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Criterion 3 – Research, Innovations and Extension

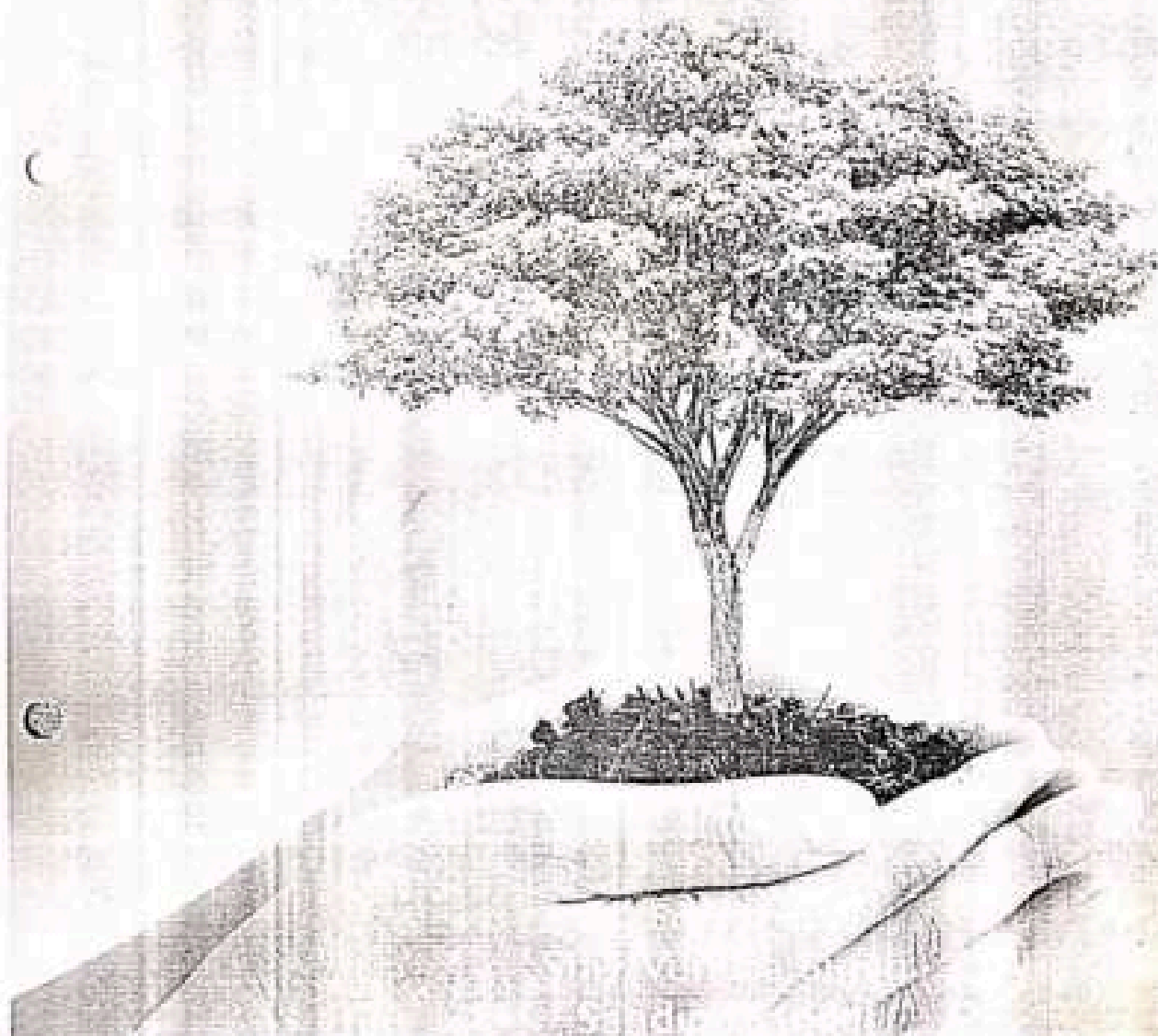
3.4

Research Publications and Awards

3.4.4 Details of books and chapters in edited volumes / books per teacher during the year

E-copies of Books, Chapters and Publications

BIOCHAR PRODUCTION FOR GREEN ECONOMY



Dr. Anil Kumar Veda
Soyindaraju



BIOCHAR PRODUCTION FOR GREEN ECONOMY

Agricultural and Environmental
Perspectives

Edited by

SHIV VENDRA SINGH

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Microwave-assisted hydrothermal carbonization for biochar production: potential application and limitations

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3.1 Introduction

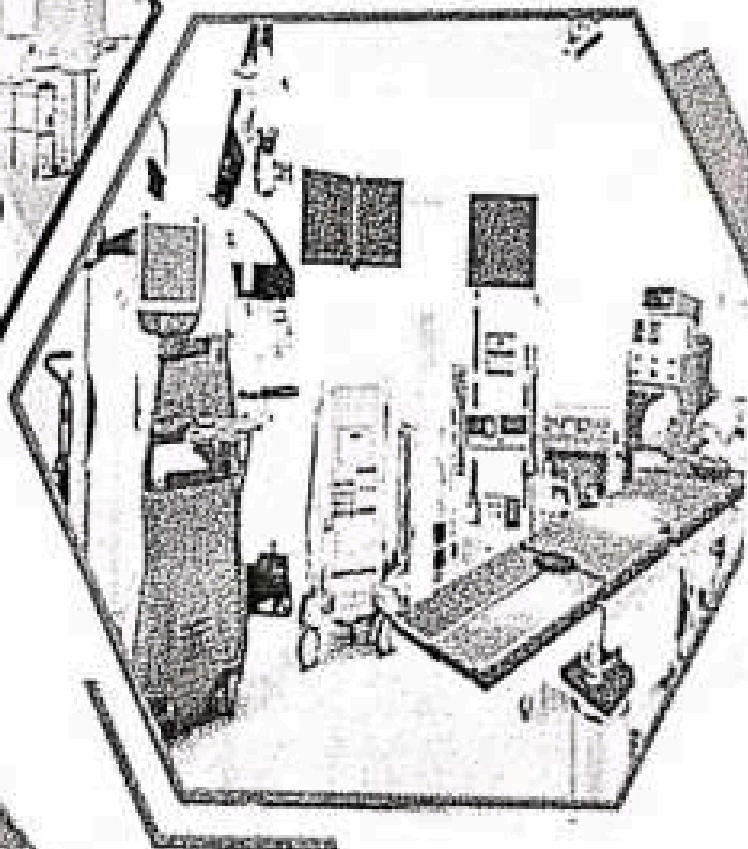
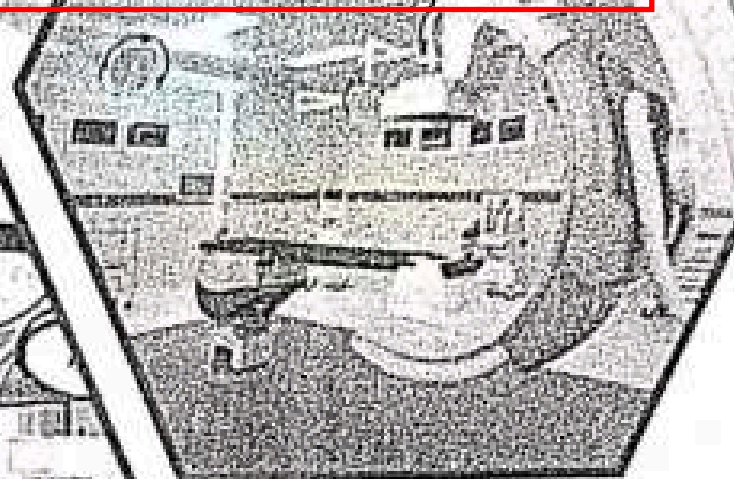
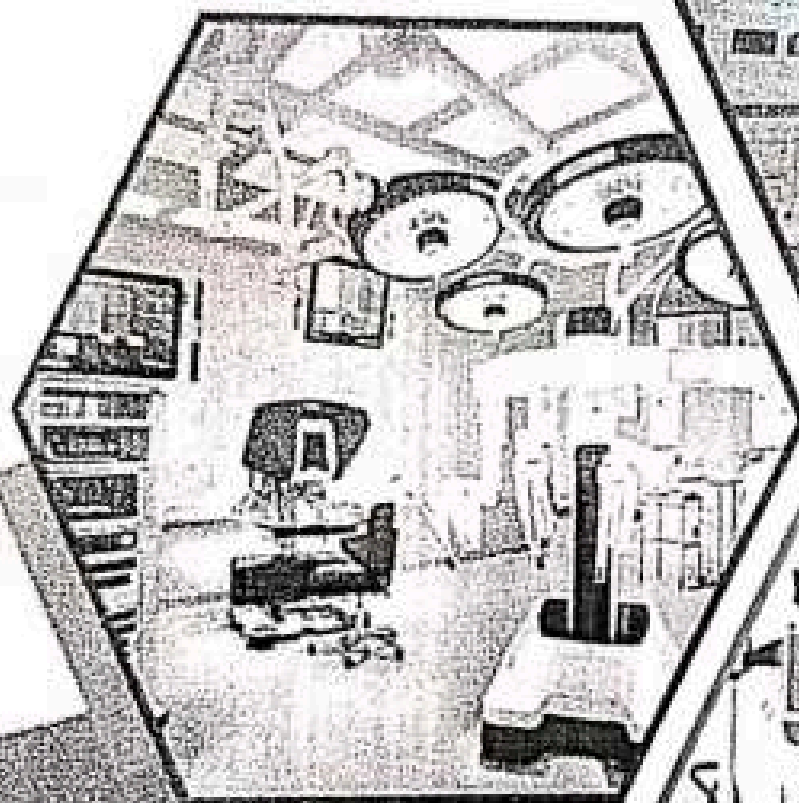
Industrialization of countries by enormous usage of electricity generated from coal-based power plants has significantly contributed to the emission of CO₂ and other greenhouse gases (GHGs) to the atmosphere ultimately evolving as the prime reason for global climate change. An alternative solution to mitigate the emissions from fossil-based power plants and provide a pollution-free power sector is to opt for renewable energy. Over the past few years, biomass energy-based industrial research has gained more interest (Prisnam et al., 2020). Biomass energy especially in the form of solid biofuel serves the need by not only producing energy in power plants but also helping in carbon sequestration indirectly benefitting soil health. Overall, utilizing all forms of renewable energy will provide a promising way to reduce overall energy consumption and environmental pollution.

Char, a solid biofuel produced from the thermochemical conversion of biomass attracts more attention from researchers and industrialists as a viable alternative to coal. Solid biochar produced from biomass is available abundantly worldwide and is renewable, and carbon-neutral with less sulfur, nitrogen and ash (Geng et al., 2020). This helps in reducing the emissions of SO_x, NO_x and other particles. It also helps in cutting down the costs required for handling and disposal of ash and maintenance of ash collection equipment. Solid char is produced conventionally by two processes: pyrolysis and hydrothermal carbonization (HTC), both of which involve anaerobic thermochemical conversion at longer

A Text Book on

BME

Bio-Medical Electronics and Instrumentation



Dr. Sachin Vasant Chaudhari
Dr. Manthan S. Manavadaria

Dr. M. Dhipa

Dr. Pradeep Devendra Gaikwad

Bio-Medical Electronics and Instrumentation



Dr. Sachin Vasant Chaudhari is a distinguished educator and researcher with over 18 years of experience in the field of Electronics and Computer Engineering. He is currently serving as an Associate Professor at the esteemed Sarjvani College of Engineering in Ahmednagar, India. He holds a Ph.D. in Electronics Engineering, which he earned in 2018. Throughout his impressive career, Dr. Chaudhari has specialized in various disciplines such as Wireless Communication, Electronics Devices and Circuits, Process Control, and Industrial Automation. His expertise and dedication have resulted in the publication of 25 research papers in prestigious national and international journals, as well as conference proceedings. Dr. Chaudhari holds memberships with esteemed organizations such as the Institution of Engineers (India) and the International Association of Engineers, further showcasing his commitment to continuous learning and professional growth. His contribution to the field of Electronics and Computer Engineering has been commendable, and his extensive knowledge and experience make him a highly sought-after educator and researcher.



Dr. Manthan S. Manavadarla is currently working as Assistant Professor in EC Department, Chandulal S. Patel Institute of Technology (CSPIT), Charotar University of Science And Technology (CHARUSAT), Changa, Petlad, Anand, Gujarat, INDIA. He has completed his doctorate in the field of Bio-Electronics (EC) in 2020 and post-graduation M.Tech. with Communication Systems Engineering specialization in 2011 from CHARUSAT. He has obtained his B.E. (EC) from DDIT, DDU, Nadiad, Gujarat in 2009. He has completed a one year research project at ITER (India), IPR, Gandhinagar, Gujarat as NFP Intern during 2010-11. He has over 11 years of teaching experience in engineering. He has published more than ten research papers and patents in National and International journals and conference. He is life member of IETE, ISTE and IE (India) and a member of IEEE. His area of expertise are analog and digital electronics, digital communication, fiber optic communication and Bio-electronics. manthan_genious@yahoo.co.in



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Dr. Pradeep Devendra Galkwad, working as a Head and Associate Professor, department of Physics at Marathwada Shikshan Prasarak Mandals R. B. Atal Arts, Science and Commerce College, Georai Dist. Beed Maharashtra. He completed graduation, postgraduation and Doctor of philosophy (PhD) from Department of Physics, Dr. Babasaheb Ambedkar Marathwada University, and Aurangabad Maharashtra. He has more than 14 years' experience of teaching and research. He has many his academic carrier like, Outstanding Scientist Award, Indo Asian Paul Dirac Distinguish Scientific Award, Award for Excellence in Research, Best Researcher Award, Global teaching Excellence Award, Indra Gandhi Gold medal Award and Dr Radhakrishnan Gold medal Award. He presented many research articles in national and international conference, seminar, workshop oral / Poster Paper presentation in International Conference at Netherlands, Malaysia and got best paper presentation Award in Thailand. He has published above 65 research papers in reputed journals and Proceeding 12 article as a Chapter in Book. 8 Book Published He published 12 patent in national and international level. He completed 02 research projects. He is also a member of Editorial Board. **Area of Research:** Electrochemical Method Chemical, Biosensors and Optical fiber sensors, Bioelectronics Remote Sensing.



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Bio- Medical Electronics and Instrumentation

Dr. SACHIN VASANT CHAUDHARI

Dr. MANTHAN S. MANAVADARIA

Dr. M. DHIPA

Dr. PRADEEP DEVENDRA GAIKWAD

RK Publications

An Experimental Study of Partial Replacement of Fine Aggregate by Steel Slag in Concrete

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ABSTRACT: A significant field of this research is the alteration of concrete properties through the addition of suitable components. This study focuses on using steel slag, a specific waste steel product of the steel industry, to partially substitute fine aggregate in concrete mixes using the M30 grade mix design. Steel slag was used to make concrete in this research study instead of raw fine aggregate. These wastes were used as fine aggregate in varying weight proportions (0%, 5%, 10%, and 15%). This study looks at the material characteristics, compressive strength and split tensile strength of concrete that has steel slag used in place of fine aggregate. According to the experimental findings, concrete that has been combined with steel slag is stronger than regular concrete.

KEYWORDS: Steel Slag, Fine Aggregate, Concrete, Mix design, Materials, concrete admixtures.

I. INTRODUCTION

As steel waste is melted, impurities and fluxing agents are released, producing a liquid slag in induction boilers and other melting units that floats on top of the liquid steel. This by-product is called as steel slag. Historically, the ferroalloys sector has produced a significant amount of solid waste. Industries produce a large amount of waste materials, which has severely harmed both the ecology and surroundings. Separately extracted trash from the boilers at a value of roughly 10% to 15% of the steel manufacture. Because of the tightening of environmental restrictions over the past ten years, which mandate minimising waste disposal, the reuse of waste material has become increasingly significant. Aggregates are in high demand in India, mostly from the civil engineering sector for the production of concrete and roads. Natural resources are under significant pressure from the expansion of several roads and the building of highways for high-speed lines. Numerous investigations and research initiatives regarding the viability, environmentally acceptability, and performance of employing waste industrial products in roadway building are now being completed by private organisations and highway agencies. These studies aim to balance the demands of the highway industry for better and more affordable building materials with the needs of society for the safe and efficient disposal of waste materials.

II. LITERATURE REVIEW

Subathra Devi V, Gnanavel B K (2014):- Utilising an M20 grade mix design, the intent of this project is about to investigate experimentally the effect of partially substituting steel slag (SS) for coarse and fine aggregates on the different strength and durability parameters of concrete. It is determined what percentage of steel slag should be used to substitute fine and coarse material. Slump cone testing is employed to verify how quickly concrete becomes less workable as the substitute percent rises. Experimental research is done on compressive strength, tensile strength and flexural strength utilising Hcl, H2SO4, and rapid chloride penetration. The findings show that adding steel slag in place of some fine and coarse materials in traditional concrete increases its compressive, tensile, and flexural strengths.

Mahalingam R and Sri Durga G (2018):- A crucial field of study for concrete is the alteration of concrete properties through the addition of suitable components. Our focus is on utilizing steel slag, a specific waste product of the steel industry, to partially replace fine aggregate in concrete production. The waste product is replace with in different proportion of (20%, 40% and 60%). The purpose of the study is to examine the material characteristics, compressive strength and split tensile strength of concrete that contains steel chips in place of some of the fine

An Experimental investigation of Coarse Aggregate replace with Soft Plastic in Concrete for M30 Grade

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ABSTRACT: Currently, the largest environmental issue facing our nation is solid waste management. Despite efforts to decrease its usage, plastic is being used more and more every day. These wastes create issues for the environment and human health. It produces an unhealthy amount of garbage every day. Recycling that is sustainable and healthful has several advantages. This project thought to be viewed as a starting point for more extensive investigation into the use of plastic aggregate in place of coarse particles in concrete. In order to identify the ideal percentage and ascertain the effectiveness of plastic aggregates, research was conducted in this work using varying percentages of plastic aggregates such as 0%, 2.5%, 5%, 7.5% and 10% and the optimum result and performance of plastic aggregate on concrete which is higher than the conventional concrete is 7.5%.

KEY WORDS: Plastic Aggregate, Artificial Aggregate, Replacement

Date of Submission: XX-XX-XXXX

Date of acceptance: XX-XX-XXXX

I. INTRODUCTION

Time series Most used materials in the construction is concrete. It have a four ingredients such as coarse aggregate, fine aggregate, cement and water. Concrete might be cast in the desired shape by using moulds. Its including strength, durability, easy handling and used for many purpose. This indicates that it is more durable and is not much impacted by chemicals. Plastic trash disposal is a major issue since, in the absence of organic substances, it is a non-biodegradable substance that poses a risk to human health and the environment. Because plastic takes a very long period to dispose and has more negative effects on the environment. As a result, we can use it in the concrete on the structure. Additionally, using plastic garbage that has undergone some processing can contribute to reducing environmental waste.

II. SCOPE

The majority of aggregates are produced by mining and crushing. Cracking releases dust particles into the environment, much like rock mining alters the local geology. As so, it harms the ecosystem in two different ways. Here we concentrated on waste products that also harm the environment. By reducing the amount of raw materials used to make concrete and employing materials that have an effect on the environment. The regions of

Influence of Fly Ash and Coir Fibre in Paver Block

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ABSTRACT: In this experiment the partial replacement of fly ash (grade F) with the cement content and the coir fibre used as addition portion on M-sand are investigated on paver block. There are three main mix proportions on coir fibre they are 0.05% to 0.15% and the proportions of replacing fly ash as 5% to 15% with the paver block. In this experimental investigation the mechanical properties of cement, coarse aggregate and addition material are checked, and also the compressive strength, water absorption of paver block checked with 7, 21, and 28 days.

KEYWORDS: Compressive Strength, fly ash, coir fibers, Water Absorption, Paver Block

I. INTRODUCTION

In this experiment the concrete are mixed with various raw and additive materials like cement, sand, water, aggregates, fly ash and coir fibre are mixed for the proportions in paver block. The nominal paver block are in the shapes like zig zag, I shaped and pentagonal shaped paver block are applied for ground surface which are fully compacted with compaction materials and layed with the thickness of 60mm, 70mm, 80mm, etc.. to lay the paver block with the compacted surface. In the paver block project's grade is M20 and the minimum thickness is 80 mm. these concrete paver block is cost effective, attractive, functional and its very easy to manufactured. Recently in concrete paver block fibres are introduced to increases strength, durability and reduction in flyash. It sounds like you're discussing the benefits of using fly ash and coir fiber in concrete paver blocks.

II. SCOPE

- To Reduce Consumption Of Cement In spite Of Flyash
- By Adding Coir Fibre To Improve Porosity In Paver Blocks
- To Achieve The Expected Strength For The Actual Grade Of Concrete
- To Improve The Usage Of Fly Ash To Create Less Economical Platforms In Paver Blocks
- By Adding Of Coir Fibre Improves The Stability Of Paver Block.

III. METHODOLOGY

- Collection of Literature
- Study of Literature
- Abstract
- Mix Design for M₂₀ grade of Concrete
- Fly ash, Coir Fibre, Cement, Fine & Coarse Aggregate
- Fine and Coarse Aggregate- Sieve, Specific gravity

IV. EXPERIMENTAL RESULTS

Cement

It sounds like you're discussing a project that involves experimental study using indeed a common type of cement used as a binding material in concrete. The "43 grade" designation refers to its compressive strength after 28 days of curing. This grade of cement is suitable for a variety of construction applications, including residential and commercial projects. If you need any further information or assistance regarding your project, feel free to ask!

Water

Using portable drinking water from an industrial company for mixing and curing paver blocks can indeed be a viable option, especially if it meets the quality standards outlined in IS 456-2000 for water used in concrete production. Ensuring that the water meets these specifications is crucial for maintaining the desired properties and durability of the paver blocks.

Study on Topographic Surveying by Using Total Station and DGPS

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ABSTRACT: Mapping the boundaries and topography of an area is now considered essential for its development. In a recent study, the focus was on conducting surveys for the SKM Wind Farm area in Tiruppur. Topography encompasses various features of the Earth's surface, such as elevation, water bodies, roads, and vegetation. The primary goal of this project was to create accurate boundary and topographic maps of the region, serving as crucial tools for future planning, design, and engineering endeavors. Advanced technologies like DGPS were employed for delineating the boundary lines, while total stations were utilized for collecting precise land coordinates. The outcomes of this project not only benefit the SKM administration but also provide invaluable resources for upcoming campus development initiatives.

I. INTRODUCTION

1.1 GENERAL:

- To prepare a Detailed project report of Topographic surveying by using Total station and Differential Global Positioning System (DGPS), which is performed in and around our SKM Wind Farm, Tiruppur. Accurate topographic map of our college campus is provided.
- The type of survey, the size and location of the property, the level of detail and accuracy required.

1.2 ABOUT TOPOGRAPHIC SURVEYING:

- Firstly, the process involves delineating the survey area's boundaries, defining the necessary level of detail, and outlining any particular deliverables or prerequisites.
- A topographical land survey entails precisely measuring and cataloging the locations and attributes of both natural and man-made elements within a designated land area.
- After completing the survey, the collected data is meticulously charted into a comprehensive plan, capturing details of man-made structures like property lines, adjacent buildings, pathways, and road networks.

1.3 METHOD OF SURVEYING:

There are many methods for doing surveying process:

- Triangulation method.
- Resection method.
- Traversing method.
- Longitudinal and Cross section method.
- Trigonometric method.

II. LITERATURE REVIEW

Mackovic, peter, and martin jurek (2021) collaborated on a thorough investigation into the archival records concerning the extensive mapping of czechoslovakia between 1921 and 1950. During this period, there was a concerted effort to update older maps inherited from the austro-hungarian monarchy while also initiating new large-scale mapping projects. Advancements in surveying techniques, including the utilization of aerial photography, played a significant role in this endeavor.

In a separate study, levin, eugene, and william roland (july 10, 2022) highlighted the enduring importance of field data collection by professional surveyors, despite remarkable advancements in artificial intelligence and automation within geospatial data acquisition.

Contour Surveying by Using Total Station

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ABSTRACT: This project that have been well-organized plan for conducting a survey using a total station instrument and creating a detailed map using AutoCAD and E-surveying software. By accurately observing and recording the coordinates of targeted points, you'll be able to calculate traverse side lengths, bearings, and ultimately determine the area of the closed field. Importing the raw data into AutoCAD will facilitate the creation of diagrams, while E-surveying software will help generate contour and level lines for the map. Providing all necessary data in a legends section ensures clarity, and mentioning the scale according to the drawing is crucial for accurate interpretation. If you encounter any challenges along the way, feel free to ask for assistance.

KEYWORDS: Total station, Contour surveying.

I. INTRODUCTION

Surveying indeed involves the precise determination of positions on the Earth's surface, typically using various tools and techniques such as chains, plane tables, dumpy levels, and theodolites. However, these traditional methods can be time-consuming, labor-intensive, prone to errors, and require manual calculations.

The introduction of Total Stations has revolutionized surveying by offering significant advantages over traditional equipment:

- Efficiency:** Total Stations streamline the surveying process, enabling faster data collection and reducing the time required for measurements and calculations.
- Accuracy:** Total Stations provide highly accurate measurements of distances, angles, and elevations, minimizing errors and ensuring reliable data for mapping and planning purposes.
- Ease of Use:** Total Stations are user-friendly and require minimal training to operate, making them accessible to a wider range of surveyors and technicians.
- Data Storage:** Total Stations can store measurement data directly onto memory cards or internal memory, eliminating the need for manual record-keeping and reducing the risk of data loss or corruption.
- Versatility:** Total Stations offer versatility in surveying tasks, allowing for a wide range of applications, including topographic mapping, construction layout, boundary surveys, and as-built surveys.
- Integration with Technology:** Many Total Stations are compatible with advanced software and GPS systems, allowing for seamless integration with modern surveying workflows and data processing techniques.

Overall, Total Stations have transformed the field of surveying by enhancing efficiency, accuracy, and productivity while reducing labor costs and the potential for errors. Their ease of use, versatility, and integration with technology make them indispensable tools for modern surveying projects.

