6th International Conference on

Engineering Science and Technology and Management (ICESTM-2025) Volume-2

General Chair

Dr. Gangineni Dhananjhay

Convener Chair

Dr. Akhib Khan Bahamani

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6th International Conference on Engineering Science and Technology and Management (ICESTM-2025)

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Editors

Dr. Gangineni Dhananjhay

Dr. Akhib Khan Bhamani

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The following are the different tracks in this conference:

Track 1: Electronics and Communication Engineering

Topics of interest but are not limited to the following:

1. Nanoelectronics and microelectronics
2. Power and Applied electronics
3. Microprocessor and Microcontroller
4. Very Large Scale Integration (VLSI)
5. Micro scale fabrication
6. Electro technologies
7. High Voltage and Insulation Technologies
8. Power Electronics and Drive Systems

Track 2: Computer Science and Engineering

Topics of interest but are not limited to the following:

1. Computer Networks.
2. Data Communications.
3. Data Encryption.
4. Data Mining.
5. Database Systems.
6. Programming Languages.
7. Image processing and Pattern recognition
8. CAD-CAM.

Track 3: Electrical and Electronics Engineering

Topics of interest but are not limited to the following:

1. Instrumentation
2. Electric Power Generation
3. Electrical Machines and Drive Systems
4. Electromagnetic Transients Programs
5. Digital Signal Processing
6. Microprocessor based Technologies
7. Economic aspects of power quality and cost of supply
8. Reliability and continuity of supply.

Track 4: Mechanical Engineering

Topics of interest but are not limited to the following:

1. Industrial Planning
2. Maintenance Engineering
3. Intelligent Mechatronics
4. Robotics
5. Automation, and Control Systems
6. Intelligent System
7. Fault diagnosis
8. Engines and Heat exchangers

Track 5: Civil Engineering

Topics of interest but are not limited to the following:

1. Advanced Concrete Technology
2. Concrete Science and Technology
3. Construction Planning, Scheduling, and Control
4. Geology
5. Mechanics of Solids and Fluids
6. Monitoring of Structures & Buildings
7. Architecture and Town Planning

Track 6: Mathematics

Topics of interest but are not limited to the following:

1. Probability & Statistics
2. Number Theory & Linear Algebra
3. Mathematical Modeling and Simulation
4. Graph Theory
5. Geometry Analysis and Fluid Mechanics
6. Computational Methods in Fluid Dynamics

Track 7: PHYSCIS AND CHEMISTRY

Topics of interest but are not limited to the following:

1. Thin Film & Characterization

2. Single Crystals & Applications
3. Semiconductor Devices
4. Polymers, Glasses & Ceramics
5. Photonic Materials
6. Graphene & Novel Materials
7. Nano Chemistry
8. Metal Alloys & Composite Structures
9. Green Chemistry
10. Electroplating
11. Catalysis
12. Biomedical Applications of Polymers

TRACK 8: Emerging Trends in Business & Commerce

Topics of interest but are not limited to the following:

1. Creative and Innovation in Business
2. Finance, Economics and Insurance
3. Accounting and Banking
4. Internet Banking and Marketing Management
5. Entrepreneurship and Sustainable Development
6. Supply Chain Management
7. Hospitality and Tourism Management
8. Stress Management Quality Control and Product Development
9. Environmental Protection and Disaster Management

TRACK 9: Emerging Trends in Economics & Statistics

Topics of interest but are not limited to the following:

1. Pedagogy of Economics
2. Innovative Practices of Economic
3. Interface between Economics and Mathematics
4. Key issues in Gender Economics
5. Nature of Economics
6. Modern Technique in Statistical Methods, Qualitative & Quantitative

REGISTRATION PROCESS

- send the paper to icestm2025@gmail.com
- After the acceptance mail received, complete the payment process.
- The registration fee is payable through crossed Demand Draft (DD) in the favour of "Principal Narayana Engineering College, Nellore", Payable at Nellore.

GUIDELINES FOR AUTHORS

- All submissions will be peer reviewed by experts in the field based on originality, significance, quality and clarity and it should be result oriented.
- All contributions must be original, should not have been published and should not be intended to be under review elsewhere during the review period.
- At least one author must register and present his/her accepted manuscript in the conference. Registration fee includes proceedings, Conference kit, Lunch, Tea& Certificate.
- Prior to submission, the paper should be checked for Plagiarism from licenced plagiarism software like Turnitin / iThenticate. The similarity content should not exceed 20% in any case (either self-contents or others).
- All the accepted manuscripts have an opportunity to be published in UGC CARE and Scopus indexed journal. Additional publication charges are applicable as per journal norms

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ABOUT NARAYANA ENGINEERING COLLEGE

Narayana Engineering College Nellore (NECN) was established in 1998. Now, ours is one of the premier Engineering Colleges in the self-financing category in Andhra Pradesh. College is locating in Nellore city, which is famous for Paddy crop and is also called city of Education. Institution has well-equipped built-up area with impressive infrastructure like state of art Laboratories, class rooms, tutorial rooms, library, drawing halls, seminar halls etc are available to provide conducive environment for academic activities.

College is ranked by Grade 'A' by Government of Andhra Pradesh, permanently affiliated to JNTUA, Ananthapuramu, recognized by UGC 2(f) and 12(B), Accredited by 'A+' grade with 3.41 CGPA by NAAC and certified by ISO 9001:2015. NECN, over the past 21 years has become a shrine of knowledge and shaped thousands of famous and adroit graduates and post graduates, who are successful in their careers, serving all over the world. Since the inception, NECN is intended to provide quality education through value-based teaching-learning process via Outcome Based Education, providing fruitful industry –institute interaction, excelling support in research initiatives among students and faculty members, encouraging to involve in innovation and incubation cell to drive towards entrepreneurship and motivating to participate in community service activities. The institute is always focusing on overall development of the students through participation in co-curricular and extra-curricular activities. NECN is committed to bringing out the best in every student by imparting a strong educational foundation. Given the dynamic and global nature of education in the 21st century, we are constantly working hard and reinventing ourselves with the ultimate goal of creating exceptional and enriching student experiences.

MAJOR ACHIEVEMENTS OF COLLEGE

- Autonomous Institutions
- Accredited with NAAC A+ Grade in Andhra Pradesh, No.3 In India wide
- Permanent Affiliation with JNTUA, Anantapuramu
- Best Engineering College in Co-Curricular Activities
- Recognized by UGC under 2(f) & 12(B).
- Rated as College with Grade-A by Govt. of AP.
- Authorized Training Partner to NSDC, New Delhi as PMKVY-TI Center
- Authorized Nodal Centre from IIT-Bombay
- Offering consultancy services to Major Government and Private Organizations – Testing / Evaluation / Design

ABOUT THE CONFERENCE

6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), which will be held at Narayana Engineering College, Nellore, Andhra Pradesh, on 14th – 15th April 2025. In the contemporary era of knowledge, higher education institutions play a pivotal role beyond traditional teaching. They actively engage in the assimilation, generation, and dissemination of knowledge. The 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) aims to bring together leading experts, researchers, and innovators from academia, research and development organizations, and industry. The conference will serve as a dynamic platform for sharing cutting-edge research, discussing emerging ideas, and exploring collaborative opportunities across disciplines. ICESTM-2025 is committed to fostering a culture of interdisciplinary research and inspiring young graduates to pursue careers in research and innovation. Join us in Nellore to be part of this knowledge-driven event that bridges academic research and industrial innovation.

Message from founder

It is a matter of immense pride that Narayana Engineering College, Nellore is hosting the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) from 14th to 15th April 2025.Research is an indispensable pillar of any esteemed academic institution. I am delighted to announce that NECN has taken a significant step in nurturing a vibrant research culture as part of its academic mission, with the aim of contributing valuable knowledge to the global community. This conference provides a vital platform for interaction and collaboration among scientists from R&D institutions, academicians from universities, and industry technocrats. It serves to sharpen research acumen and bridge the gap between theoretical advancements and their practical applications.

I extend my heartfelt congratulations to the organizers and participants. I wish the event resounding success and hope it paves the way for many future innovations.

Best wishes,

Dr. P. Narayana

Founder, Narayana Group of Educational Institution

Message from Chairmen

I am very glad that Narayana Engineering College, Nellore is organizing the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) from 14th to 15th April 2025. It is a great pleasure to welcome academicians, research scholars, and other participants to this two-day international conference. ICESTM-2025 offers a valuable platform for meaningful interaction among academicians, researchers, and industry professionals, fostering opportunities for future collaborations. It also presents a golden opportunity for the students of our institution to broaden their horizons and enrich their academic knowledge.

I extend my best wishes for the grand success of the conference and congratulate the organizing team for their commendable efforts in making this event a reality.

Best regards,

Sri. Puneeth

Chairmen, Narayana Group of Educational Institution

Message from Registrar

It gives me immense pleasure and a great sense of privilege to welcome you to the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), being held from 14th to 15th April 2025, organized by Narayana Engineering College, Nellore.

This conference aims to address the challenges faced by researchers, professionals, and students by providing a platform to share innovative ideas, explore recent trends, and discuss future directions in the fields of Engineering, Science, and Technology.

I am confident that ICESTM-2025 will open new avenues in emerging and interdisciplinary domains. The exchange of ideas among scholars and intellectuals will undoubtedly lead to novel solutions and stimulate fresh thinking in tackling complex problems across these fields.

Wishing all participants a fruitful and enriching experience, and the conference a grand success.

Warm regards,

Sri R Samba Siva Rao
Registrar, Narayana Group of Educational Institution

Message from Director

It gives me immense pleasure to pen this foreword for the proceedings of the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), being held from 14th to 15th April 2025, organized by Narayana Engineering College, Nellore.

The essence of engineering lies in the practical application of scientific and mathematical knowledge gained through study, experience, and practice for the efficient use of materials and the forces of nature. In this context, research becomes the embellishment of innovation, driving the evolution of ideas into impactful solutions. I am proud to share that NECN has undertaken the vital responsibility of fostering a strong research culture, as part of our academic commitment to generating and disseminating knowledge to the global community. ICESTM-2025 provides a vibrant forum for interaction among scientists from R&D organizations, academicians from universities, and technocrats from industry. It facilitates skill enhancement and the bridging of gaps in the application of technology through meaningful collaboration and dialogue.

I extend my heartfelt best wishes to all participants and organizers. May this event be a grand success and a source of inspiration for all involved.

Warm regards,

Dr. B. Dattatraya Sarma

Director, Narayana Group of Educational Institution

Message from Principal, NEC::Nellore

It is indeed heartening to know that Narayana Engineering College, Nellore is organizing the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), to be held from 14th to 15th April 2025. This conference aims to provide a dynamic platform for researchers, academicians, and industry experts to interact, share ideas, and explore new frontiers of knowledge. In an era marked by global interdependence and intense competition, it is imperative that we equip our young minds with quality education and training. At Narayana Engineering College, we have long embraced the tradition of delivering excellence in technical education. It is truly inspiring to witness the institution's remarkable growth over the past two decades, emerging as one of the premier engineering colleges not only in the state but also across India.

However, the pursuit of excellence is a continuous journey. Our collective efforts must be channeled toward the holistic development of the college in all aspects of modern technical education. Furthermore, it is vital that advancements in technology and research outputs are aligned with the betterment of humanity and contribute meaningfully to society.

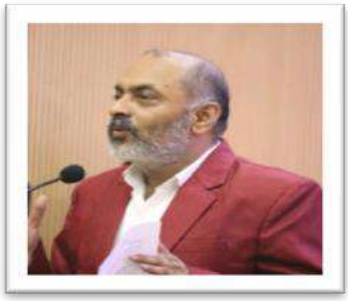
I convey my blessings and best wishes to all members of Narayana Engineering College. I also extend my heartfelt congratulations to the organizing committee of ICESTM-2025 for their commendable efforts in hosting this significant event.

With warm regards,

Dr. G. Srinivasulu Reddy

Principal, Narayan Engineering College, Nellore

Message from the General chair- ICESTM 2025, NEC::Nellore



Dear Participants,

It is a great pleasure to extend a warm welcome to all delegates attending the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), being held from 14th to 15th April 2025 at Narayana Engineering College, Nellore. At NECN, it is a regular practice to organize a wide range of academic and professional events such as workshops, symposiums, seminars, and conferences with the aim of enhancing the overall development and performance of our students. ICESTM-2025 is yet another step in this direction, aimed at fostering innovation, knowledge sharing, and collaboration among participants from academia and industry.

On behalf of the organizing committee, we are delighted to welcome you all to this prestigious event. We extend our heartfelt greetings to all distinguished delegates, researchers, academicians, and industry experts. It is a true honor and privilege to serve as the General Chair of this conference.

I eagerly look forward to your active participation and enriching discussions at ICESTM-2025.

Warm regards,

Dr. Gangineni Dhananjhay
Professor & Dean,
General Chair-ICESTM-2024

Message from the Convener chair- ICESTM 2025, NEC::Nellore

Dear Professors and Researchers

It is my privilege and honor to welcome you all to the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), being held at Narayana Engineering College, Nellore, from 14th to 15th April 2025. The primary objective of this conference is to provide a vibrant platform for sharing and enriching knowledge in this fast-evolving Information Era. ICESTM-2025 offers a valuable opportunity for individuals passionate about technological advancements to both gain insight into current developments and contribute their own innovative ideas. This conference is designed to promote the exchange of novel concepts and research findings through paper presentations and keynote addresses that spotlight cutting-edge trends in technology, particularly in Industry and Intelligent Computing Systems. It highlights the increasing significance of these domains and their growing impact on academic research and industrial practices. Participants will have ample opportunities to broaden their knowledge base, collaborate with peers, and build meaningful professional networks. Beyond the academic discussions, I also hope you take time to enjoy the scenic surroundings and warm hospitality of our campus and the city of Nellore. I would like to extend my sincere thanks to the conference committee for their tireless efforts, and to all authors, reviewers, and contributors for their unwavering support and trust in the vision of ICESTM-2025.

I warmly invite all enthusiasts to take part in this dynamic and celebrated event, which promises valuable exposure and global opportunities for everyone involved.

Dr. Akhib Khan Bahamani

Convener-ICESTM-2024

Message from HOD, Electrical and Electronics Engineering, NEC::Nellore

It gives me immense happiness to share that Narayana Engineering College, Nellore is organizing the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) from 14th to 15th April 2025.

I am confident that this conference will serve as a valuable platform for academicians, corporate delegates, and research scholars to present their innovative ideas, share their latest findings, and showcase their technical expertise across emerging research trends in Engineering, Science, and Technology.

I wholeheartedly welcome all the participants and assure you that this conference will be an enriching and memorable experience. I extend my best wishes for the grand success of ICESTM-2025.

Dr. G. Venkateswarlu

HOD EEE, Narayana Engineering College, Nellore

Message from HOD, Computer Science and Engineering, NEC::Nellore

I am honored to serve as the coordinator for the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) from 14th to 15th April 2025 at Narayana Engineering College, Nellore. I extend my heartfelt congratulations to all participants who have submitted their papers for this esteemed conference. I trust that the keynote addresses and presentations will provide valuable insights and stimulate fruitful discussions.

Dr. C. Rajendra

HOD, CSE, Narayana Engineering College, Nellore

Message from HOD Electronics and Communication Engineering, NEC::Nellore

In any engineering institution, it is customary and essential to complement academic pursuits with extracurricular activities both technical and cultural that foster holistic development.

As the Conference Chair of the 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), to be held from 14th to 15th April 2025, it is my privilege and honor to be part of organizing such a significant event at Narayana Engineering College, Nellore.

This conference serves as a platform to bring together researchers, academicians, and professionals from diverse domains to exchange knowledge, ideas, and innovations that address current and future challenges in Engineering, Science, and Technology.

I extend my heartfelt congratulations to all the participants and wish each one of you a successful and rewarding experience at ICESTM-2025.

Dr. K. Murali

HOD, ECE, Narayana Engineering College, Nellore

Message from HOD Civil Engineering, NEC::Nellore

This 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025) from 14th to 15th April 2025 organizing by Narayana Engineering College, Nellore is an attempt to focus the attention of all concerned professionals to discuss at length concerned with the Emerging trends in engineering& technology, to seek solutions wherever possible and identify areas where further research is needed.

Information provided in various papers are reproduced in the proceedings is aimed at benefiting the Engineers and professionals. It is expected that the purpose would be served in a satisfactory manner through in-depth discussion and interaction among participants during the conference. I take this opportunity to record my heartfelt appreciation and gratitude to all the authors, delegates, conference chairman and all others participating.

Prof. K. Venkatalakshmi

HOD, CE, Narayana Engineering College, Nellore

Message from HOD Mechanical Engineering, NEC::Nellore

The 6th International Conference on Engineering Science, Technology and Management (ICESTM-2025), organized by Narayana Engineering College, Nellore, from 14th to 15th April 2025, provides a valuable opportunity for research scholars, delegates, and students to interact, exchange experiences, and share knowledge on the latest applications of technology.

ICESTM-2025 will serve as an excellent international platform for discussing the recent challenges and innovations in Engineering and Technology. The goal of the conference is to foster collaboration and knowledge sharing between researchers, practitioners, and industry professionals from both academia and industry, enabling them to explore cutting-edge developments in their respective fields.

I extend my heartfelt congratulations to all the participants and wish you all the best for a successful and enriching experience at ICESTM-2025.

Dr. A.V.S. Sridhar Kumar
HOD, ME, Narayana Engineering College, Nellore

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DESIGN AND DEVELOPMENT OF UAV SYSTEMS FOR EMERGENCY MEDICAL APPLICATIONS

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ABSTRACT

The use of unmanned aerial vehicles or "Drones" has expanded in the last decade, as their technology has become more sophisticated, and costs have decreased. They are now used routinely in farming, environmental surveillance, public safety, commercial product delivery, recreation, and other applications. Health-related applications are only recently becoming more widely explored and accepted. The use of drone technology in emergency medicine is especially promising given the need for a rapid response to enhance patient outcomes. Current challenges to expanding their use in emergency medicine and emergency medical system include regulation, safety, flying conditions, concerns about privacy, consent and confidentiality, and details surrounding the development, operation, and maintenance of a medical drone network. The Design of the drone must be done in different software's such as AUTO CAD, CATIAV5, and SOLIDWORKS etc. using CATIA V5 for the designing of the drone. Some of the major requirements to design of the drone which consist of the payload capacity Range, speed & safety. Drone design using CATIAV5, emphasizing the integration of mechanical and electronic components into a cohesive and functional aerial vehicle. CATIA V5 (Computer Aided Three dimensional Interactive Application) is a multi-platform software suite for computer.

Key Words: Unmanned Aerial Vehicles (UAVs), Emergency Medicine, Payload Capacity, Drone Design, CATIA V5, CAD (Computer-Aided Design)

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DESIGN AND FABRICATION OF A CAMERA-EQUIPPED DRONE FOR AERIAL SURVEILLANCE

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ABSTRACT

The development of autonomous camera drones for aerial surveillance has gained significant attention due to their potential in enhancing monitoring and security applications. This project focuses on the fabrication of an autonomous camera drone specifically designed for efficient and real-time aerial surveillance. The primary objective is to create a drone system that integrates advanced flight control, high-resolution cameras, and intelligent navigation capabilities, allowing for autonomous operation in diverse environments. The design process includes the selection of appropriate materials, components, and sensors to ensure durability, stability, and accurate image capture. The drone is equipped with a GPS module for precise navigation, a high-definition camera for live-streaming and recording, and obstacle avoidance sensors to ensure safe flight in complex surroundings. The system is programmed to follow pre-determined flight paths and to autonomously respond to environmental changes, such as obstacles or no-fly zones. Through rigorous testing and optimization, the drone's performance, efficiency, and reliability in real-world surveillance scenarios are evaluated. This project demonstrates the potential of autonomous camera drones to revolutionize surveillance tasks, offering improved coverage, reduced operational costs, and enhanced safety in both urban and remote settings. Key words: Aerial surveillance, Flight Control System, High-Resolution Imaging, Real-Time Video Streaming, Surveillance Coverage.

