



Jen Technologies

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Contemporary Research Trends in Multidisciplinary
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FOREWORD

With great pleasure, we present the hybrid (online and offline) proceedings of the International Conference on Contemporary Research Trends in Multidisciplinary Science and Technology (ICCRTMST 2k24), which took place at the YMCA in Nagercoil on November 14, 2024.

With the topic 'Unveiling Innovations for a Sustainable Future,' the conference has brought together a wide range of researchers, industry professionals, academicians, scientists, and students from around the world. It offered a vibrant forum for exchanging ground-breaking concepts, creative studies, and workable answers to pressing global issues.

These proceedings showcase the most recent developments in science, technology, engineering, management, and multidisciplinary subjects and reflect the combined efforts of the participants. Every featured paper has passed a thorough review process to guarantee originality, quality, and relevance, all of which reflect the high standards of ICCRTMST 2k24.

Our sincere appreciation goes out to the keynote speakers, jury members, session chairs, and contributors for their insightful comments and enthusiastic participation. We would especially like to thank our partners at the YMCA, Nagercoil, and the organising committee, which was led by Jen technologies, for their tireless efforts and careful preparation, which made this event a huge success.

We hope that these proceedings will be a useful tool and source of inspiration for further study, encouraging cooperation and creativity in the direction of sustainable development.

SINCERELY



R.Jeny



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Detection and Classification of Player Formations in Sports Using Neural Networks

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Abstract

In order to improve tactical analysis and decision-making, this study investigates the use of neural networks for identifying and categorizing player formations in sports. To precisely identify player positions on the field, high-resolution match film is gathered, carefully labeled, and then subjected to sophisticated object detection algorithms. To identify different formations, a convolutional neural network (CNN) is created and trained. It recognizes tactical settings in a variety of scenarios with remarkable accuracy. The outcomes demonstrate how well the approach works to give analysts and coaches insightful information. In order to improve strategic planning and team performance in competitive sports, future work will concentrate on improving the model's performance, growing the dataset, and incorporating real-time analysis capabilities.

Keywords: Sports, Convolutional Neural Network (CNN), Tactical Analysis.

Deep Learning-Based Detection of Fine Cracks in High-Resolution Concrete Dam Surfaces

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Abstract

An innovative deep learning-based method is introduced for detecting fine cracks in high-resolution images of concrete dam surfaces, addressing the urgent need for efficient and accurate maintenance of these vital infrastructures. Traditional manual inspection methods often fail to detect subtle cracks, leading to potential safety hazards and costly repairs. By leveraging advanced deep learning techniques, this study develops a model that automates the detection process, improving both precision and efficiency. High-resolution images are collected and meticulously annotated to create a robust dataset, which is then used to train a deep learning model tailored for crack identification. The model's performance is evaluated against a separate test dataset, demonstrating significant improvements in detection accuracy. This automated approach not only facilitates timely interventions but also contributes to enhanced monitoring strategies, ultimately ensuring the structural integrity and safety of concrete dams in the long term.

Keywords: Deep Learning, Crack Detection, High-Resolution Images, Structural Integrity.

An Artificial Intelligence Approach to Lung Cancer Diagnosis using LungNet-TL model

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Abstract

Lung cancer remains one of the deadliest forms of cancer worldwide, with early and accurate diagnosis playing a critical role in improving patient outcomes. In this study, we propose LungNet-LT, a novel deep learning model specifically designed for the detection and classification of lung cancer from medical imaging data. The LungNet-TL model introduces a combination of convolutional neural networks (CNNs) and transfer learning techniques to enhance feature extraction from computed tomography (CT) scans and X-ray images. By utilizing a pre-trained model fine-tuned on lung-specific datasets, LungNet-TL achieves significant improvements in classification accuracy, sensitivity, and specificity compared to traditional diagnostic methods and existing AI models. Our approach incorporates advanced image processing techniques to mitigate noise and improve cancer cell localization, allowing for more reliable predictions in both early-stage and advanced lung cancer cases. We validate the performance of LungNet-TL on publicly available lung cancer datasets and a curated clinical dataset from a partner hospital. The results demonstrate that LungNet-TL models, achieving a diagnostic accuracy of over 98.9%, with a notable reduction in false positives and false negatives. These findings highlight the potential of the LungNet-LT model as a powerful tool for assisting clinicians in lung cancer diagnosis and improving patient prognosis through timely and precise interventions.

Keywords: Deep Learning, Crack Detection, High-Resolution Images, Structural Integrity.

MULTI MODAL ML TO ENHANCE EARLY PROGNOSIS OF CARDIOVASCULAR DISEASE FOR LONG COVID PATIENTS

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Abstract

Detection of diseases through early-stage symptoms is a great challenge in the current world scenario. Diagnosis of Diseases on time May become worse and lead to the cause of death. Corona Era fades and post-Corona sequelae still growing. In the pandemic period, big data played a crucial role in preventing and controlling COVID-19. The impact of COVID-19 is still processing only. COVID-19 infection persists or develops after severe COVID-19. Post Acute COVID-19 Syndrome signs and symptoms persist for several months after the severe phase of the disease. SARS-CoV-2 commonly presents as a pulmonary illness, but it has been associated with many cardiac complications such as endocarditis, Pericarditis, and a group of cardiovascular diseases (CVD). CVD is one of the leading cardiac complications after COVID-19 infection. CVD risk factors can be diagnosed with the help of common tests such as Blood tests, CT CMR, and more. All these tests can signal an elevated risk of systemic thromboembolic, which leads to cardiovascular health. Early prediction is challenging to deal with heterogeneous data. It is difficult to establish a standardized set of parameters for prediction models due to variations of symptoms with long-term COVID-19. Data heterogeneity has been a key obstacle in AI, ML, and DL derivatives. Multi- modal ML enables the integration of multiple models in search of a single, comprehensive solution to a complex problem. Multi-modal machine learning algorithms help with timely intervention and management to mitigate these risks earlier.

Keywords: COVID-19, Multimodal, Machine Learning, Prediction, Long Covid, Cardio vascular Disease.

A Dual-Layer Approach for Image and Data Encryption Using Logistic Mapper Using Python

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Abstract

Image encryption combined with data encryption has emerged as a critical tool for safeguarding sensitive information and maintaining secrecy. This study describes how to incorporate hidden text data within an image and encrypt it using complex techniques like logistic maps. We present a secure approach for data and image encryption that makes use of pixel intensity manipulation and pixel shuffling. The suggested technique ensures that the original image may be recovered after decryption, while the secret data is kept safely hidden. The performance, benefits, and security analysis of the proposed encryption scheme are all explored in detail.

Keywords: encryption, decryption, logistic maps, pixel shuffling.