II. NECESSARY OF SURVEYING

Engineering surveying encompasses various tasks crucial for the success of construction projects, including:

- Producing Up-to-date Engineering Plans:** These plans are fundamental for designing the construction, emphasizing the need for meticulous surveying to ensure design reliability.
- Determining Required Areas and Volumes:** Surveying helps calculate the necessary land and material volumes, facilitating efficient project management.
- Ensuring Correct Construction Positioning:** Surveying ensures that construction occurs accurately in both relative and absolute positions on the ground, preventing errors in placement.
- Recording Final Positions and Design Changes:** Surveyors document the final positions of structures, capturing any alterations made during the construction process for future reference.
- Providing Permanent Control Points:** Establishing permanent control points aids in monitoring projects, such as regularly checking for movement during construction, ensuring stability and safety.

A Study on the Strength of Fiber Reinforced Concrete with Partial Replacement of Cement by Fly Ash

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ABSTRACT: This experimental study aimed to achieve the desired strength of M20 Grade concrete by varying the proportions of fly ash, steel fiber in cement, coarse aggregate, and fine aggregate. By gradually adjusting the content of fly ash and steel fiber while keeping other parameters fixed, various combinations were moulded, cured, tested and evaluated according to prescribed standards (IS Code 456-2000). The optimal combination of 40% fly ash and 1% fiber shows significant enhancements in cube compressive strength. Results suggest that composites with up to 40% fly ash and 1% fiber perform best at 7 and 28 days with conventional ratios.

KEY WORDS: Fly ash, Steel fiber.

I. INTRODUCTION

GENERAL

Concrete is weak in tension but extremely strong in compression. As an When exposed to typical stresses and impact loads, concrete is a moderately fragile material. Because the microcracks in concrete that are subjected to tensile stress have widened, the concrete's tensile strength is reduced. The fiber's presence causes the microcracks to stop. The addition of fibers is typically considered a way to improve the flexural and tensile strength of concrete. The fine powder known as fly ash is a common waste product from thermal power plants. One of the main problems is how to dispose of fly ash because it can seriously harm the environment when dumped as waste. For this reason, using fly ash.

II. LITERATURE REVIEW

B. Vijaya Rangan and A. Sridharan (2019). This review discusses optimization strategies for mix proportions in steel fiber reinforced concrete with fly ash, considering factors such as fiber content, fly ash dosage, and water-to-cement ratio.

A. R. Khaloo, M. Y. Ghani, and A. M. S. Iqbal (2019). This review investigates the influence of steel fiber geometry on the properties of steel fiber reinforced concrete with fly ash, including mechanical performance and workability.

T.Sama et al (2014). showed that the compressive strength flexural strength and split tensile strength Increases with increase in steel fiber content in the research fly ash has a very good effect on compressive strength. The maximum strength has been achieved at 21% steel fiber and 30% fly ash.

III. MATERIALS USED AND PROPERTIES

Cement

Ordinary Portland cement grade 43 is used for this experiment.

Table 1 Test on cement

S. No.	Test	Values
1	Normal consistency	33

Preparation of Topographic and Contour Map Using Total Station

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ABSTRACT: In this project Topographical and contour map has done for a "Masala Industry", Perundurai. The Total station is a highly accurate surveying instrument that can measure distances, angles, and elevations with great precision. We have used a Total Station(krypton), Prism, Tripod, Measuring tape with krypton study manual. The measurements are made possible by accurate observation of information of targeted points. This study specifically focuses on the preparation of a topographic map for 100 Acres identify the information for contour. The method used for this study was to collect field data for each feature of " Masala Industry" to preparation of a topographic map. We provided the temporary benchmark and change point in permanent places of Masala Industry. All these data taken by using Total station can be imported to AutoCAD. Contour lines and level lines were generated by using E-surveying software.

KEYWORDS: Total station, Topographic map, Contour map.

I. INTRODUCTION

Absolutely, topographical surveys are fundamental for understanding the layout of the land. They provide crucial data for designing and executing various projects, from infrastructure development to urban planning. The detailed representation of terrain through contour lines in topographical maps is invaluable for visualizing the landscape's features and characteristics.

The methods for topographical mapping have evolved significantly with advancements in technology. Photogrammetric techniques utilize aerial photography to capture detailed images of the terrain, while remote sensing satellites gather data from space. Geodetic satellites contribute by providing precise positioning information. On the ground, terrestrial methods such as using theodolites, Electronic Total Stations (ETS), and Terrestrial Laser Scanners (TLS) offer high-resolution data collection directly from the surface, allowing for detailed and accurate mapping. Each method has its advantages and is chosen based on the specific requirements of the project and the desired level of detail.

A Total Station is a sophisticated surveying instrument that combines an electronic theodolite with an electronic distance meter (EDM). Additionally, it features a microprocessor, electronic data collector, and storage system, offering comprehensive functionality for surveying tasks.

Objectives

When our Masala Industry is construct, this Project will be very useful for

- Detailed map of the natural and man-made features of land.
- Cutting and Filling of site,Project development purpose.
- Topographic map, which thus shows valleys and hills, and the steepness or gentleness of slopes.

Study Area

We have Surveyed "Masala Industry". The site is located in Perundurai. It is a type of Industrial building G+1. The total area of the field is about 100 Acres.The Industrial building consists of storage build machinery hall , store room , labor room , compound wall, etc .

Site Visit

• Visit the site to conduct a visual inspection and to identify any features that need to be surveyed. This may include buildings, vegetation, and natural features such as roads and streams.

Experimental Investigation on Self Curing Concrete

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ABSTRACT: Self-curing concrete have a internal curing capability by the same self curing agents. In this experiment is done by two type of self curing agents Polyethylene glycol (PEG-400), Polyvinyl alcohol (PVA), mostly a normal concrete required water to mixing and curing into construction fields. In usage of self-curing concrete reduces the high amount of water usages in construction works. Most of the desert and areas of water scarcity building works are need a self curing type concrete. Because they are take small amount of water only in mixing stage. In this project the strength and capability of self curing concrete by two type of self curing agents are tested. In a proportion of the self curing agents are added in 1%, 2%, 3% in weight of cement. The high strength of self curing concrete is attain in Polyethylene glycol (PEG-400) in 1%, comparing to normal conventional concrete in grade of M30.

KEYWORDS: Polyethylene glycol-400, Polyvinyl alcohol, strength of self curing concrete.

I. INTRODUCTION

In construction of buildings concrete is a main part of a building and give extra support to the entire structure. Normally a concrete is required a high amount of water to in stage of mixing of concrete and curing of concrete. But the self curing concrete has a ability of curing from internally to a several years. The self curing agents are observe and stock the water by itself then the water content are curing the concrete the water by slowly. Comparing to the normal concrete the self curing concrete is have a more strength than the normal concrete in grade of M30.

II. MATERIAL USED AND PROPERTIES

CEMENT:

Ordinary Portland cement grade 53 is used in this experimentation of self curing concrete.

Table 1: properties of cement

S NO	DESCRIPTION	TEST RESULT
1	Grade used	53
2	Specific gravity	3.15
3	Fineness	6%
4	Normal consistency	33
5	Initial setting time	30 min
6	Final setting time	10 hrs

Investigation on Bitumen with PVC as an Additive Material for Road Construction

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ABSTRACT: The deep strength asphalt, bitumen, crushed rock, chalk rock, and compacted sand are the materials used to make modern roads. Earth sand, loam, gravel, and bituminous spray seal are the materials used to make the majority of rural roads. PVC disposable items have long been a major source of dioxin contamination in incinerators and fires. The necessity of the hour is to find a suitable use for disposed of PVC trash. On the other hand, as a result of growing traffic, it is necessary to expand the roads' capacity to support more weight. Reusing PVC waste is made possible by the use of PVC coated gravel, asphalt, or mixed bitumen in pavement construction. The various characteristics of PVC-modified bitumen, including penetration and softening point, were examined in this study. Key word: Aggregate, bitumen, PVC.

KEYWORDS: Aggregate, bitumen, PVC.

I. INTRODUCTION

Global population growth and industrialization lead to the development and manufacturing of new non-biodegradable plastic wastes, such as PVC trash. Recent research has demonstrated that plastic garbage can persist on Earth for 4500 years without deterioration and unaltered. Finding a practical recycling method is necessary to lessen pollution caused by plastic trash. Using waste plastic components to create a flexible pavement mixture is one such method. The purpose of our project is to evaluate the strength characteristics of unaltered asphalt with asphalt modified with PVC and filled with brick powder. Plastic boxes, covers, and other items made of leftover food waste are among the PVC waste materials used in this project. Various percentages were used to create the mixes.

II. SCOPE

- To get rid of potholes.
- To reduce pollution, greenhouse gas emissions, and global warming. The roadway's life span can be extended.
- Inherently eco-friendly.
- Stones are covered with plastic to improve aggregates' surface qualities.
- The coatings are simple to apply, and the necessary temperature is the same as for laying roads. The percentage of waste to bitumen should range from 6 to 8 percent, depending on the rainfall patterns in locations with high and low levels of precipitation.

III. METHODOLOGY

- Collecting the waste material like PVC pipes, water bottles, cover and cleaning process will be go head.
- Waste materials are cut into small pipes and bitumen will be heated at 120°.
- Add PVC waste in hot bitumen which vary percentage from 0%,5%,10%,15 % and test will be carry out bitumen test.
- To analysis the result of bitumen test and report will submitted.

Experimental Investigation on Geopolymer Bricks by Partial Replacement of Fly Ash with Dolomite Powder

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ABSTRACT: This experimental study investigates the feasibility of enhancing the mechanical properties of geopolymer bricks by incorporating dolomite powder as replacement material with fly ash. The replacement percentage of dolomite powder with the weight of 5%, 10%, 15% and 20% of fly ash. The study systematically examines the effects of varying dolomite powder content on the compressive strength, water absorption and efflorescence of geopolymer bricks through a series of laboratory experiments. Results reveal that the addition of dolomite powder improves compressive strength at certain percentage and the absorption rate also drops and the efflorescence gradually increases by the higher addition in dolomite powder. The Optimal proportions of 10% dolomite powder is identified for enhanced mechanical properties, balancing cost- effectiveness and performance.

KEYWORDS: Geopolymer Brick, Fly ash, Dolomite Powder, Alternative Material.

I. INTRODUCTION

Geopolymer bricks are a type of construction material made from geo polymerization, a chemical process that binds together materials like fly ash, slag, or clay. These bricks offer several advantages over traditional clay bricks, including reduced carbon emissions, higher strength, and resistance to chemicals and fire. They are an eco-friendly alternative in construction, contributing to sustainable building practices. Geopolymer bricks are formed through the reaction of calcium materials with an alkaline activator, typically sodium hydroxide and sodium silicate. This process creates a strong, durable bond between the particles, resulting in bricks with excellent strength and low absorption rates.

II. SCOPE

- The aim of study in project preparation is to promote sustainable construction practices by utilizing industrial by-products such as fly ash and inorganic materials like dolomite.
- Geopolymer bricks offer benefits like lower carbon footprint, reduced waste, and energy savings compared to traditional bricks.
- To reduce the environmental pollution because generally it requires lower energy inputs compared to conventional fired clay bricks, reducing carbon emissions.

III. PROPERTIES OF MATERIALS

MATERIALS USED

The materials that are used for making geopolymer bricks,

- Fly ash
- Quarry Dust
- Cement
- Dolomite powder
- Lime

Mechanical Properties of Self Compacting Concrete by Replacing Cement with Metakaolin in Concrete for M30 Grade

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ABSTRACT: Self-compacting concrete (SCC) is capable of moving under its own weight, filling the formwork completely without creating any mechanical vibration, it is more effective for seismic loads. The M30 grade concrete was selected and IS method was used for mix design. It is mainly adopted in complicated reinforcement structures for pile and raft foundation and retaining wall in construction areas. The use of metakaolin (MK) in this project to achieve the strength in earlier days when compared to conventional concrete techniques. The different sizes of metakaolin addition (0%, 10%, 13%, 20%) is made to determine which has the high performance in this SCC. Metakaolin has the properties as compared to cement so metakaolin was replaced with cement. A small amount of metakaolin to concrete may significantly boost its compressive strength. In comparison to metakaolin 10% and 13%, metakaolin 20% possessed the highest Flexural strength, Split tensile strength Compressive strength.

KEY WORDS: Metakaolin, cement, Replacement

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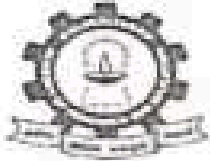
Date of acceptance: 06-05-2024

I. INTRODUCTION

Numerous studies are being conducted worldwide to investigate every potential use case and feature of SCC. SCC is seen as a future concrete that will match all performance expectations while retaining all the benefits of concrete, such as high strength and features, less labour required, speedy construction, and durability. Metakaolin gives more strength and durability than cement. In terms of production, metakaolin differs from other compounds like blast furnace slag, silica fumes & fly ash because it is created from high-purity clay and calcined at temperatures between 700 and 800 degrees Celsius. MK is developed by calcining pure kaolin clay at temperatures between 600° and 900° Celsius, which removes chemically bound water and breaks down the crystalline structure and metakaolin is an ultrafine pozzolana.

II. SCOPE

One of the products of the cement's hydration reaction is calcium hydroxide [Ca(OH)₂]. Extra Calcium Silicate Hydrate gel is produced when metakaolin is used in part place of cement and communicates with calcium hydroxide. The sole element responsible for the strength development of cement and cement-based concrete is Calcium Silicate Hydrate Gel. Generally easily accessible extremely reactive metakaolin functions as a considerably reactive pozzolanic in concrete. Metakaolin has been shown to improve the qualities of concrete when added as an alternative cementing element. The process of calcining pure kaolin clay at temperature between 600 and 900 degrees Celsius results in metakaolin, an ultrafine pozzolana that splits down the crystal structure and discharges water that has been chemically bonded. Experiments have shown that the mechanical, permeability, and durability qualities of concrete mixtures with high reactivity Metakaolin are on par with those including other mineral admixtures. Further, using these materials is ecologically conscious since it reduces the amount of CO₂ released into the atmosphere by using less Portland cement.



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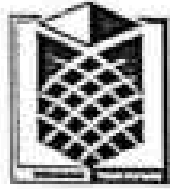
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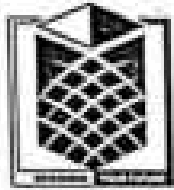
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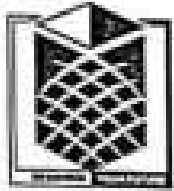
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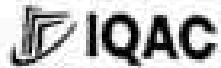
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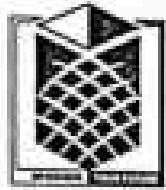
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Sustainable Utilization of Waste Butyl Rubber as a Partial Replacement of Coarse Aggregate in Concrete

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ABSTRACT: All through the improper disposal of old tires is a huge environmental issue that affects the entire world. It can lead to uncontrolled fires, pollution of the soil and vegetation, and other environmental problems. Finding alternate uses for these tires is therefore desperately needed, with a focus on recycling the used tires. It is now theoretically possible to utilize used tires in concrete, and the resulting material is referred to as lightweight concrete. A mixed ratio of concrete designs are prepared using the IS code book technique for the M30 cement concrete evaluation. The sample specimens are cast using waste butyl rubber in various rates to replace the coarse aggregate.

KEYWORDS: Waste Butyl Rubber, Environmental concern, M30 grade concrete, compressive, split tensile and flexural strength

I. INTRODUCTION

A startling number of old rubber tires amass annually throughout the world; India alone is home to 275 million of them. Because of their low density and poor degradation, these tires are landfills that we are unable to bury. There are other options for getting rid of these tires, like filling up large holes in the ground or dumping them. Furthermore, mosquitoes, which are known to transmit a wide range of diseases and present a serious and hazardous risk to human health, are greatly honored by these landfills. An estimated 1.2 billion garbage tires made of rubber are generated each year worldwide. Furthermore, it's believed that only 4% of tires are used, 27% are unlawfully piled, stockpiled, or disposed of, and 11% are exported after being used 27% are illegally piled, hoarded, or discarded, and only 4% are used for civil engineering projects. Thus, attempts have been made in civil engineering projects to recycle waste tire rubber. The additional benefit of partially replacing rubber tire aggregates in concrete is the preservation of natural aggregates.

II. LITERATURE REVIEW

Chandran (2017) The Chandran (2017) In order to strengthen concrete and preserve the environment, this study investigates the possibility of adding discarded tires into the substance as varying-sized chips. Ishwariya (2016) An investigation of the partial substitution of crumb rubber for coarse aggregate in an experimental setup. For the purpose of this investigation, we replace the coarse aggregate in regular concrete grades of M30 with crumb rubber.

Jeevana et al. (2023) Concrete preparation involves replacement the coarse aggregate with waste rubber. In place of the coarse aggregate, waste rubber tire is put in amounts of 5%, 10%, and 15%.

Paul Sibiyone et al. (2017) conducted experimentally used rubber waste as coarse aggregate. Tests are conducted on flap rubber partial replacements of coarse aggregate, looking at compressive, flexural, and split tensile strengths.

III. MATERIALS USED

Cement: Generally, Portland Pozzolana cement is used for plain cement concrete. Cement is an ingredient of concrete which is an essential construction material.

Waste butyl rubber: Butyl rubbers are also known as "butyl". Silicone is a type of synthetic rubber made by modifying the naturally-occurring chemical element of silicon.



INFLUENCE OF SUBSTITUTING FINE AGGREGATE WITH RED SOIL IN CONCRETE MIXTURES

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ABSTRACT: Concrete is being manufactured with mixture of cement, fine aggregate and coarse aggregate with suitable ratio of water content. Although it is unavoidable material but had some drawbacks of over depletion of particular materials such as conventional river sand and the environmental concerns associated with the extraction of crushed aggregate sand have prompted the exploration of alternative materials for concrete production. By mitigating reliance on diminishing natural resources and minimizing ecological footprint, this research aims to contribute to the advancement of sustainable construction practices. This project investigates the viability of utilizing red soil as a substitute for fine aggregate in concrete mixtures. Through a series of laboratory experiments and field trials, we evaluate the mechanical properties, durability and environmental impact of red soil based concrete.

KEYWORDS: Concrete, Fine aggregate replaced by red soil, substituting fine aggregate, concrete admixtures.

I. INTRODUCTION

Utilization of alternative materials called as admixtures in construction has become a paramount consideration in the quest of sustainable and eco-friendly practices within the civil engineering domain. For a good reason, concrete is the material which is most widely used for construction next to water because of its strong, durable and versatile nature and with a wide range of application. There are many researches are also going on replacement conventional ingredients of concrete with new one to reduce the over exploitation of natural aggregates. In the case of aggregates used in concrete, fine and coarse aggregates are taken from crushed rocks from mountains. Destruction of rocks and mountains for construction are increased drastically in recent years. These reaches promote to find alternative material for fine aggregate in concrete mix adding to some extend percentages aggregates in place of conventional fine aggregate. Soils are produced by natural disintegration of rocks naturally. Soil covers the top layer of the Earth surface and supports the growth of vegetation, and it can also be used for concrete. The idea of this project was attempt to use soils which are available in nearby area to replace fine aggregate in concrete. Red soil is replaced in place of fine aggregate by the percentage of 2.5%, 5% and 7.5%.

II. LITERATURE REVIEW

S. Rohman, T. Farnaz, T. Islam experimented strengths of concrete by partially replaced sand with red soil. 5%, 10% and 7.5% sand was replaced and the strength are tested. The compressive strength was decreased 10.44% at 5% replacement, 10.55% at 10% replacement and 23.51% at 15% replacement respectively. Split tensile strength are also decreased at consecutive percentage of replacement. They concluded with statement of as percentage of replacement increases, the soil particles utilises water and makes concrete less strength due to its water absorbing nature.

James Alexander. S and Antony Godwin studied about the red soil behaviour in cement concrete. Experimenting flexural strength, the actual value stops 3.67 – 4.04 N/mm² in plain concrete. But in concrete replaced with red soil, it has a better result up to 5.88 – 6.06 N/mm². For plain concrete the actual value of split tensile test stops 7.11 – 7.42 N/mm² but in concrete replaced with red soil it has a good result in strength. 8.48 – 9.2 N/mm². In compressive strength the values are 13.6 – 16.8 N/mm² but in experimented red soil mixed concrete it has the result values are 19.6 – 25 N/mm².

TamilSelvi. M and Dasarathy. A. K in his experiment 25%, and 50% replaced Fine Aggregate with soil. The compressive strength reduces for 50% replacement but increased for when steel fibres are added to it. Replacement

Sustainable Utilization Of Textile Waste In Fly Ash Brick

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ABSTRACT: In the development of civil field we aim to use textile waste as a replacement material of fly ash bricks to reduce landfills. Many textile waste materials such as polyester and other fabric etc. are used in manufacturing brick as replaceable alternatives for fly ash and reinforcing materials. , we selected polyester fabric as replacement alternatives. This paper reviews on the polyester fabric material, which is used as a partial replacement of fly ash in brick manufacturing. Different properties of fresh and hardened bricks, when admixed with polyester fabric wastes are reviewed. It has been seen that the polyester fabric brick showed better workability than their counterparts did. Flyash brick containing polyester-fabric achieved their required strength by 15% of replacement as fly ash. Close relations were analyzed among compressive strength, water absorption, efflorescence test of polyester fabric brick. After the review, it is of considerable finding that more research is deserved on all fly ash replacing polyester fabric materials, which can give more certainty on their utilization in construction.

KEY WORDS: Textile waste, Polyester fabric, Flyash bricks.

I. INTRODUCTION

Fly ash bricks are commonly used bricks in construction they are gray in colour and does not required plastering during construction. They are good fire resistance. They have 6-12% of moisture absorption rate and shows more durability. It act as a construction material unless it act as a non-toxic product when combined with other materials. These bricks are lighter in weight and absorb less heat than other bricks. It required less mortar during construction and they show higher compressive strength. It absorbs less water while constructing buildings.

Not all fly ash bricks are suitable for building. Fly ash bricks are suitable for constructions. These bricks are only suitable for subtropical regions or places with warm climates since they don't absorb heat. However, it is useless in cold climates. It is vital to exclusively utilize high quality fly ash brick. So we found some alternative to cast brick using certain percentage of textile waste (polyester fabric) as a replacement for fly ash in the manufacturing of fly ash bricks. Polyester fabric has dome molecular structure and they are extremely elastic in nature. They are very resilient and durable.

The Polyester fabric are not an environmental friendly material as they does not decompose. So we have made an attempt of casting a brick by replacing certain percentage of fly ash to reduce textile waste and act as a replacing material for fly ash. The polyester fabric brick has been cast and some common test for brick has been done and results are taken.

II. Material and methods

To cast a Polyester fabric brick a mixed proportion is made and quantity of the material taken are calculated. We cast a three trials of brick with different proportion by replacing fly ash with 5%, 10% and 15% of polyester fabric. Nominal mix for casting a normal fly ash brick . Design of standard fly ash brick as per IS 12894:2002,



AN EXPERIMENTAL INVESTIGATION USING GLASS POWDER AND STEEL SLAG INSTEAD OF CEMENT

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ABSTRACT: Pollution from cement is absolutely unbelievable. According to research for this article, the manufacturing of cement accounts for 5% of all man-made emissions worldwide. Cement is what holds concrete together, despite the fact that the terms are frequently used interchangeably. We manufacture over 4 billion tons of cement globally, and between the chemical processes and the fuel required to power them, they release an astounding 900 kg of CO₂ for every ton of cement produced. There might be an effect if there was a cement substitute that was as effective at reducing these emissions. An effective substitute for cement would be a mixture of glass powder and steel slag to create concrete. The truth is that Portland cement is not nearly as strong as steel slag and glass powder. It is able to withstand minor shocks.

I. INTRODUCTION

one of the most widely used building materials in the world. In recent years, it has become more and more common to employ residual materials and residues in concrete. Using these materials has various beneficial ecological consequences, including minimizing landfill fees, conserving energy, and protecting the environment from potential pollution, in addition to lowering the cost of cement and concrete manufacturing. They can also improve the mechanical properties, microstructure, and durability of the mortar; furthermore, the concrete is stronger than standard M25 concrete.

II. MATERIAL USED

A) PROPERTIES CEMENT:

In this experiment, cement slag and glass powder concrete are replaced with ordinary Portland cement grade 43.

Table 1: Cement characteristics

S.NO	COVERAGE	RESULT
1	Grade applied	43
2	Particular gravity	3.14
3	Time typical	6.0%
4	Grade appliconstancy	33.0

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Artificial Intelligence in Pharmaceutical Healthcare (Book Chapter)

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¹Nandha Engineering College, Tamil Nadu, Erode, India²Nandha College of Pharmacy, Tamil Nadu, Valaikalmedu, India³Meza Scale Diagnostics LLC, Rockville, MD, United StatesView additional affiliations [v](#)

Abstract

Artificial Intelligence (AI) is an automated innovation to carry out tasks that traditionally depend upon human intelligence. AI and related technologies are becoming more widespread in companies and society and are starting to be functional in healthcare. They can transform numerous aspects of patient care as well as associated business activities involving suppliers and pharmaceutical organizations. The development of AI has changed the view of pharmaceutical care, even developing in areas where only human expertise and interaction were believed to be an option. The development of AI has not only eased the work of healthcare professionals but also improved pharmaceutical practices in hospitals. AI and robotics in healthcare are growing rapidly, especially for early detection and diagnostic application. It allows them to do what humans do, often in a more efficient, easier, and cheaper way and saving time. It can detect minor patterns that humans would completely overlook. This chapter provides a review of the AI applications in health status and the benefits of robotics in surgery. It covers the use of AI in the regular monitoring of health as well as digital consultation. It also details the role of patient medication adherence in the prevention of medication errors. © 2024 selection and editorial matter, Mulsicharam Bhupathyraaj, K. Rerita Vijaya Rani, and Muthala Mohamed Essa; individual chapters, the contributors.