Key Words: Autonomous camera drones, GPS module, sensors, Flight Control System

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DESIGN AND DEVELOPMENT OF A SPIDER ROBOT BASED ON THE THEO JANSEN MECHANISM

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ABSTRACT

It is outstanding that creatures can go over a rough terrain at speeds which are remarkably higher than practically possible with wheeled vehicles. Indeed, even an individual, by getting down on each of the eight legs if necessary, can travel or climb over terrain which is inaccessible for a wheeled or followed vehicle. It is therefore of immense enthusiasm to realize what machines for land locomotion can do if they are intended to imitate nature. Legged robots can be utilized for space mission so next raterrestrial planets and in risky places, for example, within an atomic reactor, giving autonomous legged robots a great potential. Low power consumption and weight are further advantages of walking robots, so it is important to use the minimum number of actuators. In this context, the objective of this project is to learn and design a prototype of the Theo-Jansen eight leg strolling robot. The goal is to develop a new mechanical automated walker utilizing eight bar link mechanism. The essential Theo Jansen device is a 13 bar frame work that strolls when a crank is rotated. So, utilizing linkages we attempted to imitate nature and put together certain strolling robot which will suite off-road

KEY WORDS: Theo Jansen device, autonomous legged robots, atomic reactor

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ASSEMBLY AND DEPLOYMENT OF A DRONE SYSTEM FOR EMERGENCY MEDICAL DELIVERY SERVICES

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ABSTRACT

Drones, also referred to as unmanned aerial vehicles, have the potential to significantly contribute to civilian emergency medical services. The purpose of this project is to assemble the drone and to show case the actual applications of drones in hill areas and in places where people not able to travel hospital during emergency conditions for medicine, vaccines etc. In this project we will carefully write all the difficulties face while assembling, implementing and operating the drone project and closely observe the challenges encounter when facing technical and logistical issues related to drones, such as choosing the right drones, managing payload capacity, scheduling operations, and transporting drones. However, it is important to know the rules about flying drones because if an unreported drone is seen in controlled airspace, it can cause safety issues for aviation and government regulations. In this project depending on the type of drone, it can be controlled manually via a remote controller, inputs commands, or autonomously using GPS way points and pre-programmed instructions return-to-home (RTH), and waypoint navigation

KEY WORDS: Wireless technology, Brushless motors, Medicine box.

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MANUFACTURING AND IMPLEMENTATION OF A SPIDER ROBOT USING THE THEO JANSEN MECHANISM

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ABSTRACT

It is outstanding that creatures can go over a rough terrain at speeds which are remarkably higher than practically possible with wheeled vehicles. Indeed, even an individual, by getting down on each of the eight legs if necessary, can travel or climb over terrain which is inaccessible for a wheeled or followed vehicle. It is therefore of immense enthusiasm to realize what machines for land locomotion can do if they are intended to imitate nature. Legged robots can be utilized for space missions on extraterrestrial planets and in risky places, for example, within an atomic reactor, giving autonomous legged robots a great potential. Low power consumption and weight are further advantages of walking robots, so it is important to use the minimum number of actuators. In this context, the objective of this project is to learn and design a prototype of the Theo-Jansen eight leg strolling robot. The goal is to develop a new mechanical automated walker utilizing eight bar link mechanism. The essential Theo Jansen device is a 13 bar framework that strolls when a crank is rotated. So, utilizing linkages we attempted to imitate nature and put together certain strolling robot which will suite off-road.

KEY WORDS: Theo Jansen device, autonomous legged robots, atomic reactor

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INFLUENCE OF MINERAL ADMIXTURES BY DIFFERENT MIX PROPORTIONS IN PERVIOUS CONCRETE

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ABSTRACT

This Study represents the experimental methodology and experimental results related to strength, Mix ratio and water absorption. Cubes of size 150mm*150mm*150mm are prepared to investigate the properties of pervious concrete. This investigation is carried out at the end of 3days, 7days, 14days and 28days for Strength of pervious concrete and for water absorption. Different concrete mix proportion such as 1:3, 1:4 with different water cement ratios are 0.3, 0.35, 0.4, 0.45 and 0.5 of different size of gravel such as 20mm and 12mm should be used to check the properties of pervious concrete. And also used the cementitious materials such as Silica fume (10%) as a partial replacement of cement.

KEYWORDS: Pervious concrete, Fly ash, Silica Fume, Compressive Strength and Permeability

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OPTIMIZATION OF COMPRESSIVE STRENGTH FOR FLY ASH BUILDING BRICKS

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ABSTRACT

Fly ash bricks are comparable to burnt clay bricks in that they may be utilised in all types of building construction. Fly ash bricks are lighter in weight and more durable than traditional clay bricks. Because fly ash is accumulating as a waste material in large quantities near thermal power plants, causing serious environmental pollution issues, its use as a primary raw material in the production of bricks will not only provide ample opportunities for its proper and useful disposal, but will also aid in environmental pollution control to a greater extent in the power plant's surrounding areas. The study aims to determine the optimal mix ratio that yields the highest compressive strength while maintaining cost-effectiveness and sustainability. Various proportions of fly ash (40%, 50%, 60%, 70% & 80%), cement(8%, 9%, 10%, 12% & 15%) and M- Sand in addition to sand (52%, 41%, 30%, 18% & 5%) were tested to evaluate their impact on the compressive strength of the bricks. The results indicate that incorporating fly ash, cement and sand in addition to M-sand were using different mix proportions and have tested for the compressive strength of the bricks, making them a viable alternative to traditional construction materials.

The best optimum mix proportion for the samples tested in this study has been observed to be 60% Fly Ash, 10% Cement and 30% sand at 28 days curing time.

KEYWORDS: Fly ash, bricks, sustainable construction, water absorption, compressive strength.

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INTEGRATED APPROACH TO ANALYSIS AND DESIGN OF G+21 HIGH-RISE BUILDING USING ADVANCED SOFTWARE

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ABSTRACT

Load, Limit state method, shear force, bending moment and axial force In order to compete in the ever-growing competent market, it is very important for a structural engineer to save time. As a sequel to this an attempt is made to analyze and design a multi storied building by using a software packagestaadpro. For analyzing a multi storied building one has to consider all the possible loadings and see that the structure is safe against all possible loading conditions. The present project deals with the analysis and design of a multi storied building of G+21. The dead load &live loads are applied and the design for beams, columns, footing is obtained STAAD Pro with its new features surpassed its predecessors and compotators with its data sharing capabilities with other major software like AutoCAD. We conclude that staad pro is a very powerful tool which can save much time and is very accurate in Designs. The project were explained about the design and modeling of G+21 residential building by using Autocad, staad pro and Revit architecture (with BIM new technology) as it gives clear vision via design, construction and documentation

KEYWORDS: AUTOCAD (planning), STAADPro (Analysis, Design), REVIT (3D view), G+21 Storey building

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INNOVATIVE DESIGN APPROACH FOR G+20 RESIDENTIAL BUILDING USING AUTOCAD AND REVIT ARCHITECTURE

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ABSTRACT:

Our project represents a comprehensive methodology for the planning, design, and of a G+20 story building utilizing AutoCAD for architectural drafting and revit for 3d design & (MEP) system works. The design communication is gradually being changed from 2D based to integrated 3D digital interface. building information modelling is a model-based design concept, in which buildings will be built virtually before they get built out in the field, where data models organized for complete integration of all relevant factors in the building lifecycle which also manages the information exchange between the AEC(architects,engineers,contractors) professionals to strengthen the interaction between team. software shares knowledge the design about the information for lifecycle. there's still much to be learned about the opportunities decisions making during its and implications of this tool. In this project we will show the comparison and work done on both software named autocad and revit . This project presents the design and analysis of a G+20 multi-storey building using AutoCAD and Revit software. The building's architectural and structural components were designed and model using AutoCAD and Revit, considering factors such as structural integrity, architectural aesthetics, and building services.

KEY WORDS: AutoCAD. Revit. Drafting, Modeling.

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MACHINE LEARNING BASED PATIENT SAFETY PREDICTION USING EXPLAINABLE AI IN PHARMACOVILIGENCE

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ABSTRACT

Recently, a number of sectors have emphasized the importance of Explainable AI (XAI), a methodology that supplements the black box of artificial intelligence. Finding studies in the realm of pharmacovigilance utilizing XAI is the aim of this study. Only 25 of the 781 papers that were carefully verified fit the selection requirements, despite numerous prior attempts to choose papers. An intuitive overview of XAI technologies' potential in pharmacovigilance is provided in this article. The included research examined drug treatment, side effects, and interaction studies based on tree models, neural network models, and graph models using clinical data, registry data, and knowledge data. Ultimately, a number of study concerns pertaining to the application of XAI in pharmacovigilance were found to have significant obstacles. XAI is not typically used, despite the fact that artificial intelligence (AI) is actively used in patient safety and drug surveillance, collecting adverse drug reaction data, extracting medication-drug interactions, and predicting effects. As a result, there should be constant discussion about the possible difficulties in using it as well as the opportunities for the future.

KEY WORDS: Machine learning, pharmacovigilance, explainable artificial intelligence

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IPFS BASED FILE STORAGE ACCESS CONTROL AND AUTHENTICATION MODEL FOR SECURE DATA TRANSFER USING BLOCK CHAIN

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ABSTRACT

A major issue facing educational institutions, companies, and individuals alike in the digital age is guaranteeing the security and legitimacy of academic credentials. Conventional techniques for confirming academic qualifications are frequently laborious, time-consuming, and vulnerable to fraud. But the development of blockchain technology presents a viable way to deal with these problems. Every academic certificate is kept on the blockchain as a digital asset in the suggested system, which makes use of a blockchain network. To ensure their integrity and immutability, these digital certificates are time-stamped, cryptographically encrypted, and linked to distinct identifiers like public keys or hashes. By using the Meta Mask extension and Ethereum network, anyone with access to the blockchain network may confirm the legitimacy of certificate, doing away with the need for middlemen and lowering the possibility of counterfeit credentials. The paper's primary strength is that the data saved on the blockchain are distinct identifiers of the encrypted material, which is encrypted using a technique that gives academic credentials greater security. Moreover, massive volumes of encrypted data are also stored on IPFS.

KEY WORDS: Encryption, Decryption, Blockchain, MetaMask, Ethereum, IPFS

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COLOR DETECTION FOR COLOR BLINDNESS PEOPLE

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ABSTRACT

In this work an attempt is made for designing a prototype in aid for color blind people in detecting color and edges of a given image which are of similar colors. Color blind people are restricted and even excluded from some professional jobs because of their deficiency to distinguish between colors. Motivation behind this work is to try and reduce such deficiency using technology. Image processing technique is used in proposed work to develop a setup for identifying the colors in an image and indicating the edges in case of different images with similar colors. Image processing involve two parts, first is color detection and the second is edge detection which is carried out on a Lab VIEW platform. Images are obtained using a wireless camera in the field of view of a color blind person who is unable to identify or judge the colors. It is then processed using Lab VIEW, color and edge of the image is displayed on Lab VIEW front panel.

KEY WORDS: Colorino Color Identifier-Light Detector

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AI-DRIVEN AUTONOMOUS DRIVING SYSTEM WITH ROAD EVENT AWARENESS

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ABSTRACT

Humans drive holistically, which includes, among other things, comprehending dynamic road occurrences and how they change over time. By incorporating these features into self-driving cars, situational awareness and decision-making can become more human-like. In order to achieve this, we present the first-ever ROAD event Awareness Dataset (ROAD) for Autonomous Driving. The purpose of ROAD is to evaluate an autonomous vehicle's capacity to recognize road events, which are triplets made up of an active agent, the action or actions it takes, and the scenes that correlate to those actions. Annotated with bounding boxes that indicate each road event's location in the image plane, ROAD is made up of movies that were initially taken from the Oxford Robot Car Dataset. We propose 3D-RetinaNet, a new incremental method for online road event awareness, as a baseline for a variety of detection tasks. In order to shed light on the difficulties context awareness in autonomous driving faces, we also present the results of the ICCV2021 ROAD challenge winners as well as the performance of Slow fast and YOLOv5 detectors on the ROAD tasks.

KEY WORDS: decision making, ROAD Dataset, Autonomous Driving, Event Awareness Traffic Events, Vehicle Perception, Real-Time Event Detection

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.AI-POWERED NETWORK SECURITY: DETECTING CYBER THREATS USING MACHINE LEARNING

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ABSTRACT

Cyber security is a critical concern in today's digital world, with cyber-attacks evolving rapidly. Intrusion Detection Systems (IDS) play a vital role in identifying malicious activities within a network. This research explores machine learning techniques to enhance cyber-attack detection. Using the CICIDS2017 dataset, we evaluate the performance of multiple machine learning models, including Support Vector Machine (SVM), Random Forest (RF), Convolutional Neural Network (CNN), and Artificial Neural Network (ANN). Our findings demonstrate that Random Forest and ANN outperform other models with accuracies of 99.93% and 99.11%, respectively, making them effective choices for cyber-attack detection.

Keywords: cyber security; cyber-attacks; Intrusion Detection System; Machine Learning; Accuracy

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GENDER AND AGE PREDICTION USING WEBCAM

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ABSTRACT

The accurate prediction of gender and age from various data sources, such as images, text, and other biometric data, has become a critical area of research in the fields of computer vision, machine learning, and human-computer interaction. This paper reviews state-of-the-art methodologies for gender and age prediction, highlighting key techniques including convolutional neural networks (CNNs), deep learning architectures, and ensemble methods. We discuss the preprocessing steps necessary for improving prediction accuracy, such as data augmentation and normalization, as well as the challenges posed by imbalanced datasets and diverse demographic characteristics. The paper also explores the applications of gender and age prediction systems in areas such as targeted marketing, security, and personalized user experiences. Comparative analysis of different models demonstrates the effectiveness and limitations of current approaches, providing insights into future directions for enhancing the robustness and fairness of these prediction systems. Experimental results on benchmark datasets underscore the potential of advanced algorithms to achieve high accuracy, while also emphasizing the ethical considerations and privacy concerns inherent in deploying these technologies.

KEYWORDS: Gender and Age Prediction, Convolutional Neural Networks (CNNs), Deep Learning Architectures, Data Preprocessing Techniques, Imbalanced Datasets, Ethical and Privacy Concerns

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DDO'S ATTACKS

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ABSTRACT

The paper describes a Machine Learning-Based Classification and Prediction Technique for DDoS Attacks. In today's interconnected world, cyber threats like Distributed Denial of Service (DDoS) attacks have become increasingly sophisticated, posing a major risk to online services. Our system leverages machine learning algorithms, including Random Forest and XGBoost, to accurately detect and classify DDoS attacks in real-time. By analyzing key network parameters, such as duration, destination bytes, source bytes, login status, server rates, and protocol types, the model effectively differentiates between normal traffic and malicious activities like DoS, UDP flood, TCP flood, and Smurf attacks. The user-friendly interface enables real-time detection, proactive monitoring, and continuous updates to enhance cybersecurity resilience. Our project provides a reliable defense mechanism against evolving threats, ensuring uninterrupted operations for organizations and websites.

KEYWORDS*:* component; formatting; style; styling; insert

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SPATIAL ANALYSIS OF POVERTY LEVELS USING SATELLITE IMAGERY THROUGH REMOTE SENSING

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ABSTRACT

Remote sensing and satellite imagery play a crucial role in monitoring environmental and agricultural changes. This project focuses on processing hyperspectral satellite images, specifically using the Salinas dataset, to analyze and visualize different spectral bands and classify land cover types. The dataset contains high-dimensional spectral information, which provides valuable insights into surface materials and vegetation growth patterns. The project is implemented using Streamlit, a Python-based web application framework that enables interactive visualization of hyperspectral images. The system allows users to explore individual spectral bands, visualize ground truth data, and generate an RGB composite image from selected spectral bands. The EarthPy library is utilized for RGB image rendering, while Matplotlib and NumPy facilitate visualization and data manipulation. The primary objective of this project is to simplify hyperspectral image processing and visualization, making it accessible to researchers and professionals in remote sensing, agriculture, and environmental monitoring.

KEYWORDS: Convolutional Neural Network, Residual Network, Satellite Images, Architectural Neural Network, Support Vector Machine, Visual Geometry Group.

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ONLINE HARASSMENT DETECTION

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ABSTRACT

Cyberbullying has become a pervasive issue in the digital age, affecting individuals across various social media platforms. The rapid growth of online interactions has amplified the need for systems that can automatically detect and mitigate harmful behavior, such as cyberbullying. This project aims to develop a machine learning model capable of predicting instances of cyberbullying based on textual data using algorithms provided by the sklearn library. The proposed model uses various natural language processing (NLP) techniques to preprocess text data, including tokenization, stop word removal, and vectorization. Supervised learning algorithms such as Logistic Regression, Support Vector Machines (SVM), and Random Forest are employed to classify user-generated content into categories of bullying or non-bullying. The sklearn library is leveraged for implementing these algorithms, providing a robust and efficient framework for model building, evaluation, and tuning. The project evaluates the performance of these models using metrics such as accuracy, precision, recall, and F1score. Additionally, cross-validation is applied to ensure generalization and reduce overfitting. The outcome is an efficient, scalable solution that can be integrated into social media platforms to detect cyberbullying in real time, providing a safer online environment.

KEYWORDS: Cyberbullying Detection, Online Harassment, Toxic Comment Detection, Text Classification

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LOAD FORECASTING USING MACHINE LEARNING

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ABSTRACT

Load forecasting is an essential function in power system management, helping utilities balance supply and demand efficiently. Traditional forecasting models such as statistical regression and autoregressive methods struggle to capture complex patterns in power consumption due to the dynamic nature of energy usage. This project explores the application of Long Short-Term Memory (LSTM) networks for accurate energy demand prediction. LSTM models are well-suited for sequential data processing and can learn longterm dependencies in time-series data. The system utilizes historical energy consumption data to train the LSTM network, allowing it to generate precise forecasts. The implementation includes data preprocessing, feature extraction, model training, and real-time prediction visualization. This study aims to improve the accuracy and reliability of load forecasting, contributing to smarter energy management in the power grid.

KEYWORDS: Load Forecasting, LSTM, Deep Learning, Time-Series Prediction, Energy Consumption, Neural Networks

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DETECTION OF DAMAGED ROADS AND LANES IN VEHICLES USING AI TECHNIQUES

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ABSTRACT

Road infrastructure plays a crucial role in transportation safety and efficiency. Detecting damaged roads and lane markings is essential to prevent accidents and enhance road maintenance. Traditional manual inspections are time-consuming and inefficient, necessitating automated solutions. An AI-based approach leveraging computer vision and deep learning techniques is employed to identify road damage and lane deterioration using vehicle-mounted and UAV camera images. YOLOv8, a state-of-the-art object detection model, is utilized for identifying potholes, cracks, and faded lane markings, while Canny edge detection is applied for lane boundary enhancement. Image preprocessing techniques, including contrast enhancement and edge detection, further improve detection accuracy. The system is evaluated using publicly available datasets and custom-collected road images, achieving high performance in real-world scenarios. The results demonstrate the potential of AI-driven road monitoring to support smart city initiatives, improve transportation safety, and optimize road maintenance efforts.

KEYWORDS: Road Damage Detection, Lane Marking Detection, Deep Learning, CNN, Image Processing, UAV Images, Computer Vision, YOLOv8, Canny Edge Detection, Image Processing

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HEART AND LUNG DISEASE PREDICTION USING CONVOLUTION NEURAL NETWORKS

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ABSTRACT

Heart and lung diseases are among the leading causes of mortality worldwide, necessitating timely and accurate diagnosis for effective treatment. Traditional diagnostic methods relying on clinical data often lack precision and efficiency. This project addresses these limitations by employing advanced image datasets and machine learning techniques, particularly convolutional neural networks (CNNs), to enhance predictive accuracy. By analyzing medical images, the model can detect early signs of disease, offering a powerful alternative to conventional methods. The proposed system leverages the strengths of deep learning algorithms to process complex image data, identifying patterns and anomalies with high precision. This approach not only improves diagnostic reliability but also reduces dependency on manual interpretation, enabling consistent results. With applications in telemedicine, clinical support, and personalized healthcare, this project demonstrates a transformative potential to advance medical diagnostics, ultimately improving patient outcomes and supporting healthcare professionals.

KEYWORDS: Heart and lung diseases data sets, Neural networks, CNN, Flask.

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FACE-LOG ATTENDANCE SYSTEM

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ABSTRACT

The project aims to automate attendance taking in educational institutions and organizations through a Face Recognition-based system. Instead of the traditional manual methods, this system uses a device installed in classrooms that analyzes students' information, such as names and photographs, using OpenCV. A Logitech web camera and NVIDIA Jetson Nano Developer kit are employed for capturing and processing images. Student faces are identified with a Haar cascade classifier and recognized using the LBPH algorithm, allowing the system to accurately mark attendance. An Excel sheet is updated hourly with attendance data provided by the instructor.

KEYWORDS: Facial Scanning, Face detection and recognition, Computer vision, Image processing, Face dataset

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DEEPFAKE DETECTION ON SOCIALMEDIAFORIDENTIFYING MACHINE-GENERATED TWEETS

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ABSTRACT

Recent advancements in natural language processing have led to a surge in machine-generated social media content, raising concerns about misinformation. This study presents a deep learning-based approach using Fast Text embedding sand a CNN model to detect deep fake tweets. The proposed system achieves 93% accuracy, outperforming conventional machine learning models and alternative deep learning architectures. This research provides a comprehensive comparison of various models, demonstrating the efficacy of CNNs in detecting machine-generated text.

