:

After performing perfect decoding and cancellation procedure at n^{th} secondary user ($n \in 1,2,\ldots,N$) the signal-to-interference plus noise (SINR) is given as:

$$SINR_n = \left[\frac{|h_n|^2 Pt_n}{I_s + I_p + \sigma_n^2}\right], \quad (3)$$

where, $I_s = \sum_{i=n+1}^{N} |h_i|^2 Pt_i$ is the inter-user interference caused by other SN users. Pt_n is the received power of the secondary transmitter at nth SU and N is the number of users in the SN. I_P is the interference from the PN which is given by

$$I_p = |h_{p,n}|^2 Pt_p \quad (4)$$

Substituting Eqn(4) in (5) the received signal to noise ratio of the SN can be rewritten as

$$SINR_n = \left[\frac{|h_n|^2 Pt_n}{\sum_{i=n+1}^{N} |h_i|^2 Pt_i + |h_{p,n}|^2 Pt_p + \sigma_n^2}\right], \quad (5)$$

The corresponding information rate Z_n is given as:

$$Z_n = \mathbb{E}[\log_2(1 + SINR_n)]$$

$$Z_n = \mathbb{E}\left[\log_2\left(1 + \frac{|h_n|^2\delta_n}{\sum_{i=n+1}^{N}|h_i|^2\delta_i + |h_{p,n}|^2\delta_p + 1}\right)\right]$$

$$Z_n = \mathbb{E}\left[\log_2\left(1 + \frac{|h_n|^2\delta_n}{I_s + |h_{p,n}|^2\delta_p + 1}\right)\right], \quad (6)$$

where, $\delta_n = \frac{Pt_n}{\sigma^2}$ and $\sigma_n^2 = \sigma^2$ and $n \in 1,2,\ldots,N$ and $\delta_p = \frac{Pt_p}{\sigma^2}$. $I_s = \sum_{i=n+1}^{N}|h_i|^2\delta_i$.

According to symmetric channel conditions as in [26]. it is assumed that channels are symmetric and $h_n \sim CN(0, P_0 d_n^{-\eta})$, where P_0 is a normalization factor, d_n is the distance between n^{th} user and ST. η denotes the path loss exponent. we assume that $\mathbb{E}[|h_n|^2] = \mathbb{E}[|h_{p,n}|^2] = \psi$ where $\psi > 0$ and $n \in \{1,2,\ldots,N\}$.

Therefore achievable throughput of nth SU with interference from PN is given as:

$$Z_n = \mathbb{E}\left[\log_2\left(1 + \frac{\psi\delta_n}{\psi\delta_s + \psi\delta_p + 1}\right)\right] \quad (7)$$

where, $\delta_s = \sum_{i=n+1}^{N}\delta_i$

B. Effect of interference from SN to PN:

The SINR of PR is given by

$$SINR_p = \left[\frac{|h_p|^2 Pt_p}{|h_{n,p}|^2 Pt_n + \sigma_p^2}\right], \quad (8)$$

where, Pt_p is the received power of the primary transmitter at the PR. Pt_n is the secondary transmitter power received at PR. h_p and $h_{n,p}$ is the channel between PT to PR and ST to PR. According to the symmetric channel conditions we assume that $\mathbb{E}[|h_p|^2] = \mathbb{E}[|h_{n,p}|^2] = \beta$ where $\beta > 0$ and $n \in \{1,2,\ldots,N\}$.

The corresponding achievable rate of PN is as follows:

$$Z_p = \mathbb{E}\left[\log_2(1 + SINR_p)\right]$$

$$Z_p = \mathbb{E}\left[\log_2\left(1 + \frac{|h_p|^2 Pt_p}{|h_{n,p}|^2 Pt_n + \sigma_p^2}\right)\right]$$

$$Z_p = \mathbb{E}\left[\log_2\left(1 + \frac{\beta\delta_p}{\beta\delta_n + 1}\right)\right] \quad (9)$$

where, $\delta_n = Pt_n/\sigma^2$ is the SNR of ST and $\sigma_p^2 = \sigma^2$ is the noise variance.

V. RESULTS

This section presents numerical results under symmetrical channel conditions. Since NOMA is applied at SN users employs SIC to cancel out inter-user interference experienced from the same network. we assume the distance between ST and SUs $d = 4$ and the path loss η as 2 for PT to PR and 3 for ST to SUs which results in $\psi = 0.0645$ and $\beta = 0.0156$ as in [26].

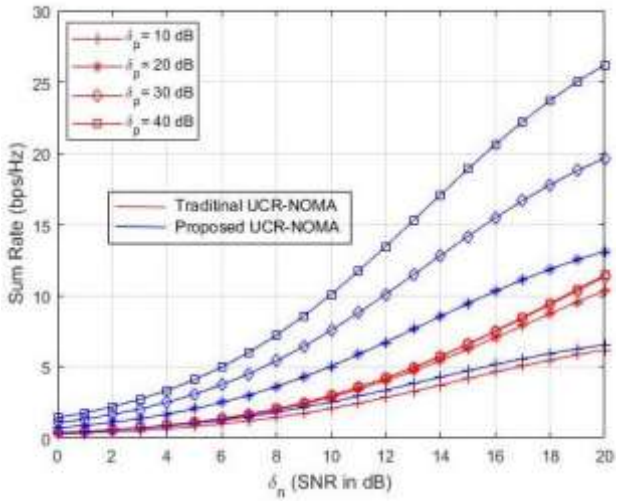

Figure 4: Effect of Interference from PN to SN for different PT power levels

The Figure 4 shows the sum rate of the SN corresponding to δ_n. Total number of users in the SN is $N = 8$ and and with one PR. the system throughput of SN is analysed for different power levels of PT such as $\delta_p = \{10,20,30,40\}$ dB.

Firstly, when $\delta_p \leq \delta_n$ the throughput achieved by the secondary networks using the proposed architecture where interference from the PN is neglected is $0.5bps\ Hz$ greater than the traditional underlay CR-NOMA network even high δ_n values. When $\delta_p = \delta_n$, the proposed method achieves good performance $3bps\ Hz$ greater than the traditional method. As the $\delta_p \geq \delta_n$ the proposed method achieves throughput twice greater than that of the traditional method which suffers from intra-network interference which degrades the secondary networks performance.

The effect of interference from SN to PN is shown in Fig.5. Here, different values of $\delta_n = \{10,20,30,40\}$dB are used and the sum rate of PN is plotted for δ_p. Similar results have been obtained in the below Figure 5.

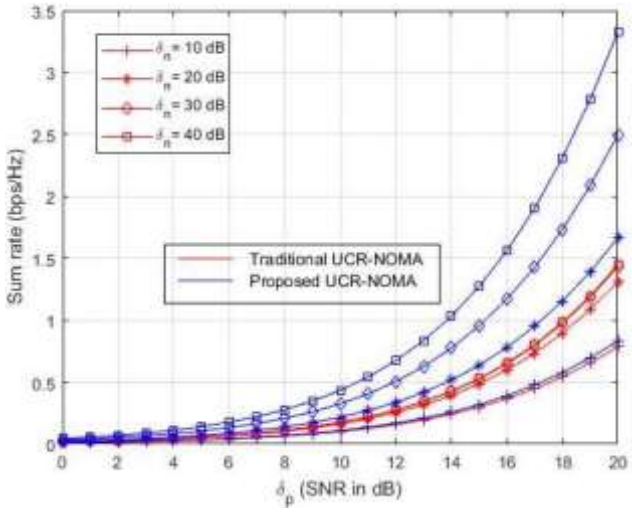

Figure 5: Effect of Interference from SN to PN for different ST power levels

Intra-network interference has significant effect on the underlay CR-NOMA network. To cancel out intra-network interference random beamforming is employed both at PT and ST to cancel out the intra-network interference from PN to SN and wise-versa. Since the proposed architecture adopts random beamforming at the ST and PT side and SIC at the SUs receiver side. The effect of interference is significantly reduced by employing random beamforming at PT and ST which can be seen from Figure 4 and Figure 5.

VI. CONCLUSION

The effect of intra-network interference and inter-user interference is analysed and new architecture is proposed to combat intra-network interference in downlink underlay CR-NOMA network. From the simulation results obtained we can conclude that by employing random beamforming at the PT and ST the effect of intra-network interference can be reduced significantly. Moreover in the traditional underlay CR-NOMA network the transmit power of ST should be lower than Pt, which may not be suited some cases. The proposed architecture has provided new track in which network performance of PN and SN may not be limited by the transmit power of both PT and ST.