A Study on The Evaluation of Antioxidant Activity in Bunchosia Argentea Fruit

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Abstract

Peanut Butter fruit, botanically known as *Bunchosia argentea* or *Bunchosia armeniaca*, is a tropical fruit tree which is a member of the Malpighiaceae family. This tree native to Northern and Western America. The peanut Butter fruit is a small, olive-sized fruit that turns from orange to a vibrant red once fully ripened. It looks a lot like grapes, tomato and thrives in tropical climates. Peanut Butter fruit is mainly help in reducing the problems of heart as it reduces the cholesterol levels which is the main reason behind which heart ailments. Also, this fruit is very helpful to reduced Diabetes and protect against certain types of Cancer. In the present study analysis of antioxidant activity using 2,2-diphenyl-1-picrylhydrazyl (DPPH) method of *Bunchosia Argentea* fruit. This study was conducted to determine the antioxidant capacity of the *Bunchosia argentea* fruit Scavenging activity is 231.33 ± 1.2 . Antioxidant acts as a defence mechanism that protects against oxidative damage caused by free radicals produced in the body. This Medicinal plant are preferably used for various diseases in many countries. This present study was identifying the antioxidant activity of *Bunchosia argentea* fruit.

Keywords: *Bunchosia Argentea*, Peanut butter fruit, Antioxidant Activity.

Optimized Hybrid Model Combining Hidden Markov and Stochastic Neural Networks for Groundwater Quality Forecasting in Kanyakumari, Tamil Nadu, India.

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Abstract

Groundwater quality is an important environmental concern particularly in areas like Kanyakumari District, Tamil Nadu given the heavy reliance on groundwater for Drinking and Agriculture. To manage underground resources sustainably, understanding groundwater quality parameters is essential. In this study, a novel hybrid model that combines the strengths of Hidden Markov Model (HMM) and Stochastic Neural Network (SNN) is employed to predict the quality of groundwater in the study area with high accuracy. Utilizing groundwater quality indicators such as pH, EC, TDS, major ions and minor ions, along with Rainfall data since it is one of the factors influencing the groundwater quality in the study area, the HMM captures latent sequential patterns within the dataset, transforming the features to enhance SNN classification. The model's performance is enhanced through optimization, achieving an overall accuracy of 97%. Additionally, the Confusion matrix, Classification Report, Cohen Kappa score, and Matthew Correlation Coefficient are used to assess the model's performance. The Training and Testing accuracy can be used to evaluate the generalization of the unseen data. This study contributes to the development of advanced tools for groundwater management.

Keywords: Groundwater quality prediction, Hidden Markov Model, Kanyakumari District, Public Health, Stochastic Neural Network.

Digital Beauty Standards: AI Approaches to Objectively Measure and Score Beauty Quotients

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Abstract

In recent years, artificial intelligence (AI) has gained traction in the field of aesthetic dentistry, where precision and personalization are essential for enhancing patient satisfaction. AI-driven techniques are now applied to quantify and optimize facial and dental aesthetics, enabling dentists to offer customized beauty care solutions. This study explores the use of AI for calculating aesthetic metrics related to smile design, symmetry, and facial harmony in dentistry, aiming to establish objective standards that support treatment planning and patient outcomes. The integration of artificial intelligence (AI) in dentistry has introduced transformative changes, offering new possibilities for diagnostics, treatment planning, and patient care. AI-driven approaches in dentistry promise to enhance accuracy, streamline processes, and provide personalized care, making them essential for modern dental practices. This study examines AI's role in objective diagnostic support, dental imaging analysis, and automated assessment frameworks that can aid dental practitioners in making evidence-based decisions.

Keywords: Artificial Intelligence in Dentistry, Beauty Quotient Calculation, AI-Driven Beauty Metrics, Facial Landmark Detection (FLD), Dental Imaging Analysis.

Automated Diabetic Retinopathy Screening in Resource-Limited Areas with Attention-Enhanced Deep Learning on Fundus Images

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Abstract

Diabetic retinopathy (DR) is a major cause of vision loss, particularly in areas with limited resources where access to specialized care is scarce. This study introduces an automated screening system for DR using attention-enhanced deep learning on retinal fundus images, designed specifically for these regions. The system utilizes a convolutional neural network (CNN) with integrated attention mechanisms to focus on critical features indicative of DR, such as microaneurysms and hemorrhages. This attention enhanced approach improves detection accuracy and reliability. A varied collection of retinal fundus images was employed for both training and validation purposes, with data augmentation to enhance model robustness. The model was optimized for deployment on low-cost hardware, ensuring feasibility in resource limited settings. Performance evaluation showed high sensitivity and specificity, and attention maps provided interpretability for healthcare providers. This automated system has the potential to improve early DR detection in underserved areas, facilitating timely intervention and reducing the risk of blindness. By making advanced diagnostic tools accessible, this approach promotes equitable healthcare and helps prevent vision loss globally.

Keywords: Diabetic Retinopathy (DR), Deep Learning, Convolutional Neural Networks, Micro aneurysms, Retinal Fundus Images, Hemorrhage.

Intelligent Adaptive Optimization for Workflow Scheduling in Cloud Environment

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Abstract

The scheduling of workflows in cloud computing systems has gained significance in both marketable and artificial operations. Still, generating effective and affordable scheduling methods under deadline constraints remains extremely difficult, particularly for large-scale workflow operations. To address the issue, this paper analyzes the workflow scheduling problem in cloud with the ambition of reducing the overall cost of execution while keeping the processing time within a set deadline. An Intelligent Adaptive optimization (IAO) algorithm is developed based on the problem specific knowledge of workflow scheduling in cloud. In the proposed IAO, an operator for discrete propagation is created using the knowledge of idle time in an hourly cost model to dynamically explore the extensive search space. The adaptive refraction operator is designed to reduce stagnation and increase the available resources. The dynamic grouping-based breaking operator is created to utilize the task allocation scheme's excellent block structure knowledge and speed up convergence.

Keywords: Cloud computing; Workflow scheduling; Deadline constraint; Cost minimization; Task allocation.

Analyzing Performance Free Biosensor Utilizing a Split-Gate T-Shape and Modeling of a Label- Channel Design with DM DPDG-TFET Technology

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Abstract

This paper introduces a novel split gate T-shape channel dielectrically modulated (DM) double-gate tunnel field-effect transistor (DGTFT) with a drain pocket (DP), proposing its application as a label-free biosensor. Through the development and validation of an analytical model using Silvaco TCAD simulation software, the focus is on both the biosensor's sensitivity and its performance as a TFET device. By innovatively shaping the channel, the device demonstrates improved sensitivity, a higher ION/IOFF current ratio, and a reduced sub threshold slope. Notably, the inclusion of the drain pocket at the drain-channel junction effectively eliminates ambipolarity, enhancing ON current performance. Through optimization of the drain pocket length and doping concentration, the device achieves high ON current without ambipolarity. The proposed T-shape DM DPDGTFT surpasses several existing devices in both biosensor and FET device performance. Evaluation of device sensitivity as a label-free biosensor considers the presence or absence of charge in various biomolecules.

Keywords: Biosensor, band-to-band tunneling (BTBT), sensitivity, split gate, subthreshold slope, T-shape channel, tunnel field-effect transistor (TFET).

Optimizing Multigenerational Renewable Energy Systems through Integrated Geothermal and Wind Energy Solutions

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Abstract

In order to effectively tackle the increasing energy demands resulting from urbanization, modernization, and economic activities, it is imperative to develop novel solutions that simultaneously mitigate greenhouse gas emissions and meet energy needs. This study investigates the feasibility of integrating wind and geothermal energy sources to enhance the efficacy and effectiveness of multigenerational renewable energy systems. The article investigates the application of a geothermal-wind hybrid system in order to maximize the efficacy of the Kalina cycle, demonstrating significant improvements in both energy and exergy utilization. Case Study 2 conducts a sensitivity analysis to evaluate the system's performance, providing critical information pertaining to wind velocities and thermal efficiencies. This research emphasizes the importance of thorough modeling and optimization, in addition to the potential of incorporating renewable energy sources to drive progress in sustainable energy.