KEYWORDS: Deep fake detection, Text classification, Social media, Deep learning models.

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DETECTION OF FAKE ONLINE RECRUITMENT USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

There are a numerous amount of job postings on the internet and sometime these vacancy postings turns out to be fake. Even on the reputed and trusted job advertising platforms, people fall prey to these fake advertisements. After selection in the job, hiring people start demanding for money and details of bank account. Good number of candidates gets duped and lose loads of money and sometimes even their current jobs. So it would be very helpful to identify if the job listed on the website is real or fake. In this paper, we have used machine learning to detect fraud job vacancy postings. In our proposed ML technique, we have applied two data balancing techniques namely "Adaptive Sympathetic" and "Synthetic Minority Oversampling Technique" in combination with "Term Frequency-Inverse Document Frequency" which if a feature extraction method. However, in the literature, some research have used "Bag of Words" for extraction of features which could just count the no. of times of the word appeared whereas the technique used in this research work (i.e TF-IDF) also provides the importance of words. The public "Employment Scam Aegean Dataset" (EMSCAD) was used which contained around 18000 job listings out of which about 800 are fraud listings. We have used two machine-learning models such as Random Forest and k- nearest classifiers to detect the online job is face or real. We have compared the performance of proposed models with existing models and it performs better in terms of recall, precision and f1-scores.

KEYWORDS: Adaptive Sympathetic, Synthetic Minority Oversampling, Term Frequency-Inverse Document Frequency, Feature Extraction, EMSCAD.

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FOOD RECOGNITION AND CALORIE MEASUREMENT USING ARTIFICIAL INTELLIGENCE

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ABSTRACT

With the rise of lifestyle-related health issues like obesity, diabetes, and cardiovascular diseases, monitoring dietary intake has become essential. This project, **"Food Recognition and Calorie Measurement using Artificial Intelligence,"** aims to develop an AI-based system using computer vision and machine learning to recognize food items and estimate their nutritional content from images. Convolutional Neural Networks (CNNs) are trained on a diverse food image dataset to ensure accurate identification. Once food is recognized, the system retrieves nutritional data, calculating caloric values, macronutrients (proteins, carbohydrates, fats), and micronutrients (vitamins, minerals). By integrating image processing with data mining, it provides real-time results, making it suitable for mobile health applications. Applications range from helping individuals manage diets to aiding healthcare providers in monitoring patient nutrition. The user-friendly interface allows users to take meal photos, get instant nutritional insights, and track daily intake. This project promotes healthy eating and provides a scalable solution for dietary monitoring, fitness tracking, and personalized nutrition planning. By combining AIdriven image recognition with nutritional analysis, it paves the way for intelligent, data-driven health management tools.

KEYWORDS: Food recognition, Calorie measurement, Computer vision, Image processing, Nutritional analysis, Machine learning

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IDENTIFICATION OF FAKE PROFILE USING EFFICIENT DEEP LEARNING TECHNIQUES

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ABSTRACT

The surge in e-scams attributed to an estimated 30% of fake social media accounts has highlighted the urgent need to identify such fraudulent profiles. An effort has been made to address the real-time issues because the existing model is unable to manage multi-model networks. This study introduced a cutting-edge deep-transfer learning model that streamlines fake-profile detection through a comprehensive analysis of diverse social media data samples. Our model gathers a wide range of data from various social media platforms, such as posts, likes, comments, multimedia content, user activity, login behaviors, etc. Each datatype is individually processed to detect suspicious patterns synonymous with fake accounts—for instance, discrepancies like male profiles predominantly posting about or using images of females. Likewise, 1D Fourier, Cosine, Convolutional, Gabor, and Wavelet transforms are applied to audio signals. On the other hand, 2D counter parts are used to process picture and video data. Word2Vec is used to modify text data, which helps our binary Convolutional Neural Network (bCNN) differentiate between real and fraudulent profiles. In order to minimize feature redundancy, feature optimization is performed by the Elephant Herding Optimizer (EHO) for 1D data and the Grey Wolf Optimizer (GWO) for 2D data. To identify phony profiles, separate 1D CNN classifiers and then categorize the improved features.

KEYWORDS: Social, media, fake, profile, audio, image, text, video, CNN, multimodal, coldstart, issues

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LANE DETECTION USING OPENCV AND NUMPY

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ABSTRACT

In recent years, the development of autonomous vehicles and advanced driver-assistance systems (ADAS) has significantly accelerated the need for reliable and efficient lane detection systems. This project explores a method for detecting lane lines on roadways using the OpenCV and NumPy library. The proposed approach utilizes image processing techniques, including grayscale conversion, Gaussian smoothing, Canny edge detection, and Hough Transform, to identify lane markers in various driving conditions accurately. The methodology begins with capturing video frames from a front-facing camera mounted on the vehicle. Each frame is preprocessed to reduce noise and enhance features relevant to lane detection. Edge detection is then applied to highlight potential lane lines, followed by a region of interest (ROI) selection to focus the analysis on the road ahead. The Hough Transform is employed to detect and fit lines to the identified edges, enabling the system to determine the positions and orientations of the lane boundaries. The effectiveness of this approach is evaluated using a dataset comprising diverse driving scenarios, including different weather conditions and road types. The results demonstrate that the lane detection system can robustly identify lane lines, providing critical information for vehicle navigation and safety. Future work will focus on integrating machine learning techniques to improve the adaptability and accuracy of the lane detection under more complex driving environments.

KEYWORDS: Lane detection, Autonomous vehicles, OpenCV, Canny edge detection, Hough Transform, Machine learning

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FEDERATED LEARNING-BASED PRIVACY-PRESERVING ON-SCREEN ACTIVITY RECOGNITION IN E-LEARNING

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ABSTRACT

In the rapidly evolving landscape of remote and online learning, the ability to monitor and assess students' engagement and productivity has become increasingly vital. This paper presents a pioneering approach to address this challenge through "Privacy-Preserving On-Screen Activity Tracking and Classification in E-Learning Using Federated Learning." Our innovative solution combines real-time user monitoring with stringent privacy protection, aiming to distinguish whether students are effectively utilizing their time for knowledge development. Federated Learning empowers our system to train machine learning models collaboratively across multiple user devices, eliminating the need to centralize sensitive data on a single server. This ensures that individual user data remains on their devices, preserving privacy and complying with stringent data protection regulations. Our system's classification capabilities are built upon deep learning models that analyze on-screen activities in real time.

KEYWORDS: Deep Learning, Random Forest, Principal Component Analysis(PCA), Distributed Learning, Data Anonymization

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NETFLIX CLONE STREAMING NETWORK

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ABSTRACT

Creating a Netflix clone using React JS involves developing a streamlined, interactive, and user-friendly streaming application that mimics the core functionalities of Netflix. The application is built with React JS to leverage its component-based architecture, ensuring modularity and maintainability. Key features include a dynamic home page with featured content, a search functionality for exploring titles, and a personalized watch list. Additionally, the app integrates a backend API to fetch content data, manage user profiles, and handle authentication securely. By Employing modern front-end practices and Reacts eco system, the clone aims to provide a seamless and immersive user experience akin to the original Netflix platform.

Recommendation Algorithm: This algorithm analyzes user viewing habits, ratings, and preferences to suggest personalized content, enhancing user engagement by tailoring recommendations based on individual tastes and behaviors.Search and Filter Algorithm: This algorithm optimizes the search functionality by ranking results based on user queries, interactions, and preferences, enabling users to quickly find relevant titles from a vast content library. Bitrates Streaming: This technique adjusts the quality of video streams dynamically based on the user's internet connection speed, ensuring smooth playback and minimal buffering across various devices.

KEYWORDS: User Profiles, JSON Web Tokens, APIs TMDBAPI, Media Management, React, Frameworks.

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FRAUD DETECTION IN BANKING USING MACHINE LEARNING

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ABSTRACT

Financial institutions, particularly banks, have a challenge of fraud detection. Fraud poses a substantial financial risk to both institutions and their customers since fraudulent activities can result in significant monetary losses and erode customer trust. Recent research has shown that machine learning techniques can be used to detect fraud in the banking sector.

In this project, we applied logistic regression, random forest, K-Nearest Neighbors and decision trees to detect fraudulent transactions to the problem of fraud detection in the banking industry. The dataset was obtained from Kaggle and has 31 variables. Logistic regression had the lowest performance metrics with an accuracy of 87.91% while decision tree had the highest performance metrics with an accuracy of 97.17.

KEYWORDS: Machine Learning, K-Nearest Neighbors, Random Forest, Fraud detection, AdaBoost

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IOT ENABLED LINE FOLLOWER ROBOT

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ABSTRACT

The "Line Follower Robot Using IoT" project aims to develop an autonomous robotic system capable of navigating predefined paths using line-tracking technology enhanced by the Internet of Things (IoT) for remote monitoring and control. The robot is equipped with sensors that detect and follow a line, typically marked on the ground, allowing it to makeover through various routes. By integrating IoT, the system can be monitored and controlled in real-time through a web interface or mobile application, providing the ability to track the robot's location, adjust its settings, and optimize its performance remotely. The project explores the practical applications of such robots in industries like warehousing, manufacturing, and logistics, where autonomous navigation and remote management can significantly enhance efficiency and safety.

KEYWORDS: Line follower, IoT, autonomous robot, infrared sensors, microcontroller, remote management

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ROAD ACCIDENT PREDICTION USING MACHINE LEARNING

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ABSTRACT

Road Accident is an all-inclusive disaster with consistently raising pattern. In India according to Indian road safety campaign every minute there is a road accident and almost 17 people die per hour in road accidents. There are different categories of vehicle accidents like rear end, head on and rollover accidents. The state recorded police reports or FIRs are the documents which contains the information about the accidents. The incident may be self-reported by the people or recorded by the state police. In this paper the frequent patterns of road accidents are been predicted using A priori and Naïve Bayesian techniques. This pattern will help the government or NGOs to improve the safety and take preventive measures in the roads that have major accident zones.

KEYWORDS: Machine learning, k-Means Clustering, Accident hotspot, Risk Assessment

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CLASSIFICATION OF MALICIOUS URL USING SVM

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ABSTRACT

Cyber security threats are rising, with malicious URLs serving as primary tools for phishing, malware distribution, and fraud. In this paper, we present a machine learning approach for detecting malicious URLs using the Support Vector Machine (SVM) classifier. The dataset comprises URLs labeled as safe or malicious, which are vectorized using Count Vectorizer for feature extraction. The model is trained with hyper parameter tuning via Grid Search CV to enhance accuracy. Our results show that SVM effectively classifies URLs, outperforming traditional logistic regression in accuracy.

KEYWORDS: Malicious URL detection, Machine Learning, Cyber security, URL Classification, URL, LLM.

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DONOR FINDER SYSTEM

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ABSTRACT

As an emerging form of enabling technology, Web-based e-Health portals provide patients easier accesses to their healthcare information and services. Service-Oriented Architecture provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations. We design and implement such a Public-Oriented Personalized Health Care which can integrate many backend medical services effectively. A major challenge in designing such a system is to meet critical security requirements, such as the confidentiality of patient data, the integrity of diagnosis results, and the availability of healthcare services. In this thesis I address the issue from the access control perspective.

KEYWORDS: User Registration, Organ Donation, Health Monitoring, Appointment Booking, Remote Healthcare Services, Security & Access Control

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FAKE PROFILE DETECTION IN SOCIAL MEDIA PLATFORMS

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ABSTRACT

With the increasing use of social media, fake profiles have become a serious concern, leading to fraud, misinformation, cyber bullying, and identity theft. The Fake Profile Detection (FPD) System is an AI-powered solution designed to identify fraudulent social media accounts based on behavioral analysis and profile characteristics. By leveraging Machine Learning (ML) and Natural Language Processing (NLP) techniques, the system evaluates user activity, engagement patterns, and network relationships to classify accounts as real or fake. The FPD system follows a three-layered architecture, incorporating data collection, processing& analysis, and decision-making mechanisms. It utilizes advanced classification algorithms such as Decision Trees, Random Forest, Support Vector Machines (SVM), and Neural Networks to ensure high accuracy in detecting fake accounts. The system is designed to work across multiple social media platforms through API integration and web scraping. The primary objective of this project is to enhance online security by automating fake profile detection, thereby minimizing risks associated with deceptive accounts. With an intuitive UI and real-time reporting features, the FPD system serves as a scalable and efficient tool for maintaining the authenticity of online communities.

KEYWORDS: component, formatting, style, styling, insert.

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TRAIN DELAY PREDICTION: A MACHINE LEARNING APPROACH

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ABSTRACT

Train delays significantly impact passenger satisfaction and railway efficiency. This study proposes a real-time Passenger Train Delay Prediction (PTDP) model using machine learning techniques such as Random Forest (RF), Gradient Boosting Machine (GBM), and Multi-Layer Perceptron (MLP). The model utilizes real-time and historical train delay data along with external factors like weather conditions, ridership, and geography. Results show that MLP with real-time and historical data outperforms other models in prediction accuracy.

KEYWORDS: Train Delay Prediction, Machine Learning, Real-time Data, Railway Systems, Random Forest, Neural Networks.

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ML-DRIVEN APPROACH TO AIRFARE PRICE PREDICTION

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ABSTRACT

Airfare price prediction is a critical problem for travelers, airlines, and agencies, as fluctuations in airfares can significantly impact decisions and strategies. This research presents a holistic approach to predicting airfare prices using machine learning (ML) techniques. By integrating various factors such as historical price data, seasonality, route information, weather conditions, economic indicators, and consumer behavior patterns, this study explores how ML algorithms can predict airfares with high accuracy. A variety of machine learning models, including regression-based algorithms, decision trees, and deep learning techniques, are employed and compared to evaluate their performance in forecasting airfares across different routes and time frames. Feature engineering plays a crucial role in identifying key factors that influence price fluctuations, while model optimization ensures the best predictive results. The outcomes of this study aim to provide travelers with better insights into price trends, while offering airlines and travel agencies tools for dynamic pricing strategies and resource optimization. Furthermore, the research emphasizes the need for continuous data collection and model retraining to adapt to evolving market conditions, ensuring long-term effectiveness in airfare price prediction.

KEYWORDS: Airfare Price Prediction, Machine Learning, Price Forecasting, Regression Models, Feature Engineering, Dynamic Pricing, Seasonality, Deep Learning, Data Analysis, Airline Pricing Strategies

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LEAF DIAGNOSIS

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ABSTRACT

Automated plant disease detection using machine learning techniques plays a critical role in modern agriculture for ensuring timely intervention and improving crop yield. This research investigates the application of machine learning algorithms to predict Leaf diseases based on visible symptoms extracted from plant images. The study focuses on understanding the structure of leaf data and developing robust models capable of accurately classifying leaf health status. Visible indicators such as shape, size, and texture variations are utilized to train and evaluate machine learning models. A variety of algorithms, including decision trees, Naive Bayes, artificial neural networks, and random forest, are implemented and compared for their effectiveness in disease prediction. The research employs a dataset comprising labeled images of healthy and diseased plants to train and validate the models. Experimental results demonstrate promising accuracy levels, highlighting the potential of machine learning in revolutionizing leaf disease diagnosis and management practices. The outcomes of this research provide valuable insights for researchers and practitioners working in the field of precision agriculture and crop protection.

KEYWORDS: Convolutional Neural Networks (CNNs), Image Classification, Convolutional Neural Networks (CNNs), Agricultural Applications, Disease Detection

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NEXT-GEN AUTONOMOUS DRIVING: AI BASED SMART VEHICLES

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ABSTRACT

Tesla Autopilot is what's known as an autonomous driver assistance system. In simple terms it's a feature that allows a Tesla to 'see' the cars and road around it, and drive itself to a limited degree. Tesla's software works with a number of cameras to analyze road conditions in real-time. self-driving algorithms have drawn growing research efforts from both industry and academia using low-cost vehicle-mounted cameras. In a self-driving car, various automation levels have been described. At level 0, there is no automation. The car is controlled by a human driver. Level 1 and Level 2 are specialized driver assistance systems where the system is still controlled by a human driver, but a few functions are automated, such as brake, stability control, etc. Level 3 vehicles are autonomous although it requires a human driver to intervene and monitor. Level 4 vehicles are completely autonomous, but the automation is restricted to the vehicle's operating architecture environment i.e. not all driving situations are covered, Level5 vehicles are assumed to be fully autonomous and their efficiency should be equal to that of a human driver. In the near future, we are still far from reaching level 5 self-driving vehicles. There is a rise in curiosity about self-driving vehicles. This is because of breakthroughs in deep learning, where deep neural networks are learned to perform tasks that usually need human intervention. To recognize patterns and characteristics in images, CNN applies models, making them helpful in the field of computer vision.

KEYWORDS: Machine learning, Convolutional Neural Network, DAVE-2, Tensor Flow

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AUDIO DEEPFAKE DETECTION

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ABSTRACT

Audio deep fake detection is an emerging active topic. A growing number of literatures have aimed to study deep fake detection algorithms and achieved effective performance, the problem of which is far from being solved. This survey provides a systematic overview of developments in audio deep fake detection, covering types of deep fake audio, competitions, datasets, features, classifications, and evaluation metrics. Key techniques and major challenges are discussed, and comparisons of detection methods on benchmark datasets are provided. Future research directions include dataset expansion, improving detection generalization, and enhancing interpretability of results.

KEYWORDS: Audio, Deep fake Detection, Machine Learning, Neural Networks, AI-generated Speech, Fake Audio Identification

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STUDENTS PERFORMANCE PREDICTION IN ONLINE COURSES USING MACHINE LEARNING ALGORITHMS

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ABSTRACT

Advances in Information and Communications Technology (ICT) have increased the growth of Massive open online courses (MOOCs) applied in distance learning environments. Various tools have been utilized to deliver interactive content including pictures, figures, and videos that can motivate the learners to build new cognitive skills. High ranking universities have adopted MOOCs as an efficient dashboard platform where learners from around the world can participate in such courses. The students learning progress is evaluated by using set computer-marked assessments. In particular, the computer gives immediate feedback to the student once he or she completes the online assessments. The researchers claim that student success rate in an online course can be related to their performance at the previous session in addition to the level of engagement. Insufficient attention has been paid by literature to evaluate whether student performance and engagement in the prior assessments could affect student achievement in the next assessments. In this paper, two predictive models have been designed namely students' assessments grades and final students' performance. The models can be used to detect the factors that influence students' learning achievement in MOOCs. The result shows that both models gain feasible and accurate results. The lowest RSME gain by RF acquire a value of 8.131 for students assessments grades model while GBM yields the highest accuracy in final students' performance, an average value of 0.086 was achieved.

KEYWORDS: Student Performance Prediction, Online Education, Predictive Analytics, Academic Performance, Student Data, Machine learning Algorithms, K-Nearest Neighbors (KNN), Cross-validation, Student Behavior Analysis

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HEART RATE VARIABILITY MONITORING USING MACHINE LEARNING ALGORITHMS

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ABSTRACT

Heart disease has now become a very common and impactful disease, which can actually be easily avoided if treatment is intervened at an early stage. Thus, daily monitoring of heart health has become increasingly important. Existing mobile heart monitoring systems are mainly based on seismocardiography (SCG) or photo plethysmography (PPG). To this end, we propose a computer vision-based mobile HRV monitoring framework- Pupil Heart, designed with a mobile terminal and a server side. On the mobile terminal, Pupil Heart collects pupil size change information from users when unlocking their phones through the front-facing camera. Then, the raw pupil size data is pre-processed on the server side. Specifically, Pupil Heart uses a one-dimensional convolutional neural network (1D-CNN) to identify time series features associated with HRV.

KEYWORDS: Heart Rate Variability, Real Time Monitoring, Preprocessing Techniques, Personalized Healthcare, Physiological Data, Machine learning Algorithms

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AI-DRIVEN GESTURE AND VOICE-INTEGRATED VIRTUAL MOUSE

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ABSTRACT

Including eye tracking, hand motions, gloves recognition, and voice automation, the AI-powered Gesture-Controlled Smart Mouse changes human-computer interaction. It substitutes touchless control derived from computer vision and multimodal artificial intelligence for traditional input devices. Media Pipe Face Mesh drives blinks for eye tracking, mapping of gaze for cursor movement, selection. Media Pipe Hands & OpenCV decodies finger movements, clicks, scrolling, navigation. HSV segmentation and Aruco markers help gloved tracking, so ensuring excellent accuracy under various conditions. The Proton AI Voice Assistant drives voice-activated execution supporting searches, app control, system navigation, and search. While gesture-based system controls regulate brightness, volume, and scrolling, a hybrid UI framework web and Tkinter guarantees flawless interaction across input modes. Designed for real-time responsiveness, the system changes alternately between modes to reduce overhead and increase accuracy. Custom motion sand commands made possible by a modular architecture increase its use across assistive technology, virtual reality, and touchless computing.Deep-learning gesture refinement, multimodal sensor fusion, and adaptive calibration which will advance predictive, user-centric AI—will take front stage in future improvements.