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AN ISOLATED POWER FACTOR CORRECTED POWER SUPPLY UTILIZING THE TRANSFORMER LEAKAGE INDUCTANCE

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Abstract—**The widespread use of electronic devices increases the need for compact power factor corrected power supplies. The use of electronic equipment has increased in last few years. AC rectification is a very inefficient process, resulting in waveform distortion of the current which is drawn from the source. This produces a large spectrum of harmonic signals that may interfere with other equipment. In input rectifier bridge the conventional boost PFC suffers from the high conduction loss This project describes an isolated power factor corrected power supply that utilizes the leakage inductance of the isolation transformer to provide boost inductor functionality. The bulk capacitor is in the isolated part of the power supply allowing for controlled startup without dedicated surge limiting components. A control method based on switch timing and input/output voltage measurements is developed to jointly achieve voltage regulation and input power factor control. A simulation and prototype design is implemented with detailed measurements and waveforms shown to confirm the desired functionality.**

Keywords - DCM-discontinuous conduction mode, CCM - continuous conduction mode, THD - total harmonic distortion, PFC - power factor correction, PF - power factor, led - light emitted diode.

I.INTRODUCTION

One type of power factor correction (PFC) involves passive correction, where the reactive power of a system is compensated by adding a component that will use an equal but opposite amount of reactive power. For example, if a load is inductive with a reactive power of 1.754 kVAR, then the system would require a capacitive load with a reactive power of 1.754 kVAR to oppose the inductance. This type of power factor correction works well for linear loads on large scales where the cost of the power factor correction system can be absorbed by the size and cost of the overall system.

A. Active correction:

In active power factor correction, we must use an active power factor circuit that forces the AC current to track the AC voltage. One of the most common active PFC circuits is called the boost PFC converter. The boost PFC circuit cycles rapidly between two states, switch closed and switch open. During this states the inductor and capacitor charges and discharges.

B..Passive correction:

One type of power factor correction (PFC) involves passive correction, where the reactive power of a system is compensated by adding a component that will use an equal but opposite amount of reactive power. For example, if a load is inductive with a reactive power of 1.754 kVAR, then the system would require a capacitive load with a reactive power of 1.754 kVAR to oppose the inductance. This type of power factor correction works well for linear loads on large scales where the cost of the power factor correction system can be absorbed by the size and cost of the overall system.Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".

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A STUDY ON TRANSIENT PROTECTION USING MO-SURGE ARRESTERS FOR DC RAILWAY SYSTEMS

S. Joshibha Ponmalar

Assistant Professor, Department of Electrical and Electronics Engineering, PERI Institute of Technology.

Abstract: Transient protection of DC railway systems is studied in this paper, by considering the different insulation of the rails and the earthing concepts. The ratings of gapless Metal oxide(MO) surge arresters are based on the relevant EN standards and national guidelines. A recently evolved crossover voltage limiter, which joins overvoltage security and the insurance against risky touch voltages, is presented in the writing is introduced in this article.

Keywords: DC railway systems, High voltage limiter, Low voltage limiter, Transient protection, Surge Arresters

1. Introduction

Transients in electrical networks are due to effects of lightning strokes and switching actions which is unavoidable. Lightning strokes hits the tall objects hence in railways there is a possibility of direct or nearby lightning. Due to indirect lightning there is a induced voltages, and unacceptable voltages due to failures in the system. Contingent upon the protection of the rails against earth, various viewpoints must be considered for an overall security idea. A DC traction protection system against a lightning strike is given in [1]. In [2] and the use of different protection apparatus is discussed.

2. Voltages in DC railway systems

The voltages in the railway system is broadly classified as (i) system voltages and (ii) overvoltage

2.1. System voltages

The supply voltages for railways are given in the two *standards*: BS EN 50163 and IEC 60850. For railway applications traction system supply voltages is used. To study about arresters and the protection concept in general the following some definitions are necessary, that are given for the reference.
Nominal voltage Vn: the designated value for a system.
Maximum permanent voltage Vmax1: the maximum value of the voltage likely to be present indefinitely.
Maximum non-permanent voltage Vmax2: the maximum value of the voltage likely to be present for maximum of 5 min .
The values for Vmax2 can become 800V in the 600V system, and 1000V in the 750V system in case of regenerative breaking.
To design a insulation coordination and transient protection, the highest value of voltage will be taken for consideration.

2.2. Overvoltage's

The height of tower, insulators used in overhead DC power transmission system and other dimensions used in railways are more or less same as that of medium voltage (MV) distribution networks. Hence the consideration used in MV system can be taken as the reference input for designing insulation coordination and transient protection. Based on the lightning day of that location, the expected number of indirect lightning which depends on the exposure of the line, nearby objects such as trees, buildings, towers, etc protection system will be designed.
Overvoltage's due to direct and indirect lightning strikes are identified by different wave shapes. From the literature it is clear that overvoltage's due to a direct strike have an overall wave shape similar to that of the incident lightning current, the fast impulse rising portion consists of superimposed with several spikes created due to insulation breakdown. Induced overvoltage's are characterized by pulse width significantly shorter than the channel-base current of the lightning and
Their wave shape is strongly affected by the ground electrical conductivity [3].
A direct lightning striking a phase conductor infuses current waves in the two ways. The relating voltage rises to half of the current increased by the line trademark impedance, which is about 400Ω. Since over 90% of the strokes have a peak current of 10 kA, the overvoltage will surpass 2MV for 90% of the strokes. These voltages developed by direct lightning are far higher than the lightning withstand voltage of the line. Thus flashovers among stage and earth will happen.

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A SINGLE PHASE TRANSFORMERLESS INVERTER FOR PV APPLICATION

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Abstract— **Recently multilevel inverters (MLI) have attracted more attention in research and industry, as they are changing into a viable technology for several applications. The concept of MLI was introduced for high power and high/medium voltage applications as they can provide an effective interface with renewable energy sources. Developing of reduced switch MLI topology has been a rapid research topic since the past decade. MLIs can generate higher voltage levels and also reduces the passive filter requirements. Diode Clamped MLI, Flying Capacitor MLI and Cascaded H-Bridge MLI are the conventional topologies. The number of components is directly proportional to the number of levels. Therefore, the reduced switch MLI topologies were introduced to overcome this drawback.. Multicarrier pulse width modulation technique is utilized for generating the quality of output voltage level. To prove the proposed multilevel inverter topologies feasibility, many comparisons are done with multiple performance parameters. Total Harmonic Distortion is the main parameter which is calculated using theoretical asymptotic time domain formula and the values are compared with simulation and experimental results.**

Keywords— MLI- MULTILEVEL INVERTER, FCMLI - FLYING CAPACITOR MULTILEVEL INVERTER, SDCMLI- SWITCH DC SOURCE MULTILEVEL INVERTER

I. INTRODUCTION

The inspection and investigation of power electronic systems had started a century ago and has encountered more than 100 years of advancement. The utilization of power electronic system has penetrated into an ever increasing number of applications during the past decade such as large motor drives, railway traction, Unified Power Flow Controllers, Static Var Compensators, HVDC transmission and STATCOM. Nowadays, the involvement of power electronic system has gained more popularity in renewable energy applications such solar, wind, fuel cell, hydrogen, biomass and ocean or marine energy.

In power electronic system, especially inverter technology plays a vital role in renewable energy application due to continuous strong interest in energy conversion process. So, the research pertaining to the inverter technology is more interesting and attractive in both academic and industry perspectives. Many industrial/modern applications require higher voltage and higher power like tens of kilo volts and mega-watts power range as the normal operating range. Therefore, the direct utilization of single switching devices for higher power range is more difficult and challenging. So, the intension is to introduce the idea of Multilevel Inverter (MLI) [1] concept to overcome the above said drawbacks.

For high voltage and high power application, the switching devices share the voltage stress in MLIs than in conventional inverters contingent upon the quantity of voltage level adopted. In the meantime, with expanding the number of level in output voltage will decrease the harmonic distortion on it. The utilization of MLI is adopted even in medium voltage application also with the benefits of lower switching losses and lower switching stress.

II. TRANSFORMER INVERTER

Voltage-fed inverter transformers are more common than the current-fed. Let Butler Winding custom design a voltage-fed inverter for your business needs. The term inverter is associated with several different electronic applications. In logic circuits inverter may be a logic inverter, the equivalent of a "Not" gate. In analogue signal processing, an inverter can be a circuit which inverts the phase of the signal being transmitted. In power conversion applications an inverter is an electronic transformer which converts power from a Direct Current (D.C.) source into Alternating Current (A.C.) power. Power conversion inverters can be divided into two sub-categories, voltage-fed inverters and current- fed inverters. Voltage-fed inverters are more common than the current-fed inverters. The electronic transformers used in inverter circuits are often called inverter transformers. Inverters produce A.C. power by switching the polarity of the D.C. power source across the D.C. power source€ ™s load. The early inverters used mechanical switches to do the switching. Vacuum tubes replaced mechanical switches in low power applications[1]. Eventually

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Z SOURCE FED H-TYPE DIODE CLAMPED MULTILEVEL INVERTER WITH LESS NUMBER OF SWITCHES

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[1, 2]Assistant Professor, EEE Department, Peri Institute of Technology.