Keywords: Geothermal Energy, Wind Energy, Kalina Cycle, Energy Efficiency, Renewable Energy Integration

Seed Dropping Using Drone Technology

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Abstract

Drone technology is increasingly being used for large-scale reforestation and precision agriculture through seed dropping techniques. This approach involves covering seeds with biodegradable coconut scrub, a natural material that acts as a protective coating. The coconut scrub helps retain moisture, shields the seed from pests, and promotes better integration into the soil, enhancing the chances of successful germination. By utilizing drones with specialized seed-dispensing mechanisms, seeds can be distributed over vast areas, including remote and challenging terrains, with high precision and consistency. This significantly reduces the labor, time, and costs associated with traditional planting methods. The coconut scrub coating serves multiple functions: it safeguards the seed during the aerial drop, facilitates moisture retention, and eventually decomposes, adding organic matter to the soil. The drone-based system can be programmed to follow specific flight paths, ensuring targeted seeding in degraded or hard-to-access regions. This method not only increases the survival rate of seeds but also supports ecological restoration efforts, aiding in combatting deforestation and promoting sustainable land management practices. Integrating drone technology with the use of coconut scrub-coated seeds presents a scalable, eco-friendly, and cost-effective solution to enhance reforestation initiatives and improve agricultural productivity in a sustainable manner.

Keyword: Drone Technology, Reforestation, Precision Agriculture, Seed Dropping, Biodegradable Coconut Scrub, Protective Coating, Moisture Retention, Pest Shielding, Soil Integration, Specialized Seed-Dispensing Mechanisms, Remote Terrains, Challenging Terrains, Labor Reduction, Cost-Effective Planting, Organic Matter, Aerial Drop, Targeted Seeding, Ecological Restoration, Deforestation, Sustainable Land Management, Scalable Solution, Eco-Friendly.

Sisal Fiber Reinforcement Effects on Polyester Composite Properties: A Mechanical Analysis

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Abstract

This scholarly investigation delineates an extensive examination of the mechanical attributes of polyester fiber composites that are augmented with short sisal fibers. Through methodical experimentation, the researchers evaluated the influence of varying proportions of sisal fibers on the overall performance characteristics of the composite material. The study employed a manual layup method for the fabrication process, integrating randomly oriented sisal fibers, each precisely measuring 20 millimeters in length, across all test specimens. To facilitate robust comparative analysis, the research incorporated four discrete fiber weight percentages: 5%, 10%, 15%, and 20%. The mechanical attributes assessed encompassed tensile strength, compressive strength, flexural strength, impact strength, and double shear strength, thereby providing a comprehensive evaluation of the material's performance capabilities. The empirical results indicated a notable and consistent trend: increased concentrations of sisal fibers resulted in enhanced mechanical properties across all evaluated parameters. This affirmative correlation between fiber content and mechanical reinforcement underscores the efficacy of sisal fibers as a reinforcing agent within polyester composites. The implications of these findings are particularly pertinent in the realm of sustainable material development, as sisal fibers constitute an environmentally sustainable, renewable resource. This research not only offers significant contributions to the domain of natural fiber composites but also paves the way for innovative engineering applications where mechanical strength and environmental sustainability are paramount considerations. The results of this study propose that sisal fiber-reinforced polyester composites may serve as viable alternatives in diverse engineering settings, especially in applications necessitating substantial mechanical properties while upholding environmental integrity.

Keywords: Natural fiber, Polyester resin, Mechanical Properties.

Coir Fiber Reinforcement Effects on Polyester Composite Properties: A Mechanical Analysis

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Abstract

The mechanical behavior of polyester composites reinforced with short Coir fibers was rigorously examined through methodical experimental analysis. Composites were synthesized utilizing a manual layup technique, which involved the incorporation of Coir fibers oriented randomly at a predetermined length of 20 millimeters. Four distinct fiber weight fractions (5%, 10%, 15%, and 20%) were scrutinized to ascertain their effects on the performance of the material. The investigation evaluated various mechanical parameters, encompassing tensile, compressive, flexural, impact, and double shear strengths. This thorough characterization lays the groundwork for comprehending the correlation between Coir fiber content and the resulting mechanical attributes of these sustainable composites. The experimental findings disclosed a notable and consistent trend: elevated concentrations of Coir fibers resulted in enhanced mechanical properties across all assessed parameters. This favorable relationship between fiber content and mechanical improvement underscores the efficacy of Coir fibers as a reinforcing agent in polyester composites. The implications of these findings are particularly pertinent in the realm of sustainable materials development, given that Coir fibers constitute an environmentally sustainable, renewable resource. This research not only offers significant contributions to the domain of natural fiber composites but also paves the way for innovative engineering applications where both mechanical integrity and environmental sustainability are imperative considerations. The outcomes of the study imply that Coir fiber-reinforced polyester composites could serve as viable alternatives across diverse engineering scenarios, especially in applications that necessitate robust mechanical characteristics while upholding environmental responsibility.

Keywords: Natural fiber, Polyester resin, Mechanical Properties.

Banana Fiber Reinforcement Effects on Polyester Composite Properties: A Mechanical Analysis

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Abstract

Banana fiber-reinforced polyester composites were investigated to evaluate their mechanical characteristics. Utilizing a manual layup technique, composites were fabricated incorporating randomly oriented banana fibers truncated to lengths of 20mm. The investigation scrutinized four distinct fiber concentrations: 5%, 10%, 15%, and 20% by mass. A variety of mechanical properties were assessed, encompassing tensile strength, compressive strength, flexural strength, impact strength, and double shear strength. The findings indicated that an increase in banana fiber content consistently enhanced all mechanical properties evaluated. This elucidates the efficacy of banana fibers as a reinforcing agent within polyester composites. These results carry significant implications for the advancement of sustainable material development. Given that banana fibers are renewable and eco-friendly, these composites present a promising alternative for engineering applications that necessitate both robust mechanical performance and environmental sustainability. The research contributes to our comprehension of natural fiber composites while unveiling novel opportunities for environmentally responsible engineering solutions. The successful enhancement of mechanical properties implies that these materials may be viable candidates for a range of engineering applications where both strength and sustainability are of paramount importance.

Keywords: Natural fiber, Polyester resin, Mechanical Properties.

Quality Optimization of Banana Fiber-Reinforced Polyester Composites Through Vibrational Testing.