KEYWORDS: Artificial Intelligence Driven Mouse, Gesture Detection, Eye-Tracking, Voice Assistant, Touchless Computing, Multimodal Interaction, Real-Time

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MODELLING OF REPTILE SEARCH ALGORITHM WITH DEEP LEARNING APPROACH FOR COPY MOVE IMAGE FORGERY DETECTION

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ABSTRACT

One of the most common manipulation artifacts in digital photographs is copy-move forgeries. The process of copying and pasting a portion of an image to another area of the same image. Although there are a number of well-established techniques for identifying copy-move forgeries, it can be challenging to identify forged areas when there is noise, blur, or a rotated region present prior to pasting. We offer a novel method for detecting copy move forgeries utilizing Completed Robust Local Binary Pattern (CRLBP) in order to address this issue. In the five primary steps of the suggested method, the suspicious image is first split into overlapping blocks and then filtered using a hybrid filter. The feature vectors are then sorted using lexicographical sorting after the CRLBP operator is performed to generate an invariant rotation descriptor for feature extraction for every block. Euclidean distances are used to compare the feature vector and identify the forged regions. Lastly, we presented a novel method to lessen erroneous matches brought on by flat regions.

KEYWORDS: Forgery, Feature extraction, Training, Image forensics, Convolutional neural networks.

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PREDICTING CAR PRICES AND MAINTENANCE COSTS WITH MACHINE LEARNING

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ABSTRACT

In today's fast-evolving technological landscape, machine learning (ML) is transforming the way businesses predict and optimize decisions. This project, "Car Price with Maintenance Prediction by using Machine Learning", aims to create a dual-purpose predictive system that integrates two critical aspects of vehicle management: resale price prediction and predictive maintenance insights. The Car Price Prediction Module utilizes regression-based machine le arning models to estimate the resale value of a vehicle based on its features, such as age, mileage, fuel type, ownership history, and more. It empowers car buyers and sellers with accurate price predictions, streamlining decision-making in the used car market. Predicting car prices and maintenance requirements is essential for buyers, sellers, and automotive service providers. Traditional price evaluation methods rely on subjective assessments, while maintenance predictions depend on manual inspections. This paper proposes a machine learning-based approach for car price prediction and maintenance analysis using historical pricing data and real-time sensor data. The model is trained using regression and classification algorithms to improve prediction accuracy. The proposed system provides a datadriven approach for decision-making in the automobile industry. The Predictive Maintenance Module leverages classification-based machine learning models to analyze real-time sensor data, such as vibration, temperature, and pressure. The system predicts whether a vehicle requires maintenance, thereby enabling proactive measures to prevent unexpected failures and reduce downtime.This project is implemented using the Streamlit UI framework, providing an intuitive interface for users to toggle seamlessly between the two modules through a dropdown menu. The Car Price Prediction Module offers inputs like current price, kilometers driven, and fuel type, while the Predictive Maintenance Module simulates real-time sensor data to assess maintenance needs dynamically.

KEYWORDS: Machine Learning, Car Price Prediction, Maintenance Analysis, Regression Models, Sensor Data.

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SIGN LANGUAGE RECOGNITION USING DEEP LEARNING

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ABSTRACT

People with disabilities have difficulty in communicating, social interaction, obsessions and repetitive behaviours. The situation gets risky when these disabled people left alone freely in the outside world. But they shouldn't be locked up for this reason. So we need a way to help and protect them. Sign language recognition is the field related to communication which is a visual language that uses body language and facial expressions to convey meaning. Recent technological advances have enabled the development of advanced sign language recognition systems that can interpret sign language and translate it into written and spoken language. These systems typically use computer vision techniques to analyse sign language gestures and movements and map them to written or spoken language. Sign language recognition technology have the potential to greatly improve the accessibility of communication for people with hearing and speech impairments and to improve communication between people who speak different languages. In this paper, our proposed system has achieved the accuracy of 91.67% which is better compared to the existing works in the literature.

KEYWORDS: sign language recognition, Mobile Net, deep learning, ASL dataset, gesture recognition, lightweight architecture, real-time application, assistive technology, inclusivity, image classification

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NUMBER PLATE FINDER

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ABSTRACT

License Plate Detection is an essential component of automated vehicle identification systems used in traffic monitoring, parking management, and law enforcement. Traditional license plate recognition systems rely on heuristic- based algorithms, which often struggle with real-world variations in lighting, occlusions, and distorstions. This project proposes a Convolutional Neural Network (CNN)-based approach to license plate detection, leveraging deep learning techniques for improved accuracy and robustness. The system consists of multiple stages, including image preprocessing, plate localization, character segmentation, and recognition. The data set is trained using a CNN model to accurately identify and extract license plates from real-world images. This research aims to enhance automated vehicle identification systems by providing a more efficient and precise method for detecting and recognizing license plates.

KEYWORDS: License plate detection, Convolutional Neural Network, Deep learning, Image processing, Automated vehicle identification.

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SPEECH-BASED SENTIMENT ANALYSIS WITH MACHINE LEARNING

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ABSTRACT

This research explores audio sentiment analysis, a field focused on detecting a speaker's emotions from natural audio, an area less explored than text-based sentiment analysis. We demonstrate that traditional methods, which rely on automatic speech recognition to transcribe audio and then use text-based sentiment classifiers, are suboptimal. Instead, we propose a novel architecture utilizing keyword spotting (KWS). This approach involves using a text-based sentiment classifier to identify key emotion-bearing terms, which are then used as a term list for KWS. An iterative feature optimization for maximum entropy sentiment model is introduced to create a compact yet effective sentiment term list. A hybrid maximum entropy-KWS joint scoring methodology is developed to integrate both text and audio parameters. To evaluate our system, we created two new audio sentiment databases: the YouTube sentiment database and the UT-Opinion Opinion audio archive, both containing naturalistic, opinionated audio. Our experimental results, conducted on audio from YouTube and the UT-Opinion corpus, show that our KWS-based system significantly outperforms the traditional automatic speech recognition architecture.

KEYWORDS: Audio sentiment analysis, keyword spotting (KWS), speech emotion recognition, hybrid sentiment modeling, automatic speech recognition (ASR), maximum entropy modeling, opinion mining, naturalistic audio datasets, YouTube sentiment database, UT- Opinion corpus.

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REFINED FACIAL EMOTION DETECTION USING MACHINE LEARNING

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ABSTRACT

This paper presents a refined approach to facial emotion detection using advanced machine learning techniques. Leveraging cutting-edge technologies like MTCNN, OpenCV, this system aims to achieve high accuracy in recognizing facial emotions in real-time. The application is designed to enhance the user experience by providing accurate emotion recognition, displaying a confidence progress bar for emotions, and delivering personalized user feedback in a dynamic environment. The system can track various facial features such as eyes, nose, and lips, and overlay emoticons or emojis based on detected emotions. Furthermore, the emotion recognition process incorporates a circular valence-arousal graph and a confidence percentage to improve the interaction and analysis of emotional states.

KEYWORDS: Machine Learning, Emotion Detection, MTCNN, OpenCV, Real-time Processing, Facial Feature Tracking, Confidence Progress Bar, Valence-Arousal Graph.

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DEEP LEARNING-BASED REAL-TIME VIOLENCE DETECTION WITH CNN-LSTM

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ABSTRACT

Despite the fact that rates of violence have decreased by roughly 57% over the last forty years, the way that violent protests take place behind closed doors remains unchanged. Higher authorities can occasionally manage large-scale violence, but in order to keep everything in line, one must "micro-govern" every movement that takes place in every square and road. I developed a novel model and a deep learning-theorized system to address the impact of butterfly effects in our environment. After making deductions from the CCTV video streams, the model determines whether a violent movement is occurring. Additionally, the proposed architecture minimizes the overhead of calculating each CCTV video feed naively and strives for probability-driven video feed computation.

KEYWORDS: Real-Time Violence Detection, Deep Learning, Convolutional Neural Networks (CNN), Long Short-Term Memory (LSTM), Action Recognition, Surveillance Systems, Computer Vision, Video Analysis, Behavior Recognition.

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DEEP DETECT: DEEP LEARNING BASED DETECTION MODEL FOR DEEP FAKE IMAGES AND VIDEOS

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ABSTRACT

Recently, deep fakes altered, realistic, high-quality movies and images have become more and more popular. Numerous amazing applications of this technology are being researched. The internet world is currently seeing an increase in the malicious us age of phony videos, including financial frauds, celebrity pornographic videos, and fake news. Celebrities, politicians, and other prominent individuals are therefore especially susceptible to the Deep fake detection problem. In the past several years, a lot of research has been done to figure out how deep fakes work, and a lot of deep learning-based algorithms have been developed to identify deep fake images or videos. Based on a number of deep learning algorithms, this project assesses deepfake detection and production methods.

KEYWORDS: Fake Content, Deep Learning, CNN.

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CROP RECOMMENDATION AND LEAF DISEASE DETECTION

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ABSTRACT

Crop recommendation and leaf disease detection are two crucial aspects that help farmers make informed decisions. Crop recommendation systems analyze soil properties, weather conditions, and historical data to suggest the most suitable crops for a given region, optimizing yield and resource utilization. Meanwhile, leaf disease detection leverages machine learning and computer vision techniques to identify plant diseases from leaf images, enabling early intervention and reducing crop losses. By integrating these technologies, farmers can improve productivity, minimize losses, and ensure sustainable agricultural practices.

KEYWORDS: cnn, crop recommendation, machine learning, plant disease identification, random forest

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A RELIABLE AND ROBUST DEEP LEARNING MODEL FOR EFFECTIVE RECYCLABLE WASTE CLASSIFICATION

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ABSTRACT

In response to the growing waste problem caused by industrialization and modernization, the need for an automated waste sorting and recycling system for sustainable waste management has become ever more pressing. Deep learning has made significant advancements in image classification, making it ideally suited for waste sorting applications. This application depends on the development of a suitable deep learning model capable of accurately categorizing various categories of waste. In this study, we present RWCNet (recyclable waste classification network), a novel deep learning model designed for the classification of six distinct waste categories using the Trash Net dataset of 2,527 images of waste.

KEYWORDS: Waste Management, Recycling, Waste Classification, Multi-label Classification, Convolution Neural Network (CNN).

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BUILDING CUSTOMIZED CHATBOTS FOR DOCUMENT SUMMARIZATION & Q/A USING GENAI, LANGCHAIN & STREAMLIT

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ABSTRACT

This project address about a comprehensive system for building customized chatbots engaged by expansive dialect models (LLMs) to summarize reports and reply client questions. Leveraging advances such as GenAI, LangChain, and Streamlit, the system empowers clients to combat data over-burden by effectively extricating bits of knowledge from long archives. This think about examined the framework's engineering, execution, and down to earth applications, emphasizing its part in upgrading efficiency and encouraging data recovery. Through a step-by-step direct, this investigate has illustrated how designers can utilize the system to make end-to-end archive summarization.

KEYWORDS: Retrieval-Augmented Generation (RAG), Generative AI (GenAI), LangChain, Streamlit Interface.

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HOME APPLIENCES AUTOMATION USING IOT WITH CLOUD

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ABSTRACT

This project integrates cloud-based control, manual switches, and voice commands to manage home appliances. Users can control devices via the Blynk app, physical switches, or Google Assistant, ensuring flexibility, convenience, and hands-free operation. The system utilizes microcontrollers (ESP32) to connect sensors, relays, and user inputs, allowing seamless control and monitoring of appliances. Real-time data from temperature, humidity, and gas sensors is sent to the cloud, enabling remote access via the Blynk app. Additionally, manual control ensures functionality even in the absence of an internet connection.

KEYWORDS: Cloud Based, Blynk app , Seamless Controls, ESP32

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ENHANCED WEATHER PREDICTION USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

This project integrates cloud-based control, manual switches, and voice commands to manage home appliances. Users can control devices via the Blynk app, physical switches, or Google Assistant, ensuring flexibility, convenience, and hands-free operation. The system utilizes microcontrollers (ESP32) to connect sensors, relays, and user inputs, allowing seamless control and monitoring of appliances. Real-time data from temperature, humidity, and gas sensors is sent to the cloud, enabling remote access via the Blynk app. Additionally, manual control ensures functionality even in the absence of an internet connection.

KEYWORDS: Cloud Based, Blynk app, Seamless Controls, ESP32

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AI-POWERED SMART SURVEILLANCE SYSTEM WITH REAL-TIME ANOMALY DETECTION USING OPEN CV

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ABSTRACT

By integrating AI and image processing techniques with traditional security camera systems, the Smart Security Camera Project using OpenCV represents a groundbreaking advancement in the field of surveillance. Equipped with real-time object detection, motion tracking, and an optional facial recognition feature the system ensures precise monitoring even in challenging environments. By employing enhanced algorithms and image enhancement methods, the system ensures security by detecting persons and their movements. The system can trigger alerts upon identifying specific objects or activities, enabling swift responses to potential security threats and enhancing overall surveillance effectiveness. The optional facial recognition functionality further strengthens security by facilitating the identification and tracking of individuals within the monitored area.

KEYWORDS: facial recognition; surveillance; image processing; real-time monitoring; anomaly detection;

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AN APPROACH TO BALANCE MAINTENANCE COST AND ELECTRICITY CONSUMPTION IN CLOUD DATA CENTERS

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ABSTRACT

This project addresses the challenges associated with the tradeoff between electricity consumption and maintenance costs in data centers. Specifically, it examines the impact of maintenance costs on total costs and investigates whether leveraging this tradeoff can provide cost benefits. To achieve this, we present a simple yet effective model for computing maintenance costs based on the variation of power states over time for a set of servers. Additionally, we employ a detailed power consumption model that considers CPU-related electricity costs, data transfer costs between servers, and costs associated with Virtual Machine (VM) migrations within the data center. We formulate the problem of jointly minimizing data center electricity consumption and maintenance costs and propose a novel algorithm, called Maintenance Energy Costs Data Center (MECDC), to address this challenge. The MECDC algorithm aims to optimize the balance between maintenance and energy costs, offering an efficient approach to managing operational expenses in data centers.

KEYWORDS: Cloud Computing, Cloud Data Center, Maintenance Costs, Electricity Costs, Fatigue, Energy efficiency.

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IMPROVING SHOPPING MALL REVENUE BY REAL-TIME CUSTOMIZED DIGITAL COUPON ISSUANCE

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ABSTRACT

With the rapid growth of e-commerce and online retail, traditional shopping malls face increasing challenges in retaining customers and improving revenue. Customer churn, the phenomenon of visitors leaving without making purchases, directly impacts sales and profitability. This paper proposes a real-time customized digital coupon issuance system that leverages big data analytics and deep learning to predict customer churn and encourage purchases through personalized discount offers. By analyzing customer behavior, such as movement patterns, dwell time, and interactions, our model predicts the likelihood of churn and issues targeted coupons to potential customers. The proposed system significantly enhances conversion rates and improves the overall shopping experience. This paper presents a comparative analysis of traditional discount models versus AI-driven approaches, showcasing the impact of predictive analytics on retail businesses. Furthermore, we explore how AI-driven techniques can be seamlessly integrated into modern shopping malls to create a more personalized and engaging customer experience, thereby fostering loyalty and increasing profitability. Digital transformation has significantly impacted consumer shopping behavior, leading to increased expectations for personalized experiences and convenience. This study investigates how intelligent systems utilizing machine learning algorithms can address the growing need for tailored marketing approaches. The system's ability to analyze large-scale customer data in real-time sets it apart from traditional marketing techniques, making it a valuable tool for modern retailers seeking competitive advantages.

KEYWORDS*:* Big Data, Deep Learning, Customer Churn, Digital Coupons, Shopping Malls, Predictive Analytics

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CRYPTO CURRENCY FINANCIAL RISK ASSESSMENT

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ABSTRACT

In the volatile In the volatile landscape of cryptocurrency markets, traditional financial risk management approaches often fall short due to the unique challenges posed by extreme price fluctuations, low liquidity, and high uncertainty. This project proposes a novel machine learning-based framework to enhance financial risk management within cryptocurrency markets. By leveraging advanced algorithms, including deep learning and ensemble methods, the framework is designed to predict market trends, identify potential risks, and optimize portfolio management strategies in real-time. The project aims to develop a robust model that integrates historical price data, trading volumes, social media sentiment, and macroeconomic indicators to assess and manage financial risks effectively. This model will not only provide early warnings of potential market downturns but also recommend dynamic hedging strategies to minimize losses and maximize returns. Moreover, the project explores the application of explainable AI techniques to ensure transparency in decision-making processes, making the model's predictions understandable and actionable for financial analysts. The outcome of this research is expected to significantly improve risk management practices in cryptocurrency trading, contributing to more stable and profitable investment strategies in this emerging asset class.

KEYWORDS: Time Series Forecasting, Portfolio Optimization, Transformer models, Decentralized Finance, Liquidity Risk

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CROP AND YIELD PREDICTION USING ENSEMBLE LEARNING MODEL

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ABSTRACT

A nation's economy depends heavily on agriculture since it provides a significant amount of its raw resources, jobs, and food. But problems like illnesses, degraded soil, and water scarcity still exist. Adoption of technology can solve these problems and enhance output and quality. Prediction, categorization, and automation in areas like soil pH, temperature, humidity, and nutrient levels are made possible by machine learning, a branch of artificial intelligence (AI). We recommend twenty-two distinct crops based on these inputs by utilizing machine learning classification techniques like Extra Tree Classifier (ETC), Logistic Regression (LR), Decision Tree (DT), Random Forest (RF), K-Nearest Neighbour (KNN), Gaussian Naive Bayes (GNB), and Support Vector Machine (SVM). We determine the best-performing model using K-fold cross-validation, Explainable AI (XAI), and feature engineering. Random Forest emerges as the top model, with an accuracy of 99.7% with precision, recall, F1 score, and confusion matrix.

KEYWORDS: Random forest, machine learning, and crop yield prediction.

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TEMPLATE DATA BASED FOOD TEXTURE PREDICTION USING MACHINE LEARNING

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ABSTRACT

A key element in how chewing is perceived is food texture. When it comes to the palatability of solid and semi-solid foods, texture is more important than flavor and scent. Therefore, a technique for assessing a variety of food textures is necessary for food development procedures. This paper suggests a technique for predicting food texture that makes use of template data and numerous measurements. The force, vibration, and sound pressure data during food compression were first collected using a measurement device. A moisture meter was also used to measure the food's moisture rate. Second, the outline waveforms of the measurement data are used to automatically determine a large number of template data. Third, distance vectors between measurement and template data are computed by the dynamic time warping. Finally, the Gaussian process regression algorithm determines the link between the distance vectors and sensory evaluation data. Utilizing template data has the benefit of eliminating the requirement to separate particular features from measurement data

KEYWORDS: Food texture, Machine learning, Measurement, Sensory evaluation

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SKIN DISEASES PREDICTION USING DEEP LEARNING TECHNIQUES

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ABSTRACT

In this paper, we present a novel method for predicting and classifying various skin diseases using convolutional neural networks (CNNs) and the HAM-10000 Dataset. Our approach demonstrates exceptional accuracy, achieving high accuracy in classifying skin conditions such as nevi, melanoma, benign keratosis, basal cell carcinoma, actinic keratoses, vascular lesions, and dermatofibroma. The versatility of our method allows for potential expansion to include a broader range of dermatological conditions. This research holds significant implications for dermatologists, offering a more efficient diagnostic process and enabling faster and more accurate treatments for patients. By leveraging our approach, dermatologists can benefit from improved decision-making support, leading to enhanced patient care. The combination of the HAM-10000 Dataset and our innovative methodology contributes to the originality and significance of this research in the field of skin disease classification.

KEYWORDS: Dermatological Conditions, Computer-Aided Diagnosis, Convolution Neural Network, Skin Disorder Diagnosis, Deep Learning, NLP

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A NOVEL METHOD FOR CREDIT CARD FRAUD DETECTION USING MACHINE LEARNING

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ABSTRACT

New business-making frameworks emerged in the financial sector as innovation progressed. One of these is the visa framework. However, because this framework contains some escape clauses, it raises a number of problems in the strategy for Visa trickery. As a result, businesses and customers who utilize Visas are facing a disastrous situation. Exam instances that analyze viable charge card numbers that are financially behind due to security difficulties are scarce. Using calculations that used artificial intelligence (AI), an attempt has been made in the composition to identify the cheaters in the Mastercard industry. In this way, two computations are used: Fraud Detection using Random Forest and Fraud Detection in Mastercard using Decision Tree. A few pieces of public data can be used as a test to determine the model's productivity. After that, an actual Visa reality group from a financial institution is examined. In addition, additional enhancements are made to the information tests to better examine the frameworks' longevity. According to the paper's tactics, the primary strategy creates a tree based on the client's workouts, and then uses this tree to think up tricks. In the second method, a client movement-based woodlands will be constructed, and an effort will be made to identify the suspect using this timberland.