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- The Omnipotent and Omnipresent Inevitability of Artificial Intelligence (AI): AI is All about Creating a Win-Win Situation
- Preface
- An Overview of Artificial Intelligence-driven Pharmaceutical Functionality
- Artificial Intelligence in Pharmaceutical Technology: Scope for the Future
- Applications of Artificial Intelligence in Drug Delivery Systems
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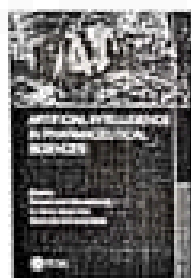
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Chapter

Role of Artificial Intelligence (AI) Drug Discovery and Development

By Prabhu Subbanra Gounder, Sabana Ponmozamy, Selvaraj Hemalatha, Hanan Fahad Alharbi, Kiruba Mohandoss, Mullaicharam Bhupathiraj

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ABSTRACT

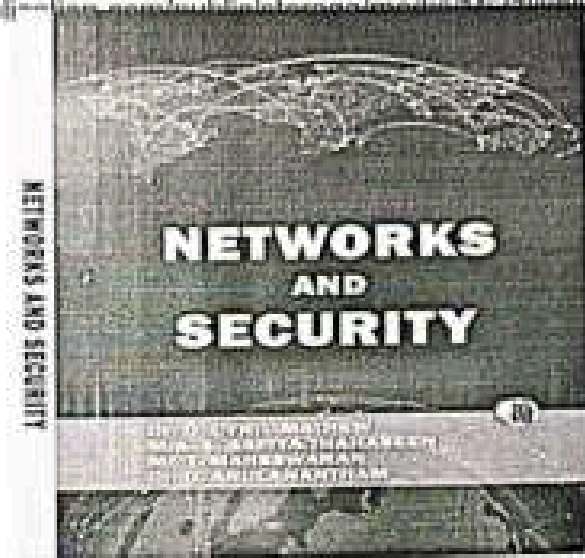
It is anticipated that the use of Artificial Intelligence (AI) in the pharmaceutical sector will attract billions of dollars in funding in the near future, underscoring the enormous development potential in this particular area. This chapter presents an overview of prospective applications of AI in synthetic compounds and natural bioactive-based drug research and development process. It also emphasizes both the benefits and drawbacks of AI in comparison to more traditional approaches to these activities. The early stages of novel drug discovery and preclinical drug development are the only areas of emphasis (stopping short of uses of AI for clinical trials). Several start-up companies are currently utilizing AI to enhance the synthetic compounds and natural bioactive-based drug discovery and development projects. To demonstrate the tremendous benefits offered by implementing state-of-the-art AI across the pharmaceutical spectrum, a variety of through case studies are featured. Due to the ability to conduct simulations using these technologies, this body of work supports the roles of AI in facilitating drug development and discovery procedures, making them more cost-effective or even eliminating the need for extensive clinical trials.



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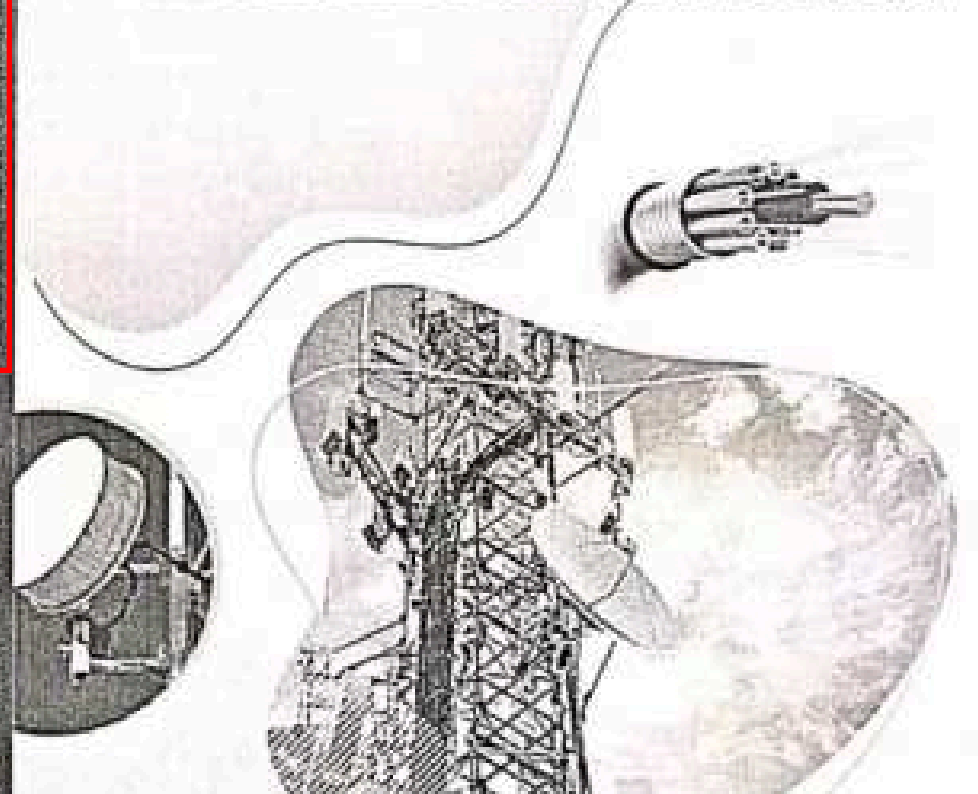
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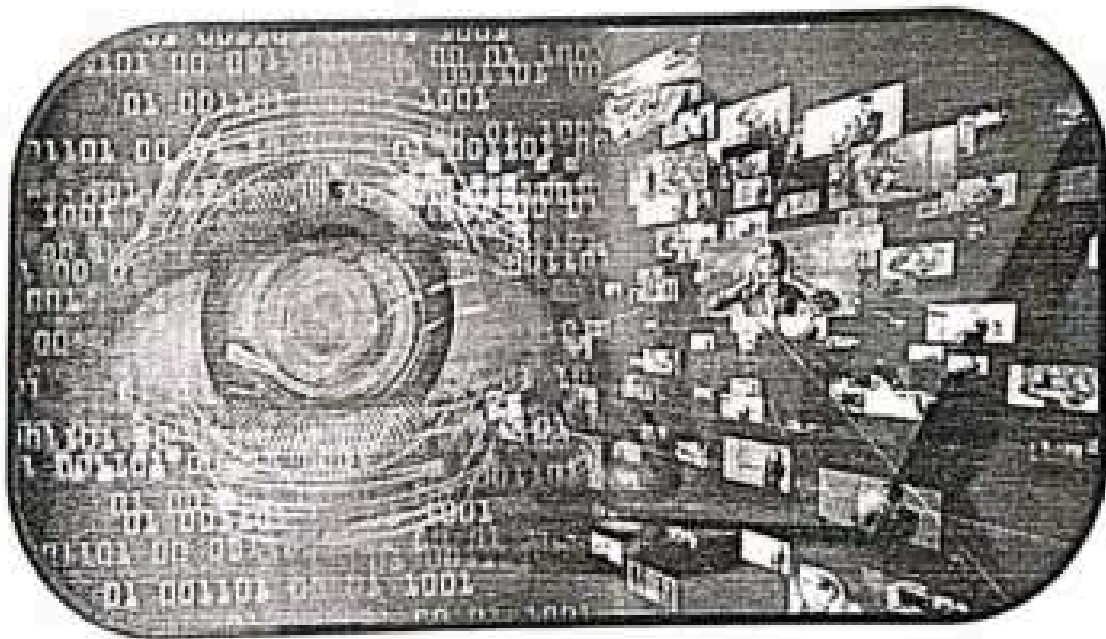
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Analysis of Electric Vehicle Performance in SRM Drives Using Fuzzy Logic

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Abstract: The electrical drive system is crucial to the drive performance and safety of electric vehicles (EVs). In contrast to the traditional two-wheeler driven EVs, the sensor less low-cost current controller in SRM drives for an electric vehicle application, can steer the vehicle by controlling the whole data speed of each wheel independently, yielding a very simple distributed derivation with high efficiency and reliability. Due to the lack of reducers, the direct-drive SRM needs to face more complex working conditions and design constraints. During the implementation, the requirements of the motor are taken through the practical EV driving cycles which are collected from the campus. Based on these requirements, two models are proposed as the preliminary designs for the SRM drives. The finite-element model and thermal network model are employed to verify the performance of the optimized SRM drives. An optimal design scheme is selected by comparing the comprehensive performance of the two optimized motors. In addition to that a duty-cycle model predictive current control is adapted to the drive motor. Finally, prototype has been developed and tested for their works.

Keywords: Switched Reluctance Motor, Pic, Converter, Sensor less, Electric Vehicles, Drives, Fuzzy Logic.

I. INTRODUCTION

This chapter provides an overview of Switched Reluctance Motor (SRM) in EV, outlining its main advantages and drawbacks using Fuzzy Logic. The optimization method for a sensor less low-cost current controller method in an electric vehicle application for a campus patrol EV based on a practical driving cycle. An efficient multi-objective optimization method is employed to the motor to improve its performance considering different operational conditions. The aim of the first sensor less method is to detect the rotor position electronically in a simple way in order to minimize the implementation cost, while keeping reasonable performance of the drive itself. In other words, the method is able to estimate the rotor position in applications that do not require high "dynamic" performance. The second sensor less method detects the rotor position based on either current or flux linkage using an observer machine model. The aim of the method is to achieve high resolution of rotor position in order to maximize the performance of the drive regardless of cost, which means that robustness and high dynamic performance are of high priority. The principle of the switched reluctance motor was introduced many years ago, however, the boom in its development started around 25 years ago with the rapid growth of power electronics devices and microcontroller technologies. The SRM drive, as other motor technologies, has benefited enormously from advances over the years in solid-state switching devices, such as diodes and transistors. This has opened the window to control the SRM drive electronically and more efficiently. The development of SRM drive technology has seen significant progress over the past few decades, particularly with advancements in power electronic devices and microcontroller technologies. These advancements have facilitated electronic control of SRM drives, leading to improved efficiency and performance.

II. LITERATURE SURVEY

The Author says that the analysis of the quality of different adjustments in DC thyristor electric drives can made using 12- pulse converters with parallel connection of valves [1]. By reducing the usage of fossil fuels, the electric vehicles will be the future of transportation to manage the increasing demand. To fulfil the high mileage demand and to reduce time fast charging is needed [2]. Power electronics technology is essential in this evolution and such that are quite mature and the systems designed should have high reliability which could be quite complicated in electrical perspective [3]. By the usage of vehicle and road operation the characteristics and the proportion of electric mileage vary [4]. Electric Vehicles connect with power grid analyses the structure of charging equipment and measures two aspects such that power grid side charging safety and equipment side charging safety [5]. This paper deals with the existing variants of propulsion systems on the market in order to find out relevant information about the characteristics of the electric vehicle [6]. This paper deals with the thermal characteristics of the electric vehicle to know the capability of the vehicle up to which it can withstand [7]. This paper notifies the sufficient torque for the motor to run efficiently without much losses [8]. This paper says the demand prediction model driven by driving track in rural areas and provides Particle Swarm Algorithm to find the optimal charging plan [9]. This paper deals with the sensor less control strategy of a fast EV battery

IoT Based Weather Reporting System Using AI Technique

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Abstract: Traditional weather forecasting methods often face limitations in accuracy. Accurate weather forecasts are crucial for implementing proactive safety measures, especially in regions prone to natural disasters. By addressing these needs, the IoT-based weather reporting system with AI integration aims to revolutionize how we collect, analyze, and utilize weather data for the benefit of society and various industries. Weather plays a significant role in transportation safety and logistics. Timely and accurate weather information helps in planning routes, managing traffic, ensuring the safety of commuters, thereby improving overall transportation efficiency. Farmers heavily depend on weather patterns for crop management. This project focuses on developing an IoT-based weather reporting system enhanced with AI techniques. Leveraging Internet of Things (IoT) devices for data collection, the system integrates advanced artificial intelligence algorithms to analyze and predict weather patterns. The AI algorithms process real-time data from various sensors to provide accurate and timely weather reports. This approach aims to enhance the precision of weather forecasting, enabling better preparedness for adverse conditions and facilitating informed decision-making in diverse sectors.

Keywords: Weather monitoring, IoT, Artificial Intelligence, ESP32 camera module, MSP430 microcontroller.

1. INTRODUCTION

The Internet of Things (IoT) has altered the way which connect with the surrounding. It has enabled everyday objects to be connected and communicate with each other, leading to a more efficient and smarter world. IoT has had a significant impact on various industries, such as healthcare, transportation, manufacturing and agriculture, by providing real-time data about processes, systems and environments. This continuous data collection and analysis have led to improved decision-making, increased efficiency, and cost savings. One of the key areas where IoT has made a significant impact is weather monitoring and reporting. Traditional weather monitoring systems rely on manual measurements and weather stations covering limited areas. These systems are often expensive, require manual installation and maintenance, and have a high risk of human error. As a result, they cannot provide timely and accurate weather information that is crucial for various industries and individuals. To overcome these limitations, we propose an IoT-based weather reporting system that leverages artificial intelligence (AI) techniques to enhance the accuracy and efficiency of weather monitoring and reporting. This system uses sensors, microcontrollers, AI technology, and other components to collect and analyze real-time weather data and provide accurate weather forecasts. The proposed system incorporates various sensors such as CO2, O2, wind speed, LM35, humidity, dust, and rain sensors, which are strategically placed in different locations to collect data on different weather parameters. These sensors are connected to an MSP430 microcontroller, which acts as the central processing unit of the system. The microcontroller collects data from the sensors and sends it to the cloud server for further analysis. The data is then analyzed using AI techniques, specifically artificial intelligence Internet of Things (AI-IOT) technology. This technology combines AI and IoT to analyze large amounts of data and make intelligent decisions based on data patterns and trends. The AI-IOT technology used in our system uses machine learning algorithms to analyze the weather data and provide accurate weather forecasts. To ensure the reliability and security of the system, an alarm and ESP32 CAM have been integrated into the system. The alarm is used for warning of severe weather conditions, such as hurricanes, tornadoes, and floods, providing individuals and industries with enough time to take necessary precautions. The ESP32 CAM, a camera module, is used for additional security measures, as it captures images of the weather conditions and sends them to the cloud server for further analysis. The data collected and analyzed by the system is displayed on an LCD screen, making it easily accessible to users. The system's user-friendly interface allows individuals and industries to access real-time weather information and make informed decisions. Our IoT-based weather reporting system offers a cost-effective and efficient solution for monitoring and reporting weather conditions. The system's wireless and automated design eliminates the need for manual measurements and maintenance, reducing the overall cost and labour. Also, the real-time data collection and analysis provide accurate weather information, which is crucial for various industries like agriculture, transportation and disaster management. The system's AI technology not only enhances accuracy but also helps in predicting natural disasters and taking necessary precautions beforehand. This proactive

Artificial Electrical Pulse Generation To Revive A Stalled Heart Using IOT

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Abstract: The paper aims to address the rising incidence of heart attacks and providing artificial electrical pulses for reviving a stalled heart by leveraging the Internet of Things (IoT). The use of IoT involves monitoring heart rates to detect potential heart attacks. The primary goal is to demonstrate how the IoT can be employed to deliver artificial electric pulses to a stalled heart, potentially reducing the death rate, associated with heart attacks.

Keywords: Internet of things (IoT), Wearable, Stalled heart, Sensor, Defibrillator, Microcontroller.

I. INTRODUCTION

The paper explores the use of electrical pulses, a method known as electrical defibrillation, to revive a stalled heart. While traditional defibrillation is effective for certain heart rhythm issues, it may not always work in cases of cardiac arrest. The research focuses on the feasibility and effectiveness of electrical pulses directed at the heart muscle to restore normal cardiac activity. The goal is to determine if this approach can be a viable, long-term solution for reviving a failing heart. The study introduces a device designed to deliver these pulses directly to the heart, minimizing their impact on surrounding organs compared to conventional methods. The research suggests that artificial electrical pulses could potentially provide a sustained solution for reviving stalled hearts, offering hope for saving lives.

II. LITERATURE SURVEY

The use of IoT in healthcare focuses on the development of an automated life-saving alarm system to monitor patients' vital signs, enabling caregivers to receive more attention. The system detects irregular heartbeats, preventing heart palpitations, heart attacks, and strokes [1]. Advancements in ambulatory and remote monitoring solutions for cardiac diagnostics show early detection of potential life-threatening conditions, but non-technical barriers and regulatory concerns need to be addressed [2].

The integration of IoT based wearable devices can monitor cardio-vascular diseases and provide remote healthcare to older adults. It analyzes commercial and non-commercial wearable [3]. Wearable technologies are used in remote cardiovascular disease screening and diagnosis. Challenges exist, but with evolving sensor and computer technologies, wearable could become integral to cardiovascular practices [4]. They have developed a raspberry pi-based health monitoring system that uses IoT to detect body parameter like blood pressure, temperature, and heart rate. The system connects patients to doctors, reports abnormalities to concerned parties via messages, emails, and WhatsApp, and stores information for future analysis [5]. Heart attacks are a significant cause of death, and an IoT-based innovation uses heart rate monitoring to detect them. This method uses an Arduino board, pulse sensor, and Wi-Fi module to measure heart rates [6]. A wireless wearable ECG system is being developed to detect unusual heart conditions in high risk patients, using three electrodes, a java-focused framework, and a web-enabled surveillance network [7]. Heart attacks are causing deaths due to the unawareness of warning signs. Heart rate is often measured using oximeters and ECG machines, but they are not indefinitely used. This research proposes a method for detecting heartbeats directly, allowing doctors to check pulses using IoT without visiting patients [8].

III. PROPOSED SYSTEM

A device will be implanted in the patients' chest, which will monitor their heart rhythm and send their information to a monitoring system. This system will record the patient's heart rhythm and alert medical experts when an irregular or stalled heartbeat is detected. An artificial electrical pulse will be sent to the heart to revive it. Following heart revival, patients receive follow-up care to ensure proper functioning and prevent future stalled heart episodes. This component powers all circuit components. The voltage of the circuit is set to a suitable level for the component, which detects the heart rate, transmits the data to the PIC microcontroller based on the data received from the heartbeat sensor, and sends the appropriate signals to the other components in the circuit to send the data from the PIC microcontroller to the LCD to be activated as shown in figure 1.

AI Based Crack Detection and Monitoring for Under Water Application

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Abstract - Infrastructure maintenance, especially in underwater environments, poses significant challenges due to the harsh conditions and limited accessibility. Submerged structures, such as pipelines, bridges and offshore platforms, are susceptible to deterioration, and timely detection of defects, particularly cracks, is crucial for ensuring structural integrity and preventing catastrophic failures. This paper presents an Artificial Intelligence (AI)-based approach for the detection and monitoring of cracks in underwater structures using advanced imaging and machine learning techniques. The proposed system employs underwater cameras and sensors to capture high-resolution images and collect relevant data from the submerged structures. These data are then processed using computer vision algorithms to identify potential areas of interest that may indicate the presence of cracks. Node MCU ESP3266 is an one of the main component in the hardware, which is used for wireless operation and communication. Furthermore, a real-time monitoring system is integrated to enable continuous surveillance of the underwater structures. The monitoring system utilizes the processed data to track changes in crack dimensions, growth patterns, and structural deformation is essential for predicting potential structural failures, facilitating proactive maintenance measures, and optimizing resource allocation for repair and rehabilitation.

Keywords - Artificial Intelligence (AI), Internet Of Things (IoT) crack detection, convolution neural network, PIC controller

INTRODUCTION

AI-based crack detection and monitoring for underwater applications represents a cutting-edge approach in the field of structural health monitoring (SHM) and maintenance of submerged structures. The underwater environment poses unique challenges for infrastructures integrity, particularly in critical structures like pipelines, offshore platforms, and under water bridges. The detection and monitoring of cracks in these structures are crucial to ensuring safety, preventing environmental hazards, and optimizing maintenance efforts.

Artificial intelligence (AI) technologies, including machine learning and computer vision, play a pivotal role in the automating and enhancing the accuracy of crack detection and monitoring processes in the underwater settings underwater environments often have low visibilities due to factors such as turbidity, sedimentation, and low light conditions. These challenges make traditional visual inspection methods less effective. Submerged structures are exposed to corrosive saltwater, biofouling, and extreme pressure conditions, which can impact the structural integrity over time. Manual inspection and maintenance of underwater structures are costly, time-consuming, and poses risks to human drivers. Automation desirable to streamline processes and reduce operational expenses. AI-based crack detection and monitoring for underwater applications represent a significant advancement in the field of structural integrity management. As technology continues to evolve, these systems are poised to play a crucial role in ensuring the safety and reliability of submerged infrastructure worldwide.

II. LITERATURE SURVEY

Underwater concrete structures play a critical role in various civil engineering applications, including dams, bridges, and offshore platforms. However, the detection of cracks in these structures poses significant challenges due to the murky underwater environment and the complex nature of concrete degradation (1). The presence of cracks on dam surfaces can compromise their structural integrity and poses significant risks to downstream communities and ecosystems (2). Concrete structures are integral components of various civil engineering projects, and the detection and monitoring of cracks in concrete play a crucial role in ensuring structural integrity and safety (3). Cracks in concrete dams poses serious threats to the safety and stability of critical infrastructure, necessitating effective detection methods for early intervention and maintenance (4).

To validate the effectiveness of the proposed approach, experimental tests are conducted on underwater concrete beams subjected to controlled damage scenarios. Piezoelectric sensors embedded in the beams capture ultrasonic signals before and after damage initiation, which are then processed using time reverse modelling algorithms to detect and localize damage (5). Tunnels are critical infrastructure components that require regular inspection and maintenance to ensure their structural integrity and safety. Water leakage and cracks in tunnel linings are common issues that can lead to significant risks and costly repairs if left undetected (6). Experimental evaluation conducted on real-world subway tunnel images demonstrate the effectiveness of the

An Efficient and Credible Grid-Interfaced Solar PV Water Pumping System with Energy Storage

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Abstract - The increasing demand for sustainable agricultural practices has prompted the exploration of alternative energy sources for water pumping systems. In this abstract, it presents a solar-powered agriculture water pumping system integrated with a Brushless DC (BLDC) motor. The system harnesses solar energy through photovoltaic panels, converting it into electrical power to drive the BLDC motor. BLDC motors offer advantages such as high efficiency, precise control, and minimal maintenance, making them ideal for agricultural water pumping applications. Key components of the system include solar panels, a power conditioning unit, a BLDC motor controller, and a pump. The solar panels capture sunlight and convert it into direct current (DC) electricity, which is then regulated and optimized by the power conditioning unit. The BLDC motor controller manages the operation of the motor, adjusting speed and torque as needed to meet varying water demand. The system's design prioritizes reliability, efficiency, and ease of maintenance to ensure optimal performance in agricultural settings. The implementation of such systems holds the promise for addressing water scarcity challenges and contributing to agricultural resilience in diverse regions worldwide.

Keywords: *BLDC Motor, Solar (PV) energy storage, Universal bridge, Controller.*

I. INTRODUCTION

In recent years, the agricultural sector has been increasingly turning towards sustainable and environmentally friendly practices to address challenges such as water scarcity, energy consumption, and climate change impacts. One notable advancement in this pursuit is the integration of solar energy with water pumping systems, particularly in the context of agriculture. Solar-powered water pumping systems offer a compelling solution to meet irrigation and livestock watering needs while reducing reliance on conventional grid electricity and mitigating greenhouse gas emissions. The integration of BLDC motors with solar energy in agriculture water pumping systems involves harnessing sunlight through photovoltaic (PV) panels and converting it into electricity to power the motor. This setup enables farmers to utilize renewable energy sources, thereby reducing operational costs and environmental impact while ensuring reliable water supply for crop irrigation, livestock, and other agricultural activities. This introduction sets the stage for exploring the various aspects of solar-powered agriculture water pumping systems utilizing BLDC motors. It emphasizes the significance of sustainable agricultural practices, the potential of solar energy in meeting water pumping needs, and the advantages offered by BLDC motor technology in enhancing system efficiency and performance. Through further examination, this study aims to elucidate the feasibility, benefits, and challenges associated with implementing such systems, contributing to the advancement of sustainable agriculture and renewable energy integration.

II. LITERATURE SURVEY

Sizing a solar water pump with cost-efficient considerations is essential for making solar irrigation systems accessible to gardeners. Evaluating the advantages and disadvantages of different storage configurations, gardeners can make informed decisions that align with their needs and budget constraints. This research strives to bridge the gap between traditional pumping systems and solar-based solutions in a practical and affordable manner. Remember, when it comes to embracing solar water pump systems, understanding the nuances of energy storage is key to sustainability and cost-effectiveness. Let harness the power of the sun efficiently for a greener future [1]. Providing sustainable energy and water supply to communities like Chete in Angola is essential for their development and well-being. By harnessing the power of renewable energy sources

Solar based wireless charging for electric vehicle using ANN algorithm

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Abstract: The Most individuals drive electrically powered vehicles. Currently, there are issues with the chargers used in electric vehicles, and there are certain challenges with charging. Many individuals utilize chargers for their electric cars. The suggested method describes how to use wireless charging for electric vehicles and highlights some of its benefits. An ANN algorithm overcomes the management of wireless charging. While wireless charging is common in other countries, it is not present in India and has not advanced significantly. This idea aids in achieving the goal of implementing a wireless charging system for Indians. Additionally, this idea helps in determining the requirements of the wireless charging system. The efficiency and security of the system may be improved by employing the ANN algorithm to control the router module. Furthermore, this approach was primarily developed for low-cost operations.

Keywords: Solar energy, Wireless charging, Electric vehicles (EVs), Artificial Neural Network (ANN).

1. INTRODUCTION

The evolution of electrical motors (EVS) has spurred revolutionary improvements in charging technologies, with wi-fi charging rising as a transformative solution. Traditional charging techniques contain bodily connecting the EV to a strength source however, the arrival of wireless electric vehicle charging (WEVC) represents a paradigm shift within the manner we strength and recharge electric powered motors. Batteries are ubiquitous in our everyday lives, from smartphones and laptops to operation of those batteries is crucial for more than one reasons. And dependable overall performance of batteries, stopping troubles like overheating, overcharging, and undischarging, that may cause decreased potential or maybe catastrophic failures. Second, powerful battery control can drastically make bigger the operational existence of batteries, which is vital in programs in which substitute or protection is costly using the ANN algorithm, it may assist to manipulate the complete module with it, which allows to growth the performance and the protection of the system. Literature Survey

As it produces enough torque to allow the vehicle to move, an electric motor is sometimes referred to as the engine of an electric car, particularly one that is fully electric. Thus, it is imperative that every element associated with the electric motor be meticulously planned and modeled. In this instance out of all the losses in a pure electric car, the motor losses account for the majority. Consequently, to significantly lower the vehicle's energy consumption, it becomes necessary to eliminate such losses and extract the greatest amount of efficiency. An induction motor's overall optimized loss equation is presented in this research. This research compares the thermal characteristics of the exteriors of conventional (combustion engine) and electric vehicles. The thermal cameras offer comprehensive categorization data associated with vehicle type recognition and can supplement or replace visible spectrum video cameras and other conventional sensors. The thermal photos were assessed using an infrared thermography camera. The use of electric vehicles (EVS) will enable transportation to meet population growth demands while lowering reliance on fossil fuels. Today's EVS are inefficient since they need a lengthy charging hour. To meet the increased mileage requirement of electric cars and shorten the time required for charging them, fast chargers are thus necessary, and this will improve the performance of EVS compared to current models. A beidou system-based electric car charging demand forecast model is put forth, powered by driving track data in rural regions. A mathematical model with several goal functions of the scheduling strategy is constructed based on the expected charging conditions of rural electric vehicles, and the particle swarm algorithm is utilized to identify the best charging schedule. According to the forecast, the best approach for scheduling electric car charging may efficiently minimize the peak-to-valley demand differential, minimize grid load fluctuations, and optimize financial gains. The transportation industry's electrification is progressing quickly. All automakers have aggressive plans to electrify their fleet of vehicles to meet societal and consumer expectations and provide carbon-neutral means of transportation for people and cargo. Power electronics technology is both rapidly developing technologically and fundamental to this progress. A few of the innovative technologies are quite developed, and because of their potential electrical complexity, the systems they are built for need to be highly reliable. Plug-in hybrid electric vehicles' (PHEVs) energy consumption and emissions depend on how the car is used and how much of its mileage is on pure electricity.