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Abstract

This research endeavor examines the damping characteristics of polyester composites that are reinforced with short banana fibers via free vibration analysis. The composite specimens were constructed utilizing a hand layup technique, incorporating randomly oriented 20mm banana fibers at various weight percentages (5%, 10%, 15%, and 20%). The results indicated that an increase in fiber content led to enhancements in both the natural frequency and damping ratio of the composites. The optimal performance was observed at a fiber content of 15 wt.%, which aligned with the mechanical properties of pure polyester. The findings establish a definitive relationship between fiber content and the vibrational attributes of these composites. This elucidates the effectiveness of banana fibers as a reinforcing agent within the matrix of polyester composites. Such outcomes carry substantial implications for the progress of sustainable material innovation. Considering that banana fibers are both renewable and environmentally benign, these composites emerge as a promising alternative for engineering applications that demand a synthesis of robust mechanical performance and ecological sustainability. The investigation contributes to the understanding of natural fiber composites while revealing novel avenues for environmentally responsible engineering solutions. The successful enhancement of the natural frequency suggests that these materials may serve as viable candidates for a diverse array of engineering applications where strength and sustainability are of utmost significance.

Keywords: Natural fiber, Polyester resin, FVT.

Glaucoma detection Based on Fundus Images Using Machine Learning Techniques

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Abstract

Glaucoma is a leading cause of irreversible blindness worldwide, often progressing without noticeable symptoms until significant vision loss has occurred. Early detection is crucial for managing and mitigating its effects, yet traditional diagnostic methods, including intraocular pressure tests and optical coherence tomography (OCT), may not be readily accessible in resource-limited areas. Fundus imaging, which captures the back of the eye, offers a non-invasive way to assess the optic nerve and retinal health, making it a viable option for glaucoma screening. By using the large datasets of labeled fundus images, machine learning algorithms can be trained to recognize early structural changes in the optic nerve and surrounding retinal nerve fiber layers that are indicative of glaucoma. Convolutional Neural Networks (CNNs) are especially useful in this application, as they can automatically extract relevant features from complex images without requiring manual intervention. This paper explores a machine learning-based approach for glaucoma detection using fundus images, aiming to develop an accessible and efficient diagnostic tool. This paper proposed Sobel edge detection for data preprocessing, Convolutional Neural Networks (CNNs) for model selection, training, and evaluation. The proposed approach has the potential to provide accurate and scalable glaucoma screening solutions, potentially aiding early diagnosis and reducing the burden on healthcare systems. This method attains better accuracy rate.

Keywords: Optic Disk, Optic Cup Segmentation, Feature Extraction, Convolutional Neural Network, Receiver Operating Characteristic Curve (AUC-ROC).

Characterization of Microstructural Evolution and Mechanical Behaviour in Laser Welded S960 High Strength Steel

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Abstract

S960 steel, developed by Tata Steel, is an advanced ultra-high-strength low-carbon, low-alloy steel with a minimum yield strength of 960 MPa. Although this material has remarkable properties, there is limited information on its behaviour during laser welding. This study investigates the laser welding of 8 mm thick hot-rolled and quenched S960 high-strength low-alloy (HSLA) steel plates using a 16-kW fiber laser system. The research focuses on analyzing the microstructure, microhardness, and tensile properties of the welded joints, as well as conducting Charpy impact testing, three-point bending tests, and examining the fracture surfaces. The results demonstrate that laser welding can produce defect-free single-pass welds. The microstructure of the fusion zone and heat-affected zone (HAZ) is primarily composed of martensite, with some self-tempered martensite, exhibiting varying grain sizes across different sub-zones. Tensile testing reveals that the mechanical properties of the welded joint are similar to those of the base material, with fractures occurring in the base material rather than the weld zone. While the welded joints show adequate performance under bending loads, there is a noticeable reduction in impact toughness when compared to the base material. These findings confirm the feasibility of using laser welding for S960 HSLA steel in structural applications, highlighting its strengths while identifying areas for improvement, particularly in enhancing impact resistance.

Keywords: S960 HSLA steel; impact resistance; impact toughness; heat-affected zone (HAZ); fusion zone.

A Study on Job Satisfaction of Employees with Special Reference to A Private Hospital, Nagercoil

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Abstract

Job satisfaction is a challenging factor which have drawn attention of managers as well as academicians in human resource management. Job satisfaction is the back bone of every organization as most of the people spend their major time of their life at working place. Job satisfaction is one's inner feeling and attitude related towards their job. Job satisfaction is related to different personal and socio-economic factors, such as: Age, sex, working environment, education, wages, conditions of work, supervision, job security etc. This study evaluates the human resource factors that affect satisfaction level of the employees at J.K. Hospital, Nagercoil. It also attempts to analyze the opinion of employees towards their working life, assesses how far welfare and financial factors motivate the employees in the hospital. To analyze job satisfaction of the hospital employees Chi square method and percentage analysis have been utilized. Job satisfied employees are more productive and more committed towards their job. They tend to have a better physical and mental well-being than the unsatisfied employees. It is observed that the motivational factors like monetary benefits, opportunities for growth and development were positively correlated with job satisfaction.

Keywords: Job Satisfaction; Hospital employees; Working conditions; factors affecting job satisfaction.

An AI-Driven Framework for Enhancing Smart Manufacturing Addressing Predictive Maintenance and Anomaly Detection Challenges Using Convolutional LSTM Autoencoders

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Abstract

Various Industry 4.0 technologies are adopted recently, which create a large demand for adaptive smart manufacturing systems to today's dynamic production environments. However, the current system has several critical challenges including accurate machine behaviour prediction, the processing of high-dimensional time-series data, and noise handling in real-time streams of sensor data. These limitations arise in traditional machine learning approaches because the complex spatial-temporal patterns within the manufacturing process cannot be captured well, and nonlinear dependencies are not addressed. Besides these problems, the lack of effective fault detection and predictive maintenance mechanisms usually leads to downtimes and inefficiencies, affecting productivity and energy consumption. In this context, proposed a novel architecture of deep learning that integrates ConvLSTMAE along with adaptive anomaly detection and predictive analytics. We let the strengths of stacked autoencoders for dimensionality reduction be used together with using ConvLSTM networks to capture both spatial and temporal dependencies across multivariate time-series data. The model will predict machine speeds and notify on emerging faults by integrating real-time monitoring with an analysis using historical data. Then, productive parameters are dynamically adjusted. Extensive validation on real-world datasets from metal packaging plants proves the system's capability for improving predictive accuracy, downtime minimization, and optimum energy consumption. An integrated approach will cover how big advancements are seen in developing resilient AI-driven smart manufacturing systems that lead to enhanced operational efficiency across Industry 4.0 environments.

Keywords: Artificial intelligence; smart manufacturing; neural network; predictive maintenance; autoencoder.

Auto Predictive Pesticide Estimator and Sprayer for Immune Eco System

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Abstract

In modern agriculture, precise pesticide application is essential to improve crop health, reduce environmental impact, and optimize resource usage. This project focuses on developing an automated vehicle designed to traverse agricultural fields and selectively spray pesticides. The primary feature of this vehicle is its ability to identify affected plants using image processing techniques. By comparing real-time images of plants to a reference image of a healthy plant, the system can detect signs of pest infestation or disease. When an affected plant is identified, the vehicle sprays a calculated amount of pesticide directly on the target area, reducing overall pesticide usage and minimizing environmental contamination. The vehicle will be equipped with sensors and cameras for continuous crop monitoring. The image processing algorithm will analyze each plant and determine if intervention is necessary based on visual anomalies that indicate poor plant health. The system's control unit will then compute the precise amount of pesticide needed, reducing excess usage and preventing overexposure of healthy plants. This autonomous solution aims to streamline crop management, promote sustainable farming practices, and contribute to agricultural efficiency. The project's impact extends to reduced chemical exposure for farmworkers, improved crop yield, and lowered production costs, aligning with goals of eco-friendly and precision agriculture.