KEYWORDS: Credit card theft, Random Forest, and Decision Tree.

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MACHINE LEARNING BASED SUICIDAL IDEATION DETECTION USING SOCIAL MEDIA TWEETS DATA

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ABSTRACT

Social media sites have developed into significant databases of user-generated content, including statements about depression and mental health. Suicidal conduct in online places must be identified and addressed in order to offer prompt support and intervention. This article proposes a unique approach for detecting suicide tweets using the eXtreme Gradient Boosting (XGBoost) algorithm, a powerful machine learning technique noted for its effectiveness and efficiency in classification tasks. The proposed methodology includes preprocessing Twitter content to extract relevant features and provide a feature vector representation. In addition to lexical, syntactic, and semantic information gleaned from the text, features include contextual data such as user metadata and temporal patterns. The XGBoost algorithm is then trained on a labeled dataset of tweets. Every tweet in this dataset has been categorized as either suicidal or not.

KEYWORDS: machine learning, artificial intelligence, suicidal ideation

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VIDEO BASED ARMED PEOPLE DETECTION USING MACHINE LEARNIING MODELS

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ABSTRACT

By using various methods on object detection models, a lot of research attempts to improve weapon detection. However, there is a dearth of study on using real-time surveillance cameras to identify armed individuals. The creation of algorithms to recognize individuals carrying weapons (pistols and revolvers) is the suggested remedy. The YOLOv4 model is the one we have selected to identify faces, firearms, and individuals. Then, in order to identify the armed individuals in each video frame, we extract information from YOLO pertaining to real-time movies, including bounding box coordinates, distances, and intersection regions between firearms and the individuals. Some obstacles must be overcome, such as occlusion, concealed firearms, and persons in close proximity to one another. It enables us to create and contrast various kinds of solutions. We suggested seven machine-learning models and three heuristics. The three heuristics are the principle of distances, the principle of intersections, and the principle of centers. The Random Forest Classifier, Multilayer Perceptron, k-Nearest-Neighbors, Support Vector Machine, Logistic Regression, Naive Bayes, and Gradient Boosting Classifier are other machine learning models.

KEYWORDS: Detection, computer vision, heuristics and machine learning.

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UPI Based Financial Fraud Detection Using Deep Learning Approach

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Abstract

Unified Payments Interface (UPI) has revolutionized digital payments by enabling seamless, real-time transactions; however, it has also led to a rise in fraudulent activities, such as phishing, identity theft, and unauthorized access [1]. Traditional fraud detection mechanisms, such as rule-based systems, struggle to identify evolving fraud patterns in dynamic financial ecosystems [2]. Machine learning (ML) provides a robust approach by leveraging historical transaction data and identifying anomalies using advanced classification and clustering techniques [3]. Supervised models like Random Forest and XGBoost have demonstrated high accuracy in detecting fraudulent transactions [4], while unsupervised methods like Auto encoders and Isolation Forests help uncover unknown fraud patterns [5]. A hybrid ML model that integrates both approaches enhances fraud detection accuracy and reduces false positives [6]. Key features, including transaction amount, time, location, device information, and user behavior, significantly influence fraud detection performance [7]. The challenges of dataset imbalance, privacy concerns, and model interpretability remain critical issues in deploying ML-based fraud prevention strategies [8]. Experimental results show that hybrid models outperform traditional fraud detection techniques, achieving higher precision and recall scores [9]. Future research should focus on real-time fraud prevention using federated learning and adversarial machine learning to improve security in UPI transactions [10]

KEYWORDS: UPI Fraud Detection, Machine Learning, Anomaly Detection, Financial Security, Hybrid Models.

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Multi-Deep Transfer Learning with Smoothing Cross-Entropy for Early Cervical Cancer Cell Detection

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ABSTRACT

The proposed research is aimed at detecting and classifying cervical cancer at early stage by controlling a multi- deep transfer learning model. Indeed, the high-level features from cervical cell images are extracted through the use of the latest convolution neural networks, MobileNetV2 with LSTM, Vision Transformer, and EfficientNetB2. On the suppressed features, class modeling will be accomplished using a Support Vector Machine for the fusion of different cell types. To achieve more accurate classifications, we will use ensemble of prediction models by combining among different models like ResNet50, DenseNet121, and EfficientNetB5. The system should classify cervical cancer cells in five different categories, namely, Dyskeratotic, Koilocytotic, Metaplastic, Parabasal, and Superficial-Intermedia. This approach, in fact, integrates the various spatial evidence through which the patient can better identify early-stage cervical cancer. The proposed solution has a very significant potential in providing assistance to health care professionals in timely and accurate diagnostics for better patient outcomes.

KEYWORDS: Cervical cancer detection, multi-deep transfer learning, MobileNetV2, Vision Transformer, EfficientNetB2, SVM classification, ensemble learning, ResNet50, DenseNet121, EfficientNetB5, image classification, early diagnosis, medical image analysis.

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CUSTOMER SEGMENATION BASED ON SHOPPERS BEHAVIOR USING MACHINE LEARNING

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ABSTRACT

Online shopping has grown at an unparalleled rate worldwide in the field of digital commerce and is now a fundamental aspect of contemporary consumer behavior. This study presents LRFS, a sophisticated consumer segmentation model designed especially for the e-commerce industry that expands on the classic LRF framework (Length of Relationship, Recency of Purchase, and Frequency of Purchase).The new component "S," which measures the Staying Rate in relation to the money earned by clients on a particular website, is what makes the LRFS model innovative. By using information taken from Google Analytics, this feature seeks to improve the effectiveness and granularity of client segmentation. This study uses two well- known clustering algorithms, K Means and K-Medoids, to operationalize the LRFS model. The dataset is examined using three different dimensionality reduction methods: Autoencoder, t-SNE (t-Distributed Stochastic Neighbor Embedding), and PCA (Principal Component Analysis).By employing K-Means clustering to assess the accuracy of customer cluster assignments, this methodological approach enables a thorough comparison between the LRFS model and its predecessors, LR, LF, and LRF. The research's empirical results demonstrate how well the LRFS model performs in achieving more precise and perceptive client segmentation.

KEYWORDS: IndexTerms—Customer segmentation, unsupervised machine learning, K-means, K-medoids.

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SCALABLE MACHINE FAULT DETECTION USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

The rising cost of fossil fuels and the negative consequences of climate change are the main drivers of the demand for alternative modes of transportation. Since they use fewer fossil fuels and have a lower carbon impact, electric vehicles (EVs) are the best choice. The creation of extremely efficient three-phase induction motors is the outcome of tremendous efforts to increase the efficiency of EVs. The success of EV applications was hampered by the challenge of building highly efficient induction motors (IM) with high torque and power factors. Therefore, our goal is to diagnose the designed IM's defect under conditions of fluctuating load. ANSYS RMxprt simulation software is used to create the suggested EV motor for an output power rating of 5 HP, 415V, and 50Hz. Machine learning (ML) techniques such as Support Vector Machine (SVM), K-nearest neighbors (k-NN), ML perceptron (MLP), Random Forest (RF), Decision Tree (DT), Gradient boosting (GB), Extreme Gradient Boosting (XGBoost), and Deep Learning (DL) are also used to implement a fault detection strategy for both healthy and faulty conditions. For the purposes of this study, defective states are defined as Open-Phase Circuit (OPC), High Resistance Connection (HRC), and Short Circuit (SC). Machine learning is used to assess motor function with varying loads in both healthy and defective states.

Index Terms— CNN, bearing, attention mechanism, fault diagnosis.

KEYWORDS: CNN, Bearing, Attention Mechanism, Fault diagnosis.

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ADVANCED CYBERBULLYING DETECTION: A HYBRID MODEL INTEGRATED WITH NAÏVE BAYES

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ABSTRACT

Cyberbullying has emerged as a significant concern in the digital era, affecting individuals across various online platforms [1]. Traditional detection methods lack efficiency in identifying complex and context-sensitive abusive content [2]. This study presents an advanced hybrid model integrating Naïve Bayes with deep learning techniques for cyberbullying detection [3]. The model utilizes natural language processing (NLP) and machine learning classifiers to improve accuracy and minimize false positives [4]. A comprehensive dataset from social media platforms was used to train and evaluate the model [5]. Feature selection techniques, including TF-IDF and word embeddings, enhance the model's predictive capability [6]. Experimental results demonstrate a significant improvement in detection accuracy compared to standalone models [7]. The hybrid approach outperforms conventional methods in both precision and recall metrics [8]. The system architecture ensures real-time monitoring and classification of online messages [9]. This research contributes to the advancement of AI-driven content moderation systems, paving the way for safer digital interactions [10].

KEYWORDS: Cyberbullying Detection; Naïve Bayes; NLP; Machine Learning; Hybrid Model; Text Classification

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VIDEO BASED ABNORMAL BEHAVIOR IDENTIFICATION USING DEEP LEARNING

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ABSTRACT

In recent years, there has been a lot of scientific interest in modeling human behaviors and activity patterns to identify or detect unusual events. There are numerous approaches for developing intelligent vision systems that are intended to comprehend scenes and correctly infer semantic information from the dynamics of moving objects. The majority of applications are found in human–computer interfaces, surveillance, and video content retrieval. This study focuses on contextual anomalous human behavior detection, particularly in video surveillance applications, in addition to providing an update that builds on earlier relevant surveys. This survey's primary goal is to thoroughly identify current approaches and describe the literature in a way that highlights important issues.

KEYWORDS: Behavior recognition, deep learning, video-based, lightweight learning framework, location-based grouping.

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A REVIEW ON MACHINE LEARNING APPROACHES FOR DIAGNOSIS OF ALZHEIMER'S DISEASE AND MILD COGNITIVE IMPAIRMENT BASED ON BRAIN MRI

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ABSTRACT

Alzheimer's disease is a progressive disease for which researchers have yet to discover the main cause, but believe it probably involves a combination of age-related changes in the brain, genetic, environmental and lifestyle factors. Alzheimer's is an irreversible disease that still has no cure. Therefore, its early diagnosis is very important to prevent its progression. Developing Machine Learning algorithms in healthcare, especially in brain disorders such as Alzheimer's disease, provides new opportunities for early diagnosis and recognition of important biomarkers. This project presents an overview of advanced studies based on Machine Learning techniques for diagnosing Alzheimer's disease and different stages of mild cognitive impairment based on magnetic resonance imaging (MRI) images in the last 10 years. Also, this project comprehensively describes the commonly efficient Machine Learning algorithms in each stage of magnetic resonance imaging processing used in the project, which can facilitate the comparison of algorithms with each other and provide insight into the impact of each technique on classification performance. This review can be a valuable resource to gain a new perspective on the various research methods used in recent studies on Alzheimer's disease.

KEYWORDS: Alzheimer's disease, image processing techniques, machine learning, mild cognitive impairment, MRI

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YOGA POSTURE DETECTION USING DEEP TRANSFER LEARNING MODELS

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ABSTRACT

Yoga is a health-promoting activity that emphasizes mental, spiritual, and physical links. On the other hand, bad postures and yoga practice can lead to health issues like discomfort and sprains of the muscles. Based on a transfer learning approach, we suggest in this study creating an interactive display-based yoga posture coaching system. Eight volunteers were required to execute each of the 14 distinct yoga poses ten times, which were captured by an RGB camera. To avoid overfitting and oversampling the training datasets, data augmentation was used. In order to choose the best model for the yoga coaching system based on assessment criteria, six transfer learning models (TL-VGG16-DA, TL-VGG19-DA, TL-Mobile Net-DA, TLMobileNetV2-DA, TL-InceptionV3-DA, and TL-DenseNet201-DA) were used for classification tasks. With an overall accuracy of 98.43%, sensitivity of 98.30%, specificity of 99.88%, and Matthews correlation coefficient of 0.9831, the TLMobile Net-DA model was ultimately chosen as the best model. The study demonstrated a yoga posture coaching system that could educate users to avoid bad postures by recognizing their movements in real time based on the chosen yoga posture assistance.

KEYWORDS: Machine learning, Deep learning, Artificial Intelligence.

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ENHANCING SECURITY: INFUSED HYBRID VISION TRANSFORMER FOR SIGNATURE VERIFICATION

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ABSTRACT

Handwritten signature verification is challenging because there is a huge variation between the orientation thickness and appearance of handwritten signatures. A strong signature verification system is essential to refine the accuracy of confirming user authentication. This investigation introduces an inclusive framework for training and evaluating hybrid vision transformer models on diverse signature datasets, aiming to refine the accuracy in confirming user authentication. In previous studies, transformer & MobileNet were used for computer vision classification and signature verification separately. Drawing inspiration from the Convolutional Neural Network (CNN), the hybrid model is proposed as a deep-learning model (ResNet-18 & MobileNetV2) with the Vision Transformer model (proposed method 1 & proposed method 2).To bring originality to this study, we excluded the final layer of the feature extractor and smoothly integrated it with the initial layer of the vision transformer. In the scope of this research, we introduced a unique hybrid vision transformer model. Furthermore, we incorporated swish and tangent hyperbolic (tanh) activation functions into the validation model to enhance its performance.

KEYWORDS: Vision transformer ResNet-18, MobileNetV2, handwritten character verification, signature verification, hybrid vision transformer, handwritten signature verification, UTsig-Persian

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DEVELOPMENT OF MACHINE INTELLIGENCE FOR SELF-DRIVING VEHICLES THROUGH VIDEO CAPTURING

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ABSTRACT

The development of machine intelligence for self-driving vehicles through video capturing focuses on leveraging computer vision and deep learning to enable autonomous navigation. This approach processes real-time video streams from vehicle-mounted cameras to detect objects, track movements, and understand the environment. By integrating advanced algorithms for lane detection, traffic sign recognition, and obstacle avoidance, the system ensures safe and efficient driving. Machine learning models, particularly convolution neural networks (CNNs) and recurrent networks, play a vital role in interpreting visual data. This research addresses key challenges in autonomy, paving the way for smarter and safer self-driving vehicles.

KEYWORDS: Self -drivings vehicles, ML, Computer Vision, Autonomous Navigation, video Processing

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DIABETIC RETINOPATHYPREDICTIONUSINGDEEP TRANSFER LEARNING MODELs

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ABSTRACT

One consequence of diabetes that impacts the human eye is diabetic retinopathy (DR). It is brought on by the blood vessels in the light-sensitive tissue at the rear of the human retina being mutilated. It is the most common cause of blindness in persons of working age, and it is far more likely to occur when diabetes is not adequately managed. There are ways to identify diabetic retinopathy, but they require an ophthalmologist to manually examine the retinal image. The goal of the suggested DR detection method is to use deep learning to automatically identify the issue. AGPU was used to train the model on 35126 retinal pictures that eyePACS made publically available on the Kaggle website. The model's accuracy was about 81%.

KEYWORDS: Preprocessing, Deep Learning, and Diabetic Retinopathy.

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GROUND WATER LEVEL PREDICTION USING MACHINE LEARNING

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ABSTRACT

The potential for enormous carbon emissions after fires makes peatlands a serious environmental hazard. Effective management is hampered by the labor-intensive and real-time data-poor nature of conventional ground water level (GWL) monitoring in peatlands. issue study addressed issue by proposing an IoT system for real-time monitoring that uses neural network-based GWL prediction. The neural network forecasts GWL based on atmospheric factors, giving the responsible party more time to take the necessary steps to lower the danger of fire in peatlands. With a Root Mean Square Error (RMSE) ranging from 3.554 to 4.920, the suggested neural network shows encouraging results and guarantees 99% accuracy within a 14.760 mm range of the real GWL. This finding underscores the novel approach of integrating IoT and neural networks for peatland GWL prediction, offering a significant advancement in real-time monitoring and fire risk mitigation strategies. The novelty lies in its capability to predict real-time GWL even in areas lacking the resources for conventional monitoring, using simple meteorological parameters

KEYWORDS: Peatland, IoT system, machine learning, neural network

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MACHINE LEARNING BASED DDOS ATTACK DETECTION IN CYBER-PHYSICAL PRODUCTION SYSTEMS

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ABSTRACT

The industrial system now functions differently as a result of recent developments in communication technology. The process has become more transparent as a result of the better communication between the various entities involved in cyber physical production systems (CPPS), including manufacturers, suppliers, and users. The availability of the production systems may be threatened by the adoption of cutting-edge new technologies in CPPS, which may create weak points that attackers may utilize to conduct complex distributed denial of service (DDoS) assaults. Current machine learning-based intrusion detection systems (IDS) frequently skip the critical testing stage with real-time scenarios since they rely on irrational datasets for training and validation. The ML models' outputs are predicated on predictions made at every stage of the flow and are unable to offer a comprehensive picture of malevolent actors. This study suggested an effective IDS system that employs both rule-based detection and machine learning techniques to identify DDoS attacks that harm CPPS's infrastructure in order to overcome this constraint. We use real-time network traffic taken from an actual industrial setting, known as a Farm-to-Fork (F2F) supply chain system, for system training and validation. CIC-FLOWMETER was used to extract bidirectional features from both attacks and regular traffic. We employ 8 ML supervised and unsupervised techniques to identify the harmful flows. The frequency of the malicious flows is then determined using a rule-based detection mechanism, and the frequency is used to assign varying severity levels.

KEYWORDS: Industry 4.0, CPPS, DDoS attacks, IDS solutions, machine learning, and rule-based detection

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MACHINE LEARNING BASED FRAUD DETECTION IN E-COMMERCE TRANSACTIONS

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ABSTRACT

The detection and prevention of fraudulent transactions in e-commerce platforms has long been at the core of transaction security solutions. However, because e-commerce is concealed, it is challenging to catch attackers using just past order data. Many research try to develop technology that prevent fraud, but they don't consider how consumers' behavior is evolving from different perspectives. This complicates the process of identifying fraudulent behavior. This paper proposes a new method for detecting fraud by tracking user activity in real time using a combination of process mining and machine learning models. First, we develop a process model for the B2C e-commerce platform that incorporates user behavior identification. Second, a method for anomaly analysis that may be used to event logs to find noteworthy features is explained. We next use Ensemble Learning to integrate the gathered information into a classification model that identifies fraudulent activity

KEYWORDS: Fraud detection, E-commerce, Transaction security, Real-time tracking, Machine learning, Anomaly analysis

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PREPARATION OF PAPERS FOR SENTIMENT ANALYSIS FOR SERVICE INDUSTRY USING MACHINE LEARNING

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ABSTRACT

In the current digital era, consumer feedback—especially that obtained from diverse sources such as evaluations of mobile applications—has become an essential tool for service-providing companies to acquire important insights into the experiences of their clients. Since offering better services to customers is the main goal of service-providing firms, customer feedback and opinions are an essential resource for these organizations to improve and enhance their services for the benefit of their clients. Research on explicitly stated opinions has been extensively researched, yet there is a notable lack of attention to implicitly articulated ideas. Additionally, the majority of current research concentrates on product-oriented corpora, highlighting certain features and qualities of products. In this paper, a novel study on end-to-end aspect-based sentiment analysis (ABSA) is presented. It involves collecting implicit opinion phrases from English mobile app evaluations, classifying them, and assigning polarity to each term. In this work, we created a domain-specific, aspect-based, service-oriented annotated dataset and presented a new two-step hybrid methodology. In the first stage, a rule-based method is used to extract many opinion terms. The retrieved opinion phrases are categorized into general aspect categories in the second stage using machine learning and deep learning methods. The double-implicit issue that frequently arose in earlier work on implicit aspects and opinion mining is successfully resolved by this two-step method. To complete the ABSA task, we improved BERT in addition to using deep learning and conventional machine learning models. This strategy made use of the pipeline method, which ensures a smooth information flow and enhanced performance by using the output of one activity as the input for the next. The classification of extracted opinion phrases into aspect categories is the first step in this multi-step process, which concludes with the assignment of sentiment polarity.

KEYWORDS: Implicit aspects, aspect categories, aspect sentiment classification, pattern creation.

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AUDIO BASED MUSIC GENRE CLASSIFICATION USING DEEP LEARNIG

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ABSTRACT

A web application that pulls songs from YouTube and categorizes them into musical genres is presented in this project. The tool described in this study is based on models that were trained using Audioset's musical collection data. For this goal, we have used classifiers from diverse Machine Learning paradigms: Probabilistic Graphical Models (Naive Bayes), Feed-forward and Recurrent Neural Networks and Support Vector Machines (SVMs). These models were all trained in a situation involving multi-label categorization. We execute classification in 10-second chunks because genres can change throughout the course of a song. Audioset makes this possible by providing 10-second samples. In real time, the visualization output displays this temporal data in sync with the playing music video. The classification results are displayed as stacked area charts, which display scores for the top ten labels acquired for each chunk. We provide a thorough explanation of the problem's theoretical and scientific foundation as well as the suggested classifiers. In order to explain model performance and music genre classification issues, we first demonstrate the application's functionality in practice using three different songs as study cases. These are then examined and contrasted with internet categorizations.