Railway Accident Prevention and Safeguarding the Tracks using Lora Technology

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ABSTRACT: In this modern world, railway transportation plays an indispensable role in societal connectivity. Indian railway uses various technologies for transportation schedules and safety factors. Even though there are a lot of accidents and loss of resources. Railway track damages, obstacles, and signal issues are the major reasons for train crashes. After a train accident, significant impact occurs on people, the train's interior, exterior, and the tracks, the recovery process is prolonged and costly. These unexpected accidents can be prevented by train safeguarding devices using LoRa technology. This technology is used for real-time wide-range communication without any signal issues. This device detects the obstacle inside the track using an Ultrasonic sensor and detects the crack that appears on the train track using an Infrared sensor. If any obstacles or cracks are present inside the track this system will alert us and the train stops automatically when an accident possibility occurs. In this device, the LoRa transmitter sends the real-time status of the train to the operating station via the Internet of Things. In addition, to avoid accidents in barrier-lifting areas which are connected to a LoRa receiver is used for awareness of the status of the train and automatic operation of the barrier-lifting gate.

KEYWORDS – Railway transportation – LoRa technology – PIC microcontroller – Infrared sensor – Ultrasonic sensor – Internet of Things (IoT) – Barrier lifting gate – Real-time communication – Railway safety – Crack detection – Obstacles detection – Swift response mechanism.

1.

INTRODUCTION

Railway transportation is crucial for connecting people and cargo, fostering economic growth, and improving mobility in modern societies. Despite its benefits, safety concerns persist due to factors like track issues, obstacles, and communication faults. Our project addresses these concerns by implementing LoRa (Long Range) technology for wide-range real-time communication between trains and operating stations. PIC microcontrollers serve as central processing units, managing data flow and executing control commands.

Various sensors, including ultrasonic and infrared, contribute to early hazard detection, triggering alarms and automatically stopping trains to prevent accidents. The LoRa receiver in barrier lifting areas receives real-time train updates, closing gates to secure railway passages during movement.

IoT modules form the communication backbone, enabling seamless data exchange between system components. This integration of IoT technology, LoRa communication, PIC microcontrollers, and sensors empowers railway operators with accurate, responsive data for monitoring and managing train operations. Through this holistic approach, our project strives to significantly enhance railway safety, mitigating risks associated with track issues, obstacles, and communication failures.

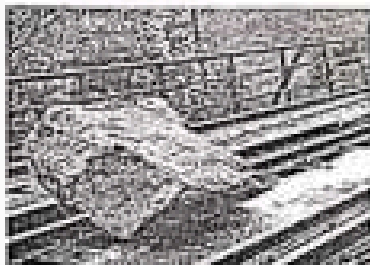


Figure 1. Obstacles in railway track

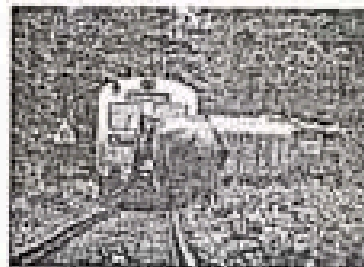


Figure 2. Animal Crossing on railway track

Verifying Robustness of Negative Voltage Regulation In Industrial Applications Using Flyback Converter

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Abstract - The use of negative voltage regulation in industrial applications has gained significant attention due to its ability to provide a stable and efficient power supply. The incorporation of a flyback converter in this system, along with solar panels, PIC controller, MPPT, Battery, PWM driver, and Power converter, it has further strengthened its performance. However, the robustness of this system needs to be verified to ensure its reliability in industrial settings. The feedback control loop, consisting of the PIC controller, monitors the output voltage and the PWM driver can adjust the pulses to maintain a constant output. This mechanism is crucial to achieving stability and efficiency in the system. One of the essential components in this setup is the DC-to-DC flyback converter. This converter utilizes the energy stored in the transformer during the switch-off period to provide a regulated output voltage. The regulation of the output voltage is negative voltage to eliminate the ripples and convert the low-voltage DC input to a high-voltage output suitable for industrial equipment. It greatly improves the efficiency of the system and reduces its size and cost, making it suitable for industrial applications.

Keywords—PIC Controller; PWM Driver; MPPT; Efficiency.

I. INTRODUCTION

A converter is a type of switched-mode power supply that uses a transformer to provide isolated and regulated output voltage. It is commonly used in industrial applications due to its simplicity, low cost, and high efficiency. Failure or malfunction of the regulated negative voltage can lead to serious consequences, such as damaged equipment or production downtime, resulting in significant financial losses. The efficient and reliable negative voltage is crucial for industrial systems. This is often required in various industrial applications such as power supplies, motor control, Battery charging, and voltage conversion. Therefore, it is essential to confirm the stability of negative voltage control in industrial applications to guarantee the dependability and safety of industrial systems. As part of this verification procedure, possible failure mechanisms are found by examining the converter performance under various conditions. The creation and application of dependable and efficient industrial systems will be further aided by the standardization of robustness verification techniques for negative voltage control. It is challenging to precisely forecast the system's performance under various scenarios due to its nonlinear nature. Negative voltage regulation and robustness verification techniques lack uniformity, which presents another difficulty. The majority of switching standards and recommendations do not offer a thorough framework for assessing the stability of negative voltage control, instead concentrating on the effectiveness and safety of converters.

II. LITERATURE SURVEY

Due to their energy efficiency, LEDs are being used in outdoor lighting more and more. As a result, external drivers are required for control and efficiency. Designing a 50W LED driver that uses peak inductor current and PWM voltage-mode control techniques. For high-brightness floodlights, a broad dimming range in LED drivers is made possible using a dual active bridge DC-DC converter. Its fast shut-off speed guarantees effective functioning, enhancing efficiency for rigorous illumination uses. An analysis of the effects of several LED driver types on harmonic production and energy quality is presented in this comparative simulation research. A high resemblance between simulation and actual findings is demonstrated when two driver circuit types-voltage stabilization via Zener diode and current stabilization via AL8806 chip-are evaluated for different LED designs [1] [2] [3].

Utilizing the intrinsic capacitance of constant LEDs, a unique capacitor-less DC-DC converter for LED drivers reduces output ripple. The energy use, power quality, harmonics, and power quality of LED lights in building systems, contrasting internal and exterior driver configurations via experimentation. A filtering circuit is devised to lower harmonic currents and increase power factor, and several case studies are carried out to provide insights into the application of energy-efficient LED technology in both newly constructed and renovated buildings. Using models that have been validated via experimentation, the effects of different driver circuit types on harmonic production and electric energy quality, and fine-tuning parameters to precisely match lab data. Strong

Machine Learning Approach Based Smart Energy Meter for Home Application

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ABSTRACT: A pic16877 micro controller is used to blueprint and run an IOT - enabled energy monitor system. The advanced system design put an end to need for manual electrical maintenance. The buyer is responsible for the cost of the electricity consumed. If the buyer does not pay on schedule, a remote server may cut off the electricity. By going to a website and entering their device IP address, users can see how much energy their device expends. The attached theft detection unit sends a signal to the corporate side via a GSM modem and they can cut off the power. On a corporate terminal, this signal will be displayed. The Wi-Fi module is used to connect energy meter readings to a public web-sites. This hardware interface circuit includes a pic161877a micro controller, an LCD display, relay driver and an esp8266 Wi-Fi module. The Wi-Fi module is used to transfer energy meter readings via an IP network.

Keywords: IOT, Node MCU, PIC Microcontroller, GSM.

1. INTRODUCTION

This paper proposes a flexible, all-encompassing power monitoring system that monitors the voltage and current in a remote system. It is influenced by corporate enterprises, everyday objects and open-source technologies.

This explores an GSM based smart energy metering system that replaces manual meter reading with do not necessitate visits to each house. To monitor and monitor power consumption, a Microcontroller based system with the sensor is used. The information is displayed on a led monitor. The meter's readings are immediately uploaded to the internet of things cloud. This paper emphasizes the importance of financial responsibility by encouraging us to pay our bills on schedule. This method has the main drawback that one has go to each house to check the meter and distribute the bills

Even after all bills have been paid in full, the electric board is infamous for eliciting reminders and alerts. This study has found a way to solve this problem by eliminating the intermediary and putting the client and service provider in direct contact. In the context of this study, the idea of a IOT - enabled smart energy meter has been presented. Given the fact that the microcontrollers consume little power, this procedure has been carried out. the primary objective of this study used to eliminate manual meter reading, accelerate electric system monitoring, extract real-time data that can be used to balance electric loads and reduce the power outages (blackouts), enable dynamic pricing (rising the electricity prices based on demand), and make more efficient use of power sources. With the support of the initiative, all of these goals can be achieved.

As these technologies progress a wide variety of intelligent device can now sense, recognize and communicate. The "Internet of Things" is the intelligent network created by these connected objects when they automatically connect to the internet. Developing fully automated energy meters can be remotely monitored and controlled. The energy meter is continuously monitored by an automatic meter reading technology. It sends the gathered information to the service provider via short message service when requested. As a result, people will be to do much less work. The scheme, which uses the existing system as a starting point, proposes a novel way to reduce the high costs associated with its design and maintenance. If the customer fails to pay the bill, the system is programmed to cut off the electricity to the remote server.

This will happen if the client falls behind on payments. This system's programming language is a modified version of C. The primary purpose is to identify areas where electricity is being stolen. This improves public health and keeps consumer prices from rising. If you give the thief a monthly a meter reading and rate, he will be caught as an added internet of things feature, this system provides consumers with an overview of the global connectivity landscape as well as the ability to check the meter reading from anywhere. When electricity is stolen consumers pay huge amount of money are exposed to danger.

IOT-Based Traffic Control System Using 5G Technology

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Abstract: In this paper, a PIC microcontroller that processes the collected data from the sensor and the real-time traffic condition data are stored in the IOT. The collected data are transmitted wirelessly and relay the processed information from the transmitter side to the receiver side, creating a seamless flow of data across the traffic network. On the receiver side, a complementary set of components, including a LoRa receiver, PIC microcontroller, LCD, and an integrated IOT platform, forms a centralized hub for data analysis and decision-making. In the LCD display, the real-time traffic condition is displayed on the receiver side. An AI algorithm interprets the transmitted data, analyzes the traffic pattern, and intelligently adjusts traffic signals in real-time. If the traffic is high, it changes the signal dynamically and reduces the traffic, thereby minimizing the congestion and improving the overall flow of vehicles. Which enables proactive adjustments to traffic signals, significantly enhancing road efficiency and safety.

Keywords: IoT, LoRa, PIC Microcontroller, Traffic control, 5G Technology.

I. INTRODUCTION

This paper proposes an intelligence that is used to reduce traffic by monitoring the real-time condition of the traffic using density sensors. Traffic jams are a big problem in the major cities. It's frustrating for people to go around. By using the IoT and 5G technology can help us to manage traffic in smarter ways. Some gadgets like cameras and sensors are used to understand the real-time conditions on the road. It tells us about the traffic condition. It's like keeping track of traffic. The sensors and cameras collect a vast amount of information, including vehicle speeds and environmental conditions, which are processed and analyzed to make informed decisions. They monitor the traffic and regulate traffic flow dynamically. By deploying these sensors at key intersections on roadways authorities gain real-time traffic patterns and congestion points and it is used to reduce potential hazards. These data are collected by the sensors are stored in the IoT.

IoT works by embedding sensors, chips, and other smart technology objects that we use every day. These gadgets are used to sense and collect data. Then, these data are sent over the internet to the central system where it is analyzed and used to make a decision-making process. IoT enabled the traffic management system to enhance safety by providing the early detection and mitigation of potential hazards. By integrating the sensors that gather the real-time traffic condition. It mitigates the risk of secondary accidents and improves overall road safety. Further integration of IoT and 5G technology opens smart transportation solutions. The 5G technology has it's unprecedented speed, low latency, and high capacity. 5G networks which enables the communication between devices and centralized control systems. The high-speed connectivity improves traffic management to respond swiftly to changing conditions, optimizing traffic signals, and rerouting vehicles in real-time. The main advantage of IoT based traffic control system is the ability to adapt dynamically to traffic demands. Traditional traffic signals operate on fixed time intervals, often leading to inefficiency during peak hours. Sensors are continuously monitoring the traffic conditions and this information is stored in the IoT to make a comparison with the old data. Adjusting the signal timings can reduce the waiting time minimizing congestion and minimizing travel time. This adaptive approach not only improves the overall flow of traffic but also reduces fuel consumption and greenhouse gas emissions associated with idling vehicles.

Another advantage of IoT-based traffic control systems is their flexibility and scalability. Whether they are used in suburban neighborhoods or bustling metropolises, these systems can be tailored to meet the changes of any environment and their unique needs. IoT and 5G technology can be expanded and upgraded to accommodate increasing traffic volumes. It also improves traffic flow and safety, IoT based traffic control system contributes to the overall sustainability of urban environments. Optimizing traffic patterns and reducing congestion can lower the fuel consumption, air pollution, and carbon emissions associated with vehicular traffic. Using IoT and 5G technology heralds a new era in traffic management to optimize mobility and enhance safety. Further innovation of this technology makes the possibilities for creating safer, more efficient, and more livable cities.

II. LITERATURE SURVEY

Design and Development of Transformer Health Monitoring System Using IOT

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Abstract: Transformers are essential parts of power networks that provide effective electrical energy distribution and transmission. Sustaining their well-being and operational dependability is essential for a continuous supply of power. Transformer Health Monitoring Systems (THMS) have been developed as a result of the evolution in transformer monitoring and maintenance brought about by the incorporation of Internet of Things (IoT) technologies in recent years. This study provides a comprehensive analysis of THMS driven by IoT. Among the main parts of the system are several sensors that are thoughtfully positioned inside transformers. These sensors include electrical parameter monitors, humidity detectors, temperature gauges, and oil quality analyzers. Operators can keep an eye on transformers remotely from a central location, which makes it possible to react quickly to new problems. There are numerous advantages to implementing such a system. Early defect identification improves system reliability by reducing the possibility of unplanned downtime. Early detection of possible risks strengthens safety precautions and helps to avert potentially disastrous failures. Predictive analytics-driven maintenance schedule optimization also results in lower costs and improved operational effectiveness. Nevertheless, there are difficulties in utilizing IoT technology to deploy THMS. Access control and strong encryption are still essential for maintaining data security. Careful evaluation and solutions are needed for the following difficulties: interoperability between various sensors and devices; scalability issues with maintaining a multiplicity of transformers; and seamless integration inside the current infrastructure.

Keywords – Internet of Things, Current sensor, Temperature sensor, Voltage sensor, A-D converter, Level sensor, Control circuit, PIC controller.

I. INTRODUCTION

This system is designed for online monitoring of distribution transformers parameter can provide useful information about the transformers health which will help the utilities to optimally use their transformers and keep the asset in operation for a long time. Transformer is used for providing electricity to the consumers. It provides the required voltage to the consumers by stepping down the voltage in distribution side. So, monitoring the distribution transformer is the unapproachable task for the electricity department to monitor these transformers regularly. This paper provides a solution for reducing the man power in monitoring of the transformer in online by analyzing various parameters like voltage, current, temperature. The power system any unbalance condition informed IOT LAB switch open without permission informed officer using IOT Line voltage stress & power transformer winding stress for premier & security controlling & monitoring using IOT. The on-line monitoring system integrates a Global Service Mobile (GSM) Modem, without alone single chip microcontroller and sensor packages. It is installed at the distribution transformer site and the above-mentioned parameters are recorded using the built-in 3-channel analog to digital converter (ADC) of the embedded system. Customers by measuring these parameters voltage, current, temperature of a windings, oil Level of a transformer by using various sensors and in the future trends various updates may be come across towards the innovative ideal system. Its installation on Wireless technology.

II. LITERATURE SURVEY

The IoT-based solution for monitoring and controlling of distribution transformers is quite easy and effective compared to manual monitoring method. The paper focuses on transmitting real time data from each transformer to IoT platform using LoRa (Long Range) modules. Selected advantages of this method are like, continuous monitoring of DTs, timely alerts to rectify the abnormality if any, thereby extending the lifetime of distribution transformers, simplifying. In this paper distribution transformers are monitored and controlled using LoRa modules and LoRa WAN (LoRa wide area network) which are referred under Internet of Things (IoT) technology. IoT is a network of smart devices that are embedded with sensors, actuators and network connectivity that enables them to collect and exchange data. A mobile monitoring system for distribution transformer was designed, implemented and tested.

An Embedded Based Electric Shock Prevention for Human Life Safety

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Abstract—In the mining business, electric shock is a serious safety risk. The goal of this project is to design an embedded system that can prevent electric shock to humans by detecting unsafe electrical circumstances related to the grounding of electrically operated mining equipment. A microcontroller unit, a relay driver unit, a relay, an energy meter, a human body voltage measurement unit, a reference voltage unit, a voltage comparison unit, and a power supply unit make up the system. The voltage between the human body and the ground is continuously monitored by the system to ensure it is operating properly. The device isolates the human body from the electrical threat if the voltage differential rises above a safe level. Monitoring the mining equipment's energy usage is another application for the system.

Keywords—Electric shock, human safety, prevention, embedded system.

I. INTRODUCTION

Mining operations come with several characteristic dangers by nature. Of them, electrical shock is one of the foremost vindictive dangers, with fatalities and devastating wounds detailed yearly. These mishaps regularly result from issues with electrical gear that go unnoticed or untreated, opening entryways for dangerous streams to enter. This extension takes on this critical point head-on by proposing the creation and application of a cutting-edge inserted innovation made particularly to counter electric shock dangers in mining settings. This methodology receives a proactive approach, forcefully distinguishing and killing any risks some time recently they might harmed representatives, going past routine systematic procedures. A complex voltage-observing instrument is at the center of the framework. Envision an attentive defender who is ceaselessly observing the electrical potential between an individual's body and the ground reference point. The soul of the framework is this real-time information, which offers crucial experiences in the electrical environment. Any deviations that may point to an up-and-coming risk can be rapidly recognized by the framework by persistently comparing this measured voltage with a pre-established secure edge.

Be that as it may, only recognizing a threat is deficient. This is when the implanted system's genuine control comes into play: A specialized microcontroller takes center arrangement, serving as the brains of the framework. With modern calculations and the capacity to translate information in real-time, it carefully looks at the approaching voltage readings. A basic reaction is started by the microcontroller when it facilitates a breach of the secure limit. Like a master conductor composing a chunk of music, the microcontroller triggers a hand-off. Consider this hand-off as a snap-action switch that can rapidly cut the conceivably unsafe electrical association. The innovation promptly separates the individual from the energized gear, subsequently disposing of the hazard of electric shock and maybe sparing lives, Fig. 1. The system's capabilities go past fair immediately decreasing shock dangers. Its plan incorporates a vitality meter, illustrating its acknowledgment of the significance of taking preemptive activities. Workers can recognize conceivable electrical framework issues some time recently they ended up with security concerns by analyzing these patterns, which gives them a noteworthy edge. Fair pictures being able to expect and settle hardware disappointments sometimes recently imperil life and appendage.



Fig. 1. Safety of using Electricity

In terms of securing human life within the mining segment, this extension marks a major headway. The inserted framework gives a comprehensive technique for decreasing the chance of electric shock by melding clever decision-making with real-time voltage monitoring. If, in conclusion, contribute to a more peaceful and effective mining segment by making working conditions more secure for miners around the world. Like a master conductor organizing a chunk of music, the microcontroller triggers a hand-off. Imagine this hand-off as an unequivocal switch, capable of disjoining the possibly perilous electrical association in a part moment. The innovation instantly separates the individual from the actuated hardware, in this manner dispensing with the chance of electric shock and maybe sparing lives. The system's essential defense is this fast and definitive activity.

Battery management and energy exchange control of battery with IoT for enhancement battery life

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Abstract: The aim of this study is to enhance battery performance and prolong battery life through the development and deployment of a complete Battery Management System (BMS) that integrates Internet of Things (IoT) technologies. To overcome this difficulty, the suggested system makes use of Internet of Things (IoT)-enabled sensors to continually check important variables such battery state of charge (SoC), voltage, current, and temperature. Advanced algorithms are used to interpret this real-time data and dynamically alter the charging and discharging settings to ensure best performance and avoid overcharging, over discharging, and overheating. Additionally, the system has bidirectional energy exchange control to maximize the battery's longevity by enabling effective use of the energy stored in the battery. To solve the issues of battery deterioration and improve overall energy sustainability, the integration of IoT technologies with battery management systems is a potential strategy. To verify the efficiency and scalability of the suggested method, further work may entail further algorithm improvement, integration with cloud-based analytics, and deployment in real-world settings.

Keywords: Battery Management System (BMS), Internet of Things (IoT).

1. INTRODUCTION

Batteries are used in many different applications in modern society, such as portable electronics, renewable energy sources, and electric vehicles. Even still, problems with limited lifespans, degradation, and wasteful energy use persist despite advancements in battery technology. To surmount these challenges, battery management approaches need to be inventive, using innovative control algorithms and contemporary technologies such as the Internet of Things (IoT). The aim of this project is to develop a comprehensive Battery Management System (BMS) that perfects battery performance and life using IoT technologies. Because they lack real-time monitoring and often rely on static control settings, conventional battery management techniques can lead to subpar performance and premature degradation. The proposed system, on the other hand, appears to supply dynamic control and monitoring capabilities provided by IoT sensors and communication protocols. Building and implementing a BMS that can continuously and in real-time monitor critical parameters including temperature, voltage, current, and state of charge (SoC) is the primary goal of this project. As critical indicators of the health and performance of batteries, these metrics must be precisely watched to ensure effective battery management. Sensors with Internet of Things capabilities collect this data, which is then processed and analyzed by complex control algorithms running on embedded systems. One of the key features of the proposed system is its ability to dynamically adjust the charging and discharging parameters based on available data and external conditions. Because common issues like overheating, overcharging, and over discharging can significantly reduce battery life, this dynamic management assists in preventing them. The system also incorporates bidirectional energy exchange control, which increases battery efficiency even more, to perfect energy consumption and minimize waste. Hardware and software development are combined in this process, which includes designing sensor nodes, communication protocols, and control algorithms. To provide seamless connection with existing infrastructure and compatibility with diverse applications, a range of Internet of Things platforms and protocols are being examined. Furthermore, by analyzing historical data and projecting battery behavior, machine learning algorithms enable predictive maintenance and problem identification. The significance of the research lies in its ability to address the pressing need for efficient battery management techniques in a limited number of industries. Using the power of IoT and advanced control algorithms, the proposed system aims to increase battery performance, prolong lifespan, and reduce maintenance costs. Because the technology is flexible and scalable, it may be used for a wide range of applications, from consumer devices to grid-scale energy storage systems. In summary, this research employs IoT to supply real-time control and monitoring, which ought to advance the field of battery management technology. The proposed system has the potential to promote widespread use of battery-powered solutions and increase overall energy sustainability by perfecting battery performance and extending its lifespan. Further optimization, real-world validation, and integration with emerging technologies will be part of the endeavor to gain even greater benefits.

Power Generator Using Manual Door and Window Momentum

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Abstract—Electricity is one of the most important human resources in the life of today's human being. It keeps the lights on, air conditioners and fans running throughout the hot weather and connecting people through smart phones. These household appliances will be causing higher dependency on electricity among customers. The electricity requirements are rising at alarming rate where the fossil fuels and other conventional resources that are being used for generation of electrical energy may no longer be sufficient to keep pace with increasing demand of the electrical energy of the world. This power generation depends on fossil fuel which also causes pollution and changes to the global climate. Thus, the main objective of this study is to propose a mechanical design of power generator which the input is from the movement of door openings. The power generator is designed and fabricated through various manufacturing processes and it consists of bevel gears, shafts and wheels. The power generator is then attached to a moving door and connected to a voltmeter. Result shows that the power generator is able to generate approximately of 12V and this is sufficient to charge a smart phone. To conclude, the designed power generator is not only environmental friendly but also has potential to be used by households because of its simple input requirement and small in size.

Keywords—Power generator; mechanical input; door openings

1 INTRODUCTION

Electrical technology has been changing rapidly from the invention of a simple light bulb to the development of sophisticated electronic devices such as smartphones, computers and smart watches. These inventions will be causing higher dependency on the electricity among users. Thus, the production of electricity will increase and the power generation which mostly depends on fossil fuels produces huge amount of emissions. The important thing in this case is the awareness of the environmental consequences of the existing energy system as the fossil fuels could change global climate figure in the modern environmental. With the awareness of the environmental situation, this study aimed to design and fabricate a power generator which can be used by the household to generate electricity without being harmful to the environment.

Nowadays, the researchers are urged to focus on the renewable energy field in response to the increasing energy demands and environmental pollution that need for alternative energy sources. Wind energy has become a major source of the renewable energy in many countries due to many advantages [1]. Wind power generators work the opposite of a fan. The wind turns the blades that eventually spin a shaft which connect to a generator and generates electricity. The interesting part of wind energy is that it can generate electricity by small operation and maintenance costs. Although the generation of electricity is quite environmental friendly and the wind is free, the disadvantage of using this system is the nature of the wind is unpredictable and become a critical factor on investment decision.

As the energy demand in the world is keep increasing, there are many small electricity power productions have been invented to overcome this problem. These power generators are invented basically for household use and for appliances that use only small amount of electricity to function. There are several types of small electric power generator such as micro hydro system which uses household water supply as the source to generate power [16]. There is also an approach to generate electricity which the source is from the temperature changes. This idea is using thermoelectric power generation system. This technology was better known in the middle of 20th century and the use of semiconductors with her band gap was found to perform better than two metals. The recent work done on improving the performance of the thermoelectric generation system is using the solar thermal energy and thermal concentration. Kraemer has demonstrated in his investigation that traditionally photovoltaic systems widely used flat panel whereas solar thermal systems generally use the optical concentrators to achieve high temperatures source for power generation.