Abstract— **In this paper, simulation using MATLAB-SIMULINK is performed with bipolar triangular fixed amplitude multi-carrier Phase Disposition (PD) PWM strategy with sine wave and Third Harmonic Injection reference for the chosen Z Source based H-Type Diode Clamped Multilevel Inverter (ZSBH-Type DCMLI). The root mean square value of the fundamental component and THD of the output voltage which are the most important performance indices for the chosen inverter topologies are evaluated presented and compared for various references through duty ratios. From the simulation results it is observed that for both the reference the THD is almost similar but the root mean square value in terms of voltage is more for THI reference with phase disposition strategy.**

Keywords— -Source inverter, DCMLI, PWM, THD, Boost

I. INTRODUCTION

Inverter is a power electronic device which converts DC into AC. Based on the nature of the input source; inverters are mainly classified as voltage source and current source inverters. DC link of current source inverters needs large DC chokes. So it has limited dynamic performance. This is the drawback of current source inverters. Voltage source inverters do not have high dynamic performance and have dv/dt problems. The demerits of the traditional voltage source inverters are compensated by the emergence of multilevel inverters. Multilevel Inverter (MLI) is made up of multiple switches. Multilevel inverter enables the use of environmental friendly energy sources like solar cells and fuel cells.

MLIs have problems of shoot-through state and MLIs can perform buck operation only. Impedance-Source (Z-Source) networks are extensively used to provide boost ability in such MLIs. Z-Source MLIs have single-stage power conversion capability, which make use of shoot-through and non-shoot-through states of the inverter bridge to provide boosted output voltage, thus achieving high immunity to the EMI noise. However, Z-Source MLI has noticeable flaws such as high voltage stress across the capacitors and switching devices, high inrush current and small boost ability. Another major drawback of the Z-Source MLI is the discontinuous input current that may lead to low utilization and permanent damage of the dc source.

Babaei et al[1] discussed about the reduction of dc voltage sources and switches in asymmetrical multilevel converters using a novel topology. Anderson and Peng [2] developed different types of quasi-Z-Source inverters. Babaei [3] introduced a cascade multilevel converter topology with reduced number of switches. Axelrod et al [4] suggested a switched-capacitor/switched-inductor structure for getting transformer less hybrid DC-DC PWMconverters. Astudillo et al [5] proposed a new symmetrical hybrid multilevel DC-AC converter. Al-Othman and Abdelhamid [6] proposed different method to elimination of harmonics in multilevel inverters with non-equal dc sources using PSO. Abdel et al [7] suggested a switched inductor boost converter for PV applications. Abu-Rub et al [8] Quasi-Z-source inverter-based photovoltaic generation system with maximum power tracking control using ANFIS. Aida Baghbany Oskouei and Seyed Hossein Hosseini [9] introduced a novel SVC algorithm for multilevel Z-source inverter. Anh-Vu Ho et al [10] made a Analysis and control of single- phase Z-source multilevel inverter. Weihua Liang et al [11] described about state of charge balancing control for battery energy stored quasi-Z-Source cascaded multilevel inverter based photovoltaic power system. Mohamed Trabelsi et al [12] introduced a 1-MW quasi-Z source based multilevel PV energy conversion system. The above literature survey gave some idea about the proposed work on Z source inverter and multilevel inverter. Balamurugan et al [13] developed hardware implementation of cascaded hybrid multilevel inverter with reduced number of switches. Balamurugan et al [14] also developed hybrid carrier PWM strategies for three phase h-bridge multilevel inverter Balamurugan et al [15] introduced dspace based implementation of various inverted sine carrier PWM strategies for three phase five level h-bridge inverter. Vijayalakshmi and Balamurugan [16] made an investigation on Z-source based cascaded

VR Based Underwater Museum of Andaman and Nicobar Islands

T. Manju, Allen Francis, Nikil Sankar, Tharick Azzarudin, and B. Magesh

Abstract Nowadays, world is full of technology and inventions. Many computer applications are developed in the favour of mankind and to ease human work. As a top trending, technology acts a human organ. Every day wakes up using technology and doze off using a technology. In short, technology is moving along with us in our day-to-day life. So it is all about how we are going to use the technology. Speaking of technology, we can see many technologies ruling the world. Like Big Data, Internet of Things, etc., virtual reality is also one of the promising fields. The term virtual reality is used to describe a 3D virtual environment created by sensors which allows

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SOLAR PANEL ROADS FOR FOOT PATH

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ABSTRACT:

India has the second-largest road network in the world and is blessed with about 300 days of sunny weather. India does not have enough electricity to even power all its cities, towns and villages. In order to make the solar power a viable economical option, open spaces that are situated close to the high energy demand areas must be identified. Hence, it is proposed that open spaces such as the roads, parking lots, bicycle lanes, footpaths etc be utilized for this purpose. All great cities have one thing in common - clean, wide, pedestrian-friendly roads. Chennai, with an eye on the future, is planning huge investments to build roads that encourage walking. Therefore solar panel footpaths can be

[1] INTRODUCTION

The Solar Roadway is a series of structurallyengineered solar panels that are driven upon. The idea is to replace all current petroleum-based asphalt roads, parking lots, and driveways with Solar Road Panels that collect energy to be used by our homes and businesses. Solar roadways can save our country from energy crisis and climate change. The solar roadways gives answers to our deteriorating highway infrastructure, our crumbling power grid, and the climate change. As the day by day the price of petroleum products are getting huge hike and resources are very

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EXPERIMENTAL INVESTIGATION ON PARTIAL REPLACEMENT OF CEMENT WITH ALKALI ACTIVATED GLASS POWDER

G. Karthika

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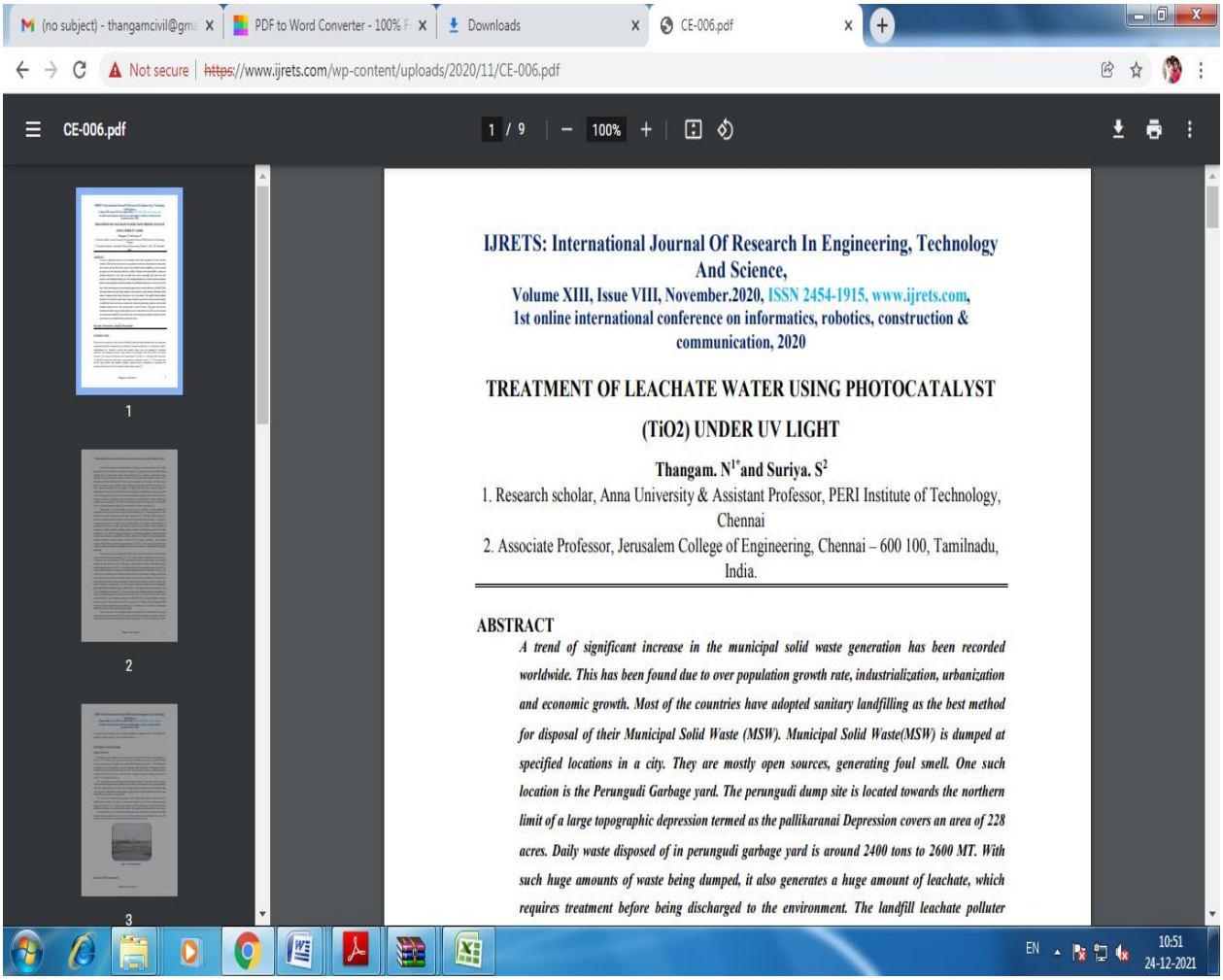
Abstract - Efforts have been made in the concrete industry to use waste glass as partial replacement of coarse or fine aggregates and cement.In this project, finely powdered waste glasses are used as a partial replacement of cement in concrete and compared it with conventional concrete. This work extensive study the possibility of using Glass powder as a partial replacement of cement for new concrete. M30 grade was used. Glass powder was partially replaced as 15%, 20% and tested for its compressive,Tensile and flexural strength up to 28 days of curing and were compared with those of conventional concrete , it is found that glass powder can be used as cement replacement material upto particle size less than 75µm.The glass powder is mixed with Naoh solution and metakolin which tends to form gel like structure producing the binding property .