KEYWORDS: Feature extraction, Music, Support vector machines, Classification algorithms.

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FOREST FIRE PREDICTION AND MANAGEMENT USING AI, ML, AND DEEP LEARNING TECHNIQUES

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ABSTRACT

Forest fires pose a significant threat to ecosystems, wildlife, and human settlements, leading to severe environmental and economic consequences. The ability to predict and manage forest fires using Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning techniques has emerged as a crucial area of research. AI-driven models leverage historical fire data, meteorological variables, and remote sensing information to identify fire-prone regions and predict fire outbreaks with high accuracy [1]. In this paper, we explore various AI methodologies, including supervised and unsupervised learning models, Convolutional Neural Networks (CNNs), and Recurrent Neural Networks (RNNs) to enhance prediction accuracy. Additionally, we discuss data collection, feature selection, model training, evaluation, and real-time applications. Our findings indicate that hybrid AI models integrating multiple techniques yield superior performance in early fire detection and efficient disaster management [2].

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ONLINE RECRUITMENT FRAUD DETECTION USING DEEP LEARNING APPROACHES

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ABSTRACT

Online recruitment platforms have revolutionized job searching, but they also present significant challenges due to the rise in fraudulent job postings that deceive job seekers and lead to Online recruitment fraud is leading to a decline in organizational reputation, financial loss, and personal loss. This paper presents an algorithm deep learning for detecting online recruitment fraud (ORF) which outperforms previous methods based on banking industry datasets. The research utilizes the publicly available Fake Job Posting Prediction dataset, which contains real and fraudulent job postings, for training and evaluation. Existing models such as BERT and RoBERTa have demonstrated strong performance in text classification tasks. However, to further enhance accuracy and robustness, we introduce a hybrid approach leveraging GPT-2, XLNet, and LSTM. GPT-2 and XLNet, with their transformer-based architectures, are employed to capture contextual and semantic relationships in job descriptions, while LSTM is used for sequential pattern learning to improve fraud detection. The system will be fraud-proof regarding actual job postings and false job postings with a minimum threshold for false positive and false negative rates. The proposed model performances are evaluated using standard classification metrics, such as accuracy, precision, recall, and F1-score. Experimental results indicate that our approach significantly improves ORF detection, offering a reliable solution to safeguard job seekers from fraudulent employment opportunities. This research contributes to enhancing trust and security in online recruitment platforms.

KEYWORDS: Online Recruitment Fraud Detection, Deep Learning, GPT-2, XLNet, LSTM

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GESTURE-BASED HUMAN-MACHINE INTERFACE WITH ESP32

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ABSTRACT

Traditional communication methods for non-verbal, bedridden patients rely on physical buttons or caregiver intervention, which can be slow and inefficient. The Smart Gesture-Based Communication System improves patient assistance using AI-driven hand gesture recognition and IoT. An ESP32camera captures real-time hand gestures, processed using MediaPipe for AI-based detection and transmitted to Firebase Realtime Database for remote monitoring. Each gesture (1 to 5 fingers) corresponds to a specific request, represented through colored light bulbs, an LCD display, and an optional buzzer alert. The ESP32 microcontroller ensures seamless processing and communication, allowing caregivers to monitor patient requests remotely for timely responses. This system eliminates manual intervention, reducing stress while improving healthcare assistance. By integrating AI, IoT, and real-time alerts, it ensures faster response times, enhancing patient comfort and autonomy. The solution is cost-effective, scalable, and reliable, offering greater efficiency and flexibility compared to traditional methods.

KEYWORDS: ESP32Camera, ESP32 Microcontroller, LCDDisplay, Buzzer.

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IOT-ENABLED SMART SHOE WITH CLOUD MONITORING FOR THE VISUALLY IMPAIRED

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ABSTRACT

These IoT-enabled smart shoes are designed to enhance the safety and awareness of visually impaired individuals. Equipped with ultrasonic sensors, they detect obstacles like walls, steps, and uneven surfaces within a predefined range. Upon detection, the system provides audio feedback through a DFPlayer Mini, issuing alerts such as "Obstacle Detected" and "Moisture Detected." An emergency feature, integrated via Google Routine, enables users to send distress messages to caregivers using a voice command like "Help." Additionally, the shoes update real-time data, including step count, moisture level, obstacle count, and GPS location, to the Ubidots cloud for monitoring. This solution enhances user confidence, safety, and independence.

KEYWORDS: IoT, Ultrasonic Sensors, Microcontrollers, Smart Shoes, Assistive Technologies

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DTMF PHONE CALL CONTROL HOME AUTOMATION

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ABSTRACT

This paper explores how Dual-Tone Multi-Frequency (DTMF) technology, typically used for telephone keypads, can be repurposed to control home automation systems via regular phone lines. By sending specific key press tones from a telephone, users can manage various home devices like lights, thermostats, fans, door locks, and security systems. The system utilizes a DTMF decoder connected to a microcontroller, such as an ESP32, or PIC, to interpret these tones and execute commands efficiently. This setup lever ages existing phone infrastructure, eliminating the need for additional smart devices, expensive hardware, or internet connectivity, making home automation more accessible and cost-effective. The system is designed for reliability, security, and ease of use, incorporating noise filtering techniques to ensure accurate signal reception even in noisy environments. Additionally, it supports multiple users and allows customization of control commands for enhanced flexibility. The proposed system is particularly useful in rural and remote areas where internet access is limited or unreliable. It also benefits elderly and disabled individuals by providing a simple, non-internet-dependent automation solution that can be controlled from any telephone. By repurposing traditional phone technology for modern home control, this system presents an innovative, low-cost, and practical alternative to internet-based smart home solutions.

KEYWORDS: Dual-ToneMulti-Frequency (DTMF), security, reliability, easeofuse, internet-independent, ESP32

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SECURE DOOR LOCK SYSTEM USING OTP AND GSM MODULE WITH ARDUINO

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ABSTRACT

The proposed work aims to replicate the extensive literature research on OTP-based door locks, which are crucial for residential, commercial, and auto security because of ever increasing risk of theft. The existing methods include various kinds of door lock security systems, such as traditional security systems that transmit signals through alarms. Some door lock security systems are based on GSM, GPS, and biometrics like face recognition, iris scanning, RFID, smart cards, and passwords. Every system has benefits and drawbacks of its own. Overcoming the limitations of authentication mechanisms like mechanical and digital door locks is there as on why access control systems based on OTP are preferred. The user does not require the administrator's help to access the door if they are familiar with the proposed method and have the registered mobile number and OTP. The OTP is generated and sent to user's mobile number whenever the user accesses the door.

KEYWORDS: Arduino Uno, SIM900LGSM Module, Finger print Sensor, Relay Module, Solenoid Door Lock.

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RS-485 MODBUS SERIAL COMMUNICATION AND IoT ENABLED CONTROL SYSTEM

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ABSTRACT

This paper presents an innovative explores the development of an IoT-enabled lot control system using the RS-485 MODBUS protocol with an Arduino UNO acting as a slave device. Our main objective is to integrate robust industrial communication standards with modern IoT capabilities to enhance efficiency, scalability, and remote monitoring in lot management applications. Our system facilitates real-time data acquisition, control, and monitoring of various devices within an industrial or commercial lot environment. the RS-485 standard for reliable long-distance communication and MODBUS for standardized data exchange, the project ensures robust and secure communication. The IoT capabilities allows for remote access and control via cloud-based platforms, significantly improving operational efficiency and decision-making processes. Our system is particularly beneficial in applications such as smart agriculture, parking lot management, and warehouse automation, where it enhances the ability to monitor and control operations from any location.

KEYWORDS: RS-485, MODBUS, serial communication, Arduino UNO, industrial automation

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INNOVATIVE MIMO ANTENNA DESIGN FOR HIGH-SPEED 5G NETWORKS

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ABSTRACT

This paper presents the design of a high-performance Multiple Input Multiple Output (MIMO) antenna optimized for 5G communication systems. The proposed antenna is engineered to operate efficiently across both sub6 GHz (3.5 GHz) and millimeter-wave (mm Wave) bands (28 GHz and 38 GHz), ensuring seamless connectivity for diverse 5G applications. To enhance performance, defected ground structures (DGS) are incorporated to mitigate mutual coupling, while met materials are employed to expand bandwidth and improve radiation efficiency. The compact design facilitates high data transmission rates while addressing critical challenges such as interference and gain limitations. Simulations performed using HFSS Microwave Studio confirm notable enhancements in return loss, gain, directivity, and isolation compared to conventional MIMO antenna models. The results indicate a peak gain of 10.5 dBi at 3.5 GHz and 13.2 dBi at mm Wave frequencies, with mutual coupling effectively reduced to -35 dB. The proposed design provides a promising solution for compact, high-gain, and wideband MIMO antennas, laying a strong foundation for future 5G wireless networks.

KEYWORDS: MIMO Antenna, 5G Communication, Millimeter Wave, Defected Ground Structure (DGS), Met materials.

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DESIGN AND EVALUATION OF A 4 GHZ MICROSTRIP PATCH ANTENNA ACROSS TWO SUBSTRATE VARIANTS

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ABSTRACT

This paper presents the design and comparative analysis of a 4 GHz microstrip patch antenna using two different substrates: Rogers RT Duroid and FR4. The primary objective is to evaluate the influence of substrate material on the antenna's overall performance. Through comprehensive simulations, key performance parameters including return loss, gain, and voltage standing wave ratio (VSWR) are analyzed for each substrate. The results reveal significant variations, underscoring the critical role of substrate selection in optimizing microstrip patch antenna designs. These findings provide valuable insights for future antenna development, demonstrating how substrate properties directly impact performance and efficiency.

KEYWORDS: 4GHz Microstrip Patch Antenna, Substrate Comparison, Rogers RT Duroid, FR4, Antenna Design

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REAL-TIME WATER QUALITY MONITORING USING IOT

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ABSTRACT

The growing need for clean and safe water highlights the importance of efficient water quality monitoring systems. This paper presents an IoT-based smart water quality monitoring system that provides real-timed at a on essential parameters, including pH, turbidity, temperature, RGB color, and Total Dissolved Solids (TDS). The system utilizes multiple sensors integrated with a microcontroller to enable continuous monitoring and seamless data transmission to a cloud platform. The collected data can be accessed via a web or mobile application, allowing stakeholders to respond promptly to any deviations from safe water quality standards. Designed with a modular architecture, the system is highly scalable and energy-efficient, making it ideal for deployment in remote locations. Offering high accuracy and reliability, the proposed system serves as a cost-effective solution for environmental sustainability and public health protection.

KEYWORDS: IoT, Smart Water Quality Monitoring, Real-Time Data, pH, Turbidity, Temperature, RGB Sensor, Total Dissolved Solids (TDS).

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DRY HAND WASHING MACHINE USING FOG DISINFECTION

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ABSTRACT

Since the start of COVID pandemic it is been suggested to wash your hands multiple number of times per day. But can we afford to waste such huge amount of water. The problems that would be created by wastage of water would create a greater problem than the pandemic itself. To help solve this system we here design a system that provides hand washing while consuming over 95% less water. Our machine goes ahead another level to enable even more water saving using a fog based a system can be developed that allows to sanitize the hands without using more than 95% sanitizer. To disinfect with disinfectant or sanitizer, it should reach every millimeter of the hand. The machine designed is a fog-based system. When the user inserts the hands inside the box, the mist system activates automatically, converting the sanitizer into fog. After exposing the user to sanitizer mist for 5-15 seconds, the hands will be clean.

KEYWORDS: Hand Washing, Covid Pandemic, Automation, Fog Disinfection.

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REAL-TIME OBJECT DETECTION IN SMART SURVEILLANCE USING DEEP LEARNING

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ABSTRACT

Security and surveillance are critical in modern society, where real-time threat detection and anomaly identification are essential for ensuring public safety. Traditional surveillance systems often rely on manual monitoring, which is prone to errors and inefficiencies. To address these challenges, this study presents a deep learning-based object detection system designed for smart surveillance applications. The proposed system integrates Deep Transfer learning with a cosine annealing scheduler to enhance detection accuracy and optimize model performance. Utilizing a publicly available surveillance dataset containing various objects and activities, the system is trained to detect and classify potential threats in real-time. Performance evaluation is conducted using key metrics such as accuracy, precision, and F1 score, ensuring a robust and efficient object detection framework for modern security applications.

KEYWORDS: Object Detection, CNN, Deep Learning, Smart Surveillance, Anomaly Detection, Transfer Learning, Real-Time Monitoring, Security Systems, Video Analytics

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DEEP LEARNING-BASED HAND WRITTEN IMAGE ANALYSIS FOR PARKINSON'S DISEASE

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ABSTRACT

Parkinson's disease is a debilitating neurological condition impacting millions globally. The disease's progression stems from the deterioration of brain cells responsible for dopamine production, a crucial neurotransmitter governing motor functions. As dopamine levels decline, characteristic symptoms emerge, including impaired movement, balance, and posture. Timely diagnosis is paramount, as it significantly slows disease progression and enhances the quality of life for those affected. This project proposes a novel predictive approach utilizing handwriting analysis, combining cosine annealing scheduler with Deep Transfer Learning. Leveraging the KAGGLE dataset, which comprises handwriting samples from individuals with Parkinson's and healthy controls, we evaluate the performance of two models: Custom CNN and VGG16. Our assessment is based on three key metrics: accuracy, precision, and F1 score.

KEYWORDS: Parkinson, Custom CNN, VGG16, F1-Score

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CNN-BASED AN ALYSIS OF RESPIRATORY SOUNDS FOR DISEASE IDENTIFICATION

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ABSTRACT

The "Lung abnormal detection using CNN" project aims to lung disease, including pneumonia, asthma, chronic obstructive pulmonary disease (COPD), and pulmonary fibrosis, are significant global health concerns. Early and accurate detection of lung abnormalities is crucial for effective treatment and management. In this study, we propose a deep learning-based approach using Convolutional Neural Networks (CNNs) to automatically detect lung abnormalities from respiratory sound recordings. The respiratory sounds are obtained from a standardized respiratory sound database and preprocessed using techniques such as noise reduction, segmentation, and feature extraction through Mel-Frequency Cepstral Coefficients (MFCC) and Mel- Spectrograms. The extracted features are then used to train a CNN model designed for classifying normal and abnormal lung sounds. The proposed model is evaluated using various performance metrics, including accuracy.

KEYWORDS: Lung abnormality detection, Respiratory sound classification, Convolutional Neural Network (CNN), Deep learning in respiratory analysis, Pulmonary disease detection.

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LEAF DISEASE DIAGNOSIS USING MORPHOLOGICALALGORITHMS

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ABSTRACT

Leaf disease detection is crucial for ensuring healthy crop growth and improving agricultural productivity. This study focuses on using image processing techniques in MATLAB to identify and classify leaf diseases efficiently. The process involves image acquisition, pre-processing, segmentation, feature extraction, and classification using machine learning algorithms. By analyzing features such as color, texture, and shape, the proposed system can detect common leaf diseases with high accuracy. The automation of disease detection helps in early diagnosis, reducing crop losses and aiding farmers in timely intervention.

KEY WORDS: Morphological Operations, IoT, Image Processing

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ENERGY HARVESTING FROM SPEED BREAKERS FOR STREET LIGHTING

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ABSTRACT

With the increasing demand for renewable energy, utilizing unconventional methods for power generation has become crucial. One such method is speed breaker power generation, which converts mechanical energy from moving vehicles into electrical energy. This paper explores the power generation mechanism using speed breakers and its application in street lighting. By integrating mechanical-to-electrical energy conversion through rack and pinion or piezoelectric technology, this system ensures sustainable and efficient power generation. The produced energy can be stored in batteries and used for lighting, reducing dependency on traditional grid power.

KEYWORDS: Speed Breaker, Power Generation, Renewable Energy, Street Lighting, Piezoelectric Sensors, Rack And Pinion Mechanism.

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EFFECTIVE LONG RANGE TRACKING USING RYLR 406

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ABSTRACT

In this paper, a LoRa-based GPS Tracking System is designed to provide efficient lora power location tracking. The system consists of a transmitter module using an Arduino Nano, GPS module, and LoRa transmitter, and a receiver module that includes an ESP32 and LoRa receiver. The transmitter acquires GPS coordinates and transmits them wirelessly using LoRa technology. The receiver collects this data and sends it to a mobile device via USB-OTG or Bluetooth, allowing real-time location tracking using an Arduino ESP32 GPS Maps app. This system is ideal for tracking assets, vehicles, or individuals in remote areas where traditional communication methods like GSM are in effective. The use of LoRa communication enhances the system's efficiency by enabling long-range data transmission while consuming minimal power. Unlike conventional GPS tracking solutions that rely on cellular networks, LoRa provides reliable connectivity in areas with limited network coverage. The receiver processes the GPS data and allows visualization of the tracked location on a mobile device, ensuring an easy-to-use and cost-effective tracking solution. This project demonstrates how LoRa technology can be effectively integrated with IoT for location tracking, providing a smart and scalable solution for various applications such as logistics, wildlife monitoring, and disaster management.

KEYWORDS: Internet-free tracking, Long-range Communication, Google Maps Integration

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EARLY DETECTION OF LEAF DISEASES USING RASPBERRY PI

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ABSTRACT

The Green Leaf Disease Detection System is a smart, real-time solution designed to assist farmers in identifying plant diseases accurately and efficiently. By integrating advanced technologies such as computer vision, deep learning, and edge computing, the system facilitates early disease detection, helping to prevent widespread crop damage and enhance agricultural productivity. This affordable and portable system is especially useful for small-scale and remote farmers, enabling proactive disease management and sustainable farming. A Raspberry Pi serves as the core processing unit, working alongside a camera module to capture real-time images of leaves. These images are analyzed using a pre-trained Dense Net121-based Convolutional Neural Network (CNN), which classifies the min to categories like Bacterial Spot, Early Blight, Leaf Mold, and Healthy Leaves. The system employs an image processing pipeline involving resizing, normalization, and feature extraction to improve classification accuracy. Once a disease is detected, an alert system provides information about the condition and suggests appropriate treatments. Additionally, the system can be equipped with an automated spraying mechanism to apply pesticides or fertilizers when needed.

KEYWORDS: Raspberry Pi, Embedded System, Convolutional Neural Network (CNN), Plant Disease Identification

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AUTOMATED CARDIOVASCULAR DISEASE DETECTION IN ECG IMAGES USING AI AND DEEP LEARNING TECHNIQUES

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Abstract

Cardiovascular diseases (CVDs) are the leading cause of mortality worldwide, emphasizing the need for early detection and accurate classification. Electrocardiogram (ECG) analysis is a widely used, cost-effective, and non-invasive method for diagnosing heart conditions. This study employs deep learning and machine learning techniques to classify four major cardiac abnormalities: abnormal heartbeat, myocardial infarction, history of myocardial infarction, and normal heart conditions. Initially, transfer learning was applied using pretrained deep neural networks, such as SqueezeNet and AlexNet, to extract meaningful features. Additionally, a novel Convolutional Neural Network (CNN) architecture was developed to enhance classification accuracy.

KEYWORDS: Electrocardiogram (ECG), Deep Learning, Machine Learning, Cardiovascular Disease, *CNN, Transfer Learning*

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EFFICIENT FAST MAPPING AND UPDATING ALGORITHMS FOR BINARY CONTENT ADDRESSABLE MEMORY (CAM) ON FPGA

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ABSTRACT

Content Addressable Memory (CAM) is a specialized form of memory designed for highspeed data retrieval by matching content rather than memory addresses. It is extensively used in applications such as networking, data compression, and artificial intelligence for its rapid parallel search capabilities. However, traditional CAM implementations face several limitations, including high power consumption, limited scalability, and latency during updates. This project introduces efficient fast mapping and updating algorithms for Binary CAM (BCAM) implemented on FPGA platforms. By leveraging parallel processing techniques and reconfigurable architecture, the proposed system reduces search latency and enhances throughput. The model incorporates advanced mapping algorithms to optimize memory utilization and minimize power consumption. The system employs a hybrid updating mechanism, allowing real-time modifications with minimal performance degradation.