Apart from that, there are also power generators that are using unconscious human's movement as its power input. Walking is a common activity performed in a person's everyday life. The energy is induced when the person's body weight is transferred to the ground when a person is walking. Therefore, the energy of the person from the foot step can be converted to the electricity by placing a device in a continuous human traffic such as in railway station platform, shopping complex or in a city footpath. This power generator uses piezoelectric effect to generate electricity. In this technology era, most of the gadgets or products that have been invented are run by the electricity. For an example, mobile phone is one of the necessary things that most people have. Mobile phone needs to be charged every day to ensure that it is always ready to be used. Although this

A New Multioutput DC-DC Converter for Electric Vehicle Applications

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Abstract - Electric cars (EVs) are gaining popularity due to their eco-friendly advantages and its enhancement in battery technology. To power the various electric system in an EV efficiently, multi output DC-DC converter plays an vital role. This article introduces the invention of a fresh multi output DC-DC converter exclusively tailored for EV usage. The suggested converter includes various output channels, each fine tuned for different voltage specifications needed by different parts like the propulsion motor, support systems and on board charging mechanism. By effectively controlling power distribution, the converter enhances the overall system efficiency and curtails energy wastage, thus expanding the driving range of the EV. Key design elements encompass high efficiency, small size and consistent performance under varying for?and?normal circumstances. The converter deploys sophisticated control algorithms to precisely output voltage and rapidly respond shifts in load requirements. Additionally, it incorporates features like soft-switching methods and optimization of passive components to minimize switching errors and enhances overall efficiency.

Keywords – Internet of Things, Electric Vehicle, Eco-friendly, DC-DC converter, PIC controller.

I. INTRODUCTION

Power plays a crucial role in our daily lives, fueling nearly every aspects of our contemporary world. The need of electricity is continuously on the rise due to technological progress and the growing population. Nevertheless, the generation of electricity using traditional methods like fossil fuels and nuclear power has notable environmental, economic and social conveniences. Global warming, air pollution and resources exhaustion are among the outcomes of depending on non-renewable energy sources. In recent times, there has been a shift towards exploring alternatives and sustainable approaches for producing electricity. Different renewable energy sources, including solar, wind and hydropower have been investigated and put into practice. However, there is still a necessity of further cutting-edge and effective solutions. This article introduces a newly designed multi output DC-DC converter tailored for EV applications, featuring advanced controlled algorithm, compact packages and high-efficiency power conversion techniques to meet the strict requirements of modern electric vehicles. Key design element encompass voltage regulation, thermal management and compatibility with various EV structures. The advancement of this DC-DC multi output converter marks a significant progress in EV power electronics technology, paving the way for more efficient and sustainable electric transportation solutions.

II. LITERATURE SURVEY

This paper presents an comprehensive review of non-isolated Bi-directional DC+DC converters designed for PHEV charge station application at municipal parking desk. The review covers the various converter topologies, control strategies and performance metrics, highlighting their advantage and limitations in terms of their efficiency, power density, cost and grid integration capabilities(1). The integration of renewable energy source such as solar, wind power into modern system necessitates efficiency energy conversion and management solutions. This paper proposes the utilization of three-level DC-DC converter as an efficient interface in two-stage integrated energy exchange (IEE) power system(2). The review covers the range of wide topologies including buck, boost, buck-boost and multi-level converter, discussing their advantages limitations and suitability for different high-power applications(3). The paper discusses the operating principles of ECC1 and their advantage in terms of magnetic coupling, leakage inductance reduction and enhanced power density. Furthermore, the paper outlines the design consideration, control strategies and performance of high power DC-DC converter utilizing ECC1, focusing on its suitability for its applications(4).

This paper presents a comprehensive characterization and Comparison of high blocking voltage insulated gate bipolar transistor (IGBT) and Inverted-Embedded Gate Transistor(IEGT) under both hard and soft switching conditions(5). This paper proposes a novel neutral-point-clamped(NPC) and pulse width modulation (PWM) inverter designed for high performance power conservation application . The proposed NPC PWM inverter offers several advantages over traditional NPC inverter, including reduced switching losses, improved harmonic performance and enhanced reliability (6). The results confirms the superior performance and efficiency of three level ZVS PWM converter compared to conventional converters positioning it as promising solutions for next generation power conversion system in renewable energy, electric vehicles and industrial applications (7). This paper introduces a novel neutral-point-clamped (NPC) a multi level a four quadrant dc-dc

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Performance Characteristics of a Newly Developed Asymmetric Seven-Level Inverter Utilizing Various Hybrid Pulse Width Modulation Strategies



Abstract: - This study heralds a notable breakthrough in inverter technology, holding promise for substantial improvements in voltage quality and the attenuation of harmonic distortions within power systems. This study concentrates on the design and implementation of a novel Seven-Level Asymmetric Inverter (NSLAI) by incorporating various hybrid Pulse Width Modulation (PWM) techniques. The primary goal is to improve the output voltage magnitude while decreasing the Total Harmonics compared to conventional PWM methods.

The investigation introduces a novel Seven-Level Asymmetric Inverter (NSLAI) with innovative Hybrid Pulse Width Modulation (PWM) strategy. The purpose of this study is to investigate the distinct features of a recently developed asymmetric seven-level inverter, with a focus on exploring its characteristics through the implementation of diverse hybrid pulse width modulation strategies. Hybrid PWM methodology intricately centers on enhancing voltage quality and achieving better harmonious spectral characteristics. The gate signal producing approach for this suggested PWM technology incorporates a hybrid PWM methodology that combines trapezoidal and sinusoidal waveforms, as well as a standard triangular carrier signal enabling NSLAI. The hybrid version of PWM practices is deliberately used to generate switching signals for the NSLAI. An intensive evaluation of numerous indicators of effectiveness across multiple modulation indexes leads to the demystification of quantitative findings that compare the unique Hybrid PWM practice with established PWM tactics. Notably, the hybrid reference Carrier Overlapping strategy has emerged as a leading approach surpassing conventional pulse width modulation techniques. It achieves a significantly higher fundamental Root Mean Square voltage output and remarkably lower percentage of Total Harmonic Distortion values compared to all within the hybrid reference Variable Frequency strategy. The principal analytical tool used in the modeling investigation is MATLAB-SIMULINK. This study marks a watershed moment in the development of inverters, claiming significant improvements in battery power quality and distortion caused by harmonics avoidance across power systems, as evidenced by extensive simulation and prototype-based discoveries.

Keywords: Hybrid pulse width modulation, seven-level asymmetric inverter, sinusoidal pulse width modulation, total harmonic distortion.

1. INTRODUCTION

The primary function of a Multilevel Inverter (MLI) lies in the synthesis of a desired AC output voltage by ingeniously amalgamating several DC voltage sources while maintaining an exceedingly low distortion profile. MLIs exhibit the remarkable capability to deliver high output voltages with minimal harmonic content, all without the need for transformers or a series of synchronized switching devices. The advantages offered by MLIs are manifold. Multilevel inverters have emerged as a pivotal development, particularly in the realm of medium voltage and high-power applications, thanks to their proficiency in shaping waveforms with an improved harmonic spectrum. The term "multilevel inverters" refers to inverters capable of producing output voltages that encompass more than the standard two voltage levels relative to the pole. This unique feature, which yields an output voltage level surpassing the ratings of the power semiconductor switching devices, firmly situates MLIs within the high-power inverter category. Moreover, the application domain of MLIs has expanded into the medium-power range due to their inherent advantages, which encompass reduced distortion, [1]. However, it is not without limitations, primarily the requirement for a considerable number of switches [2]. To circumvent these challenges, involving the cascading of smaller, dissimilar inverter circuits [3]. In one instance [4], a novel transformer-based cascaded multilevel inverter is outlined, capable of operating in both symmetric and asymmetric configurations. Additionally, a seven-level inverter utilizing series/parallel

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Visual Fire Alarm System: Leveraging OpenCV For Detections

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Abstract: The suggested system combines Open CV with real-time video feeds to detect fire alarms in real time. Pre-processing involves converting frames to the HSV colour space and using thresholding to separate out areas that resemble flames. Morphological techniques improve accuracy and reduce noise by further refining the segmented areas. Fire alarms are located by looking for contours in these areas. With possible applications in fire monitoring and safety systems, this methodical technique seeks to offer a dependable way for detecting fire alarms. The technology can effectively analyse video feeds and enable early detection and response to fire situations in a variety of environments by utilising computer vision algorithms on live camera streams. Its capacity to recognise particular visual clues connected to fire alarms makes it beneficial in enhancing safety protocols and maybe saving lives. Tight testing and optimisation, however, will be necessary to guarantee the system's dependability and functionality in a variety of settings.

Keywords— Fire Detection, Alarm System, Open Cv, Emergency Response.

1. INTRODUCTION

Using Open CV to construct a Fire Detection Alarm System is a significant step forward in utilising computer vision to improve safety protocols in home and business settings. Using real-time picture and video analysis, this system is aimed to detect the early indicators of fire by utilising Open CV (Open Source Computer Vision Library). By employing advanced algorithms to identify alterations in hue, movement, and additional fire-related cues, the system can promptly notify inhabitants and emergency services, therefore diminishing reaction times and perhaps save lives and assets. This novel method not only surpasses conventional smoke-based systems in terms of fire detection accuracy but also shows how computer vision technology can be used to make spaces safer.

1.1 FIRE DETECTION

Safe operations in homes and businesses depend heavily on fire detection, which calls for sophisticated systems that can identify fires quickly and precisely. Fire detection systems currently use complex algorithms to analyse real-time photos or video feeds, utilising cutting-edge technologies like computer vision to quickly identify the presence of flames or smoke. These devices can offer early warnings, enabling quick responses and possibly averting catastrophic damage or fatalities by utilising methods like colour and motion analysis. Fire detection systems, which use innovation to improve safety and security in a variety of settings, are essentially an essential layer of protection.

1.2 ALARM SYSTEM

The cornerstone of any security architecture is an alarm system, which offers an essential line of defence against potential threats and unauthorised access. As a result of technological breakthroughs, contemporary alarm systems now include advanced features like motion sensors, door and window sensors, and remote monitoring capabilities in addition to basic sound-based warnings. These systems are made to quickly alert authorities and residents to a variety of security breaches, such as fire, environmental threats, and intrusions. Alarm systems provide complete security solutions suited to the particular requirements of residences, workplaces, and other facilities by fusing resilient hardware with smart software. This protects valuables and fosters peace of mind.

1.3 OPENCV

The Open Source Computer Vision Library, or Open CV, is leading the charge to transform computer vision applications in a variety of industries. OpenCV, which was first created by Intel, has grown to be an indispensable resource for scientists, engineers, and developers all across the world because of its adaptability, effectiveness, and accessibility. With its wide range of features, which include deep neural networks, machine learning, object detection, image processing, and more, Open CV makes it comparatively simple for users to take on challenging visual tasks. Open CV keeps pushing the limits of computer vision



Optimizing Service Performance Through Hybrid Fog-Cloud Offloading

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Abstract: In this study, a Cloud server, Virtual Machine (VM) are scheduled to hosts according to their instant resource usage (e.g., to hosts with more available RAM) without considering their cost and long-term utilization. Also, in many cases, the scheduling and placement processes are computational expensive and affect performance of deployed VMs. In this work, a Cloud VM scheduling algorithm that considers process running VM resource usage over time by analyzing past VM utilization levels to schedule VMs to optimizes performance by using K-NN and Naive Bayes classification techniques. The Euclidean distance of K-NN is employed and then virtual machine is scheduled on the physical machine. The Cloud management processes, like VM placement affect already deployed services in the way to be minimize such performance degradation. Moreover, overloaded VMs tend to steal resources from neighboring VMs, so the work maintains VMs and CPU utilization. The results show that our solution outperforms traditional heuristic based physical machine selection as it learns the system behavior as well as it adapts over time. The usage of VM scheduling according to resource monitoring data extracted from past resource utilization (including CPU and VM). The cost of the physical machine gets reduced by fine tuning K-NN & NB classifier.

Keywords: Cloud Data Center, Virtual Machine, Energy Consumption, Resource Management, Task Scheduling.

1. INTRODUCTION

The rapid proliferation of new digital devices leveraging emerging networking technologies has led to the generation of increasingly sophisticated tasks. These tasks often necessitate or utilize applications that significant demands on processing power, data rates, and various resources [1] [2]. However, despite the advancements in device design, contemporary devices often struggle to run resource-intensive applications like virtual reality, smart healthcare, and action Internet of Things (IoT) applications. In contrast to traditional computing platforms, IoT nodes exhibit limited capabilities due to their inherent functionalities or operational environments such as factories and hospitals. To address these limitations, researchers have proposed the concept of task offloading, allowing resource-intensive applications to be executed remotely on high-performance servers. This approach is particularly relevant for scenarios where IoT nodes lack sufficient processing capabilities. Task offloading involves the execution of applications on fog nodes or cloud servers, thereby alleviating the computational burden on end-nodes. Fog nodes or cloud servers execute these offloaded applications on behalf of end-nodes, enabling the deployment of resource-intensive applications in transient, distributed environments. In cloud computing, task offloading has emerged as a prominent solution for executing high-complexity tasks across diverse domains. Cloud services offer extensive capabilities such as large storage, high-speed communication, and powerful processing units. Cloud computing services are accessible online from anywhere, attracting a significant user base. However, the geographical distance between edge-side devices or IoT devices and the cloud can introduce significant latency, particularly for real-time applications sensitive to delay. To mitigate this challenge, fog computing has emerged as an intermediary layer between cloud servers and edge-side devices. Fog nodes, positioned closer to end-nodes, facilitate quicker access to resources and reduce latency, thereby enhancing the performance of IoT applications.

In our project, we are focused on Virtual Machine (VM) scheduling, which is crucial for making the best use of resources and meeting Quality of Service (QoS) requirements. VM scheduling involves assigning VM instances to physical machines like servers or fog nodes, considering factors such as resource availability, workload, and performance goals. To do this efficiently, we are proposing to use machine learning algorithms, specifically K-nearest neighbors (K-NN) and Naive Bayes (NB). K-NN is a simple yet effective classification algorithm.

It works by finding the K-nearest data points to a given query point and assigning a label based on the majority class among them. In VM scheduling, K-NN helps predict the best placement for VMs by analyzing historical patterns. On the other hand, NB is a probabilistic classifier that relies on Bayes' theorem with a "naive" assumption of feature independence.



Detecting Lung Cancer in CT Scans Using CNN: A Deep Learning Approach

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Abstract: Lung cancer stands as one of the deadliest diseases worldwide, highlighting the urgent need for early detection and precise treatment strategies to combat its high mortality rates. Utilizing computerized tomography (CT) scans, especially in conjunction with deep learning models, has emerged as a pivotal approach for detecting lung cancer at its nascent stages. This study proposes a framework based on Convolutional Neural Networks (CNNs) for early lung cancer detection using CT scan images. Furthermore, we undertake a comparative assessment with leading models such as Inception V3, Xception, and ResNet-50. Our analysis encompasses key metrics including accuracy, Area under Curve (AUC), recall, and loss. Our findings reveal CNN's superiority, indicating its potential over traditional methods. Notably, CNN achieves an accuracy rate of 92%, an AUC of 98.31%, a recall of 91.72%, and a loss of 0.328, underscoring its promise in enhancing lung cancer diagnostic capabilities.

Keywords: Lung cancer, deep learning, convolutional neural network, CT scan images, early detection, comparative analysis, Inception V3, Xception, ResNet-50, accuracy, AUC, recall, loss.

I. INTRODUCTION

Lung cancer represents one of the most lethal and devastating forms of cancer globally. Its detection poses a significant challenge, with symptoms often manifesting in advanced stages. However, early detection coupled with appropriate treatment can substantially reduce mortality rates associated with this disease. While lung cancer typically originates in the lungs, early symptoms may occasionally manifest before its spread [1]. Over recent years, numerous techniques have emerged, and ongoing research aims to enhance the efficiency of lung cancer identification. Among these methods, CT scan imaging stands out as the most effective for early diagnosis, albeit interpreting and detecting cancer from CT scan images can pose challenges for medical professionals. Lung cancer manifests in various cell types, including adenocarcinoma, large cell carcinoma, and squamous cell carcinoma. Adenocarcinoma, prevalent among lung cancers, typically develops on the lung's outer surface. Large-cell undifferentiated carcinoma, characterized by rapid growth and widespread dissemination, can emerge in any lung region. Squamous cell carcinoma, associated with smoking, primarily affects the lung's central region. [6, 20] In the pursuit of detecting cancer, predicting treatment outcomes, and improving patient survival rates post-diagnosis, a plethora of methods are under exploration. Medical professionals and researchers employ techniques for screening, identification, and classification of cancers to facilitate early diagnoses. Presently, machine learning models are extensively utilized in critical medical healthcare scenarios. Among these, Convolutional Neural Network (CNN) based machine learning models stand out as particularly promising for early detection, observation, and classification of lung cancer using CT scan images. In medical imaging, CNNs are extensively used for tasks such as disease detection, diagnosis, and prognosis. For instance, in lung cancer detection using CT scans, CNNs analyze images to identify abnormalities indicative of cancerous lesions, assisting radiologists in accurate diagnosis and treatment planning.

II. LITERATURE SURVEY

This study [1] investigates lung cancer prediction models using machine learning and ensemble techniques. Existing research articles are reviewed, and novel ensemble methods are introduced based on a survey dataset of 109 individuals. Techniques such as XGBoost, LightGBM, Bagging, and Adaboost are evaluated using attributes including age, smoking, anxiety, and more. XGBoost emerges as the most effective technique, achieving an accuracy of 94.42%, precision of 95.66%, recall of 94.46%, and an AUC of 98.14%. This review explores [4] Cancer, characterized by its diverse subtypes, underscores the importance of early diagnosis and prognosis for effective patient management. Recognizing the significance of classifying patients into high or low-risk groups, numerous research teams in biomedical and bioinformatics fields have turned to machine learning (ML) methods. These techniques aim to model cancer progression and treatment by detecting key features from complex datasets. Artificial Neural Networks (ANNs), Bayesian Networks (BNs), Support Vector Machines (SVMs), and Decision Trees (DTs) are among the ML tools widely applied in cancer research to develop predictive models, facilitating precise decision-making. While ML methods enhance our understanding of cancer progression, rigorous validation is essential for their integration into everyday clinical practice.



SALES PREDICTION BASED ON SARIMAX TIME SERIES ALGORITHM

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Abstract—Businesses must perform time-series forecasting of seasonal item sales because it enables them to predict future demand and modify their inventory accordingly. This investigation compares the performance of three well-known machine learning methods for time-series forecasting of seasonal item sales: Support Vector Machine (SVM), Seasonal Autoregressive Integrated Moving Average with Exogenous Variables (SARIMAX), and Multi-layer Perception (MLP). A dataset of historical sales data is used to evaluate the algorithms. The data is split into training and testing sets, and measures like Mean Absolute Error (MAE), Relative Absolute Error (RAE), and Root Mean Squared Error (RMSE) are used to assess each algorithm's performance. The analysis's findings support the assertion that SARIMA- X provides greater accuracy than other methods in calculating the seasonal sales of the historical data.

Keywords—, Time-series forecasting, SARIMAX, ARIMA, Machine Learning

1. INTRODUCTION

Sales forecasting using machine learning and Angular View is a powerful combination that leverages data-driven insights and a dynamic user interface for effective decision-making. There are various methods of forecasting based on historical data or values, which have been refined and optimized through the development of science and technology. In terms of sales forecasting statistical analysis techniques for

forecasting sales, including time series, linear regression and other methodologies. Both multiple factorial linear regression models and time series. At the company level, sales forecasting is the major part of the business plan and significant inputs for decision-making activities. It is essential for organizations to produce the required quantity at the specified time. For that, sales forecasting will give the idea about how an organization should manage its budgeting, workforce and resources. This forecasting helps the business management to determine how much products should be manufactured, how much revenue can be expected and what could be the requirement of employees, investment and equipment. Machine learning techniques can be used to automatically create precise sales forecasting models using the wealth of sales data and related data. This strategy is significantly easier. It is adaptable, so it can adjust to data changes, and it is not biased by the quirks of a single sales manager. Yet, it runs the risk of overestimating the human expert's predictor's accuracy, which is typically faulty. For instance, businesses once produced goods without taking demand or sales volume into account, which resulted in a number of issues. Data on consumer demand for items is crucial for any producer to decide whether to increase or decrease the number of units produced because they don't know how much to sell. Companies will suffer losses if they don't take these guidelines into account when they compete in the market. Various businesses use various metrics to estimate their market and sales.

1.1 ROLE OF MACHINE LEARNING IN SALES FORECASTING



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PET VITAL TRACKER

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ABSTRACT— The Pet Vital Tracker project is all about making sure our pets stay healthy and happy, and we're tackling some big problems to make that happen. Right now, it can be tough to tell if our pets are feeling sick because they can't tell us with words like we can. Sometimes, by the time we notice something's wrong, it's already serious. That's a big worry for pet owners because we all want our furry friends to stay healthy and live their best lives. Not only that, but the tools we have to help us keep our pets healthy can be really expensive and hard to use. Going to the vet all the time can cost a lot of money, and some of the gadgets we can buy to monitor our pets' health are complicated to set up and understand. But that's where the Pet Vital Tracker comes in. It's like having a super smart friend who's always watching over our pets. This special device keeps an eye on our pets' health all the time, even when we're not there. It's designed to be really easy for everyone to use. All you have to do is put it on your pet, and it does the rest. Our main goal with the Pet Vital Tracker is to help pet owners understand their pets' health better. By giving us clear and simple information about how our pets are feeling, we can take better care of them. And because it's affordable and easy to use, more people can benefit from having one. To make the Pet Vital Tracker work, we're using the latest technology and working with experts who know a lot about pets and their health. With their help, we're making sure the Pet Vital Tracker does its job well and gives pet owners the peace of mind they deserve. But we're not stopping there. We're committed to making the Pet Vital Tracker even better over time. We want to keep listening to pet owners and experts so we can make improvements and add new features that make it even easier to take care of our pets. With the Pet Vital Tracker, we believe we can make a big difference in how we take care of our furry friends.

KEYWORDS— Pet health monitoring, real-time monitoring, data accuracy, accessibility, affordable pet care, technology integration, user-friendly design, collaboration, continuous improvement.

I. INTRODUCTION

In today's fast-changing world, technology is changing how we care for our pets. We have cool stuff like automatic feeders and GPS trackers that help us take care of our furry friends. One super cool thing that's changing pet care is the Pet Vital Tracker. It uses a special computer chip called NodeMCU to keep an eye on our pets' health. Pets mean a lot to many people. They're like family members, and we want to make sure they're healthy and happy. But sometimes, it's hard to know if our pets are feeling okay. We might not notice if they're sick, or we might not understand what they need. That's where the Pet Vital Tracker comes in. It's a smart system that helps pet owners take better care of their pets. It uses NodeMCU, which is like a super smart brain, to connect different parts together. These parts can sense things like the pet's heart rate, how much oxygen is in their blood, and even the temperature and humidity around them. With all this info, pet owners can see if something's wrong with their pet and get help early. The best part about the Pet Vital Tracker is how easy it is to use. It has a special app that shows all the important info about the pet's health in a simple way. Pet owners can quickly check if their pet is okay or if they need to do something to help. Plus, there's a GPS feature that helps track the pet's location. So, if the pet goes missing, it's easier to find them quickly. The Pet Vital Tracker is a big deal because it can change how we take care of our pets. It gives pet owners important info about their pet's health so they can keep them happy and safe. This helps strengthen the bond between pets and their owners, making the experience of having a pet even better. In short, the Pet Vital Tracker is on a mission to make pet care better with new technology. It's easy to use, keeps track of pet health in real-time, and can make a big difference in how we look after our beloved pets. Additionally, the Pet Vital Tracker promotes proactive pet care by providing early detection of health issues, allowing pet owners to intervene before they become serious. This can lead to improved outcomes and a higher quality of life for pets. Furthermore, the Pet Vital Tracker fosters peace of mind for pet owners, knowing that they can



FORECASTING VARIOUS CHILDBIRTH METHODS USING MACHINE LEARNING

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Abstract: Childbirth is a multifaceted process influenced by various factors, including maternal health, fetal conditions, and labor dynamics. Accurate prediction of the mode of delivery, whether cesarean section or vaginal birth, is pivotal for ensuring optimal maternal and neonatal outcomes. We employed a combination of Support Vector Machines (SVMs) and Random Forests (RFs), two powerful machine learning algorithms, to enhance prediction accuracy. SVMs excel in classifying data into multiple classes, while RFs, an ensemble learning algorithm, integrate predictions from multiple decision trees to produce more robust forecasts. Our results indicate that the integration of SVMs and RFs significantly improves the accuracy of predicting the mode of childbirth compared to individual algorithms. The combined approach of SVMs and RFs effectively captures the complexity of childbirth data, offering valuable insights for clinicians to make informed decisions. This predictive model not only enhances clinical decision-making but also empowers expectant mothers by providing insights into their birthing options. By advancing the capabilities of predictive analytics, this study contributes to improving healthcare quality, reducing unnecessary interventions, and enhancing maternal and neonatal safety.

Keywords— Childbirth Prediction, Mode of Delivery, Support Vector Machines (SVMs), Random Forests (RFs), Machine Learning Algorithms, Maternal Health, Neonatal Outcomes, Clinical Decision-Making, Predictive Analytics, Obstetrics, Healthcare Quality, Maternal Safety, Neonatal Safety, Informed Decision-Making, Ensemble Learning.

I. INTRODUCTION

The use of machine learning algorithms in the healthcare industry has grown significantly in recent years, providing novel solutions to challenging problems. Predicting the modes of childbirth is one such crucial area of study, where identifying important characteristics is essential. Researchers and practitioners are investigating different machine learning algorithms to identify the most pertinent aspects that lead to effective predictions in delivery outcomes as the healthcare industry continues to harness the power of data. The desire to improve overall healthcare outcomes, optimize resource allocation, and improve maternity and neonatal care is what motivates this investigation. Under these circumstances, the combination of cutting-edge computational methods and obstetric data presents enormous potential for identifying trends and connections that could help inform choices made in the delivery room. This research explores the field of machine learning with the goal of determining and assessing the most significant characteristics that lead to the precise prediction of delivery modes, therefore opening the door to more individualized and successful obstetric healthcare interventions.