Keywords: Metakolin, NaoH solution, glass powder, split

waste glass is milled down to micro size particles, it is expected to undergo pozzolanic reactions with cement hydrates, forming secondary Calcium Silicate Hydrate (C–S–H).In this research chemical properties of both clear and coloured glass were evaluated. Chemical analysis of glass and cement samples was determined using different composition between clear and coloured glasses. Since the demand in the concrete manufacturing is increasing day by day, the utilization of river sand as fine aggregate leads to exploitation of natural resources, lowering of water table, sinking of the bridge piers, etc as a common treat. Attempts have been made in using crushed glass as fine aggregate in the replacement of river sand.

The crushed glass was also used as coarse aggregate in concrete production but due to its flat and elongated nature which enhances the decrease in the workability and attributed the drop in compressive strength. Glass is non - biodegradable material hence it is not suitable for landfill



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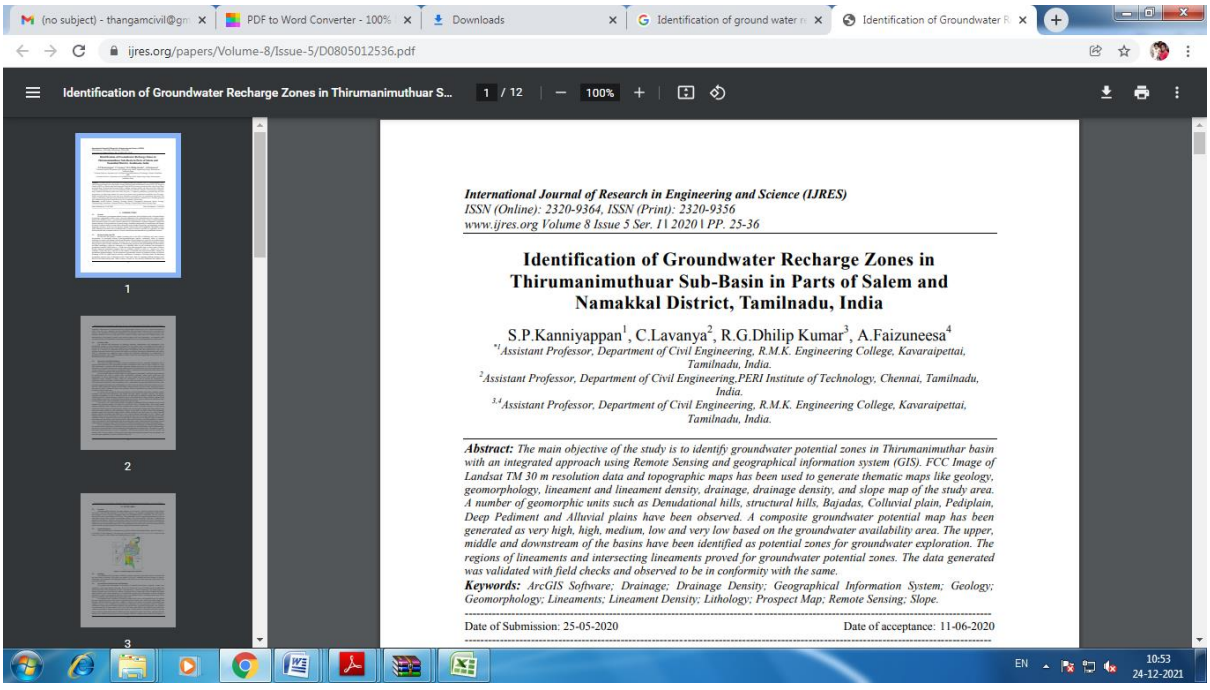
TREATMENT OF LEACHATE WATER USING PHOTOCATALYST (TiO2) UNDER UV LIGHT

Thangam. N[1]* and Suriya. S[2]
1. Research scholar, Anna University & Assistant Professor, PERI Institute of Technology, Chennai
2. Associate Professor, Jerusalem College of Engineering, Chennai – 600 100, Tamilnadu, India.

ABSTRACT

A trend of significant increase in the municipal solid waste generation has been recorded worldwide. This has been found due to over population growth rate, industrialization, urbanization and economic growth. Most of the countries have adopted sanitary landfilling as the best method for disposal of their Municipal Solid Waste (MSW). Municipal Solid Waste(MSW) is dumped at specified locations in a city. They are mostly open sources, generating foul smell. One such location is the Perungudi Garbage yard. The perungudi dump site is located towards the northern limit of a large topographic depression termed as the pallikaranai Depression covers an area of 228 acres. Daily waste disposed of in perungudi garbage yard is around 2400 tons to 2600 MT. With such huge amounts of waste being dumped, it also generates a huge amount of leachate, which requires treatment before being discharged to the environment. The landfill leachate polluter



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Identification of Groundwater Recharge Zones in Thirumanimuthuar Sub-Basin in Parts of Salem and Namakkal District, Tamilnadu, India

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[3,4]*Assistant Professor, Department of Civil Engineering, R.M.K. Engineering College, Kavaraipettai, Tamilnadu, India.*

Abstract: *The main objective of the study is to identify groundwater potential zones in Thirumanimuthar basin with an integrated approach using Remote Sensing and geographical information system (GIS). FCC Image of Landsat TM 30 m resolution data and topographic maps has been used to generate thematic maps like geology, geomorphology, lineament and lineament density, drainage, drainage density, and slope map of the study area. A number of geomorphic units such as Denudational hills, structural hills, Bajadas, Colluvial plain, Pediplain, Deep Pediment and Alluvial plains have been observed. A composite groundwater potential map has been generated as very high, high, medium, low and very low based on the groundwater availability area. The upper, middle and downstream of the basins have been identified as potential zones for groundwater exploration. The regions of lineaments and intersecting lineaments proved for groundwater potential zones. The data generated was validated with field checks and observed to be in conformity with the same.*

Keywords: *ArcGIS Software; Drainage; Drainage Density; Geographical Information System; Geology; Geomorphology; Lineaments; Lineament Density; Lithology; Prospect Map; Remote Sensing; Slope.*

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AN EXPERIMENTAL STUDY ON CONCRETE PARTIALLY REPLACEMENT OF CEMENT BY ZEOLITE

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Peri Institute of Technology, Mannivakkam, Chennai-48, India.

ABSTRACT:

The main aim of this study is the use of admixtures that can be incorporated into concrete for new added benefits in order to gain understanding into the characterization of their influence and specific behavior in linear structures. With the use of special admixtures the number of benefits of concrete during its useful life increases, both in terms mechanical properties and durability. Zeolite is a popular type of natural pozzolanic material which has been widely utilized in constructions since ancient times and zeolite is the largest group of silica minerals. It is widely used in producing blended. The use of Zeolites in mixture designs, both mortar and concrete. The present study is carried out in mix of M_{30} grade concrete with partial replacement of cement by 0%, 5%, 10%, and 15% Zeolite is carried out to determine the optimum percentage of replacement and hardened concrete properties such as compressive strength, flexure strength, split tensile strength test of the concrete on 7, 14 & 28 days is achieved. The presence of silicon dioxide in natural zeolite will expected to increase the concrete strength through reaction with the calcium hydroxide from the hydration of OPC (Ordinary Portland Cement).Test results indicate the use of combination of Zeolite in partial replacement of cement in the concrete has improved the mechanical properties

Keywords: *Zeolite, mechanical properties, M30, optimum percentage, test on concrete.*

1. INTRODUCTION

Today concrete is the most used man-made material in the world due to its competitive price and desirable properties. However cement production is estimated to produce about 5% to 7% of total greenhouse gas emission each year. This has a significant impact on the environment and construction industries. The high carbon footprint of cement production urges the industry to look for more sustainable, durable and low energy product.