KEYWORDS: Content Addressable Memory (CAM), FPGA, Binary CAM (BCAM), Fast Mapping, Efficient Updating, Low Power

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SCHEMATIC VISUALAISATION AND SIMULATION TOOL

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ABSTRACT

Circuit design and simulation are crucial in electronics engineering, but manual design methods are time-consuming and require expertise. This paper presents the Easy Circuit Designing Tool (ECD Tool), which automates schematic generation, component recognition, and simulation based on natural language input. The tool utilizes Python, schemdraw, PySpice, and MySQL for database storage. It extracts circuit components and connections, generates SPICE netlists, and performs DC, AC, and transient analysis. The tool simplifies the design process, ensuring accurate results and reducing manual errors.

KEYWORDS: Circuit Design, Simulation, SPICE Netlist, Node Mapping, Automated Schematic Generation, Natural Language Processing (NLP), DC Analysis, AC Analysis, Transient Analysis, PySpice, Electronic Design Automation (EDA).

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INNOVATIVE METAMATERIALS ANTENNA DESIGN FOR HIGH-SPEED 6G NETWORKS

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ABSTRACT

This paper presents an innovative metamaterial-based antenna design optimized for high-speed 6G networks operating at terahertz (THz) frequencies. The proposed antenna leverages engineered metamaterial structures to enhance gain, bandwidth, and radiation efficiency, addressing key challenges in next-generation wireless communication. Advanced simulations using HFSS (High-Frequency Structure Simulator) demonstrate significant improvements in return loss, directivity, and beamforming capabilities, making the design highly suitable for ultra- reliable, low-latency 6G applications. The results indicate that metamaterial integration enables compact, high- performance, and energy-efficient antennas, paving the way for future wireless communication systems.

KEYWORDS: 6G, Metamaterials, Terahertz Antenna, High-Gain, HFSS Simulation, Wireless Communication.

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CNN BASED BRAIN TUMOR DETECTION USING MRI DATA

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ABSTRACT

Brain tumors are life-threatening neurological conditions affecting thousands of individuals worldwide. The progression of brain tumors leads to severe neurological impairments, including headaches, cognitive decline, and motor dysfunction. Early detection is crucial, astimely diagnosis enables effective treatment planning and improves patient outcomes. This presents a deep learning-based approach for brain tumor detection using MRI scans, integrating a cosine annealing scheduler with Deep Transfer Learning. Utilizing the Kaggle MRI brain tumor dataset, which contains MRI images from both tumor-affected and healthy individuals, we evaluate the performance of two models: Custom CNN. This is conducted using three key metrics—accuracy, precision, and F1 score—to ensure reliable and efficient tumor classification.

KEYWORDS: MRI, CNN, Medical Imaging, Tumor classification

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A SMART SOLAR PANEL MONITORING SYSTEM WITH REAL-TIME INSIGHTS USING LoRaWAN

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ABSTRACT

A Smart Solar Panel Monitoring System With Real-Time Insights Using LoRaWAN is an advanced solution for real-time tracking of solar panel performance, ensuring efficiency and reliability. It utilizes IoT-enabled sensors to measure critical parameters such as voltage, current, temperature, irradiance, and panel health. These sensors communicate via a LoRaWAN gateway, which transmits data to a cloud-based platform for storage, analysis, and visualization. LoRaWAN technology offers long-range, low- power, and cost-effective data transmission, making it ideal for remote and large-scale solar farms. The system provides real-time alerts and predictive maintenance insights, enabling early detection of faults, shading issues, degradation, and performance anomalies. By minimizing manual inspections and reducing operational costs, it enhances system uptime and maximizes energy output. The cloud-based interface allows users to monitor performance trends, generate reports, and optimize power generation strategies. The system's scalability supports integration with multiple solar sites, providing a comprehensive monitoring solution. Overall, this LoRaWAN-based monitoring system improves the reliability and efficiency of solar PV plants, making renewable energy management more intelligent and cost-effective. Its ability to operate in remote locations with minimal power consumption ensures sustainable and long-term monitoring, contributing to the growth of smart solar energy solutions.

KEYWORDS: Photovoltaic Monitoring, Energy Harvesting, Power management, LoRa Technology

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ARDUINO-BASED TIME-DRIVEN SOLAR PANEL TRACKING SYSTEM

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ABSTRACT

The RTC-based solar tracking system using Arduino Uno to maximize solar energy absorption. Unlike conventional sensor-based trackers, this system utilizes a DS3231 Real-Time Clock (RTC) module to calculate the sun's position based on time. By using servo motors, the solar panel is automatically adjusted to maintain optimal alignment with the sun throughout the day. Since the efficiency of solar panels largely depends on their orientation, this method ensures consistent energy harvesting. Experimental results show improved performance compared to fixed solar panels, making this system a cost-effective and reliable solution for solar tracking applications.

KEYWORDS*:* Solar tracking system, Arduino UNO, RTCDS1307, solar panel, motor driver, energy optimization

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A PYTHON-BASED VIDEO STEGANOGRAPHY FRAMEWORK FOR SECURE COMMUNICATION

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Abstract

This innovative system leverages the Least Significant Bit (LSB) technique to conceal secret messages within video frames, facilitating confidential communication. By extracting video frames, embedding messages via LSB steganography, and reconstructing the video, this system ensures seamless and secure message transmission. Utilizing OpenCV, Stegano, and Tkinter, the system provides a user-friendly interface for effortless interaction, allowing users to embed and extract messages with ease. FFmpeg ensures efficient video and audio processing, making this system an effective tool for covert communication.

KEYWORDS: Open CV, Message Embedding, Data Hiding, Encryption, Decryption, Covert Communication.

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SMART VOICE-ENABLED EMPOWERMENT SYSTEM

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ABSTRACT

The Smart Voice-Enabled Empowerment System is an IoT-based assistive technology designed to aid physically disabled individuals by enhancing their ability to communicate and interact with their environment. The system leverages voice recognition, artificial intelligence (AI), and smart monitoring to provide a seamless and user-friendly experience. The proposed system incorporates speech-to-text (STT) and text-to-speech (TTS) technologies, allowing users to control smart devices, send messages, and access essential services through voice commands. Additionally, it integrates real-time health monitoring using wearable sensors, which can detect vital signs such as heart rate, body temperature, and oxygen levels. Alerts are sent to caregivers in case of emergency situations. A machine learning-based speech recognition model ensures high accuracy, enabling users with different accents and speech impairments to effectively interact with the system. The integration of IoT connectivity allows the system to control home appliances, assist with navigation, and provide emergency alerts. This system aims to empower individuals with disabilities by enhancing accessibility, independence, and safety. Future advancements may include AI-based predictive analysis, brain computer interfaces (BCI), and multilingual support to further improve usability and inclusivity.

KEYWORDS: Smart Voice Recognition, IoT, AI, Assistive Technology, Speech Processing, Accessibility, Health Monitoring.

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REAL-TIME HEALTH DATA COLLECTION AND ANALYSIS WITH WEB-BASED IOT

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ABSTRACT

Integrated health monitoring systems have gained significant attention in recent years due to their potential in providing real time and continuous monitoring of various physiological parameters. This paper presents the design and implementation of an integrated health monitoring system using an ESP32 microcontroller and various biosensors, including SpO2 (MAX30100) the system allows simultaneous SpO2, Room temperature and by using DHT-11 Sensor and heart rate measurements, providing comprehensive insights into oxygenation levels. The obtained results demonstrate the successful integration of multiple biosensors and the system's capability to provide synchronized and real-time monitoring of key physiological parameters. The significance of this research lies in its potential applications in healthcare, and remote patient monitoring. By leveraging the capabilities of ESP32 and advanced technology, the proposed system offers a portable, and cost-effective solution for continuous health monitoring. The results highlight the system's effectiveness in measuring SpO2 levels and by using fall detection the position of the patient also captured accurately. In conclusion, this integrated health monitoring system offers a robust platform for real-time monitoring of SpO2, and heart rate measurements.

KEYWORDS: ESP32 Microcontroller, blood pressure, Heart rate, Body Temperature, Pulse Oximeter

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SMART TRAFFIC MANAGEMENT AND ALERT SYSTEM FOR HILLY ROADS USING LORA COMMUNICATION

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ABSTRACT

In hilly regions, traffic safety and management of traffic are vital due to the challenges posed by complex terrain, adverse weather, and natural risks. This project introduces a Lo-Ra Enabled Smart Traffic and Emergency Alert System that enhances road safety, monitor traffic density, provide weather forecasts, and detect natural disasters. The system utilizes IR sensors to monitor traffic flow and provides real-time alerts at critical curve points through traffic lights, effectively managing traffic congestion and reducing accidents. DHT11 and LDR sensors forecast weather conditions, while LDR sensors also control automatic street lighting, ensuring visibility in poor weather. The GPS module sends information about high traffic region exact location. For natural disaster detection, a vibration sensor is incorporated to monitor landslides and earthquakes, issuing alerts to ensure public safety. A LoRa communication, which not only sends emergency alerts and GPS locations but also transmits real-time data on traffic density, weather reports, and landslide risks to the central control station. This enables comprehensive emergency response, making the system adaptable to a wide range of safety and management challenges. The system's robust, scalable design makes it highly adaptable to the unique challenges of hilly road environments.

KEYWORDS: IR Sensor, DHT11 Sensor, LDR Sensor, Vibration Sensor, GPS Module, LoRa Module, LED Display, Traffic Light

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HAND GESTURE VIRTUAL MOUSE

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ABSTRACT

This paper focuses on improving how people interact with computers using a new technique called Human-Computer Interaction (HCI). Instead of using a physical mouse, our project allows to control computer with gestures. It is developed using an object-oriented programming language named PYTHON and computer vision library like Opencv, ediaPipe, pyauto GUI, etc. First use a desktop web camera to recognize and track the hand movements. Based on this gesture, the system moves the mouse cursor to the screen. The basic idea is to replace input devices with a simple camera, such as a standard mouse. The Virtual Mouse uses the camera to connect with computer. This means that there is don't need any physical devices to communicate with the device. It control everything by human normally do with a mouse, like moving and clicking the cursor, by simply moving the hand in front of the camera.

KEYWORDS: Skin Disease Dataset, Image Processing Techniques, Deep Learning Techniques, Convolution Neural Network, Classification, Accuracy.

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SMART TRANSPORT AND MONITORING SYSTEM, CONNECTED TRANSPORT AND LOGISTICS PLATFORM, REAL-TIME TRANSPORT MANAGEMENT SYSTEM, IOT-ENABLED TRANSPORTATION NETWORK, AND INTELLIGENT TRANSPORTATION AND MONITORING

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ABSTRACT

With the popularity of smart transportation in smart cities, there is an exponential increase in the number of vehicles on the road, which in turn increases the congestion in the network traffic. Therefore, it is becoming a challenging task to find parking slots in modern societies around the globe. To tackle the aforementioned issues, in this paper, we propose a system named iERS, which reduces the user's effort to locate the nearest available parking slots in real-time. It reduces individual efforts to locate a suitable parking slot. iERS helps the user to find an available parking slot and also provides direction towards the slot. iERS uses the Internet of Things (IoT)-based infrastructure to monitor and signal the availability of different parking slots around the smart communities. The simulation and testbed results demonstrate that iERS provides better guidance to the users to reserve the available parking slot in comparison to the other existing solutions.

KEYWORDS: Smart Transportation, Internet of Things, Machine Learning, Intelligent Systems, Distributed Systems

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SMART MOBILE CHARGER WITH COIN-BASED ACTIVATION

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ABSTRACT

The "Coin-Operated Mobile Charging Station" is an innovative solution designed to address the growing need for accessible and controlled mobile charging in public spaces. This project integrates a microcontroller-based system with a coin acceptor module to enable users to charge their mobile devices for a specified duration upon inserting a coin. The system is equipped with a relay module that regulates the power supply to the charging ports, ensuring that charging is only activated when a valid coin is inserted. The charging duration is predetermined and can be displayed on an optional screen, providing users with clear information on their remaining charging time.This project is particularly suited for deployment in public areas such as train stations, bus terminals, and shopping malls, where the demand for mobile charging facilities is high. By offering a pay-per-use model.

KEYWORDS: Smart Mobile Charger, Payment-Activated Charging, Coin Operated Device

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SMART SHOPPING CART WITH AUTOMATIC BILLING SYSTEM

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ABSTRACT

The Smart Shopping Cart with Automated Billing System aims to improve the in-store shopping experience. The cart has a user-friendly digital interface, real-time item tracking, and RFID or barcode scanning. The system maintains inventory, offers customized promotions, and automatically changes the overall cost when products are added or deleted. Real-time billing information and item details are shown on an LCD display, guaranteeing a flawless shopping experience. Furthermore, a GSM module permits remote updates and billing summaries through SMS. By allowing direct payment via the cart's interface or a connected mobile app or number, the system does away with traditional checkout lines, cutting down on shopping time and enhancing retail operations for contemporary, tech-driven establishments.

KEYWORDS: Smart Shopping Cart, RFID Technology, Real-Time Billing, IoT-Integration

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FINGER PRINT BASED BIOMETRIC SMART ELECTRONIC VOTING MACHINE

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ABSTRACT

Elections are the fundamental defining characteristics of any democracy. The traditional voting is done by manually, which is time consuming and complicated. But now-a-days you can see that multiple voting's involved; this will lead to fraud. To eradicate these issues, we are proposing a new device called finger print based voting machine. In the existing system they used to vote by pressing the thumb. This will allow multiple voting's by a single user. To make the system more secure, another layer of security is reinforced through the use of fingerprint module. GSM Sends message on abnormal conditions. Nodemcu Uploads data to thingspeak. In the proposed design a new model of voting through electronic voting machine is introduced which is based on biometric system using finger print detection. If the person tries to vote multiple times, then the Microcontroller will automatically display the message on the LCD.

KEYWORDS: Arduino, LCD, Automatic Fraud

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FULL RESOLUTION NETWORK AND DUAL THRESHOLD ITERATION FOR RETINAL VESSEL SEGMENTATION

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ABSTRACT

Identification of an Accurate blood vessel segmentation is crucial for various medical imaging applications, including diagnosis and treatment planning. This project represents an approach for blood vessel segmentation using MATLAB and Dual Threshold techniques. Leveraging the powerful capabilities of deep convolution neural networks (CNNs), our method integrates MATLAB's robust image processing and neural network tools to enhance segmentation performance. By using a hybrid architecture combining a pre- trained network with custom layers tailored for vessel detection. Extensive experiments were conducted on diverse datasets, demonstrating superior accuracy and robustness compared to traditional methods.

KEYWORDS: FR-UNET, Medical imaging, CNNs, Dual-Threshold Iteration

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EARLY DETECTION OF ROAD DAMAGE VIA LIDAR

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ABSTRACT

Nowadays, night driving can be challenging due to reduced visibility, glare from oncoming headlights, animal crossings, and navigation difficulties. All of these can lead to accidents while driving at night. Small accidents have a more significant effect on drivers on national highways. These factors can contribute to accidents that are more pronounced on national highways. When traveling during night time hours, the bright lights from opposing vehicles can obscure the road, hindering visibility for drivers. Additionally, severe collisions may arise from unanticipated potholes and cracks on the road, further impairing visibility. To mitigate these issues, we employ a road analysis system that evaluates the condition of the roadways. This system allows for the detection of potholes and cracks, enabling our vehicle to automatically reduce speed and thereby decrease the risk of accidents to some degree.

KEYWORDS: Obscure, Hindering visibility, Unanticipated potholes, Impairing visibility.

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REVERSIBLE DATA HIDING IN ENCRYPTED IMAGES WITH SECRET SHARING AND CONVOLUTIONAL NEURAL NETWORK

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ABSTRACT

Reversible data hiding (RDH) in encrypted images is a crucial technique that enables secure data embedding while preserving the original image content. This approach is widely used in applications requiring high-security standards, such as medical imaging, cloud storage, and confidential data transmission. By integrating secret sharing with convolutional neural networks (CNNs), this method ensures both secure data embedding and high- fidelity image reconstruction. The proposed framework employs encryption techniques to secure the original image, followed by secret sharing for enhanced data protection. A CNN-based decoder is then utilized to extract hidden information while accurately restoring the original image. Performance evaluation is conducted using key metrics such as Peak Signal-to-Noise Ratio (PSNR), Structural Similarity Index (SSIM), and embedding capacity to ensure optimal security and image quality.

KEYWORDS: RDH, Encrypted Images, Secret Sharing, CNN, Data Security

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SMART PILL DISPENSER

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ABSTRACT

The Smart Pill Dispenser is an automated system designed to assist elderly patients in adhering to their medication schedules. By integrating Arduino, a gear motor, a motor driver, a GPS module, a real-time clock (RTC), an LCD display, and a buzzer, the system ensures timely and accurate medication dispensing. It features three compartments designated for morning, afternoon, and evening doses. At the scheduled time, the dispenser automatically rotates to the correct compartment, stops, and alerts the patient with a buzzer and an LCD message. The RTC module tracks time and triggers the motor to position the appropriate compartment, while the LCD provides real-time status updates such as "Take Medicine" and "Medicine Done." The integration of a GPS module allows for remote monitoring, enhancing patient safety. This cost-effective and user-friendly system reduces the risk of missed doses and promotes better medication adherence, making it an ideal solution for elderly patients requiring assistance with their daily medication routine.

KEYWORDS: Smart Pill Dispenser, Automated Medication System, Elderly Care, Arduino, Real-Time Clock (RTC), Motor Driver, LCD Display, Buzzer Alert, GPS Tracking.

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NEURAL IMAGE COMPRESS

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ABSTRACT

Image compression is a critical technique for reducing the storage and transmission costs of visual data. Traditional compression methods, such as JPEG and JPEG 2000, rely on hand-crafted algorithms and transforms. Recently, deep learning-based approaches have emerged as a promising alternative for image compression. This paper proposes a neural network-based image compression frame work that leverages there presentational power of deep convolutional networks. Our approach learns a compact representation of images through a convolutional auto encoder, which is optimized using a rate-distortion loss function. Experimental results demonstrate that our method achieves state-of-the-art compression performance on various image datasets, outperforming traditional compression algorithms in terms of peak signal-to-noise ratio (PSNR) and structural similarity index (SSIM). Furthermore, our framework enables efficient compression of images at multiple quality levels, making it suitable for a wide range of applications.

KEYWORDS: Image compression, deep learning, neural networks, convolutional auto encoders, rate- distortion optimization.

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UTILIZING CONVOLUTIONAL NEURAL NETWORKS FOR SKIN DISEASE DIAGNOSIS

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ABSTRACT

The "Skin Disease Detection System Using Convolutional Neural Networks" is designed to accurately identify and classify various skin conditions through advanced image processing methods. The system begins with the collection of input images, which are then processed using a series of enhancement techniques to improve image quality. Data augmentation methods such as rotation, flipping, and zooming are applied to expand the training dataset, enhancing the model's performance and generalizability. The heart of the system is an optimized Convolutional Neural Network (CNN) architecture tailored specifically for skin disease classification. The dataset is divided into training, validation, and test sets, with around 70-80% used for training and 10-15% for validation, ensuring robust model performance on unseen data. In the final step, the model classifies skin conditions such as Actinic keratosis, Dermat of ibroma, Melanoma, and Squamous cell carcinoma. This system is intended to support dermatologists in making early, accurate diagnoses, ultimately contributing to better patient care through prompt and effective treatment.

KEYWORDS: Skin Disease Dataset, Image Processing Techniques, Deep Learning Techniques, Convolution Neural Network, Classification, Accuracy.

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DESIGN AND ENHANCEMENT OF TERAHERTZ MICROSTRIP PATCH ANTENNA FOR ORAL CANCER DETECTION

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ABSTRACT

This paper focuses on the development of a microstrip patch antenna optimized for terahertz (THz) frequencies, specifically designed for non-invasive oral cancer detection. Operatingat3THz, the antenna is built using Rogers RT/Duroid5880substrate, chosen for its low loss and superior performance at THz frequencies. To improve impedance matching, bandwidth, and sensitivity, the design incorporates fully ground surfaces (FGS). Simulations confirm that the optimized FGS patterns enable the antenna to effectively distinguish between healthy and cancerous oral tissues by detecting differences in their dielectric properties. The antenna's performance, including gain, radiation patterns, and impedance characteristics, is validated through fabrication and experimental testing. This innovative design marks a significant step forward in the development of accurate and non-invasive diagnostic technologies for early oral cancer detection.

KEY WORDS: THz, FGS, Oral Cancer, Gain, Impedance

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DESIGN AND OPTIMIZATION OF MICROSTRIP PATCH ANTENNA USING TERAHERTZ FREQUENCY WITH DEFECTED GROUND SURFACES

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ABSTRACT

This paper presents the design of a terahertz microstrip patch antenna incorporating defected ground surfaces (DGS) to enhance performance. The antenna operates at 1 THz, using two substrates: Rogers RT/Duroid 5880 for its low loss tangent and FR4 for com parison. The patch is optimized with precise dimensions calculated for THz frequencies, and DGS patterns are implemented to improve impedance matching, bandwidth, and radiation characteristics. Simulations using HFSS software demonstrate the effectiveness of the DGS in enhancing the antenna's performance. The Rogers RT/Duroid 5880 substrate shows superior performance with reduced signal loss compared to FR4, making it more suitable for high frequency applications. The design is validated through fabrication and testing, showcasing improved gain and efficiency. This antenna design offers significant advancements for terahertz applications in imaging and communication.