I.1 CHILD BIRTH PREDICTION

Predicting the result of childbirth is a critical area in modern medicine, where the incorporation of cutting-edge technologies has started to reshape conventional methods. The use of machine learning and predictive modeling algorithms has become a game-changing method in obstetrics in recent years. In order to predict the delivery method, a complex analysis of various aspects affecting the health of the mother and the newborn must be done. Scholars and medical professionals want to decipher complex patterns in obstetric data by utilizing data analytics and computational methodologies, which will ultimately lead to better informed decisions being made in the delivery room. Predicting childbirth modes with sufficient accuracy not only presents the potential to optimize resource allocation and improve healthcare outcomes, but it also highlights the possibility of customized and individualized interventions aimed at making every childbirth experience as safe and optimal as possible.



Improvement in Automated Diagnosis of Soft Tissue Tumors Using Machine Learning

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Abstract: Because of its inadequate diagnostic system, prostate cancer (PCA) is a serious kind of cancer that kills a significant number of men. Images from cancer patients include important and intricate details that are difficult for conventional diagnostic methods to extract. It is adjusted and works without the need for hand-crafted features. 148 Algorithm, k-nearest neighbor-Cosine (KNN - Cosine), support vector machine (SVM), Gaussian Kernel, and other non-deep learning classifiers were used to compare the outcomes with manually created characteristics including texture, morphology, and grey level co-occurrence matrix. Recent research has concentrated on the suitability of Ensemble Learning (EL) and Transfer Learning (TL) techniques for prostate histopathology image evaluation. In any event, the phases of separation of prostate CT images have not been seen in many exams. In order to organize well, moderately, and insufficiently separated prostate CT scans, we thus suggest an Ensembled Transfer Learning (ETL) structure in this work.

Keywords: Cancer, Machine Learning, Cervical Cancer, Segmentation, image processing.

I. INTRODUCTION

Prostate cancer carries a significant risk of morbidity and mortality, making it the disease that kills men least frequently. However, because prostate cancer grows slowly, there are options for prevention, early identification, and therapy as the disease progresses via precancerous alterations. The primary obstacle to eliminating prostate cancer is seen in low- and middle-income countries (LMICs), where over 88% of prostate cancer fatalities occur due to severe poverty and gender discrimination that significantly restricts a woman's ability to seek care. The process of converting an image into digital format and applying various adjustments to it to produce an improved image or extract some valuable information is known as image processing. This kind of signal distribution uses an image as the input, such as a picture or video frame, and outputs an image or features related to the image. In an image processing system, pictures are typically processed as two-dimensional signals using pre-established signal processing techniques. It is one of the modern technologies that is expanding quickly, having uses in many different facets of business. Within the fields of computer science and engineering, image processing is a fundamental research subject.

II. BIOMEDICAL IMAGE PREPROCESSING

Processing is a general term for procedures involving the least abstract pictures; both the input and the output have the intensity of biological images. These recognizable biomedical pictures are identical to the original sensor data; typically, a matrix of image function values (brightness values) is used to represent the intensity of the biomedical image. Pre-processing aims to improve the image data by suppressing unwanted distortions and enhancing certain image features that are crucial for further processing. However, since similar techniques are used, geometric image transformations, such as rotation, scaling, and translation, are included in the pre-processing methods category. By enabling the extraction of quantitative information from confocal microscopy pictures of biological materials, image processing techniques have significantly expanded the set of biological topics that may be investigated through experiments. The goal of biology is to comprehend how cells function, what genes do to create a typical animal, and what goes wrong during illness or after damage. For this, they use confocal microscopy pictures of materials labelled with cell-specific markers to examine how changes in gene activity and medication administration influence tissue, organ, or whole body integrity. Although image-processing techniques are shockingly still underutilized, they offer a great deal of potential for extracting information from this type of data. Cell number is one helpful statistic to quantify. Cell number is the delicate balance between cell proliferation and cell death; it is strictly

SMART CANE WITH OBSTACLES DETECTION

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Abstract— The project describes ultrasonic blind walking stick with the use of Arduino. According to World Health Organisation, 30 million peoples are permanently blind and 285 billion peoples with vision impairment. If a notice them, you can very well know about if they can't walk without the help of other. One has to ask guidance to reach their destination. They have to face more struggles in their life daily life. Using this blind stick, a person can walk more confidently. This stick detects the object in front of the person and give response to the user by vibrating. So, the person can walk without any fear. This device will be best solution to overcome their difficulties. Generally, blind people use a traditional cane (known as white cane) for moving from one place to another. Activities like walking down the road, knowing and recognizing the presence of an obstacle in front of them, reading road signs etc. We represent a model of walking stick for blind people. This consists of GPS module, GPS Antenna, Arduino, ultrasonic sensor and buzzer. This stick can detect place and obstacles. The system employs a point-by-point approach to analyze the surrounding environment, providing real-time feedback to the user. Blind people consists of a large group of people in our society. Losing their eyesight has caused them inconvenience in performing daily tasks. Hence, smart cane had been developed in order to increase the life quality of a blind person. The purpose of this project is to design a smart cane with ultrasonic sensor and global system for mobile (GSM) for the blind. This embedded system mainly has mobility. For mobility system, it is equipped with ultrasonic sensor, HC-SR04 and vibrating motor. Ultrasonic sensor will send the trigger pulse to detect obstacles. When an obstacle is detected, signals will be sent to vibrating motor and activate it. The vibrating motor will vibrate with different strengths according to the distance of the obstacle. The microcontroller used in this embedded system is Arduino Uno. The prototype of

smart cane was built to increase the mobility of the blind people.

Keywords— Signal processing, Internet of things, Ultrasonic sensor, visual impaired people

I. Introduction

People with visual impairments are the people who find it hard to recognize the smallest element with healthy eyes. Globally, 32.4 million people were blind in 2010, and that 191 million people had moderate and suffered from vision impairment. The issues with visual impairment lie in the difficulties in self-navigation in unfamiliar outdoor environments. Use of the traditional cane, guide dogs and mobility training are included in expertise and supports considered by professional working in the field of orientation and mobility to help visionless people. Typically, users tap the cane from left to right and as far ahead as the cane's length. The tapping technique help users to recognize the ground surface in the user's environment. However, the problem with the standard white cane is that it has a limited detection range of obstacles at only a distance equals to the cane's length. Thus, this restricts the users' walking speed and leads the users to assess approaching obstacles outside of the range unconsciously. Additionally, outdoors could also be a dangerous place for individuals with visual impairment. This study provides another piece of work and future research direction by providing an alternative solution in the smart cane body of knowledge and development. The proposed smart cane integrates two different devices which are obstacle detection, and GPS module to monitor the visually impaired location. Furthermore, this study contributes to improving the protection and safety of its user while navigating an outdoor and unfamiliar area.

1.1 INTERNET OF THINGS

The Internet of things (IoT) describes devices with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems



SECURITY AND PRIVACY FOR HEALTHCARE

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Abstract: Block chain technology has the potential to completely transform healthcare management systems by enhancing data security, interoperability, and integrity because to its decentralized and unchangeable structure. Sensitive patient information is more difficult for bad actors to breach thanks to the SHA-256 algorithm, which improves data security. Interoperability between diverse healthcare systems is facilitated by smart contracts and standardized data formats. However, issues with user adoption, scalability, and regulatory compliance also face block chain implementation in the healthcare industry. This study offers important insights into the changing environment of healthcare data management by highlighting the possible advantages and challenges of integrating block chain technology in healthcare management systems.

Keywords: patient monitoring, health, security, IIRs, Block Chain

1. INTRODUCTION

The use of sensor-based data analytics has become a game-changer in the field of contemporary healthcare, changing patient monitoring in linked healthcare applications. This paradigm change allows for the real-time gathering and analysis of a variety of patient data, including vital signs and activity levels, by utilizing sophisticated sensor technology. The smooth incorporation of sensors into medical equipment enables an ongoing flow of data, promoting a thorough awareness of a person's health state. This method not only improves patient monitoring's precision and timeliness, but it also gives medical staff members useful information for proactive, individualized actions.

1.1 PATIENT MONITORING

A vital component of modern healthcare is patient monitoring, which is a dynamic and essential method of following and evaluating a person's health. In a time of rapid technological development, patient monitoring has expanded beyond conventional limits to include a wide range of advanced equipment and sensors that continually gather and evaluate critical health data. This attentive observation covers a wide range of physiological parameters, such as blood pressure, oxygen saturation, heart rate, and more, giving medical staff a thorough and up-to-date picture of a patient's health. Continuous patient monitoring has an impact on remote and home-based healthcare in addition to acute care settings. It provides a proactive way to spot possible problems, optimize treatment plans, and eventually promote a more individualized and flexible approach to healthcare delivery.

1.2 HEALTH

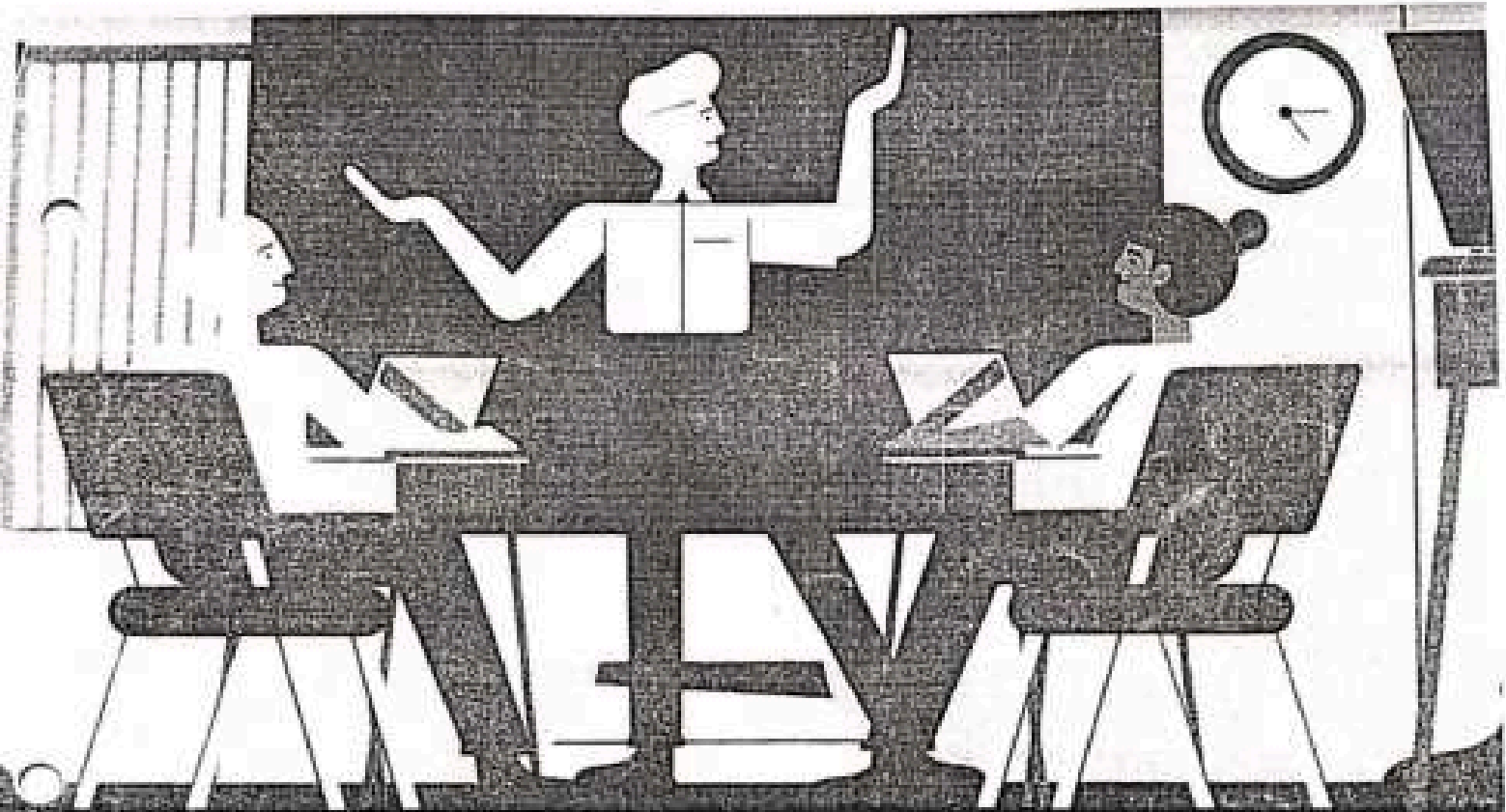
A ubiquitous and priceless feature of human existence, health includes people's total physical, mental, and social well-being in addition to the absence of disease. It is a human necessity and a fundamental right that cuts beyond social, cultural, and economic divides. Over time, our knowledge of health has changed, shifting from a solely biological viewpoint to one that takes a more holistic approach and takes into account the complex interactions between social, mental, and physical aspects. The pursuit of health, whether at the individual or societal level, is a dynamic and always changing subject of study and practice because it incorporates many complicated factors, including access to healthcare, the caliber of healthcare services, preventive measures, and the wider determinants of health.

1.3 SECURITY

A vital component of human existence, security is essential to the welfare of people, groups, and society as a whole. It is the guarantee of safety from a plethora of possible dangers and hazards that can interfere with our daily routines. Every aspect of our everyday lives is impacted by security, from the locks on our doors to the encryption on our digital communications. It includes maintaining social order, protecting private information, and ensuring one's physical safety. Security challenges have become more intricate in a more interconnected and dynamic world, requiring a thorough grasp of the constantly changing environment of dangers

MBA - 2.4.4

**Synergizing Business Functions, Case Studies
Integrating Customer-Centric Strategies,
Culture Catalysts, Capital Chronicles and
Innovation Imperative**

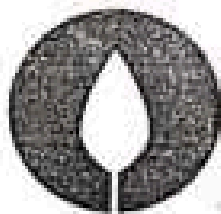


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Synergizing Business Functions, Case Studies Integrating Customer-Centric Strategies, Culture Catalysts, Capital Chronicles and Innovation Imperative

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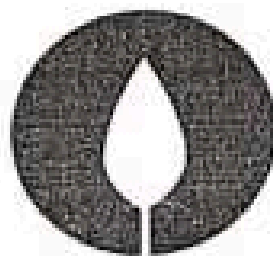
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Synergizing Business Functions, Case Studies Integrating Customer-Centric Strategies, Culture Catalysts, Capital Chronicles and Innovation Imperative



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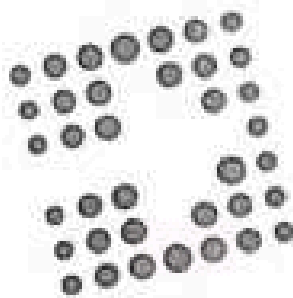


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Chapter 2

AI-Powered Marketing Revolutionizing Customer Engagement Through Innovative Strategies

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EXECUTIVE SUMMARY

This chapter delves into the integration of artificial intelligence (AI) in content marketing, highlighting its potential to revolutionize customer engagement strategies. It highlights the evolving consumer preferences in the digital age, the growing demand for personalized content experiences, and the challenges faced by marketers. AI's ability to analyze vast datasets and extract actionable insights enables businesses to create hyper-targeted content, driving higher engagement and conversion. The chapter also discusses how leading brands have successfully implemented AI-driven content strategies to enhance customer engagement and foster brand loyalty. AI-powered analytics provide actionable insights into content performance, enabling continuous refinement and optimization of marketing strategies. This chapter highlights the potential of AI-powered content strategies in boosting customer engagement and driving sustainable business growth in a competitive digital landscape.

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INTRODUCTION

The digital era has transformed customer engagement into a important focus for marketing strategies across industries. With consumers accessing a vast array of online channels, businesses must adapt to meet the demands of today's discerning consumers. The digital era offers unprecedented access to information, enabling consumers to research products, compare prices, and read reviews. This has empowered consumers, giving them greater control over their purchasing decisions. As a result, businesses must adopt customer-centric approaches that prioritize engagement and relationship-building over traditional sales tactics (George et al., 2024).

The rise of digital channels and devices has fragmented audiences, making it harder for marketers to reach their target demographics. Consumers interact with brands through various touchpoints, including social media, email newsletters, and mobile apps. However, this complexity presents challenges in delivering consistent experiences across all channels. Customer engagement is crucial for brands to stand out in a crowded marketplace. Engagement metrics offer deeper insights into the quality of interactions between brands and consumers, such as likes, comments, shares, and time spent on a website (Aldaseri et al., 2024).

Customer engagement in the digital era is crucial for long-term success, as it involves the emotional connection and loyalty consumers feel towards a brand. Businesses must adopt a holistic approach that integrates various marketing disciplines and channels, such as content marketing, social media management, email marketing, and customer relationship management (CRM). By delivering relevant, timely, and personalized content across multiple touchpoints, businesses can create meaningful interactions that resonate with their audience, ensuring long-term success in a competitive digital era (Ahmed, 2022).

The digital era offers opportunities for innovation in customer engagement strategies due to advancements in technology like artificial intelligence and machine learning. These technologies enable businesses to analyze data, predict consumer behavior, and deliver personalized experiences. AI-powered solutions, such as chatbots and recommendation engines, are revolutionizing brand engagement. As consumers become more discerning, businesses must prioritize engagement and relationship-building to stand out in a competitive marketplace. By adopting a customer-centric approach, leveraging technology, and delivering compelling experiences across all channels, brands can cultivate strong relationships and drive sustainable growth (Dutta et al., 2024).

The digital era has significantly influenced consumer behavior, offering both opportunities and challenges for businesses. The rise of digital technology has given consumers unprecedented access to information, enabling them to research products, compare prices, and read reviews. This has led to consumers becoming more informed and discerning, demanding transparency, authenticity, and value from brands they engage with. Understanding these shifts is crucial for marketers to adapt their strategies to meet the evolving needs of modern consumers (Khan & Iqbal, 2020).

The rise of mobile devices has significantly influenced consumer interactions with brands, blurring the lines between online and offline experiences. As mobile phones become a gateway to information, entertainment, and commerce, brands must optimize their digital presence for mobile devices to ensure seamless experiences across all touchpoints. Social media platforms like Facebook, Instagram, and Twitter have become indispensable tools for communication, entertainment, and discovery. Consumers use social media to connect with friends and family, follow brands, discover new products, and engage with content. Therefore, brands must maintain an active presence on social media to build relationships and drive conversions (Khan & Iqbal, 2020).

The rise of e-commerce has transformed consumer shopping experiences, offering convenience, choice, and flexibility. Online marketplaces like Amazon and eBay provide a vast selection of products, competitive pricing, and fast shipping. This has put pressure on traditional retailers to innovate and adapt to the digital world. The COVID-19 pandemic has accelerated this shift, as consumers seek safer, more convenient shopping, work, and socializing options. Businesses must adapt and embrace digital transformation to survive and thrive in this rapidly changing landscape (Kamal & Himel, 2023).

The digital era has brought about a new era of consumer empowerment, requiring businesses to adapt to changing behaviors and expectations. By prioritizing transparency, authenticity, and value in customer interactions, businesses can establish meaningful connections with their audience and drive sustainable growth in the digital age through digital technologies, mobile presence optimization, and social media and e-commerce channels (Rathore, 2020).

Importance of Customer Engagement in Modern Marketing

Customer engagement is a crucial aspect of modern marketing strategies, as it helps build brand loyalty, drive sales, and foster long-term customer relationships. In today's competitive marketplace, businesses must go beyond traditional advertising to connect with their audience on a deeper level. Customer engagement is directly linked to brand loyalty and advocacy, as engaged customers develop a strong affinity for a brand, leading to repeat purchases and positive word-of-mouth referrals (Naveenkumar et al., 2024; Ravisankar et al., 2024). By cultivating meaningful interactions, businesses can create brand ambassadors who champion their products or services, amplifying their reach and influence. Customer engagement is also closely tied to customer satisfaction and retention, as when customers feel valued and appreciated, they are more likely to remain loyal and continue doing business with the brand (George et al., 2024).

Customer engagement is a crucial tool for businesses to improve their products, services, and customer experience. Engaged customers provide valuable feedback through surveys, reviews, and social media interactions, which can inform strategic decision-making and product development. By listening to their audience and acting on their feedback, businesses can demonstrate commitment to continuous improvement and customer-centricity, strengthening their competitive position. Additionally, customer engagement drives sales and revenue growth, as engaged customers are more likely to make purchases, upgrade to premium offerings, and participate in upsell and cross-sell opportunities (Khan & Iqbal, 2020).

Gap Analysis Objectives

A gap analysis is vital for identifying opportunities and enhancing a company's customer engagement efforts, with important objectives outlining specific areas to focus on.

- Evaluate existing engagement metrics, such as social media interactions, email open rates, and customer satisfaction scores, to understand the current state of customer engagement.
- Compare engagement metrics against industry benchmarks and competitors to identify areas of strength and weakness.
- Conduct market research and customer surveys to gain insights into the preferences, behaviors, and expectations of the target audience regarding engagement strategies and channels.

- Assess the effectiveness of existing technology and tools for customer engagement, such as CRM systems, marketing automation platforms, and social media management tools, to identify gaps and opportunities for improvement.
- Analyze the effectiveness of current content strategies in driving engagement, including the type, format, and distribution channels of content, to identify areas for optimization and refinement.
- Evaluate the quality and responsiveness of customer service and support channels, such as live chat, phone support, and self-service portals, to ensure they meet customer expectations for engagement and satisfaction.
- Assess the level of employee engagement and empowerment in delivering exceptional customer experiences, as engaged employees are more likely to drive positive customer interactions and outcomes.
- Explore emerging trends and technologies in customer engagement, such as artificial intelligence, chatbots, and personalized experiences, to identify opportunities for innovation and differentiation.

A gap analysis helps businesses understand their customer engagement state, identify improvement opportunities, and develop targeted strategies to enhance engagement and drive business growth in the modern marketing landscape. This comprehensive understanding informs the development of effective marketing initiatives.

STRATEGY IN DRIVING CUSTOMER ENGAGEMENT

Content strategy involves planning, creating, distributing, and managing content to achieve business objectives. It involves identifying target audiences, understanding their needs, and developing a plan to deliver valuable, relevant, and consistent content across channels, aiming to drive engagement and brand awareness (Mohanthy et al., 2023; Ravisankar et al., 2023).

Significance of Content Strategy

- **Alignment with Business Goals:** Content strategy aligns content initiatives with overarching business objectives, such as increasing brand visibility, generating leads, driving sales, or improving customer retention. By defining clear goals and performance indicators (KPIs), content strategy ensures that content efforts are purposeful and measurable, contributing directly to business success.
- **Audience-Centric Approach:** Content strategy places a strong emphasis on understanding the needs, preferences, and behaviors of target audiences. By conducting audience research and segmentation, businesses can tailor content to address specific pain points, interests, and aspirations of their audience, thereby increasing relevance and resonance.
- **Consistency and Coherence:** A well-defined content strategy ensures consistency and coherence across all content touchpoints and channels. By establishing brand guidelines, voice, tone, and messaging frameworks, businesses can maintain a cohesive brand identity and narrative, reinforcing messages and values to the audience.
- **Maximizing Content ROI:** Content strategy focuses on maximizing the return on investment (ROI) of content initiatives by optimizing resources and efforts. By identifying high-performing

content formats, channels, and topics, businesses can allocate resources effectively and prioritize content efforts that deliver the greatest impact and value.

- **Driving Customer Engagement:** Perhaps most importantly, content strategy plays a crucial role in driving customer engagement. By delivering valuable, informative, entertaining, or inspiring content, businesses can capture the attention and interest of their audience, encouraging them to interact, share, and participate in conversations around the brand. Engaging content fosters deeper connections with customers, builds trust and loyalty, and ultimately drives desired actions, such as conversions or advocacy.
- **Adaptability and Optimization:** Content strategy is not static but evolves over time based on changing market dynamics, audience preferences, and business objectives. By continuously monitoring performance metrics, gathering feedback, and analyzing data, businesses can refine and optimize their content strategy to stay relevant, competitive, and effective in a dynamic digital landscape (Bosupathi et al., 2023; Naveenkumar et al., 2024; Paul et al., 2024).

Content strategy is crucial for driving customer engagement by aligning efforts with business goals, understanding audience needs, maintaining consistency, maximizing content ROI, and driving meaningful interactions. By adopting a strategic and audience-centric approach, businesses can unlock the full potential of content marketing for sustainable growth and success.

Different Types of Content and Their Impact on Engagement

- **Blog Posts and Articles:** Informative and educational blog posts and articles are effective in providing valuable insights, tips, and solutions to the audience's pain points. They encourage engagement through comments, social shares, and discussions, as readers seek further clarification or share their own experiences and perspectives.
- **Videos:** Videos are highly engaging content formats that appeal to both visual and auditory learners. They capture attention quickly and convey information in an easily digestible format. Video content often leads to higher engagement metrics such as likes, comments, shares, and views, as viewers are more likely to interact with and share compelling video content.
- **Infographics:** Infographics combine text, visuals, and data to present information in a visually appealing and easily understandable format. They are highly shareable on social media platforms and can attract attention and engagement from audiences who prefer visual content.
- **Podcasts:** Podcasts offer a convenient way for audiences to consume content while multitasking or on the go. They create a sense of intimacy and connection with the audience through authentic conversations and storytelling. Engagement metrics for podcasts may include downloads, listens, subscriptions, and listener feedback.
- **Social Media Posts:** Social media posts encompass a variety of content formats, including text, images, videos, and live streams. They encourage engagement through likes, comments, shares, and direct messages, as audiences interact with and respond to content that resonates with them on social platforms.
- **Interactive Content:** Interactive content, such as quizzes, polls, surveys, and interactive games, encourages active participation from the audience. It creates a sense of involvement and personalization, leading to higher engagement metrics as audiences interact with and respond to the content in real-time.

Chapter 15

Driving Profitable Business Growth Through Economical Optimization, Energy Management, and Industrial 5.0 Innovations

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EXECUTIVE SUMMARY

The chapter emphasizes the significance of economic optimization, energy efficiency, and Industrial 5.0 innovations in driving sustainable growth and profitability in today's business landscape. It highlights the strategic allocation of resources to maximize efficiency and minimize costs, using lean management principles, automation, and data analytics. Energy management is crucial for reducing operational costs and mitigating environmental impact, using renewable energy sources and smart technologies. Industrial 5.0, a new era of industrial transformation, combines automation, connectivity, and data exchange, with technologies like artificial intelligence, IoT, and blockchain.