Keywords: Precise Pesticide Application, Automated Vehicle, Image Processing, Pest Detection, Selective Spraying, Crop Monitoring, Sustainable Farming, Reduced Pesticide Usage, Environmental Impact, Precision Agriculture.

Automated Detection of Tomato Leaf Diseases through Convolutional Neural Networks

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Abstract

The research aims to use Convolutional Neural Networks (CNNs) to create an automated system for identifying and categorizing tomato leaf diseases to increase agricultural productivity and crop management. By addressing the inefficiencies of traditional manual inspection methods, this study aims to provide timely and accurate disease diagnoses, ultimately benefiting farmers. The methodology involves several key steps, including data collection from high-resolution images of tomato leaves, data preprocessing, and the implementation of CNNs for feature extraction and classification. The model achieved impressive accuracy rates in identifying various diseases, demonstrating the effectiveness of deep learning in agricultural applications. Additionally, the results highlight the robustness of the proposed system against variations in image quality and conditions. This research contributes to the ongoing efforts to improve disease management practices in agriculture. Future work will focus on expanding the model's capabilities to include other plant species and integrating real-time monitoring solutions for enhanced field application.

Keywords: CNNs, Tomato Leaf Diseases, Automated System, Agricultural Productivity, Disease Diagnosis, Feature Extraction, Classification, Deep Learning, Real-Time Monitoring.

Design Of Dynamic Magnitude Comparator Using Domino Logic

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Abstract

Comparators are an essential component in modern digital circuits, digital signal processors, and data processing applications. Comparison is the most fundamental arithmetic operation whether one number is higher than, equal to or lower than another. The use of comparators in high-performance system makes it necessary to find ways to reduce power consumption and delay. Conventional CMOS-based comparator designs tend to consume more power and exhibit higher propagation delays due to their static nature and large transistor count. A dynamic comparator is implemented using domino logic gates, which utilize dynamic charging and discharging to reduce delay and improve speed. A Domino Logic based Comparator design achieve a faster switching speed and low power dissipation. The comparator's performance with a domino logic style in terms of power consumption and delay is analyzed and compared with a conventional complementary metal oxide semiconductor (CMOS) logic comparator of similar functionality. Simulations are carried out in the Generic 0.25um Technology Tanner EDA tool under identical operating conditions to evaluate the effectiveness of the domino logic.

Keywords: Comparator, CMOS logic, Domino logic, Dynamic comparator and Power Consumption.

Design Of Low Power Johnson Counter Using Sleepy-Keeper Power Gating Technique

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Abstract

The design of low-power circuits is critical for modern digital applications, especially in systems requiring continuous data delivery, such as Johnson counters. This paper presents a Johnson counter optimized for reduced leakage power using the sleepy-keeper power gating technique. Power gating, a method of turning off parts of a circuit during idle states, significantly reduces leakage power. The sleepy-keeper technique, specifically utilized here to retain the state of the Johnson counter during sleep mode while minimizing power leakage, making it highly suitable for applications where continuous data availability is essential. By maintaining the state without continuous power supply, the circuit achieves energy efficiency without compromising functionality. The power consumption and leakage reduction are analyzed by using Vivado tool. This approach highlights an effective strategy for low-power design in digital circuits, specifically within continuous-loop data applications.

Keywords: Low Power; Johnson Counter; Power Gating; Leakage Power; Sleep mode; idle mode.

Investigation Of Mechanical Properties of Nano Si 3 N 4 Reinforced -Al 7055 Composites Produced by Novel Stir Casting Method

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Abstract

Nano metal matrix composites are widely used in defense and aerospace sector owing to its inherent properties high strength, high toughness and good tribological properties. In our work, AL 7055 is selected as matrix material and Nano size silicon nitride as reinforcement in different weight fractions (3,6 and 9 wt.%). Composites were synthesized by using novel bottom pouring stir casting method. SEM results reveals that there is homogeneous distribution among the developed composites. Mechanical tests like hardness and tensile studies were conducted. Hardness value shown improvement due to increase in weight percentage of reinforcement. Tensile test result reveals that there is enormous increase in ultimate tensile strength.

Keywords: 7055, Nano Si 3 N 4, SEM, Hardness, UTS.

Disease Prediction in Coconut Trees Using Artificial Intelligence Techniques

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Abstract

Artificial Intelligence techniques are used in agriculture to find out pesticides, fertilizer and irrigation. Which helps farmers by minimizing resource usage and increasing the yields. Economy of a country depends on Agriculture. Coconut production plays a role in Indian economy. Since India is one among the world's largest producers of coconut with a turnout of 11,706,343 tonnes every year. In recent days, it has been observed that the production rate is getting reduced because of various diseases in coconut trees. Few diseases like caterpillar, flaccidity, yellowing and drying make changes in leaves and reduce the production of coconut. This paper proposes a solution for such diseases using Artificial Intelligence tools. Rather than finding diseases manually, automatic identification using AI tools will be faster and accurate. In this, a mobile application is designed to identify the disease that affects the coconut tree. So initially the datasets of those diseases were collected for doing pre-processing, augmenting and optimizing. Later deep learning algorithms were used for doing classification and prediction. The prediction rate was 95.47% of accuracy. The result of this paper helps the farmers to identify the disease and increase the production rate.

Keywords: Artificial Intelligence, pre-processing, augmenting, optimizing, deep learning, classification, prediction rate.

Digital Patient Record System Streamlining Hospital Operations and Reducing Paperwork

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Abstract

The transition from paper-based patient records to a centralized digital management system offers significant improvements in healthcare delivery. A centralized patient record management system (CPRMS) enables hospitals to store, access, and share patient information electronically across multiple facilities, reducing reliance on paper records. This system enhances efficiency by streamlining data management, minimizing administrative workload, and reducing human errors associated with paper documentation. Additionally, CPRMS facilitates better patient care by providing healthcare professionals with immediate access to comprehensive, up-to-date medical histories, enabling faster and more accurate decision-making. It also ensures consistency in patient information, regardless of the healthcare provider or location. By integrating CPRMS across hospitals, healthcare systems can improve coordination of care, reduce costs, and ensure compliance with data protection regulations. This abstract explores the benefits, challenges, and potential impact of centralized record management for modernizing hospital operations and enhancing patient outcomes.

Keywords: CPRMS, Digital Healthcare, Patient Records, Data Management, Patient Care, Decision-Making, Care Coordination, Cost Reduction, Hospital Operations.