Nowadays, supplementary cementing materials (SCM) have been widely used to reduce the consumption of Portland cement in order to improve the sustainability of our environment. Materials are usually added to concrete to reduce permeability, increase strength or to provide a sustainable solution where a large amount of binder required.

Natural zeolite is a crystalline hydrated alumino silicate and alkaline earth cation having an infinite, open and three dimensional structures. This low-cost natural mineral is generally easily mined

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ABSTRACT

A trend of significant increase in the municipal solid waste generation has been recorded worldwide. This has been found due to over population growth rate, industrialization, urbanization and economic growth. Most of the countries have adopted sanitary landfilling as the best method for disposal of their Municipal Solid Waste (MSW). Municipal Solid Waste(MSW) is dumped at specified locations in a city. They are mostly open sources, generating foul smell. One such location is the Perungudi Garbage yard. The perungudi dump site is located towards the northern limit of a large topographic depression termed as the pallikaranai Depression covers an area of 228 acres. Daily waste disposed of in perungudi garbage yard is around 2400 tons to 2600 MT. With such huge amounts of waste being dumped, it also generates a huge amount of leachate, which requires treatment before being discharged to the environment. The landfill leachate polluter potential is 10 to 100 times greater than sewage. Leachate is generated as water percolates through a landfill and comes into contact with the waste. Physical (particulate), chemical, and microbial pollutants transfer into the water forming what is termed 'leachate'. This paper deals with the treatment of leachate using the photocatalytic process. In this study we used TiO_2 for the treatment of leachate from landfills.The result of this study seems promising and might be applied for futher treatment process of lanfills leachate and polluted water.

Keywords: Groundwater, Landfill, Photocatalytic

INTRODUCTION

Solid wastes are garbage, refuse, trash and different discarded solid materials that were generated from human activities, particularly from residential, industrial institutions (e.g., Restaurants, banks), establishment (e.g., hospitals, schools) and typically wastes area unit managed by municipal authorities. In developing countries, large quantities of municipal solid waste (MSW) are formed because of the growing urbanization and manufacturers. In India, it's calculated that concerning 115000 MT of municipal solid waste is generated daily within the country [1, 2]. This solid waste has the high volume and numerous qualities; moreover these compounds are persistent and extremely stable because of the formation of their organic matter [3].

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THE PHOTOCATALYTIC ACTIVITY OF PD-CR2O3/CDS ALONG WITH BATCH PROCESS WITH PASSIVE MIXING

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ABSTRACT

We report on the photocatalytic hydrogen production of Pd-Cr2O3/CdS photocatalyst using an unconventional batch process with passive mixing. The catalyst has been characterized using X-ray diffraction and Scanning electron microscope to reveal a colloidal solution of CdS aggregates with particle size 3.7 µm. The feasibility studies were carried out by varying the treatability parameters and it was found that maximum hydrogen production occurs at their respective optimum values. The highest volume of hydrogen produced after optimization is 40.1 mL at 220 W/m² light intensity, 0.2M sulphide concentration, 0.2M sulphite concentration, 10 pH, 300mL photolyte volume, 0.5g catalyst dosage and 30mL/hr recycle flow rate. Close investigation revealed that this high production is due to the optimization of parameters coupled with batch process with passive mixing. The catalyst also has proved to be photo stable for up to 5 trials.

Keywords: *Photocatalyst; Hydrogen production; photocatalytic activity; batch process*

1. Introduction

Hydrogen has gained importance as a clean fuel in the energy economy recently. The idea is to obtain a renewable solution to supply this fuel in sufficient quantities and photocatalytic splitting of hydrogen sulphide waste stream have been garnering attention in this area. H_2, as an energy carrier with a high calorific value of 122 kJ g^{-1} (2.75 times greater than hydrocarbon fuels) is clean and renewable[1]. Photocatalysis was carried out using Pd-Cr_2O_3 nanocomposite cocatalyst which has been reported earlier in achieving high photocatalytic efficiencies greatly due to the doping of CdS with Pd and Cr [2]. The rate of hydrogen production depends on the type of reactor used as its main purpose is to facilitate photocatalysis using a catalyst. Batch process with passive mixing was found out to have good photocatalytic hydrogen production [3]. This method of batch process with passive mixing omits the need for a magnetic stirrer to circulate the catalyst that have settled at the bottom in conventional batch processes. There is no formation of dead zones where some amount of the catalyst settles down and remains stagnant.

2. Materials and methods

Preparation of photocatalyst

For the synthesis of the photocatalyst Palladium chloride ($PdCl_2$, 99.99% purity), Chromium nitrate ($Cr(NO_3)_3.9H_2O$, 98% purity), Sodium borohydride

VR Based Underwater Museum of Andaman and Nicobar Islands

T. Manju, Allen Francis, Nikil Sankar, Tharick Azzarudin, and B. Magesh

Abstract Nowadays, world is full of technology and inventions. Many computer applications are developed in the favour of mankind and to ease human work. As a top trending, technology acts a human organ. Every day wakes up using technology and doze off using a technology. In short, technology is moving along with us in our day-to-day life. So it is all about how we are going to use the technology. Speaking of technology, we can see many technologies ruling the world. Like Big Data, Internet of Things, etc., virtual reality is also one of the promising fields. The term virtual reality is used to describe a 3D virtual environment created by sensors which allows interaction. The environment develops an immersive feel that the person is actually in a real environment and he can manipulate objects or perform some actions [1]. Using this virtual reality technology, our aim is to develop an underwater museum to experience the feel of being under the sea.

1 Introduction

Andaman and Nicobar Islands is a place to most spectacular species of marine life in the world. Over 560 different species of corals had been recorded until date, and variety of the sights underwater can leave you spellbound. One of the few tourist attractions in India for underwater activities, the corals in Andaman Islands, makes it a must visit for everyone. Apart from being mesmerized by the beauty of the world within your world, what do you really see underwater? This project takes you through some of the marine life and corals you may see during your dive or underwater walk.

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SOLAR PANEL ROADS FOR FOOT PATH

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ABSTRACT:

India has the second-largest road network in the world and is blessed with about 300 days of sunny weather. India does not have enough electricity to even power all its cities, towns and villages. In order to make the **solar power** *a viable economical option, open spaces that are situated close to the high energy demand areas must be identified. Hence, it is proposed that open spaces such as the* **roads,** *parking lots, bicycle lanes, footpaths etc be utilized for this purpose. All great cities have one thing in common - clean, wide, pedestrian-friendly* **roads. Chennai,** *with an eye on the future, is planning huge investments to build* **roads** *that encourage* **walking.** *Therefore solar panel footpaths can be implemented in Chennai. In this context, a solarpowered foot paths that generates electricity sounds like a good idea. Solar panel footpaths are a modular system of specially engineered solar panels that can be walked upon. Solar panel tiles are made of acrylic glass protecting crystalline silicon solar cells, which can support the weight of the pedestrians. Solar panel consists of three layers, road surface layer, electronics layer and base layer. Solar panel tiles use solar panels, photovoltaic effect, LEDS and microprocessor chips with circuit boards. The renewable energy generated by solar panel footpaths will replace the current need for fossil fuel which is used for generation of electricity.*

Keywords: *solar panels, foot paths, roads, mechanical properties, tiles.*

[1] INTRODUCTION

The Solar Roadway is a series of structurallyengineered solar panels that are driven upon. The idea is to replace all current petroleum-based asphalt roads, parking lots, and driveways with Solar Road Panels that collect energy to be used by our homes and businesses. Solar roadways can save our country from energy crisis and climate change. The solar roadways gives answers to our deteriorating highway infrastructure, our crumbling power grid, and the climate change. As the day by day the price of petroleum products are getting huge hike and resources are very less there will be no longer feasible material such as asphalt for our road surfaces. The renewable energy generated by solar road panels will replace the current need for fossil fuel which is used for generation of electricity as also oil used for driving the vehicles which in turn reduces the greenhouse gases nearly to half. The implementation of Solar Roadways Technology will create the clean energy boom, spurring private investment on a massive scale, with relatively little extra cost.

Limitation of petrol, diesel and other fossil fuels in nature will create a resource crisis in near future. It's hazardous pollution and global warming is creating severe environment problem even for the survival of human. This has attracted attention all around the world and alternative resources and technologies. The concept of solar roadways is to replace the all traditional fuel

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RESEARCH ARTICLE

Simulation study on thermal performance of a Solar box Cooker using nanocomposite for natural Food invention

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Abstract

The double glass cover analysis of a solar box cooker has been implemented in an internal heat transfer using MoS_2–Fe_2O_3–Cr_2O_3 nanomaterials. A nanocomposite material's essential role is its higher surface/volume ratio which agrees in small area size of a high ductility without strength loss and an enhanced optical property. The nanocomposite materials have an average particle size of 0.2 - 0.5 μm. Compared to the overall thermal energy efficiency of the solar cookers used, the samples with and without this study's modification are 56.21–31.77% and 33.90–24.90%. The design used nanomaterials' performance with and without coating materials achieved by the bar plate temperature of about 163.74 °C and 113.34 °C below solar radiation of 1037W/m^2. The simulation model is conducted on the fuzzy intelligent logic and Cramer's rules. It agreed with the experimental results by 91%.