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The convergence of economic optimization, energy management, and Industrial 5.0 offers organizations a platform for innovation and value creation. This approach can lead to cost efficiencies, environmental sustainability, enhanced competitiveness, and market differentiation. By aligning operational practices with strategic objectives, businesses can position themselves for long-term success in a rapidly evolving marketplace. The synergy between these principles and technologies offers a pathway towards resilience, innovation, and sustainable growth, enabling businesses to optimize their operations and chart a course towards a prosperous and sustainable future (Hao et al., 2023).

Profitable growth is crucial for organizations to survive and thrive in today's competitive business environment. It involves expanding revenue streams while maintaining healthy profit margins, despite market dynamics, technological disruptions, and changing consumer behaviors. Profitability is essential for creating value for stakeholders and shareholders, as it serves as a financial metric and operational efficiency indicator. It also encourages reinvestment in innovation, expansion, and talent development, enabling businesses to adapt and thrive in an ever-changing environment. Thus, profitability is not just a strategic option but an existential imperative for survival and success (Liu et al., 2022).

Profitable growth is crucial in today's global marketplace, where competition is intensifying and entry barriers are decreasing. Failure to grow risks stagnation and obsolescence. It allows businesses to attract top talent, form strategic partnerships, and invest in advanced technologies, strengthening their market position. Profitable growth is also linked to organizational sustainability and resilience, enabling businesses to weather economic downturns, navigate market volatility, and withstand competitive pressures effectively. It provides financial flexibility to invest in diversification strategies and pursue long-term strategic initiatives that drive value creation and differentiation (Zhou et al., 2020).

Profitable growth is crucial in today's competitive landscape, as it allows organizations to drive profitability while reducing their environmental footprint and enhancing their social impact. By optimizing operational efficiency, minimizing waste, and embracing sustainable business models, businesses can align their objectives with broader societal goals. This aligns with the moral imperative of aligning business objectives with broader societal goals. In an increasingly interconnected and volatile world, businesses must prioritize profitable growth to not only thrive in the short term but also lay the foundation for long-term success, resilience, and relevance in a rapidly evolving marketplace (Zhou et al., 2020). Top of Form

Significance and Background

In today's competitive business landscape, sustainable growth and profitability are crucial for organizational success. Economic optimization, energy management, and Industrial 5.0 innovations are key drivers for maximizing efficiency, minimizing costs, and capitalizing on opportunities. Leveraging lean management principles, automation, and data analytics, businesses can streamline processes, optimize supply chains, and drive profitability by optimizing supply chains (Ren et al., 2022).

Energy management is crucial for reducing operational costs and environmental impact. Adopting renewable energy sources, smart technologies, and energy-efficient practices can optimize usage, lower utility expenses, and demonstrate corporate responsibility. Industrial 5.0, characterized by automation, connectivity, and data exchange, can revolutionize manufacturing processes, enhance decision-making, and drive innovation across the value chain.

Social Innovations in Education, Environment, and Healthcare

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ABSTRACT

The National Education Policy (NEP) of India is a significant reform aimed at addressing education challenges and promoting excellence. It emphasizes higher education, teacher training, technology integration, and flexible learning initiatives. The policy advocates for multidisciplinary approaches, flexibility, autonomy, and innovation in curriculum design and delivery. It aims to enhance graduates' quality, relevance, and employability, positioning India as a global knowledge hub. The policy also emphasizes teacher training, professional development, and technology integration. It promotes flexible learning initiatives, accommodating diverse learning needs, and lifelong learning. Implementation of the NEP will require capacity building, research, innovation, and partnerships. With collective action, it can transform India's education into more inclusive, equitable, and responsive to 21st-century needs.

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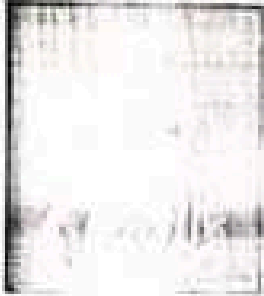
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**ADVANCEMENTS IN SUSTAINABLE FOOD PACKAGING: BIODEGRADABLE
COATING FOR FRESH PRODUCE PRESERVATION AND PROTECTIVE
FUNCTIONS**



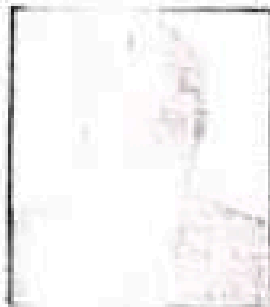
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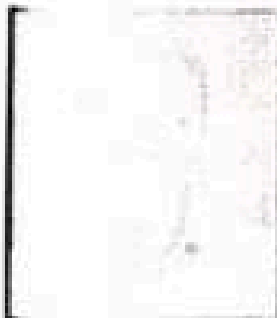
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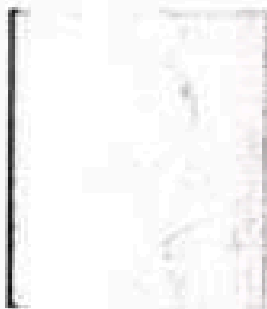
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KINETICS, SYMMETRY, ISOTHERM AND THERMODYNAMIC MODELING OF SORPTION OF REACTIVE ORANGE 4 ON TO *BALSAMODENDRONCAUDATUM* WOOD WASTE ACTIVATED NANO POROUS CARBON MATERIAL

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Abstract -Balsamodendron caudatum wood waste activated nano porous carbon material (BANCM) has the possible to take up the dyes from aqueous solution. The unfortunate disposal of dyes in waste water constitutes an ecological problem and can cause harm to the flora and fauna. Present assessment deals with the utilization of (BANCM) waste as sorbent for the purging of Reactive Orange 4 dye from its aqueous solutions. The treated (BANCM) using sodium sulphate was evaluated through SEM. The analysis indicates that adsorption is inclined by initial dye concentration, contact time, dye solution pH. A Kinetic study of dye followed the pseudo-first-order, pseudo second-order and Elovich models correspondingly. Conclusions show that the pseudo first order kinetic model was found to compare the investigational data well.

Keywords: BANCM, Adsorption, Reactive Orange 4, Kinetics, Isotherm; Low-priced sorbents; Aqueous solution.

INTRODUCTION

Pollution of soil and running waters by industrial dyes is a hazard to aquatic life and human beings and is a main environmental problem. Synthetic dye stuffs are widely used as coloring agents in the paper, textile, gasoline, food, and pharmaceutical industries. The hydrosphere polluted by the discharge of dyes into the environment is a notable source of pollution due to its intractable nature, visibility even at very low concentrations, giving an objectionable color to the water, biological attack, and reducing sunlight dispersion. The aromatic molecular structure of dyes most probably comes from coal tar-based hydrocarbons such as naphthalene, benzene, toluene, and xylene. Today, the yearly production of commercial dyes is $>7 \times 10^5$ tons per year, and to date, more than 100 000 dyes are known. Therefore, a significant area of applied and basic research deals with the removal of dye pollution from industrial wastewater.

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Kinetics, Symmetry, Isotherm And Thermodynamic Modeling Of Sorption Of Reactive Orange 4 On To Balsamodendroncaudatum
Wood Waste Activated Nano Porous Carbon Material

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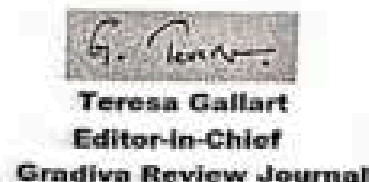
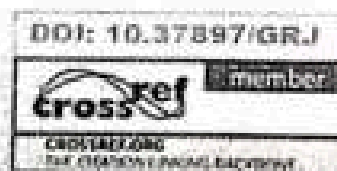
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Strengthening QR code Anti-Counterfeit through Multi-Encryption Algorithm

Publisher: IEEE | Cite This | PDF

Disruptive Technology | S. Prithvi | All Authors

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Manage Current Alerts
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Abstract

Abstract:

The rise in digital information sharing poses risks to privacy and personal identity, making data vulnerable to eaves and swift modifications during transfer. Safeguarding digital data against attackers is crucial. To enhance QR code security and combat counterfeiting, a novel approach is presented in this study. This method integrates the Advanced Encryption Standard (AES) algorithm and Rubik's Cube Principle, fortifying anti-counterfeit measures in QR codes. The QR code image is divided into RGB channels using the Rubik's Cube Principle. The AES encryption key encrypts these channels, and the results are combined into an encrypted image. Experimental outcomes affirm the effectiveness of the proposed scheme, demonstrating robust encryption and impeccable concealment capabilities.

Document Sections

- I Introduction
- II LITERATURE SURVEY
- III PROPOSED WORK
- IV METHODOLOGY
- V RESULTS

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1. Introduction



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Improving QR Code Security using Multiple Encryption Layers

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S. Dhyanashree Narayanan, S. Prabhu, E. Padma [All Authors](#)

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Alerts

Manage Current Alerts
Add to Global Alerts

Abstract

Document Sections

- I. INTRODUCTION
- II. LITERATURE SURVEY
- III. PROPOSED WORK
- IV. METHODOLOGY
- V. RESULT

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Abstract

Growing concerns about identity theft and privacy are brought on by the increased sharing of digital information, which leaves data open to quick changes while in transit. [View more](#)

Metadata

Abstract

Growing concerns about identity theft and privacy are brought on by the increased sharing of digital information, which leaves data open to quick changes while in transit. Digital data must be protected from hackers. This study presents a novel approach to improve QR code security and fight counterfeiting. This technique strengthens QR code anti-counterfeit measures by integrating the AES algorithm with Rubik's Cube Principle. The Rubik's Cube Principle is used to separate the RGB channels in the QR code image. Following the encryption of these channels using the Advanced Encryption Standard (AES) encryption key, the encrypted image is combined with image steganography and is subjected to lower feedback shift register (LFSR) processing. Test results confirm the efficiency of the suggested plan, exhibiting strong encryption and flawless covert abilities.

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A Review on Cued Click Points Graphical Password Authentication in Web Security

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ABSTRACT

Cued Click Points (CCP) is a graphical password authentication technique which comes under Authentication a subdomain of web security. The key area in security research is authentication which determines if whether a user should be allowed to access the given system. Authentication is a process of a system which verifies the identity of a user. Authentication is generalized by saying, "to authenticate" means "to authorize". A graphical password is an authentication system which makes the user select images in a specific order that presented in a graphical user interface. Textual alphanumeric passwords are abstracted by Graphical Passwords. Graphical passwords are easy to remember but hard to guess. An important goal for authentication systems is to support the users in selecting the better password, thus increasing security. In Cued Click Point, the users click on one point per stage of a sequence of images. The next image will be displayed based on the previous click point. It improves the performance in terms of speed, accuracy, and number of errors. Cued Click Points (CCP) provides high security because the sequence of images increases the workload for attackers. In increasing the number of images and number of grids in Password, the security and efficiency will be very high.

Keywords: Authentication, Graphical Password, Cued Click Points

1. Introduction

Web Security

Web Security is very important nowadays. Websites are always prone to security threats/risks. Web Security deals with security of the data which is being transferred to the internet. When data is transferring between client and server and the data have to protected that security of data is web security. Hacking a Website may result in the theft of important data like credit card details or the login information. It can bring destruction of one's business like propagation of illegal content to the users or steal important data of the customer through the website. Therefore, security is highly considered in the context of web security.

Authentication

Authentication technology provides access control for the system by checking user's credentials matches with the credentials in a database of authorized users. Authentication assures sensitive systems, programs and enterprise information security. Authentication enables systems to keep their network systems by permitting only authenticated users. Authentication may includes in computer systems, networks, databases, websites and other network-based applications or services.

Graphical Password Authentication

In the graphical password authentication, the user selects points of images in a specific order presented in a graphical user interface (GUI). According to a study, the human brain has a greater remembering of what they see (pictures) rather than alphanumeric characters. Graphical passwords help to overcome the disadvantage of textual alphanumeric passwords. Cued Click Points technique (CCP) is an alternative to the Pass Points technique [1]. CCP, users click one point on each image unlike Pass Points in which five points is clicked on one image. It alerts the users if they make any mistake while entering.

2. Literature Survey

2.1 Cued Click Points Password Authentication using Picture Grids

The main problem with password authentication is that users tend to use simple, easy-to-remember passwords rather than strong passwords. So, passwords that are hard to remember. Users typically write down their passwords and share them with others, use the same password on multiple systems, and



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A Review on Wireless Sensor Network Using Machine Learning

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ABSTRACT

Machine learning sensors represent a paradigm shift for the future of embedded machine learning applications. Current realizations of embedded machine learning (ML) suffer from complex integration, lack of modularity, and privacy and security concerns from data movement. This article proposes a new data-centric paradigm for embedding sensor intelligence on edge devices to combat these challenges. Our vision for "sensor 2.0" entails integrating sensor input data and ML processing from the wider system at the hardware level and providing a rich interface that minimizes traditional sensors in heterogeneity. This integration leads to a modular and easy-to-use ML sensor design. We discuss challenges presented by the standard approach of building ML processing into the software stack of the operating (micro)processor on an embedded system and how the modularity of ML sensors addresses these problems. ML sensors increase privacy and security while making it easier for system builders to integrate ML into their products as a simple component. We provide examples of prospective ML sensors and an illustrative dashboard in a demonstration and hope that this will build a dialogue to progress us towards sensor 2.0.

1. INTRODUCTION

1.1 Machine Learning

Machine Learning is said to be a subset of Artificial Intelligence that is mainly concerned with the development of algorithms which allow a computer to learn from the data and past experiences on their own. The term machine learning was first introduced by Arthur Samuel in 1959. We can define it in a summarized way as: "Machine learning enables a machine to automatically learn from data, improve performance from experiences, and predict things without being explicitly programmed."

With the help of sample historical data, which is known as training data, machine learning algorithms build a mathematical model that helps in making predictions or decisions without being explicitly programmed. Machine learning brings computer science and statistics together for creating predictive models. Machine learning constructs or uses the algorithms that learn from historical data. The more we will provide the information, the higher will be the performance.

1.2 The benefits of a Machine learning

The various use cases and benefits of machine learning can help determine whether a particular specialization within this field is right for you. Here are the benefits of this field based on various use-cases.

Natural language processing:

- Natural language processing (NLP) allows machine learning algorithms to process language-based inputs from humans, such as text-based messaging through an organization's website. With NLP, these algorithms can detect the tone of a message and its topic to better understand what consumers want. An example is the chatbots that many organizations use to respond to consumer queries through their websites. These chatbots can be convenient as they're available 24 hours a day, allowing them to handle queries until human customer service agents become available.

Recognizing images:

- Machine learning algorithms can learn to recognize images and then classify them into different categories. This means that they can recognize certain objects in an image and even recognize a face. In some cases, the algorithm might even be able to differentiate one person's face from another to identify people. This facial recognition ability is potentially useful for recognizing people in photographs and videos, security measures and even product research.

Data mining:



6G-Based Intelligent Cybersecurity Model for Autonomous Vehicles

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¹PG Scholar, Department of Computer Science and Engineering, Hindustan Engineering College, Madhavaram, Tamilnadu, India
²Associate Professor, Department of Computer Science and Engineering, Hindustan Engineering College (Autonomous), Enkalai, Tamilnadu, India

ABSTRACT

In the Sixth Generation (6G) mobile system, the algorithms of security increase even more in the communication system. A comprehensive set of security technology solutions will be actively required for communication systems for the 6G era of the 2030s. The future 6G network is predicted to be implemented with artificial intelligence-driven communication via machine learning, enhanced edge computing, post-quantum cryptography and so forth. The vision of 6G incorporates new radio frequencies and technologies, the integration of sensing, cognitive methods defining both network functions and their management, and new networking approaches for a broader range of applications and distribution. This paper aims to use 6G Network 6G ecosystems are considered a perfect candidate for innovations in computing, artificial intelligence, connectivity and sensors, virtualization, and more. It is designed to meet the requirements of higher global coverage, greater spectral efficiency, and a reduced carbon footprint, emphasizing sustainability, safety, trust, and security through unprecedented architectural solutions and technology. 6G will be an integrated network system that includes traditional terrestrial mobile network, space network, and underwater network to provide ubiquitous network access. Even if studies on the vision of the 6G network have already been published, there is still a significant amount of ground to cover. There is no decision made yet regarding anything, and nothing has been ruled out. The focus of this study is to identify a complete picture of changes in architectures, technologies, and challenges that will shape the 6G network. The research results will provide indications for further studies on 6G ecosystem. The results of this review contribute to previous research on 6G network security.

KEYWORDS: 6G Networks, 6G-Based Intelligent Cybersecurity, 6G Management, 6G-Based Industrial Applications, 6G Mobile Networks, 6G Security.

1. INTRODUCTION

1.1 6G NETWORK

However, 6G will not meet all requirements of the future in 2030+. Researchers must start to focus on the sixth generation (6G) wireless communication network. One of the main distinguishing features of 6G is low latency or more specifically guaranteed deterministic latency, which needs deterministic networking (DetNet) to guarantee end-to-end latency with precision and accuracy that future use cases demand. The 6G will have additional requirements of high time and phase synchronization accuracy beyond what 5G can deliver. Additionally, 6G will have to provide near 100% geographical coverage, sub-centimeter geo-location accuracy and millisecond geo-location update rate to meet use cases.

1.2 Performance Metrics and Application Scenarios

6G networks are expected to achieve superior performance and have more performance metrics, as illustrated. The peak data rate for 5G is 20 Gbps, while for 6G networks it can be 1-10 Tbps with the aid of THz and optical frequency bands. The max experimental data rate can achieve a Gbps-level with these high frequency bands. The area traffic capacity can be more than 1 Gbps/km². The spectrum efficiency can increase 3-5 times, while the network energy efficiency must increase by more than 100 times compared to 5G to make up for the increase in data rate by 100 times. This can be achieved by applying AI to achieve much better network management and automation. The connection density will increase 10-100 times due to the use of extremely heterogeneous networks, diverse communication scenarios, large numbers of antennas, and wide band-widths. There are multiple cycles of mobility associated by surfers, UAVs, and ultra-high-speed trains, which can move with a much higher speed of larger than 100 km/h, in comparison to the existing terrestrial terminals. For a selected set of applications, the latency is expected to be less than 1 ms. In addition, other important performance metrics should be considered, e.g., cost efficiency, security capacity, coverage, intelligence level, etc. **Example Industry Verticals**

The current 5G wireless communication networks have shown the possibility to be the fundamental infrastructure of modern information society. They have been some practical industry verticals based on 5G networks and it will be deepened in future 6G networks. There are opportunities on multiple industry verticals, including cloud VR, AI industry automation, C-V2X, digital twin, body area network, and energy efficient wireless network control and industrial factory systems.



A Review on a Cervical Cancer Image Segmentation Using Machine Learning

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ABSTRACT

The application of “machine learning” and “artificial intelligence” has become popular within the last decade. Both terms are frequently used in science and media, sometimes interchangeably, sometimes with different meanings. In this work, we aim to clarify the relationship between these terms and, in particular, to specify the contribution of machine learning to artificial intelligence. We review relevant literature and present a conceptual framework which clarifies the role of machine learning to build (artificial) intelligent agents. Hence, we seek to provide more terminological clarity and a starting point for (inter- disciplinary) discussions and future research. It provides an overview of machine learning, highlighting its key concepts, algorithms, and applications. It begins by explaining the fundamental principles of supervised and unsupervised learning, which are the two primary approaches in machine learning. Supervised learning involves training a model on labeled data, where the desired output is already known. In contrast, unsupervised learning deals with unlabeled data and aims to discover patterns or structures within the data.

INTRODUCTION

Machine Learning

Machine Learning is said as a subset of Artificial Intelligence that is mainly concerned with the development of algorithms which allow a computer to learn from the data and past experiences on their own. The term machine learning was first introduced by Arthur Samuel in 1959. We can define it in a summarized way as: “Machine learning enables a machine to automatically learn from data, improve performance from experiences, and predict things without being explicitly programmed.”

With the help of sample historical data, which is known as training data, machine learning algorithms build a mathematical model that helps in making predictions or decisions without being explicitly programmed. Machine learning brings computer science and statistics together for creating predictive models. Machine learning constructs or uses the algorithms that learn from historical data. The more we will provide the information, the higher will be the performance.

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A Review on Detection and Characterization of DDoS Attacks using Time-Based Features

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ABSTRACT

DDoS is a growing problem in cyber security. One DDoS defense technique actively studied by researchers is on-line packet attribute analysis followed by selective packet filtering. In order to evaluate the effectiveness of this technique, we have analyzed the packet traffic data collected at the routers in two sites: a university department network and an ISP backbone network during a DDoS attack. In this report, we first summarize the system model which is the basis for the approach of packet filtering. Then we describe our technique for analyzing the data collected by the Net Flow measurement system. Finally, we present the results on the histograms of the different packet attributes under normal and attack scenarios. We observe that there are significant differences in the histograms under different scenarios, so that attack detection based on packet attribute analysis will be effective. Moreover, we note that there is a ramp up period (several minutes) of attack traffic volume, which should allow enough time for the selective packet filtering procedure to be implemented before serious damage is done to the resource under attack.

Keywords: DDoS, Protocol attack, SDN

INTRODUCTION

DDoS Attacks

In a distributed denial-of-service (DDoS) attack, multiple compromised computer systems attack a target and cause a denial of service for users of the targeted resource. The target can be a server, website or other network resource. The flood of incoming messages, connection requests or malformed packets to the target system forces it to slow down or even crash and shut down, thereby denying service to legitimate users or systems. Many types of threat actors, ranging from individual criminal hackers to organized crime rings and government agencies, carry out DDoS attacks. In certain situations - often ones related to poor coding, missing patches or unstable systems even legitimate, uncoordinated requests to target systems can look like a DDoS attack when they are just coincidental lapses in system performance.

Types of DDoS attacks

There are three main types of DDoS attacks: Network-centric or volumetric attacks These overload a targeted resource by consuming available bandwidth with packet floods. An example of this type of attack is a domain name system amplification attack, which makes requests to a DNS server using the target's Internet Protocol (IP) address. The server then overwhelms the target with responses.

Protocol attacks These target network layer or transport layer protocols using flaws in the protocols to overwhelm targeted resources. A SYN flood attack, for example, sends the target IP addresses a high volume of "initial connection request" packets using spoofed source IP addresses. This drains out the Transmission Control Protocol handshake, which is never able to finish because of the constant influx of requests. Application layer Here, the application services or databases get overloaded with a high volume of application calls. The inundation of packets causes a denial of service. One example of this is a Hypertext Transfer Protocol (HTTP) flood attack, which is the equivalent of refreshing many web pages over and over simultaneously.

Identifying DDoS Attacks

DDoS attack traffic essentially causes an availability issue. Availability and service issues are normal occurrences on a network. It's important to be able to distinguish between those standard operational issues and DDoS attacks. Sometimes, a DDoS attack can look mundane, so it is important to know when to look for. A detailed traffic analysis is necessary to first determine if an attack is taking place and then to determine the method of attack.

ENRICHED PLANT LEAF DISEASE ANALYSIS USING META-HEURISTIC ALGORITHM BASED DEEP LEARNING TECHNIQUES

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Ms. M. Rohith⁶

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Abstract: Adaptive histogram equalization (AHE) and the Laplacian filter are used in the preliminary processing phase of the research work to enhance the image quality and diagnose plant leaf diseases in paddy. In addition to thresholding and HSV color mode, fusion background removal is employed. To create a balanced dataset, an appropriate ANN-GAN data augmentation technique is applied. To increase the ability to extract features, geometric changes, contrast alterations, luminance changes, and saturate changes are applied. At last, a DBN-ACO technique is used in the phase of classification, which integrates Deep Belief Networks (DBN) for extraction of features and Ant Colony Optimization (ACO) for categorization. Disease spots are first segmented using KNN on improved images. Compared to other current techniques, our data demonstrate an accurate illness classification.

Keywords: Ant Colony Optimization and Adaptive histogram equalization.

IOT-DRIVEN STREET LIGHT CONTROL: IMPROVING FAILURE MANAGEMENT AND DIAGNOSIS SYSTEM

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Abstract: The Internet of Things or IoT, is quickly developing technology centered on connecting components and gadgets as well as humans. One important technological advancement made possible by this technology is the automated identification malfunctioning street lighting. Facilitating remote management and recognizing faulty street lighting is the research projects main goal. The goal of this lighting system is to maximize energy efficiency, automate task at a low cost for streets, and give prompt notice of any problems with the street lights. This suggested method uses sensors to automatically record these lights operating state without the need of human involvement. This method cuts down on human labor while also minimizing problem solving delays. In response to these difficulties, a system has been developed automatically detects problems with street lights at night. Upon identifying an issue with a specific street light, notifications are forwarded to authorized staff, including the location of the affected light. Using IoT, the street lights are automatically regulated

Keywords: Remote Management and Technological Advancements.

**ROBUST SECURE CLOUD STORAGE AND ADVANCED
AUTHORIZATION FOR CUTTING-EDGE BIOMEDICAL
TECHNOLOGIES**

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Abstract: Medical systems have been enhanced by the Internet of Things (IoT) and intelligent diagnostics implants, which provide remote monitoring of individuals' health problems from anywhere at any time. Medical IoT devices keep an eye on people' health and gather information into health files, which are stored in the cloud and examined by physicians before making an assessment. However, the protection and confidentiality of electronic medical records are major considerations when it involves sharing information and outsourced on the Cloud. This study proposes an effective storage and access to data management mechanism to provide privacy and security in an intelligent health system. With the addition of a username and password, a psychometric slot enabled by deep learning, and an assessment powered by deep learning, this paper offers an additional three tiers of protection. The work includes three new Multiple layers of protection, such as a password, a psychometric slot with deep learning activated, and a deep assessment based on learning. Test findings for the proposed method indicate that it is feasible in comparison to the current access control systems.

Keywords: Medical Internet of Things and Psychometric slot.

Foundations of Data Science



DATA
SCIENCE

Dr. Devi. P.P.

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Dr. R. Joshitta

Dr. Jenifer Jothi Mary. A

CHARULATHA PUBLICATIONS

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Dr. Devl P.I. received her B.E in Computer Science and Engineering, from Saveetha Engineering College, Anna University, Chennai (2009), M.E Degree in Computer Science Engineering from Meenakshi College of Engineering, Anna University, Chennai (2012) and her PhD Degree from Anna University, Chennai (2023). She has been working since 2012 as Assistant Professor in various Engineering Colleges affiliated to Anna University. She received certificate of Merit Award for Academy excellence in the Post Graduate program in the year 2011. She guided several B. E projects during the academic service. She was a Co-Author for the book "Problem Solving and Python programming. Her research interest includes Wireless Technology and Applications.