KEYWORDS: Defected ground, THz, Microstrip patch, antenna.

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SECURITY SYSTEM WITH AUTOMATED PHONE ALERTS USING RASPBERRY PI PICO

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ABSTRACT

Security is a primary concern in residential, commercial, and industrial areas. This paper presents a Smart Security System using the Raspberry Pi Pico, which can detect unauthorized access and automatically initiate a phone call to alert the user. The system integrates motion sensors (PIR), door/window sensors, and a camera module to monitor the surroundings. When an intrusion is detected, the Raspberry Pi Pico processes the sensor data and triggers an automatic phone call via a GSM module or VoIP service. Additionally, an alarm system (buzzer) and an optional notification system (SMS or email) enhance the security response. This low-cost and energy-efficient security system ensures real-time alerts and can be deployed in homes, offices, and warehouses. With its compact size, low power consumption, and easy installation, it provides a reliable and scalable solution for modern security needs.

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SINGLE-PHASE, SINGLE-STAGE TRANSFORMERLESS PHOTOVOLTAIC (PV) INVERTER

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ABSTRACT

A single-phase single-stage PV transformerless five-level inverter is to address the leakage current issues. By utilizing a single PV source, the proposed inverter generates five output voltage levels. The design involves cascading two converters to achieve the proposed single-phase single-stage PV transformerless five-level inverter. Operating in both buck and boost modes, the proposed single-phase single-stage PV transformerless five-level inverter demonstrates distinct output voltage peak values matching the input PV voltage in buck mode and doubling the input PV voltage in boost mode. The key innovation lies in maintaining a constant common-mode voltage, effectively reducing leakage current. This feature remains consistent in both buck and boost modes. The implementation of a Genetic Algorithm (GA) as an optimization technique to enhance the system's performance. The GA is used to optimize the control parameters of the buck-boost converter and the Pulse Width Modulation (PWM) strategy, ensuring improved power quality, reduced total harmonic distortion (THD), and better voltage regulation. The five-level output improves the quality of the AC waveform, reducing switching losses and improving grid compatibility

KEYWORDS: Common mode voltage, leakage current, PV systems, five-level inverter. GA.

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DEVELOPMENT OF AN ELECTRIC VEHICLE SYNCHRONOUS RELUCTANCE MOTOR DRIVE

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ABSTRACT

This paper presents the development and control of an electric vehicle (EV) synchronous reluctance motor (SynRM) drive. A bilateral DC/DC converter is used as an interface between the battery and the motor drive. The biostable and well-regulated DC-link voltage with robust regulation control can enhance the motor driving performance in wide speed range. And the regenerative braking energy can be successfully recovered to the battery. In SynRM drive, the robust current PWM switching control considering inherent slotting effects and robust speed model reference control are made. Moreover, an adaptive commutation scheme (ACS) is developed to automatically set the commutation instant for achieving the motor total loss minimization. The dynamic and static driving characteristics of the established EV SynRM drive in various conditions are verified experimentally.

KEYWORDS: Electric vehicle, synchronous reluctance motor, battery, interface converter, commutation, current control, robust control, adaptive control.

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COMPARISION OF CONVENTIONAL P&O AND FLC ALGORITHMS FOR SOLAR PV SYSTEM

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ABSTRACT

This research describes that in light of the ongoing energy crisis, there is a growing need for a substantial supply of renewable energy. Solar energy offers a viable solution for increasing the utilization of green energy sources in residential and commercial sectors. To facilitate impedance matching, various types of DC-DC converters are employed to connect PV arrays and loads. Photovoltaic systems commonly employ maximum power point tracking (MPPT) techniques to optimize the power output of the PV generator and overcome the limitations associated with PV arrays operating under varying irradiance levels. Because of its low cost, simple implementation, and effective tracking, the Perturb and Observe (P & O) approach is the utmost often used. In contrast, when meteorological conditions change quickly, the P & O approach is unable to follow the MPP. This is overcome by comparing P & O and FUZZY logic MPPT algorithm to determine which efficiently creates the MPPT. The features of boost converters are analysed to determine the best architecture for the PV system being employed. In order to acquire the necessary expert knowledge for developing a logic controller, a simulation is executed in MATLAB. The results of the simulation study indicate that the system performance can be effectively enhanced by employing the fuzzy logic technique.

KEYWORDS: MPPT, P&O, Boost Converter, FUZZY, MATLAB, PV system

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INTEGRATED PV AND GRID CONTROLLED BIDIRECTIONAL EV CHARGING FOR LITHIUM-ION BATTERY APPLICATIONS

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ABSTRACT

This manuscript presents a grid-connected electric vehicle (EV) charging system powered by a solar photovoltaic (PV) array, ensuring continuous and distortion-free charging throughout the day and night. The system enhances energy efficiency and promotes renewable energy utilization in transportation electrification. The proposed setup integrates a bidirectional charging system, allowing the charging and discharging of the EV battery, thereby facilitating vehicle-to-grid (V2G) and grid-to-vehicle (G2V) operations. This system's core is a DC bus, where the EV battery is directly connected, enabling efficient power exchange. An independent solar PV source is also incorporated, which harnesses solar energy and feeds it into the system. The connection to the AC grid is established through a bidirectional voltage source converter (VSC), which performs critical functions such as power conversion, voltage regulation, and bidirectional power flow management. This arrangement ensures optimal utilization of renewable energy by directly charging the EV from the solar PV system when solar energy is available while also allowing excess energy to be stored in the EV battery or fed back into the grid. The intelligent control mechanism of the system maintains a stable power supply, minimizes grid disturbances, and contributes to a cleaner and more sustainable energy ecosystem. A new conjugate gradient-based adaptive control algorithm for voltage source converter control has been applied. The performance analysis is tested using MATLAB/SIMULINK.

KEYWORDS: Electric vehicle, harmonics distortion, power quality, solar photovoltaic (PV).

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HYBRID ENERGY SYSTEM CONTROL FOR WIND-SOLAR-BATTERY MICRO GRIDS

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ABSTRACT

In this research, an efficient energy management system for a small-scale hybrid wind-solar-battery based micro-grid is proposed. The wind and solar energy conversion systems and battery storage system have been developed along with power electronic converters, control algorithms and controllers to test the operation of hybrid micro grid. The power balance is maintained by an energy management system for the variations of renewable energy power generation and also for the load demand variations. This microgrid operates in standalone mode and provides a testing platform for different control algorithms, energy management systems and test conditions. The proposed small-scale renewable energy based microgrid can be used as a test bench for research and testing of algorithms in smart grid applications.

KEYWORDS: Energy management system, hybrid system, microgrid, solar energy, standalone system, wind energy.

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ARTIFICIAL INTELLIGENCE-ENHANCED ENERGY DISTRIBUTION FOR HYBRID PV-WIND-FUEL CELL SYSTEMS

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Abstract

In this paper we present an energy management simulation for a hybrid renewable energy system comprising photovoltaic (Pv) solar panels, wind turbines, and a fuel cell. The integration of these energy sources aims to provide a sustainable and reliable power supply, minimizing dependency on conventional energy resources. The Energy Management System (EMS) is designed to optimize the utilization of renewable energy, ensuring efficient power distribution while maintaining system stability. Simulation models for the Pv, wind, and fuel cell systems are developed using MATLAB/Simulink to analyze the performance under various environmental conditions. The system balances intermittent solar and wind energy with the more stable output from fuel cells, ensuring continuous energy supply to meet demand. This paper also explores different control strategies to manage the energy flow between components, minimizing energy losses and improving overall efficiency. The results demonstrate the potential of hybrid renewable systems to enhance energy security and reduce greenhouse gas emissions, offering a scalable solution for off-grid and grid-connected applications.

KEYWORDS: Solar system, Wind energy, Fuel Cell, BESS, PI Controller and energy management

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ADVANCED ATM CRIME PREVENTION SYSTEM BY USING WIRELESS COMMUNICATION

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ABSTRACT

The main aim of this paper is to design and implement a bank locker security system based on RFID and IOT technology which can be arranged in bank, secured offices and homes. In this system only genuine person can recover money from bank locker. We have arranged a bank locker security system based on RFID and IoT technology which include door locking system using RFID and IoT which can activate, authenticate and validate the user and unlock the door in real time for bank locker secure access. The main merit of using passive RFID and IoT is more secure than other systems. This system is made up of microcontroller, RFID reader, IoT, and LCD. In this system the RFID reader reads the id number from submissive tag and send to the microcontroller, if the id number is valid then microcontroller send the SMS request to the authenticated person mobile number, for the master password to open the bank locker, if the person sends the password to the micro-controller, which will verify the passwords entered by the key board and received from authenticated mobile phone. If these two passwords are matched the locker will be opened otherwise it will be remained in locked position. This system is more secure than other systems because two passwords required for verification. This system also generates a log containing check-in and checkout of each user along with basic information of user.

A smart card reader is provided to read data from the card assigned to the authorized personnel. The smart card reader is interfaced to a microcontroller. Whenever the data read by the smart card matches with the data on the microcontroller then LCD would display that the card is authorized and a relay is used simultaneously to switch ON a lamp (indicating a device or access to secure area). If an invalid card is inserted in the smart card reader, it displays that the card is not authorized and the load (i.e., lamp) remains OFF indicating that the user is not authorized to access the particular area/device.

This project can be enhanced further by integrating IOT technology such that any attempt of unauthorized access is made, then an alert SMS is sent to the concerned department. Further it can be upgraded to Thumb / IRIS identification system for higher degree of security system.

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AUTOENCODER DESIGN AND ANALYSIS OF IMAGE COMPRESSION

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ABSTRACT

Traditional image compression methods, such as JPEG and PNG, rely on transform coding techniques like Discrete Cosine Transform (DCT) and Discrete Wavelet Transform (DWT), which may not successfully capture complicated spatial redundancy. In contrast, autoencoders can learn compact latent representations of images, enabling efficient compression while preserving essential details. This paper aims to design and analyse an image compression technique using an autoencoder-based deep learning model. The proposed model consists of a convolutional encoder that extracts hierarchical features and reduces dimensionality, followed by a decoder that reconstructs the image from the compressed representation.

The model's performance is assessed using important metrics such as compression ratio (CR), peak signal-to-noise ratio (PSNR), structural similarity index (SSIM), and mean squared error (MSE). Experimental results demonstrate that the autoencoder-based compression technique achieves competitive or superior performance compared to conventional methods, particularly at high compression rates. Furthermore, we analyse the computational efficiency in terms of encoding and decoding time, assessing its feasibility for real-time applications. This work demonstrates the potential of deep learning for developing image compression algorithms and provides insights into the trade-offs between compression efficiency and picture quality.

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RESTORING IMAGES DISTORTED BY MOVING WATER SURFACES USING ADAPTIVE HIGHER-ORDER SPECTRAL ANALYSIS

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ABSTRACT

In recent years, environmental research has increasingly relied on image data. The accuracy of such research is closely tied to the quality of the acquired images. Consequently, image acquisition under environmental conditions has become more complex and critical, with a strong emphasis on achieving high spectral and spatial resolution. The primary objective of this paper is to develop an intelligent higher-order spectral analysis approach for recovering images distorted by the dynamic motion of water surfaces. The proposed image recovery framework consists of three main phases: (a) image pre-processing, (b) lucky region selection, and (c) image recovery. Following the initial pre-processing, lucky region selection is performed using the Dice coefficient to identify the least distorted image regions. As an enhancement over conventional methods, the proposed approach incorporates an optimized bispectral analysis to improve the quality of the reconstructed images. A novel hybrid optimization algorithm, combining Dragonfly Optimization and Colliding Body Optimization (D-CBO), is introduced to further refine the bispectral features. The proposed methodology has been validated using distorted underwater images, and comparative evaluations demonstrate its superior performance over existing techniques.

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ENHANCED UNDERWATER IMAGING VIA COLOR-CONSERVING AND LOCALLY ADAPTIVE CONTRAST ENHANCEMENT

Dr. K. Pavan Kumar[1], Ms. N. Sahitya[2], Ms. K. Sindhu Priya[3], Ms. K. Chamundeswari[4], Ms. M. Nandu[5], Mr. P. Vijaya Simha Prasad[6]

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ABSTRACT

Underwater images are often plagued by visibility problems and color distortions caused by wavelength-dependent absorption and scattering. To address these challenges, this paper presents an effective framework for enhancing underwater images through adaptive color correction and contrast optimization. The proposed method is composed of three main stages: (1) image pre processing, (2) adaptive color correction using a novel color balancing model, and (3) locally adaptive contrast enhancement based on integral image statistics calculated within local regions. Experimental evaluations on various underwater datasets demonstrate that our approach outperforms existing state-of-the-art methods, achieving significant improvements in visual clarity, color accuracy, and contrast, as confirmed by both subjective and objective assessments.

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SMART IOT BASED SURVEILLANCE SYSTEM FOR WOMEN'S PROTECTION AND EMERGENCY ASSISTANCE

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ABSTRACT

Women's safety remains a critical concern and social issue with growing cases of harassment, especially in urban areas where they may be exposed to potential threats during daily activities. The integration of Internet of Things (IoT) technology in safety systems offers a promising solution, enabling real-time monitoring, automated threat detection, and emergency responses. This work presents a portable device with Arduino, LCD display, buzzer, GPS, IR sensors, and camera module monitors surroundings for unusual activities. It sends alerts to emergency contacts and local authorities. The system uses GPS technology and IoT infrastructure for automated responses, ensuring quick responses in high-stress situations. It captures images of threats to ensure faster response time, for visual evidence and enhanced security. The system offers reliability, privacy, and seamless communication, making it a discreet yet powerful safety net for women. It can integrate with smart city frameworks for scalability. With its scalable design, the system can be further enhanced, adapted, and expanded to meet the growing needs of women's security in diverse environments.

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DEEPFAKE VIDEO DETECTION SYSTEM USING DEEP LEARNING (INCEPTIONV3 AND GRU)

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ABSTRACT

This project presents the development and implementation of a DeepFake video detection system using a hybrid deep learning model designed to address the growing challenges posed by manipulated digital media. The proposed system integrates InceptionV3 for efficient spatial feature extraction and Gated Recurrent Units (GRU) for modeling temporal dependencies across video frames, enabling accurate and robust identification of forged videos. A lightweight and scalable web application is developed using the Flask framework, offering an intuitive HTML-based user interface for seamless video upload, analysis, and classification. The system is trained and evaluated using the Kaggle DeepFake Detection Challenge dataset, which contains a wide range of authentic and manipulated videos to ensure diversity and reliability in training. Through extensive experiments, the hybrid model achieves an overall accuracy of 86%, outperforming traditional CNN-only and RNN-only architectures in terms of precision, recall, and F1-score. Comparative analysis highlights that the fusion of spatial and temporal features significantly improves the system's ability to detect subtle artifacts and inconsistencies introduced during DeepFake generation. Furthermore, the system exhibits strong generalization across different DeepFake techniques, lighting conditions, and compression levels. Simulation results demonstrate that the hybrid approach not only enhances detection capability but also provides better resilience to adversarial attacks and video quality degradation. This work emphasizes the critical importance of leveraging both spatial and temporal information in building trustworthy and real-time DeepFake detection solutions for media forensics, social media platforms, and security-sensitive applications.

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A COMPREHENSIVE APPROACH TO PRE-OWNED CAR PRICE PREDICTION USING MACHINE LEARNING

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ABSTRACT

Accurately predicting pre-owned car prices is critical for both buyers and sellers to navigate the dynamic automotive market. This study presents a comprehensive machine learning approach to estimate used car prices, leveraging four advanced algorithms: Gradient Boosting Machines (GBM), Neural Networks (NN), Random Forest (RF), and Support Vector Regression (SVR). A diverse dataset encompassing features such as vehicle age, mileage, brand, engine specifications, and maintenance history is utilized to train and validate the models. The methodology integrates rigorous data preprocessing, feature engineering, and hyperparameter optimization to enhance predictive performance. Evaluation metrics, including Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared (R^2), are employed to assess model accuracy. Experimental results demonstrate that Gradient Boosting Machines outperform other models, achieving an R^2 of 0.92 and the lowest error rates, attributed to their ability to handle heterogeneous data and model complex nonlinear relationships. Neural Networks follow closely, while Random Forest and SVR exhibit moderate performance. This research underscores the efficacy of ensemble methods in price prediction tasks and provides actionable insights for stakeholders in the automotive industry.

KEYWORDS: Gradient Boosting Machines, Neural Networks, Random Forest, Support Vector Regression, Pre-Owned Car Pricing, Machine Learning.

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PERFORMANCE ANALYSIS OF HIGH-SPEED 4:2 COMPRESSORS USING CADENCE TOOL

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ABSTRACT

The growing need for high-performance and energy-efficient computing necessitates the creation of novel digital circuit architectures. Because they simplify intricate computations, compressors are essential to digital signal processing and mathematical circuits. Compressors are specifically necessary for multipliers to increase their efficiency. Digital multipliers and compressors aid in the reduction of partial product rows in contemporary technology, which enhances computational efficiency. The evaluation and comparison of high-speed, low-power 4:2 compressors is the main goal of this study. The suggested 4:2 compressor stands out among other architectures because to its capacity to improve speed and power efficiency. This compressor's design is completed with the 45nm gpdk CMOS Cadence Virtuoso tool. The suggested model is tuned to reduce latency and power usage in comparison to current methods.

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DESIGN AND ANALYSIS OF RECTANGULAR MICROSTRIP PATCH ANTENNA FOR 5G USING HFSS

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ABSTRACT

This paper focuses on the design and analysis of a rectangular microstrip patch antenna employing an inset feed for5G applications, utilizing an FR4 epoxy substrate. The antenna is engineered to function at 27 GHz and is fine-tuned to achieve high gain and efficiency. Simulations reveal a gain of 5.29 dB and an efficiency of 78.85%. The findings are compared with prior studies, emphasizing the balance between gain, efficiency, and the choice of substrate material. The inset feed technique enhances impedance matching and boosts radiation efficiency. The antenna exhibits performance suitable for 5G applications, taking into account the cost and limitations of the FR4 epoxy substrate. y. To verify its practical applicability, the proposed design is fabricated using conventional PCB manufacturing methods. The fabricated antenna exhibits performance suitable for 5G applications, taking into account the cost and limitations of the FR4 epoxy substrate. Index Terms—Microstrip Patch Antenna, 5G Applications, HFSS Software, FR-4 Epoxy Substrate, Band Width, Return loss, Radiation Efficiency.

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REVERSIBLE DATA HIDING ALGORITHM IN ENCRYPTED DOMAIN BASED ON IMAGE INTERPOLATION

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Y. K. Chakradhar Reddy[2], V. Guru Sai Yadav[2]

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ABSTRACT

This study presents a new algorithm for reversible data hiding in encrypted images (RDH-EI) that improves capacity, reversibility, and separation. It uses an enhanced Arnold and chaos-based encryption method to encrypt the image. The encrypted image is then interpolated using a better interpolation technique to create a cover image for embedding secret data. The algorithm calculates the difference between the secret data and the maximum n-bit value before embedding. It then adapts the embedding method based on this difference and the size of the secret data. The results show that the algorithm is fully reversible, has no added data or overflow, and can separate data with uncorrelated keys. It also provides better image quality at the same embedding rate and is resistant to certain steganalysis techniques.

]KEYWORDS: Encrypted domain, reversible data hiding, adaptive embedding, and image interpolation.

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HIGH PERFORMANCE AND LOW POWER 17-TRANSISTOR FULL ADDER CIRCUIT AT 45 NM NODE

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ABSTRACT

A novel 1-bit full adder circuit comprising 17 transistors (17-T) at the 45 nm technology node is proposed in this study. The design focuses on minimizing transistor count, enhancing speed, and reducing power consumption while maintaining reliable performance. The efficiency of the 17-T full adder is evaluated through simulation and compared against the conventional 19-transistor (19-T) full adder in terms of power dissipation, propagation delay, and power-delay product (PDP). Simulation results demonstrate that the proposed 17-T design achieves superior performance, exhibiting lower power consumption, reduced latency, and improved overall energy efficiency compared to the 19-T counterpart. These advancements make the 17-T full adder highly suitable for VLSI applications, particularly in portable and high-performance computing systems.

KEYWORDS: 17-T Full Adder; Low Power Design; High-Speed Circuits; Power-Delay Product (PDP); 45 nm Technology Node; VLSI Design; CMOS Full Adder.

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