Keywords Double glass covers · Nanocomposites · Cooking power · Fuzzy and Cramer's rules · Thermal performance parameters

Introduction

In recent years, the development means the use of ecologically followed by friendly behavior technology. The multicomponent composite materials are using more solar energy absorption of bar plate temperature enhanced by the solar box cooker and have involved much attentions. The solar box cooker method effectively uses abundant and clean solar radiation through an extensive range of possible applications in the elimination of affluence and manufacture of energy conversion used by the solar thermal applications.

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Crystal growth, spectroscopic and antimicrobial investigations on glycine-doped $ZnSO_4$–$(NH_4)_2SO_4$ single crystal

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ABSTRACT

In this paper, investigations on Glycine doped in Zinc Sulphate, ammonium sulphate were reported for the first time. Single crystals Glycine and zinc-ammonium sulphate were grown at room temperature by slow evaporation technique. Single-crystal X-ray diffraction studies show that the grown crystal belongs to hexagonal crystal structure with a $P3_1$ space group. Inductively coupled optical emission spectrometry studies were analyzed to know the Zinc Sulphate-ammonium sulphate element presence in the grown new material. To find the title material crystalline nature Powder X-ray diffraction analysis was carried out, and using FT-IR the grown crystal functional groups was identified. Thermal behavior and melting point of the sample was found using TG/DTA-DSC analysis which indicated that the material does not decompose before melting. The emission of green light on passing the Nd: YAG laser light confirmed the second harmonic generation property of the crystals and the SHG efficiency of the crystals was found to be higher than that of KDP. The NLO test confirms the second harmonic signal generation in the sample. The UV–Vis–NIR result shows that the crystal has a sharp cut off at 210 nm and is nearly 75% transparent over a wide wavelength range enabling it for application in the UV region. To know the grown crystal surface morphology scanning electron microscopy analysis was done. The antibacterial activity was carried out for the title compound using agar diffusion method. The test compounds were screened in vitro for their antibacterial activity against three Gram-positive species (*Staphylococcus aureus*) (*E. coli, Salmonella typhi*) of bacterial strains and also against two fungal strains i.e., *Aspergillus Niger* and *Aspergillus clavatus*.

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Crystal growth, spectroscopic, optical, thermal and hirshfeld surface analysis of glycinium hydrogen fumarate glycine solvate monohydrate (GHFGSM): A third harmonic nonlinear optical organic crystal

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ABSTRACT

An efficient nonlinear optical single crystal, GHFGSM was grown by solvent evaporation method. Single crystal XRD evince that GHFGSM crystallized in monoclinic system with centric space group $P2_1/n$. The composition of different functional groups in GHFGSM was identified with FTIR spectral investigation. The UV–visible and fluorescence spectrum proved the optical and electronic properties respectively for the grown crystal. The various optical parameters such as extinction coefficient, reflectance, and linear refractive index, electrical and optical conductivity were also determined. Inter molecular interaction in the compound was studied using Hirshfeld Surface generated by crystal explorer 3.1 program. The thermal firmness of the grown crystal was decided by thermogravimetric analysis and accurate melting point was confirmed from differential scanning calorimetry. The dielectric property of the grown crystal was examined for different temperatures. The third harmonic generation in GHFGSM has been investigated using Z-scan technique employing Nd:YAG laser and thus this technique clearly suggest its suitability in emerging technologies such as optoelectronics and third order nonlinear optical applications.

1. Introduction

Much evolution has been made in the new materials with high optical nonlinearities because their practical applications in harmonic generation, amplitude and phase modulation, laser technology, switching and other signal processing devices [1,2]. Nonlinear optical (NLO) materials have attracted many researchers due to their huge range of applications in the area of photonics, lasers, electro-optic switches and frequency conversion devices [3]. The interaction between the electric field of the wave and the nonlinear optical medium giving out the output possessing three times that of the original frequency executes third harmonic generation (THG) effect. In certain cases when the THG is not acquired directly, then in such case firstly a fraction of the fundamental is converted into second harmonic and thereafter that unconverted fundamental and second harmonic generated signal are coupled to tripler to produce third harmonic signal. The third order nonlinear optical (NLO) materials have been actively employed as promising materials in photonics, communications devices, information processing, optoelectronic switching devices which forms the basis for future optical systems [4,5] and also in photodynamic therapy [6]. The NLO properties can be utilized as sensitive probes in biomedical and environmental fields [7,8]. Especially two-photon absorption is utilized in the field of medicine and photonics [9]. From the computer and telecommunication advances, inherent high nonlinearity, synthetic flexibility and scope to alter their properties

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Synthesis and characterization analysis of unique organic crystal – Urea Glutaric Acid, an optimistic candidate for optical device applications

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Linear and nonlinear optical investigation of L-arginium adipate single crystal for photonic applications

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Abstract

The L-arginium adipate (LAA) single crystal, is an organic component material efficiently grown by a simple technique called slow evaporation solution technique at ambient temperature. The monoclinic crystal system with the space group of $P2_1$ is exhibited for LAA from the X-ray diffraction analysis. FTIR spectroscopy that designates different molecular vibrations existing in LAA crystal was studied. The absorbance spectrum from the UV profile proclaims very less cut-off wavelength down to 206 nm and its wide optical band gap is also calculated. The perfection of the crystal is shown from Urbach's energy determination. The extent of polarization phenomena was examined for selected temperatures at dissimilar frequencies from the dielectric studies. The double harmonic output and triple-order nonlinear response for LAA are inspected from Kurtz-Perry and Z-scan technique, respectively.

1 Introduction

The focus on the development of new nonlinear optical crystals and its designing technology creates a good exposure in the domain of photonics and optoelectronics. Young scientific researchers explore this technique for assembling suitable materials among various applications for diverse device fabrication. The NLO third-order material with feeble nonlinear absorption and durable refraction has extensive courtesy because of their potential use in signal processing. The existence of strong nonlinear absorption enables the optical limiting property of an organic crystals [1–3]. The potentialities of different organic and inorganic materials with good nonlinear optical properties involve its application over vast image and information processing, terahertz wave generation, optoelectronic modulators etc. through engineering procedures [2, 3].

Mostly, primary amines act as strong bases among carboxylic acid groups because it can easily make bond among different organic acids. Organic materials offer more attention due to their capable application in adipic acid over higher (third) order harmonic generation based on their elevated NLO efficiency with strong optical (laser) damage threshold and show good stability over temperature dependence [4–7]. The nonlinear optical materials grown from low-temperature solution growth techniques stand as a new focus of science and development of technologies of photonics which effectively show more application in the field information domain, optical data transfer, laser, and optical power limiting [8].

Moreover, the crystal structure may be obtained due to fundamental forces through inter-molecular interactions and form the supra assembly of molecules. The hydrogen bondings are more dominant over engineering categories

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Spectral, dielectric, mechanical and optical characteristics of LPDMCl single crystal for nonlinear optical applications

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Excess Properties and Theoretical Evaluation on Ternary Systems of 1-Pentanol in n-Hexane Solution with some Organic Compounds at 313 K Using Ultrasonic Technique

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Abstract: The parameters like density(ρ), ultrasonic velocity (U), and viscosity (η) were experimentally measured. The excess parameters like adiabatic compressibility, acoustic impedance, free volume, free length, internal pressure and ultrasonic velocity in addition to K value were computed from the experimental data. The variation of these parameters at a constant temperature for the three ternary systems, namely OMP + 1-pentanol+n-hexane, N, N-DMF + 1-pentanol+n-hexane, and MMP + 1-pentanol+n-hexane, have been discussed in the light of molecular interaction. Further, certain theoretical studies are validated with respect to experimental velocities, and the Chi-square test for the goodness of fit is also applied to check the validity of such theoretical models.

Keywords: Charge-transfer complex, stability constant, excess acoustic impedance, Chi-square, molecular interactions.