Integrating GPS with Automated Toll Collection for Efficient Traffic Management

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Abstract

The increasing number of vehicles on the road has intensified the need for efficient traffic management and streamlined toll collection systems. Traditional toll booths not only cause delays but also contribute to traffic congestion, fuel wastage, and environmental pollution. While RFID-based systems have offered some improvements, they are still limited by physical infrastructure and require vehicles to slow down or stop near toll plazas. This paper presents an innovative GPS-based automated toll collection system aimed at transforming toll operations into a seamless, contactless experience. By leveraging GPS technology, this system tracks vehicles in real time and automates toll deductions as they pass through designated virtual toll zones, eliminating the need for physical toll plazas. The proposed solution integrates an in-vehicle GPS module and a backend server to facilitate real-time data exchange. The GPS module continuously updates the vehicle's position, allowing the system to detect when a vehicle enters a toll zone. Once the vehicle's location is confirmed within the toll zone, the system automatically calculates and deducts the appropriate toll fee from the driver's account. This process not only reduces wait times but also significantly decreases operational and maintenance costs associated with traditional toll booths. Furthermore, this GPS-based approach improves road safety by allowing vehicles to maintain their speed, thereby reducing the risk of accidents near toll plazas. The system also incorporates additional features, such as real-time traffic monitoring and data analytics, to assist in traffic management. By analysing vehicle flow and toll data, transportation authorities can make informed decisions about traffic control and infrastructure improvements. Security measures, including encrypted data transmission and user authentication, ensure the integrity and privacy of toll transactions. The paper examines the technical requirements for implementing a GPS-based tolling system, including accuracy in positioning, data management, and integration with existing transportation infrastructure. Simulation results and case studies are provided to evaluate the system's effectiveness in reducing congestion, lowering fuel consumption, and enhancing overall traffic management. The findings indicate that a GPS-based toll collection system offers a scalable, cost-effective alternative to traditional methods, benefiting both commuters and transportation authorities. This research concludes that implementing GPS-based tolling on a large scale could significantly improve urban mobility, reduce environmental impact, and pave the way for smart, connected transportation systems.

Keywords: GPS-Based Toll Collection, Automated Toll System, Traffic Management, Real-Time Tracking, Virtual Toll Zones, Road Safety, Congestion Reduction, Fuel Consumption, Smart Transportation Systems.

VisionMate: Enhancing Accessibility for the Visually Impaired with Real-Time Object Detection

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Abstract

This project introduces an Android-based real-time object detection application with voice feedback to help visually impaired individuals navigate and interact with their surroundings independently. Leveraging Optical Character Recognition (OCR) for text recognition, Text-to-Speech (TTS) for audio feedback, and Mobile Net-SSD for efficient object detection, the application offers a range of accessible features. Users can access functions such as reading printed text, identifying objects, checking time and date, and monitoring battery status using voice commands and swipe gestures. Built in Android Studio with Java, and integrating Google Assistant API and TensorFlow, the app provides a user-friendly interface that minimizes reliance on visual input. By enhancing accessibility, this application empowers visually impaired users to achieve greater independence. Future updates include expanding language options, wearable device compatibility, and offline functionality to broaden the app's reach and adaptability, making it an essential tool for visually impaired individuals.

Keywords: Android-Based Object Detection, Visually Impaired, Voice Feedback, Optical Character Recognition (Ocr), Text-To-Speech (Tts), Object Identification, Accessibility, Tensorflow.

NEXT-GENERATION VEHICLE TRACKING AND MONITORING

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Abstract

The next-generation vehicle tracking and monitoring system represents a transformative leap in intelligent transportation management. This innovative solution integrates advanced GPS technology, Internet of Things (IoT) devices, and artificial intelligence (AI) to deliver real-time vehicle tracking, predictive maintenance, and performance optimization. Designed to enhance safety, efficiency, and sustainability, the system offers precise location tracking, dynamic route optimization, and behavior monitoring to mitigate risks and improve operational efficiency. Its AI-driven analytics provide actionable insights into fuel consumption, engine health, and maintenance schedules, reducing costs and down time. With user-friendly interfaces and customizable alerts, it empowers businesses, fleet operators, and individual users to make informed decisions and ensure compliance with regulatory standards. Additionally, the system incorporates robust data security measures, ensuring privacy and reliability. This comprehensive approach to vehicle management paves the way for smarter transportation networks, contributing to improved urban mobility and environmental sustainability.

Keywords: Vehicle Tracking, GPS Technology, Iot, Artificial Intelligence (AI), Predictive Maintenance, Performance Optimization, Fuel Consumption, Engine Health, Operational Efficiency, Data Security.

Automatic Solar Rain Shield Dryer

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Abstract

The "Automatic Rain Shield Solar Dryer" is designed to address two main challenges in solar drying: the unpredictable rainfall and the high costs associated with power dryers. General sunlight Solar drying is important for preserving produce such as red peppers and grains. However, unpredictable rain can wreak havoc on these commodities. While traditional dryers Those with high costs are often out of reach for small farmers. This innovation includes an automatic rain protection system that uses rain sensors. When the rain is about to fall the system will activate the motorized shield holder. By placing a protective polyester sheet over the drying area, when the rain subsides, the shield will automatically withdraw. This practical and cost-effective solution provides a reliable drying method. which helps maintain product quality Reduce losses due to weather conditions and increase access for farmers in rain-prone areas.

Keywords: Automatic Rain Shield Solar Dryer, Solar Drying, Rain Sensors, Motorized Shield, Polyester Sheet, Drying Area, Cost-Effective, Product Quality, Weather Conditions, Small Farmers.

Second-Order Polynomial Interpolation Filters for Image Demosaicking with Perceptual-Based Tone Mapping and Quantum-Inspired Optimisation

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Abstract

This paper presents an innovative method for image demosaicking that utilizes perceptual-based tone mapping, second-order polynomial interpolation filters, and Quantum-Inspired Optimisation to attain superior image reconstruction quality. The suggested method incorporates an Autoregressive Wavelet Water Optimisation (WWO) algorithm to get coefficients for second order polynomial filters within the LPA-ICI framework. A Deep Convolutional Neural Network (Deep CNN) is concurrently employed to produce residual images, encapsulating intricate features. The outputs from the interpolation-based approach and Deep CNN are combined using an entropy-based metric, leading to improved visual quality and diminished artefacts in the demosaicking images. To rectify brightness discrepancies, perceptual-based tone mapping is utilised, guaranteeing luminance precision and enhanced image realism. Furthermore, Quantum Inspired Optimisation improves the efficacy and resilience of the filtering process. Experimental findings indicate substantial enhancements in reconstruction accuracy, rendering the suggested method a viable alternative for applications necessitating precision and aesthetic demosaicking. Future research will investigate the applicability of this method to multispectral images and the challenges of real-time processing.

Keywords: Image demosaicking, perceptual-based tone mapping, Quantum-Inspired Optimization.

Seawater Intrusion Assessment Using Vertical Electrical Sounding in Tiruchendur to Manapadu Coastal Region, Tamilnadu, India

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Abstract:

Seawater intrusion poses a serious environmental threat to coastal freshwater aquifers. Vertical Electrical Sounding (VES) is a crucial tool for demarcating seawater intrusion in coastal aquifers. In order to identify the seawater intrusion, 14 geophysical Vertical Electrical Sounding (VES) surveys were carried out in the study area to infer the subsurface geoelectrical parameters. The study area covers approximately 5 to 7 km from the near shore to the inland. The acquired data were processed using IPI2WIN software. The results revealed the study area is comprised of three to five geo-electrical layers and predominant sounding curves are K, Q, KQ, HK, AK, QHK, and HKQ. The low aquifer resistivity values obtained in the study area spanning from 0.23 Ωm to 9.3 Ωm , indicate the presence of saline or brackish groundwater due to the potential seawater encroachment. This study suggests enhanced monitoring systems and sustainable groundwater abstraction practices to prevent the further advancement of seawater into the aquifer.