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A Text Book on

Machine Learning with IoT

Dr. Sneha Arjun Khaire | Dr. Harsahd N. Prajapati
Dr. P. Sukumar | Dr. Rashmi Shekhar

Machine Learning with IoT



Dr. Sneha Arjun Khaire holds a **Doctorate in Computer Engineering** from IIT Bombay (2017), awarded **Young Faculty Award** by IIT Bombay in 2018 and **Best Paper Award** for contributions towards research and teaching. She holds various **patents** and **open-source** projects. With 10+ years of experience in academia, she has significantly contributed to various research including **Deep Learning, Reinforcement Learning**, etc. She has presented several **papers** and **invited talks** at international conferences.



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**A PRIVACY-PRESERVING BLOCKCHAIN-BASED TRACING MODEL IN
CLOUD FOR VIRUS-INFECTED PEOPLE**

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Abstract: Block chain technology has the potential to revolutionize the management and sharing of electronic health records (EHRs). By utilizing a distributed ledger system, block chain can establish a secure and tamper-proof record of transactions, making it an ideal solution for safeguarding sensitive EHR data from unauthorized access and modification. One approach to leveraging block chain for EHRs involves the utilization of a SHA-256 algorithm. This cryptographic hash function enables the generation of a unique identifier, known as a hash, for each data element. When a new EHR is generated, its hash is calculated and stored on the block chain, thereby establishing a secure and tamper-proof record of the EHR. In the event that an EHR undergoes any unauthorized modifications, its hash will change accordingly. Consequently, any unauthorized alterations to the EHR can be promptly detected. This characteristic of block chain makes it an optimal method for ensuring the integrity of EHRs.

Keywords: A Privacy-Preserving Block chain Maintain Healthcare Management Used EHR.

BIG DATA AND MACHINE LEARNING WITH HYPERSPECTRAL INFORMATION IN AGRICULTURE

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Abstract: Hyper spectral and multispectral information processing systems and technologies have demonstrated its usefulness for the improvement of agricultural productivity and practices by providing useful information to farmers and crop managers on the factors affecting crop status and growth. These technologies are widely used in a range of agriculture applications such as crop management, crop yield forecasting, crop disease detection, and the monitoring of agriculture land usage, water, and soil conditions. Hyper spectral information sensing can acquire several hundred spectral bands that cover the electromagnetic spectrum of an observational scene in a single acquisition. The resulting hyper spectral data cube contains a large volume of spatial and spectral information. In this system, hyper-spectral images are processed and classified using a combination of the 2D-DWT algorithm for image data pre-processing and the Extreme Learning Machine (ELM) algorithm for image classification. The process involves extracting pixel information, applying 2D-DWT to enhance feature representation, and utilizing ELM for classification. ELM stands out for its rapid training and its ability to work with hidden nodes whose parameters are randomly assigned and not iteratively updated, making it highly efficient for classification tasks. The system significantly improves hyper-spectral image classification, providing a streamlined and effective solution for analyzing and categorizing these complex data sets.

Keywords: Hyper spectral and multispectral information, Machine learning algorithm, Electromagnetic spectrum, Spectral bands, Image classification.

SOFTWARE DEFECT PREDICTION USING DEEP LEARNING

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Abstract: Software defect prediction involves the application of various techniques and methodologies to identify and anticipate potential defects in a software project before they manifest as costly and disruptive issues. By harnessing the power of data analysis, machine learning, and historical defect data, organizations can make informed decisions to allocate resources efficiently, enhance software testing strategies, and ultimately deliver higher-quality software products. Software defect prediction is the process of identifying software modules that are likely to contain defects. The proposed system is designed for software defect prediction, leveraging Learning to Rank (LTR) and Linear Regression (LR) as its core predictive modeling technique. It encompasses data collection from historical defect and relevant data sources, pre-processing to clean and transform the data, feature selection to identify key indicators, and training a Learning to Rank (LTR) and LR model. This model, once deployed, predicts the likelihood of defects in software modules based on their features. The system's output guides resource allocation and testing strategies, enhancing software quality and development efficiency. Continuous monitoring and refinements ensure ongoing accuracy, offering an effective solution for proactive defect management in software development.

Keywords: Machine learning, Software testing strategies, learn to rank (LTR), Linear regression (LR), Proactive defect management, Software development efficiency.

PREDICTION OF DEPRESSIVE SYMPTOMS USING DEEP LEARNING

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Abstract: Depression is a common illness worldwide with potentially severe implications. Early identification of depressive symptoms is a crucial first step towards assessment, intervention, and relapse prevention. With an increase in data sets with relevance for depression, and the advancement of machine learning, there is a potential to develop intelligent systems to detect symptoms of depression in written material. This work proposes an efficient approach using Long Short-Term Memory (LSTM)-based Recurrent Neural Network (RNN) to identify texts describing self-perceived symptoms of depression. The approach is applied on a large dataset from a public online information channel for young people in Norway. The dataset consists of youth's own text-based questions on this information channel. Features are then provided from a one-hot process on robust features extracted from the reflection of possible symptoms of depression pre-defined by medical and psychological experts. Then, a deep learning approach is applied (i.e., RNN) to train the time-sequential features discriminating texts describing depression symptoms from posts with no such descriptions (non-depression posts). Finally, the trained RNN is used to automatically predict depression posts. The system is compared against conventional approaches where it achieved superior performance than. The linear discriminant space clearly reveals the robustness of the features by generating better clustering than another traditional feature.

Keywords: Deep Learning, Depressive Symptoms, Textual Data Analysis, Predictive Modelling, Sentiment Analysis.

BLOOD PRESSURE PREDICTION USING MACHINE LEARNING

ALGORITHM

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Abstract: Hypertension is a major health concern across the globe and needs to be properly diagnosed so it can be treated and to mitigate for this critical health condition. In ambulatory blood pressure monitoring is essential to provide for a proper diagnosis of hypertension, which may not be possible otherwise due to the white coat effect or masked hypertension. In this paper, the objective is to develop a model which incorporates expert's knowledge in the feature engineering process so as to accurately predict multiple medical condition have considered multiple symptoms related to hypertension and used an ambulatory blood pressure monitoring method to continuously acquire hypertension relevant data from a patient. Ambulatory Blood Pressure Monitoring (ABPM) is a widely used method for assessing blood pressure levels over an extended period, typically 24 hours, providing valuable insights into a person's cardiovascular health. In this study, we propose the utilization of the Naive Bayes algorithm as a classification tool for ABPM data analysis. The Naive Bayes algorithm assumes feature independence, which aligns well with ABPM data, where various physiological parameters such as age, gender, body mass index (BMI), and heart rate contribute independently to blood pressure variations.

Keywords: Blood Pressure Monitoring, Machine Learning, Blood pressure.

**AN IOS APP FOR BUILDING 3D MODEL FOR BUILD SPACES USING
CAMERA AND LIDAR SENSOR IN IPAD PRO DEVICES**

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Abstract: A cutting-edge iOS application designed exclusively for iPad Pro devices, leveraging the integrated camera and LiDAR sensors to redefine spatial design and modeling. Capitalizing on the advanced capabilities of the iPad Pro's hardware, the app facilitates real-time capture of detailed and accurate spatial information. Through the synergistic integration of camera and LiDAR sensors, users can create immersive 3D models with unparalleled precision, making it a versatile tool for architectural planning, interior design, and virtual exploration. The app empowers users to unleash their creativity, streamlining the process of transforming real-world spaces into dynamic, digital representations. With seamless technology integration, it serves as an invaluable tool for both professionals and enthusiasts, marking a new era in spatial modeling on iOS devices. This project focus on innovation, hardware utilization, versatile applications, real-time capabilities, user empowerment, and digital transformation.

Keywords: iOS application, iPad Pro, LiDAR sensors, Spatial design, Precision, Digital transformation.

EFFICIENT AUDITING SCHEME FOR SECURE DATA STORAGE IN FOG-TO-CLOUD COMPUTING

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Abstract: The advent of cloud computing, data owners are motivated to outsource their complex data management systems from local sites to commercial public cloud for great flexibility and economic savings. But for protecting data privacy, sensitive data has to be encrypted before outsourcing, which obsoletes traditional data utilization based on plaintext keyword search. Thus, enabling an encrypted cloud data search service is of paramount importance. Considering the large number of data users and documents in cloud, it is crucial for the search service to allow multi-keyword query and provide result similarity ranking to meet the effective data retrieval need. Related works on searchable encryption focus on single keyword search or Boolean keyword search, and rarely differentiate the search results. In this paper, for the first time, we define and solve the challenging problem of privacy-preserving multi-keyword ranked search over encrypted cloud data (MRSE), and establish a set of strict privacy requirements for such a secure cloud data utilization system to become a reality.

Keywords: Privacy-Preserving, Multi-Keyword Ranked Search, Encrypted Cloud Data (MRSE).

MULTI-OBJECTIVES GREY WOLF OPTIMIZER FOR CLOUD DATA CENTERS

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Abstract: In Cloud systems, Virtual Machines are scheduled to hosts according to their instant resource usage without considering their overall and long-term utilization. Also, in many cases, the scheduling and placement processes are computational expensive and affect performance of deployed VMs. In this work, a Cloud VM scheduling algorithm that considers already running VM resource usage over time by analyzing past VM utilization levels in order to schedule VMs by optimizing performance by using Ant lion optimization classifier (ALO) technique. The Cloud management processes, like VM placement, affect already deployed systems so the aim is to minimize such performance degradation. Moreover, overloaded VMs tend to steal resources from neighbouring VMs, so the work maximizes VMs real CPU utilization. The results show that our solution refines traditional Instant-based physical machine selection as it learns the system behaviour as well as it adapts over time. The concept of VM scheduling according to resource monitoring data extracted from past resource utilizations (VMs). The count of the physical machine gets reduced by four using Ant lion optimization classifier.

FAKE LOGO DETECTION USING PYTHON

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Abstract: This Logo Detection app aims to help consumers distinguish forgeries from the original product. Using this system, a consumer can verify whether a product is in fact an original. This application can also be helpful for brands struggling to fight against forged products. Counterfeit products usually have an inferior built quality and along with stealing sales, they also damaging a brand's reputation in the long run. Along with harming a brand's sales and reputation, unaware consumers also get cheated out of their money. This Logo Detection project aims to help users identify forgeries by analyzing the logo on the product. Along with helping users identify the logo, this app also helps brands combat logo piracy. A logo recognition system can therefore help brands get more insights from user generated content, optimize digital marketing strategy, and even protect trademarks against misuse.

Keywords: Fake Logo Detection, Python, Image Processing, Machine Learning, Model Evaluation.

A MODERN E-COMMERCE PLATFORM WITH CUSTOMIZATION FEATURES

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Abstract: In the competitive landscape of e-commerce, offering a personalized and engaging shopping experience is paramount for attracting and retaining customers. This abstract outlines the strategy to enhance an e-commerce platform with advanced product customization features aimed at increasing user engagement. The proposed features include the ability for users to modify attributes such as color, size, and material of products, thereby transforming the traditional online shopping experience into a customizable one. To achieve this, the integration of React.js and Ruby on Rails is proposed for its robustness and scalability. React.js facilitates dynamic and interactive user interfaces, while Ruby on Rails provides a solid foundation for backend development, ensuring seamless integration and efficient performance. The benefits of implementing these advanced customization features are twofold. Firstly, customers will enjoy a unique and engaging shopping experience tailored to their preferences, resulting in increased satisfaction and loyalty. Secondly, administrators will gain efficient product management capabilities, enabling them to easily handle a diverse range of customizable products and streamline their operations. Overall, the integration of advanced customization features into the e-commerce platform aims to revolutionize the online shopping experience, fostering deeper connections with customers and driving business growth.

Keywords: E-Commerce, Product Customization, User Engagement, Scalability, Unique Shopping Experience, Efficient Product Management.

**UPDATING POINT CLOUD LAYER OF HIGH DEFINITION (HD) MAP
BASED ON CROWD-SOURCING OF MULTIPLE VEHICLES
INSTALLED LIDAR**

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Abstract: In the real time of Vehicular Ad Hoc Networks (VANETs), ensuring efficient and secure authentication holds paramount importance for vehicular communication and safety. This study proposes a novel approach to address this challenge through the integration of blockchain technology and Roadside Units (RSUs). By leveraging the inherent security and decentralization features of blockchain, a robust framework is devised for secret key extraction and management. Upon vehicle registration, a unique cryptographic identity is assigned, and a blockchain-based consortium network is established, wherein RSUs play a crucial role as trusted nodes. The RSUs collectively generate and distribute cryptographic keys to vehicles, ensuring secure communication among vehicles and with RSUs. This cryptographic identity is utilized for signing messages, thereby guaranteeing the authenticity and integrity of exchanged data. The blockchain ledger maintains an immutable record of authentication events, enhancing transparency and traceability. While offering a decentralized architecture that mitigates single points of failure, challenges such as scalability and latency are acknowledged and require further exploration. Ultimately, this research contributes to the enhancement of VANET security, paving the way for a safer and more efficient vehicular communication ecosystem.

Keywords: Vehicular Ad Hoc Networks (VANETs), Block chain technology, Roadside Units (RSUs).

BRAIN DISEASE DIAGNOSIS USING MACHINE LEARNING AND DEEP LEARNING APPROACHES

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Abstract: Brain disease detection is a challenging task, due to the complexity of the brain and the variability of brain diseases. Existing diagnostic methods, such as neuroimaging and clinical examinations, can be time-consuming, expensive, and invasive. Moreover, these methods may not be accurate or sensitive enough to detect brain diseases at an early stage. Machine learning and deep learning have the potential to overcome the limitations of existing diagnostic methods. These technologies can be used to develop accurate and efficient models for brain disease detection. However, there are a number of challenges that need to be addressed before machine learning and deep learning models can be widely deployed in clinical settings. Here, BAT algorithm is adjusted to extract and relabelled the tumour and then find its size in pixels. The algorithm works well in two stages. The first stage is to determine the input image labels and the number of pixels in each label. The second stage is to determine the output requested region to get total number of pixels accessed. Segmented areas are automatically calculated and to get desired tumour area per slice.

Keywords: Image Segmentation, Deep Learning, Brain Tumour.

MULTIPLE DISEASE PREDICTION SYSTEM USING MACHINE LEARNING

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Abstract: Due to numerous contributing risk factors, including high blood pressure, high cholesterol, irregular pulse rate, and others, diagnosing heart disease is challenging. Various data mining and neural network techniques have been employed to determine the severity of cardiac disease in humans. According to the research paper, the proposed model demonstrated satisfactory performance, predicting the evidence of heart disease in individuals using K-nearest neighbour (KNN) and logistic regression with good accuracy compared to previously used classifiers like naive Bayes. Healthcare is a rapidly evolving field with increasing data volumes. Big Data Analytics is emerging as a crucial approach in the healthcare domain to handle the vast amount of data generated daily from millions of patients seeking treatments worldwide. Analyzing trends in patient treatment aids in making informed and effective decisions to enhance the general standard of healthcare and diagnose specific conditions. In addition to heart disease, breast cancer prediction is also a focus of research. Decision trees, random forests, and neural networks are utilized to forecast breast cancer. Diagnosing Parkinson's disease through a machine learning approach provides a better understanding using datasets such as the one retrieved from the UCI Machine Learning repository.

Keywords: Heart disease, Parkinson's disease, Machine learning algorithm, Early detection.

COMPARATIVE ANALYSIS STUDY FOR AIR QUALITY PREDICTION IN SMART CITIES USING REGRESSION ALGORITHMS

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Abstract: We estimate the air nature of India by utilizing AI to foresee the air quality file of a given region. Air quality file of India is a standard measure used to demonstrate the poison (SO₂, NO₂, rspm, spm, etc.) levels over a period. We fostered a model to foresee the air quality file in light of verifiable information of earlier years and foreseeing over a specific impending year as a Slope nice helped multivariable relapse issue. We work on the effectiveness of the model by applying cost Assessment for our prescient Issue. Our model will be proficient for effectively anticipating the air quality list of a complete district or any state or any limited locale furnished with the verifiable information of contamination fixation. Forecast of air quality can be helped by meteorological circumstances, which fundamentally affect the nature of the air. In any case, while considering meteorological circumstances, it is challenging to acquire solid profound learning models for air quality expectation due to the "discovery" nature of profound learning. Utilizing logical profound learning, we show the effect of meteorological circumstances on air quality forecast in this paper to address the previously mentioned issue. The meteorological condition datasets estimating temperature, moistness, and air pressure, as well as the source information from air poison datasets, including PM2.5, PM10, and SO₂ Air Quality list values are gotten. Foreseeing air quality utilizing AI calculations, for example, Straight relapse and choice tree relapse. The exactness values will be displayed as two calculations are executed.

Keywords: SPM, PM, SO₂, NO₂, smart cities, AI (air quality index), Regression Algorithms.

CHRONIC KIDNEY DISEASE DETECTION USING MACHINE LEARNING

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Abstract: Chronic Kidney Disease (CKD) is a prevalent health issue necessitating timely detection for effective intervention. This paper focuses on utilizing state-of-the-art deep learning techniques, specifically Convolutional Neural Networks (CNNs), to develop robust predictive models for CKD diagnosis using CT images. The study exclusively explores the performance and efficacy of CNNs in comparison to traditional machine learning algorithms. The deep learning models are meticulously trained and evaluated, showcasing their ability to discern subtle patterns indicative of CKD in CT scans. The paper aims to provide a comprehensive analysis of the strengths and limitations of the CNN model, offering insights crucial for its practical implementation in healthcare settings. Furthermore, the paper addresses the need for seamless integration of complex deep learning models into healthcare workflows by developing a user-friendly interface. This interface facilitates intuitive interaction for healthcare professionals and patients, enabling efficient access and interpretation of CKD predictions derived from the CNN model. The exclusive reliance on deep learning, particularly CNNs, underscores the paper's commitment to pushing the boundaries of medical image analysis for enhanced early detection and management of CKD. The findings contribute to the growing body of knowledge in deep learning applications in healthcare, offering a promising avenue for advancing CKD diagnosis through advanced technology.

Keywords: Chronic Kidney Disease, CT Scan Images, Convolutional Neural Networks, Deep Learning, Patterns indicative.

DIABETES PREDICTION USING LOGISTICS REGRESSION MODEL IN MACHINE LEARNING

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Abstract: This paper, titled "Diabetes Prediction using Logistic Regression Model" is designed using machine learning. It is a research paper aimed at predicting whether a person has diabetes or not using a logistic regression model. Diabetes, a chronic metabolic disorder, poses a significant global health challenge, affecting millions of individuals worldwide, and 1 in 5 of them doesn't know they have it. Early detection and proactive management are pivotal in mitigating the impact of diabetes. This research paper delves into the realm of diabetes prediction, employing advanced machine learning techniques to develop a logistic regression model. Through the exploration of the Diabetes Database, the paper aims to contribute to the early identification of diabetes, fostering more effective intervention strategies and ultimately improving healthcare outcomes. The logistic regression model is constructed and rigorously evaluated, achieving an impressive .98% accuracy on the test set. The results and insights derived from this study are encapsulated in the Model Evaluation notebook, underscoring the potential utility of the logistic regression model in the early detection of diabetes. In this research endeavor, the utilization of Python, Pandas, and Scikit-learn underscores a robust and technologically advanced approach.

Keywords: Diabetes, Logistics Regression Algorithm, Accuracy, Early detection

MACHINE LEARNING FOR CLINICAL OUTCOME PREDICTION

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Abstract: Predictions or recommendations made by data-driven machines are already influencing clinical decision-making in healthcare. The latest clinical literature has seen a surge in machine learning applications, particularly in the development of outcome prediction models. These models cover a wide range of outcomes, including mortality, cardiac arrest, and acute conditions. Among these models, the PTPP (Patient Treatment Time Prediction) model stands out as the most accurate in predicting patient waiting time. Our paper provides a comprehensive overview of the current state-of-the-art in data processing, inference, and model evaluation for outcome prediction models that utilize data extracted from electronic health records. Additionally, we address the limitations of existing modeling assumptions and identify potential areas for future research.

Keywords: Machine Learning, Electronic Medical Records, Clinical Outcome.

DRIVER DROWSINESS DETECTION BASED ON IMAGE PROCESSING

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Abstract: Drowsy driving is a prevalent and a serious public health issue that deserves attention. Recent studies estimate that around 20% of car crashes have been caused by drowsy drivers. A person when he or she does not have a proper rest especially a driver tends to fall asleep causing a traffic accident. Nowadays, one of the main goals in the development of new advanced driver assistance systems is trustworthy drowsiness detection. It is why the present paper wants to realize a system that can detect the drowsiness of the driver, in order to reduce traffic accidents. As a premise, it was assumed that the drowsiness is linked to the images in which the driver has closed eyes and the alert state is linked to the images in which the driver has opened eyes. After the face is detected using Naive Bayes Region of Interest, the region containing the eyes and mouth has to be separated. An image which took inside a vehicle includes the driver's face. Typically, a camera takes images within the RGB model (Red, Green and Blue).

Keywords: Driver Drowsiness Detection, Image Processing, Naive Bayes Region of interest.

DETECTION OF CYBERBULLYING ON SOCIAL MEDIA USING MACHINE LEARNING

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Abstract: Due to technological revolution over the years, bullying which was confined to physical boundaries has now moved online. Denigration or insult is one form of cyber bullying. According to Sri Lanka Computer Emergency Readiness Team, social media cyber bullying incidents are escalating. Insulting words are dynamic, and same word can have several meanings according to the context. Simply because a comment contains such a word, it cannot be classified as bullying. Hence, when labelling comments, simple keyword spotting techniques are inadequate. Other languages have addressed this issue using lexical databases such as Word Net which provides synonyms and homonyms of words. Since there is no proper lexical database developed for English language, detecting a word as bullying is a challenge. Therefore, we used rules to overcome this issue. Twitter comments with profane words were collected, outliers were removed, and remaining tweets were pre-processed. To determine insult in the text, five rules were used for feature extraction. Afterward, we applied Support Vector Machine (SVM), K-nearest neighbour (KNN) and Naïve Bayes algorithms. The results show that SVM with an RBF kernel performs better with an F1-score of 91%. Novelty of this research is the focus on English language cyber bully detection which has not been addressed before.

Keywords: Cyber bullying, SVM, KNN, Machine learning.

A ROAD ACCIDENT PREDICTION MODEL USING MACHINE LEARNING

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Abstract: The contemporary concern for safe driving necessitates a thorough analysis of road crash data to influence road and automobile designs and guide policy implementation for enhanced road safety. This study focuses on predicting effective criteria for vehicle crash injuries, framing accidents as events resulting in injury, loss of life, or property damage. The Naive Bayes (NB) method is proposed for this prediction. The enduring issue of motor vehicle crash severity is acknowledged as a challenge for both high way agencies and vehicle manufacturing companies. The study employs ordered probability models to examine factors significantly contributing to the severity of right-angle crashes following an accident.

Keywords: Road Accident, Safety, Machine learning Algorithm.

FARMER ONLINE SELLING APPLICATION

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Abstract: This Farmers Online Selling Application project helps are knowledge-based farmer selling software that helps selling the products in data-driven decision making for improving productivity and profitability. With the most complete feature-set on the market, this project empowers coconuts to manage all field activities product details, inventory, and workforce and get insight into overall farming performance with a single click. The selling application undertakes to supply agreed quantities of a like crops, fertilizers or livestock product, based on the quality standards and delivery requirements of the purchaser. In return, the buyer, usually a company, agrees to buy the product, often at a price that is established in advance. The company often also agrees to support the coconut through, e.g., supplying inputs, assisting with land preparation, providing production advice and transporting produce to its premises. Database provides planners and policy makers easy access to information necessary for revitalizing agricultural and natural resources growth, enhancing farmer selling security and promoting rural development. The database provides tools for data entry, data viewing, and data analysis and report generation. Built on top of a powerful agricultural knowledge base, its automated pest and disease detection alert coconuts to protect crops timely. Farmers is able to update our profile and change password. The farmer is responsible for sales and purchasing coconut and can view sales and purchase reports.

Keywords: Selling application, Direct sale from farmers.

STOCK PRICE PREDICTION USING MACHINE LEARNING

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Abstract: Accurate prediction of stock prices plays an increasingly prominent role in the stock market where returns and risks fluctuate wildly, and both financial institutions and regulatory authorities have paid sufficient attention to it. As a method of asset allocation, stocks have always been favored by investors because of their high returns. Estimation of the stock accurately can generate huge revenues for the customers. Considering the historical data insights need to be drawn to predict the future value. Stock price prediction has long been a challenging yet vital task for investors, traders, and financial analysts. With the advent of machine learning techniques, there has been a surge in research aimed at improving the accuracy of stock price predictions. This paper presents a comprehensive review of recent advancements in machine learning-based stock price prediction methodologies. Additionally, feature engineering techniques, data preprocessing methods, and evaluation metrics are discussed to provide insights into building robust prediction models. Experimental results on real-world stock market datasets demonstrate the effectiveness and potential of machine learning approaches in forecasting stock prices, offering valuable insights for investors and stakeholders in financial markets.

Keywords: Stock price prediction, Machine learning, Financial markets, Data preprocessing, Evaluation metrics, Forecasting.

DRIVER DROWSINESS DETECTION BASED ON IMAGE PROCESSING

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Abstract: Drowsy driving is a prevalent and a serious public health issue that deserves attention. Recent studies estimate that around 20% of car crashes have been caused by drowsy drivers. A person when he or she does not have a proper rest especially a driver tends to fall asleep causing a traffic accident. Nowadays, one of the main goals in the development of new advanced driver assistance systems is trustworthy drowsiness detection. It is why the present paper wants to realize a system that can detect the drowsiness of the driver, in order to reduce traffic accidents. As a premise, it was assumed that the drowsiness is linked to the images in which the driver has closed eyes and the alert state is linked to the images in which the driver has opened eyes. After the face is detected using Naive Bayes Region of Interest, the region containing the eyes and mouth has to be separated. An image which took inside a vehicle includes the driver's face. Typically, a camera takes images within the RGB model (Red, Green and Blue).

Keywords: Driver Drowsiness Detection, Image Processing, Naive Bayes Region of interest.