1. INTRODUCTION

Ultrasonic studies play a vital role in various fields such as medicinal, biological, food industries, pharmaceuticals, Non-destructive testing (NDT) and molecular liquids, etc. Through the ultrasonic studies of liquid mixtures, which are of micro-level concentrations, the strength or nature of the molecular interactions can be detected and assessed [1, 2]. The ultrasonic velocity is temperature dependant for most of the liquid mixture with respect to their acoustical properties. The present investigation is undertaken for three ternary systems consisting of OMP (o (2)-methoxy phenol) /N, N-DMF (N, N dimethylformamide) /MMP (m (3)-methoxy phenol) + 1-pentanol in n-hexane medium at constant temperature 313 K. The organic compounds which are considered for the present study such as OMP, N, N-DMF, and MMP are used in a wide variety of reactions including electrophilic substitution, nucleophilic substitution, oxidation and reduction [3]. n-hexane may not be able to deprotonate under normal temperature, but at high temperature, its behaviour is changed, and hence it is used in various fields like separation technique, preparation of organolithium, etc. For the preparation of many organic compounds, the role of alcohol is considered as important. There are many differences between the branched and unbranched organic compounds, particularly alcohols, and in the present case, unbranched C-5 is considered [4]. The present study is undertaken with OMP /N, N-DMF/ MMP as a donor, and 1-pentanol as an acceptor in n-hexane as the solvent. The present study doesn't consider the para substituent (para methoxy phenol) since it is deliquescent in nature, and also, the instrument which is used in the present investigation is specially made for liquids alone. Besides, the following characters of the organic compounds which are under study prompted the author to probe the present study.

The radical scavenging activity and cytotoxicity of 2-methoxy phenols(OMP) and related compounds and their effect on lipopolysaccharide (LPS) gives rise to possess the antioxidant property. 2-Methoxy phenols are antioxidants widely used in the cosmetic and food industries. Dimers were synthesized, and their radical-scavenging and biological activities were compared with those of the original or other phenols. Computational chemistry is one of the most rapidly expanding and exciting areas of scientific endeavour in the medical, dental, and material sciences [5-21]. The information available from computational methods may help interpret the molecular mechanism of interactions of 2- methoxy phenol antioxidants. N, N-DMF is used in the synthesis of many organic compounds like 2 nitroso 5 methoxy phenol, which is used in the medicinal field, and the same N, N-DMF is also used as food additives and colourants. It is understood that the role of N, N-DMF as in pharmacology and in biochemical reactions which itself a predicted metabolite found in the human body; MMP is used as a food additive, and flavouring agent including cosmetics, perfumes, lotion, shampoos, toothpaste, etc. and these characters of organic compounds (OMP, N, N-DMF, and MMP) stimulated the author to undertake the present study [22, 23].

Therefore, the authors have taken the present study to provide useful information regarding the molecular

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EFFICIENT NETWORK THREAT DETECTION AND CLASSIFICATION METHOD USING SVM+NB ALGORITHM ON CLOUD COMPUTING

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ABSTRACT

In this work, NSL-KDD dataset is considered for processing the session flow and to analyse threat which is related to files in the cloud. Also, feature extraction is performed based on two essential features like high level features and low level features which are considered for classification purpose. Here, three effectual classifiers like efficient Naive Bayes (NB) classifier, Improved Support Vector Machine (ISVM) and Artificial Neural Networks (ANN) are utilized over the features extracted from the dataset for intrusion detection. Empirical outcomes depict that the selected features will offer better outcome to design the threat detection system which will be more efficient for cloud based network security. Results acquired from this methods show better trade off in comparison with existing systems like decision tree, random forest and so on. Performance metrics like as precision with 100%, accuracy with 99.5%, specificity with 100%, Recall with 100% and F measure with 100% has been evaluated with this machine learning algorithms.

Key words: Cloud storage, Machine Learning algorithms, SVM, NB classifier, Artificial Neural Network

1. INTRODUCTION

With the emergent growth in internet technology, various strategies for hacking information have also been raised. Even though there are numerous deals for protecting methodologies such as encryption and other protecting schemes [1]. However, there are certain types of intrusion that is to be detected.
As well, there is a bigger concerns related to cloud users and enormous hurdles to transfer their inhouse business towards public cloud security. The problem might be that cloud vendors have not offer data security whilst being transported towards cloud environment. Furthermore, remote access comes under the influence of clients" responsibility and users" needs to possess stronger security knowledge associated to internet and networking, before acquiring access to cloud [2]. Anything that is connected with internet is not secured perfectly. Consequently, numerous data breaches occur.
Information stealing is the foremost concern when dealing with cloud computing, based on the Breach level Index website, there is roughly 39891145672 records were stolen in 2013. In 2016, roughly of 554 million records were lost, by reaching highest peak in October (approximately 472 million stolen data). Even technology giants like Microsoft was not left out, with 8 recorded data breaches in the year 2013-2016.
Intrusion Detection (ID) methodologies utilize two ideas: Anomaly Detection and Misuse Detection [3]. The former recognizes pattern sourced attacks departed from normal characteristics whilst the latter recognizes pattern sourced attacks that is inhibited from acknowledge intrusions. Accuracy is essential

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MECHANICAL TESTING OF POLYVINYLE CHLORID WITH LOTUS STEM FIBERS

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ABSTRACT

In this polypropylene lotus stem composites were developed and studied for wear behavior at two different applied loads and acacia concentrations. Wear tests were conducted using taber abraser or taber abrader apparatus. The composite discs were tested against E100-125 steel disc. The wear test is experimentally investigated for speeds of 500 and 1000 rpm. The specific wear rate of polypropylene reduced on addition of acacia powder.

Key words: Polypropylene, Lotus stem Wear test, Taber abraser.

1. INTRODUCTION

The kinds of composite material used in production technology and their use areas are continually increasing. On account of their good combinations of properties, fiber-reinforced-polymer composites are used particularly in the automotive and aircraft industries and the manufacture of spaceships and sea vehicles [1–3]. There are the two main characteristics which make these materials attractive compared to conventional metallic designs. They are of relatively low density and they can be tailored to have stacking sequences to provide high strength and stiffness in directions of high loading [4].The environment friendly, natural-fiber reinforced polymer composites are being preferred over the synthetic fiber reinforced composites due to their inherent bio-degradability, low density, a range of mechanical properties, less abrasiveness ,etc.[5-11].The application of nanoparticles with polymers for novel composites is a rapidly developing field of study and has become one of the most promising means of dramatically enhancing the physical properties of plastics [12].

Amongst the natural fibers, acacia is one of the most popular fiber used in several applications those varying from common fabrics to composites.

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Polypropylene (PP) was the thermoplastic used in this work, being a semi-crystalline polymer with various industrial applications [13], but it is also a commodity polymer by the low cost, low level of mechanical resistance, processing facility and larger production [14]. This polymer remains unaffected when it comes in contact with chemicals such as alkaline substances, acids, de-greasing agents, electrolytic attacks, etc. However, its resistance towards aromatic or aliphatic hydrocarbons, chlorinated solvents and ultraviolet radiation is not very strong. Its tensile strength is quite high. It shows strong resistance towards stress and cracking. Polypropylene is crystalline in nature and possesses a regular geometrical shape. Polypropylene does not get damaged by water exposure because its moisture absorption is very low.

Many studies of the wear mechanism of acacia-polypropylene composites have been carried out [15–19]. In the past, this material was used for the manufacture of statically loaded parts but nowadays, after some improvement on material, it is used for the manufacturing of components that

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ANALYSIS OF DRILLS USED IN BONE SURGERY

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ABSTRACT

The aim of this research is to find the life of the drill material used in bone surgery. In ancient days the doctors used to fix the bone fracture with the help of bamboo sticks, and a raw medicine from the forest due to the change of time, there are mechanical devices taking part in the human body as external bodies to the implementation also. In this work, three different materials are taken for testing and stress analysis of both static and dynamic for all the materials will be done to get the stress values for the life prediction inputs. Also, the optimization will be done to find out the best material. For evaluating the data obtained, wear analysis of different materials will be done and the life period will be compared with the fatigue life of the materials.

1. INTRODUCTION

Drill bit include very wide range of geometrically and functionally an operational surgical drill bit is the special group of medical instrument. Furthermore, because of a work in chemically active environment (body fluids, drugs) it is necessary to sterilize them after each use. The mentioned working conditions of the surgical instrument determine the selection of drill bit material which are Tungsten – Carbide, Titanium, Cobalt – Chromium and Titanium – chromium – vanadium.

1.1 Purpose

The aim of the work is determination of life period of a surgical drill – bone system in simulated conditions of drilling in a bone.

1.2 Design/methodology/approach

Drill is loaded with forces in the range F= 100200 N and torque T = 0.04 Nm. Calculations were carried out for two kinds of metallic material of the drill. The dynamic load and Static load were considered in selection of drill bit materials.

1.3 Findings from the literature

The effect of numerical analysis determinate of strains and stresses in working part of the drill. Results of analysis indicate diverse values of strains and stresses distribution in working part of the drill depending on its

geometry. The maximum values of strains and stresses were obtained for the drill of point angle $2\kappa 1=120$ deg. For evaluating this wear analysis of different materials will be done and the life period will be compared with the fatigue life of the materials.