Keywords: VES, IPI2WIN, aquifer and seawater Intrusion.

Short Communication

Revolutionizing Cancer Treatment Using Nanotechnology Driven Combination Therapies

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Abstract

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cell in the body. It can lead to the formation of tumors and affect various tissues and organs. Globally cancer affects millions of people each year. According to the World Health Organization (WHO) there were approximately 19.3 million new cancer cases and about 10 million cancer related death in 2020. The major cases of the global cancer related deaths is due to treatment complications which can lead to side effects like chemotherapy, radiation or surgery which can cause infections and organ failure. To overcome this problem, we use nanobots which is an application of nanotechnology. It targets tumors by delivering drugs directly to cancer cells reducing side effects. Nanotechnology enabled nanobots are emerging as significant potential for improving patient outcomes. By using this approach cancer cells can be detected early, thus increasing the survival rate. Nanobots represent a exciting new avenue in cancer treatment.

Keywords: Cancer; Tumor; Chemotherapy; Nanobot; Nanotechnology.

Introduction

Nanobots in cancer treatment is to target cancer cells with higher precision delivering therapeutic agents directly to tumors while minimizing damage to surrounding health issues. This approach aims to enhance the effectiveness of treatment, reduce side effects typically associated with conventional therapies and improve early detection, diagnosis and real time monitoring of cancerous cells. Nanobots in cancer treatment are implemented through several key methods. Targeted drug delivery allows nanobots to transport chemotherapy directly to cancer cells reducing side effects. In photothermal therapy, nanobots absorb light and generate heat and destroy tumors. They also enable gene therapy by delivering genetic material to alter cancer cell behavior. Additionally, nanobots can enhance immunotherapy by boosting immune response against tumors. Finally nanobots can serve as biosensors, detecting cancer makers for early diagnosis and real time monitoring. Using nanobots in cancer treatment have shown potential improvement in drug delivery and efficiency. These tiny machines are capable for reducing systemic toxicity and side effects. They enhance radiation

therapy and immunotherapy which can lead to early cancer detection and sufficient treatment.

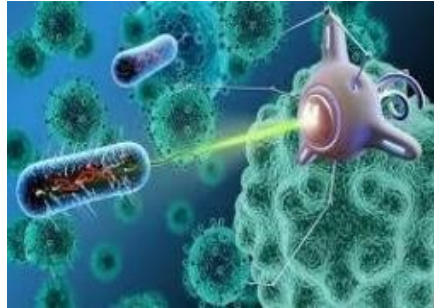


Figure 1. Nanobot attacking cancer cell

Conclusion

In conclusion, our study demonstrates the potential of nanobot-mediated cancer treatment, offering to improved efficiency, reduced toxicity and enhanced targeting capabilities. Our results show significant improvements in tumor reduction and survival rates. Future studies will focus on optimizing nanobot design and scaling up to clinical trials, offering new hope for cancer patients.

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Blockchain-Based Proxy Re-Encryption for Secure Data Sharing in IoT Networks

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Abstract

In the rapidly growing Internet of Things (IoT) ecosystem, ensuring secure data sharing between devices is a significant challenge decentralized nature due to the and limited computational resources of IoT devices. Traditional encryption methods struggle to balance security and performance in these environments. This paper proposes a blockchain-based proxy re-encryption (PRE) scheme to secure data sharing in IoT networks. By leveraging proxy re encryption, data owners can securely delegate decryption rights to authorized devices without exposing the original encryption keys. Blockchain technology ensures a tamper-proof and transparent mechanism for managing access control and encryption key delegation. The decentralized nature of blockchain enhances security and eliminates the need for a central authority, while proxy re encryption provides fine-grained access control, allowing efficient and secure data sharing across IoT devices. Experimental results demonstrate that our approach provides strong security guarantees, efficient key management, and scalability suitable for large-scale IoT deployments.

Keywords: Secure Data Sharing, Decentralized Nature, Limited Computational Resources, Traditional Encryption, Blockchain, Proxy Re-Encryption (PRE), Decryption Rights, Encryption Keys.

Introduction

The evolution of the Internet of Things has seen data sharing as one of its most useful applications in cloud computing. As eye-catching as this technology has been, data security remains one of the obstacles it faces since the wrongful use of data leads to several damages. In this article, we propose a proxy re-encryption approach to secure data sharing in cloud environments. Data owners can outsource their encrypted data to the cloud using identity-based encryption, while proxy re-encryption construction will grant legitimate users access to the data. With the Internet of Things devices being resource-constrained, an edge device acts as a proxy server to handle intensive computations. Also, we make use of the features of information- centric networking to deliver cached content in the proxy effectively, thus improving the quality of service and making good use of the network

bandwidth. Further, our system model is based on blockchain, a disruptive technology that enables decentralization in data sharing. It mitigates the bottlenecks in centralized systems and achieves fine-grained access control to data. The security analysis and evaluation of our scheme show the promise of our approach in ensuring data confidentiality, integrity, and security.

Existing System

- ❑ ABPRE allows a semi- trusted proxy to transform an encryption under an access-policy into an encryption under a new access policy, without revealing any information about the underlying message.
- ❑ Healthcare is a multi-actor environment that requires independent actors to have a different view of the same data, hence leading to different access rights. Ciphertext Policy- Attribute-based Encryption (CP- ABE) provides a one-to-many access control mechanism by defining an attribute's policy over ciphertext.

Disadvantages

- ❑ Compatibility Issues
- ❑ Unblock Websites

Proposed System

We have proposed a proxy re- encryption scheme for E-healthcare data sharing on fog computing, which deals with the problem of overhead and delay of previously proposed PRE schemes. Our scheme reduces the commutation cost and communication overhead of the resource-constraint IoT devices. When we need to share encrypted data with multiple participants, we can achieve significant performance by using the proxy re- encryption scheme.

Advantages

- Security against chosen ciphertext attack
- It ensures the integrity of electronic health records for mobile device users stored in the cloud computing database
- Fine-grain access control is provided on the user's private data.

Input Design

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input.
- Methods for preparing input validations and steps to follow when error occur.

Objectives

1. Input Design is the process of converting a user-oriented description of the input into a computer-based system. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.
2. It is achieved by creating user- friendly screens for the data entry to handle large volume of data. The goal of designing input is to make data entry easier and to be free from errors. The data entry screen is designed in such a way that all the data manipulates can be performed. It also provides record viewing facilities.
3. When the data is entered it will check for its validity. Data can be entered with the help of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus, the objective of input design is to create an input layout that is easy to follow

Output Design

Efficient and intelligent output design improves the system's relationship to help user decision-making:

1. Designing computer output should proceed in an organized, well thought out manner; the right

output must be developed while ensuring that each output element is designed so that people will find the system can use easily and effectively. When analysis design computer output, they should Identify the specific output that is needed to meet the requirements.

2. Select methods for presenting information.
3. Create document, report, or other formats that contain information produced by the system.

The output form of an information system should accomplish one or more of the following objectives.