1.4 Research limitations/implications

In order to simulate phenomena in real system, a simplified model of surgical drill – femur system will be modelled for analysis. The simplifications concerned mostly geometry of a femur. The femur is represented by

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ANALYSIS OF POLYPROPYELEN ACACIA FIBERS

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ABSTRACT

In this polypropylene acacia composites were developed and studied for wear behavior at different applied loads and acacia concentrations. Wear tests were conducted using taber abraser or taber abrader apparatus. The composite discs were tested against E100-125 steel disc. The specific wear rate of polypropylene reduced on addition of acacia powder. The coefficient of friction of polyester resin increased on cotton reinforcement and reduced significantly on addition of graphite in cotton–polyester composite. The temperature of contact surface reduced on addition of acacia in polypropylene composite.

1.INTRODUCTION

The kinds of composite material used in production technology and their use areas are continually increasing. On account of their good combinations of properties, fiber-reinforced-polymer composites are used particularly in the automotive and aircraft industries and the manufacture of spaceships and sea vehicles [1–3]. There are the two main characteristics which make these materials attractive compared to conventional metallic designs. They are of relatively low density and they can be tailored to have stacking sequences to provide high strength and stiffness in directions of high loading [4]. The environment friendly, natural-fibre reinforced polymer composites are being preferred over the synthetic fibre reinforced composites due to their inherent bio-degradability, low density, a range of mechanical properties, less abrasiveness, etc.[2–8]. The application of nanoparticles with polymers for novel composites is a rapidly developing field of study and has become one of the most promising means of dramatically enhancing the physical properties of plastics[9].

Amongst the natural fibres, acacia is one of the most popular fibre used in several applications those varying from common fabrics to composites.

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Polypropylene (PP) was the thermoplastic used in this work, being a semi-crystalline polymer with various industrial applications [10], but it is also a commodity polymer by the low cost, low level of mechanical resistance, processing facility and larger production [11]. This polymer remains unaffected when it comes in contact with chemicals such as alkaline substances, acids, de-greasing agents, electrolytic attacks, etc. However, its resistance towards aromatic or aliphatic hydrocarbons, chlorinated solvents and ultraviolet radiation is not very strong. Its tensile strength is quite high. It shows strong resistance towards stress and cracking. Polypropylene is crystalline in nature and possesses a regular geometrical shape. Polypropylene does not get damaged by water exposure because its moisture absorption is very low.

Many studies of the wear mechanism of acacia-polypropylene composites have been carried out [3, 11–14]. In the past, this material was used for the manufacture of statically loaded parts but nowadays, after some improvement on material, it is used for the manufacturing of components that sustain dynamic effects [2]. In the production industry, non-metal composite materials have begun to be used instead of steel and other metals. For this reason, the wear resistance of this material according to mechanical effects must be known [3]. In industry, particularly materials working in places under wear effects, are desired to resist wear. The wear resistance of materials was determined by the result of laboratory experiments. In this study, the wear behaviours of a acacia polypropylene composite and plain polypropylene were experimentally investigated under various loads and speeds.

2. EXPERIMENTAL:

2.1. *Materials and specimens:*

In this study, a acacia powder and polypropylene (MAPP110) were chosen as test

FINITE ELEMENT ANALYSIS OF COMPRESSION SCREW USED FOR SMALL BONE TREATMENT

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Abstract

There is a huge requirement in the material technology in the biomedical engineering domain. Many people are working in this domain for the past decade and few researchers from India also working on this domain. In this research work, for the small bone treatment in orthopaedic surgery, an "I" section has been selected for the analysis of compression screws. The analysis will be carried out on the metatarsal bone „I" - compression screws system. The influence of the loads and displacements on the bone - screws system on the numerical analyses. In order to carry out calculations, models of diverse mechanical properties of screw - Ti-6Al-4V alloy - model , stainless steel (Cr-Ni-Mo) - model 2 and two load steps will be selected.

The limitations were connected with simplification of numerical model of as well as with the selected boundary conditions. Two difference way of loads metatarsal bone „I" - compression screws. The obtained results can be useful in clinical practice. They can be applied in selection of stabilization methods or rehabilitation as well as in describing the biomechanical conditions connected with type of bone fracture obtained from medical imaging Stress-strain-displacement characteristics of metatarsal bone „I" - compression screws system, obtained from the numerical analysis were present in this project work.

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DESIGN, ANALYSIS AND RAPIDPROTOTYPE OF HIP SIMULATOR

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Keywords: Fatigue, hip prosthesis, acetabular cup, Finite element analysis, daily activity

ABSTRACT:

Universally more than 2lakhs people are ailing from hip failure every year and the remedy for this is replacement. In India, the percentage of people getting handicapped due to hip fractures is high. For that, the people are going for replacements of the hip using artificial hip prosthesis. The artificial prosthesis is imported from the foreign countries which are costlier than the custom made Indian prosthesis. For that, the Indian people are going for Indian custom made prostheses. To evaluate the custom made for patients of Indian prostheses, many institutes are working on the prostheses simulators. In this work the walk simulator or hip simulator for Indian customized prostheses is designed. Using this simulator the prostheses life period can be evaluated with the existing data available from the literature and with the data acquiring from the simulator.

Keywords: *Hip simulator model, stainless steel and aluminium alloy material, Fatigue and wear analysis.*

1. INTRODUCTION:

Once a suitable implant configuration was achieved, initial bench testing was repeated with the simple load to failure test using a hydraulic jack and donated polyurethane foam femurs from Pacific Research Laboratories The information from these initial tests was valuable to develop a qualitative understanding of failure modes. For example, it was noted that the head of the compression screws migrated superiorly as the construct approached failure. This was addressed with a plate designed to fit between the interlocking screw and the posterior compression screw to serve as a buttress. Although prominence of the plate was originally problematic, this was resolved with successive iterations of the design. Furthermore, early testing demonstrated the distinct advantage of having the threaded screw heads for fixation into the lateral cortex. Overall, the load-to-failure testing system was invaluable in comparing early design iterations of the hip construct. Ultimately, it was recognized that although early bench testing was helpful, a more sophisticated testing apparatus was needed before using the implant clinically. This testing was achieved through a collaborative effort between SIGN, Program for Appropriate Technology in Health (PATH) (an international on-profit organization), and Allan Tenser from the University of Washington Orthopaedic Science Laboratory. Although load-to-failure testing was valuable in the early design process of the SHC, fatigue testing was necessary to understand the failure

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DESIGN AND ANALYSIS OF AUTOMOTIVE BUMPER BEAM USING POLYMER MATRIX COMPOSITE

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Abstract :

An automotive bumper beam is a structural component with intended function to absorb kinetic energy during dynamic loading condition. Generally, most of the researches focus on the substitution of new material such as polymeric based composite to achieve higher energy absorption capacity. This project is aimed to investigate the most suitable geometry of bumper beam at conceptual design stage. The various geometry of automotive bumper such as Box, Channel, T and I- sections were analyzed. The suitable shape of bumper beam was selected due to its high stiffness, low weight and high load sustainability. Also, compare the analysis results for epoxy polymer/ glass fiber material with steel, aluminum and copper materials.

Key words: composite; polymer matrix; bumper beam; conceptual design.

INTRODUCTION

It is a truism that technological development depends on advances in the field of materials. One does not have to be an expert to realize that a most advanced turbine or aircraft design is of no use if adequate materials to bear the service loads and conditions are not available. Whatever the field may be, the final limitation on advancement depends on materials. Composite materials in this regard represent nothing but a giant step in the ever-constant endeavor of optimization in materials.

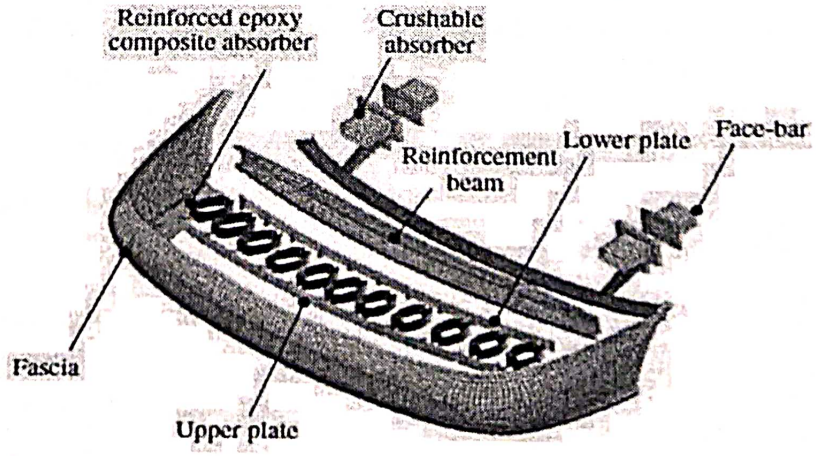

Fig :AUTOMOTIVE BUMPER SYSTEM COMPONENT