RESOURCE REQUIREMENT

HARDWARE REQUIREMENTS:

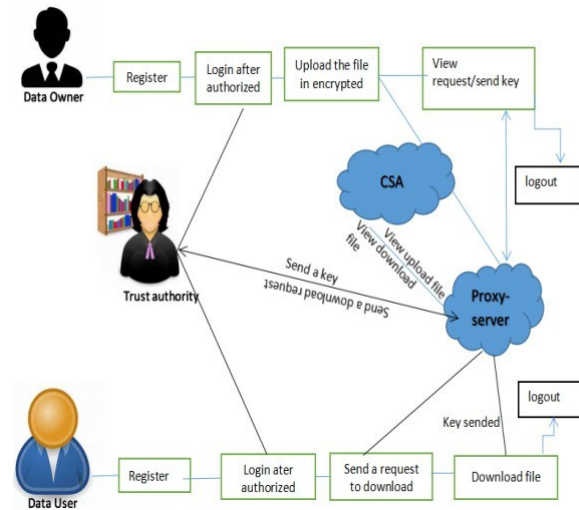
- System : Intel i3.
- Hard Disk : 160 GB.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 4 GB.

SOFTWARE REQUIREMENTS:

- Operating system: Windows XP/7/8/10
- Coding Language: JAVA
- Front End: NetBeans Software

Backend: My SQLyog Community 32

SYSTEM ARCHITECHTURE:



MODULE DESCRIPTION:

Main Module

In this project has two modules:

■ Data User

■ Data Owner

■ Trust authority

■ Proxy server

■ Cloud service provider DATA OWNER

- Register the account with the basic information After authorize user can login the account with correct username and password
- Upload the file with the encryption format.
- View user request and make a request for re-encryption
- View the status and Re-encrypted the key
- Logout

USER

- Register the account with the basic information
- After authorize user can login the account with correct username and password
- Profile
- Send Download request
- Download file
- Logout

TRUST AUTHORITY

- TA can login the account with the correct Credentials
- View users and owners authorize them
- View user Download request and Send the Key
- Logout

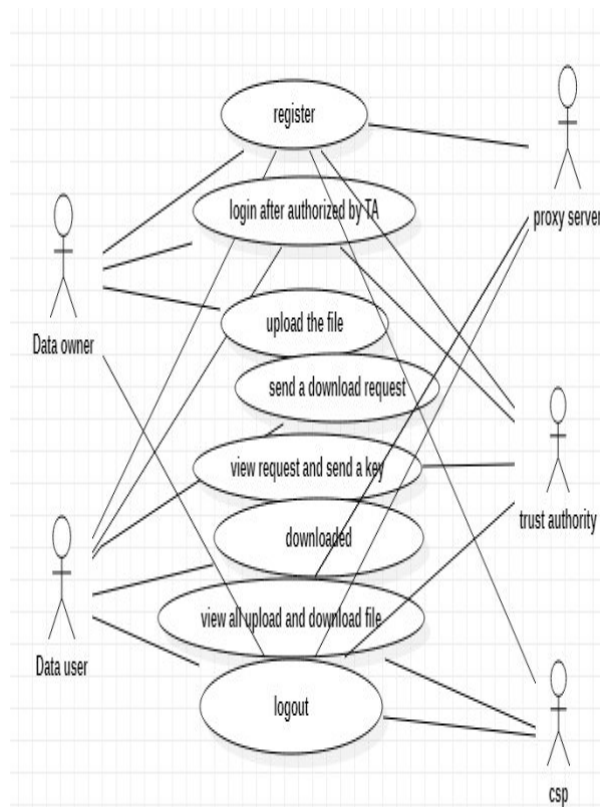
PROXY SERVER

- Login the account with the correct username and password.
- View all uploaded files
- View Re-Encryption request and Send the Responses
- View all downloaded files
- Graph
- Logout

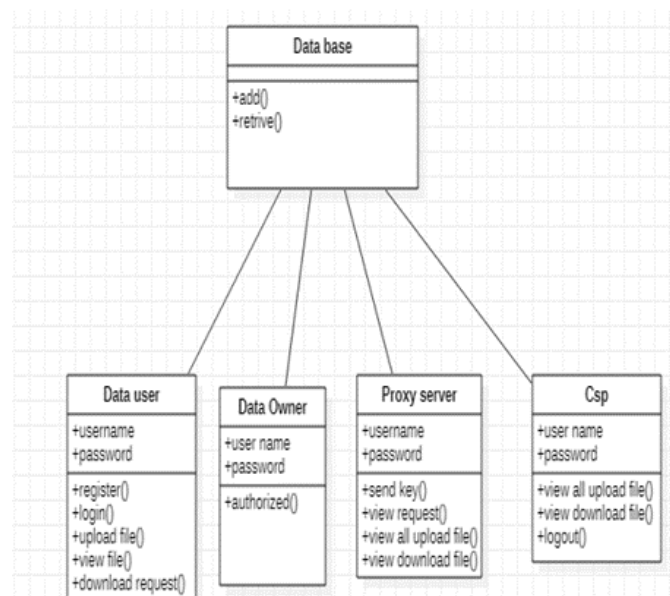
CSP

- Login the account with the correct username and password
- View all uploaded files
- View all downloaded files
- Graph
- Logout

USE CASE DIAGRAM:



Class diagram:



CONCLUSION

This project has addressed a critical challenge in IoT networks—secure and efficient data sharing—by implementing a blockchain-based proxy re-encryption (PRE) system using Java. By combining the immutability and decentralized features of blockchain with the flexible encryption capabilities of proxy re-encryption, the solution achieves a highly secure and adaptable data-sharing framework. This framework ensures that sensitive data can only be accessed by authorized users, significantly reducing the risk of data breaches and unauthorized access, which are common issues in IoT networks. Through careful design and implementation, the system enables seamless, scalable data sharing without compromising on security, even across resource-constrained IoT devices. By integrating blockchain for data integrity and transparency with re-encryption for dynamic access control, this project demonstrates the potential for highly secure data management in IoT environments. Ultimately, this approach lays the groundwork for future applications where data security and controlled sharing are essential, offering a practical, secure, and scalable solution for IoT-based systems.

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Identification of Glaucoma using Deep Learning Approach

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Abstract

An incurable condition that impacts quality and eye sight of life is glaucoma. In this paper, we developed a deep learning framework for the detection of spontaneous eye problems using a convolutional neural network. Comprehensive teaching techniques, such as convolutional neural networks, may assess visual sequences where glaucoma and non-glaucoma traits can be distinguished for assessment purposes. Six study layers make up the proposed Deep Learning architecture: two fully functional levels and four convolutional layers. Methods of discontinuation and augmentation are used to improve the diagnosis of glaucoma. Details of SCES and ORIGA have been extensively tested.

Keywords: Area under curve, Digital fundus image, Region of Interest, Optic Disc, Cup Disc Ratio.

1. Introduction

By 2021, glaucoma is expected to impact 80millionpeople worldwide and is one of the causes of vision impairment. a long-term eye condition that causes vision loss by progressively harming the visual cortex. Glaucoma is known as the "silent robber of vision" since symptoms don't appear until the condition has advanced considerably. Although there is no cure for glaucoma, medication can delay its progression. Using high-quality imaging to diagnose glaucoma as soon as possible is essential. Digital fundus imaging is one of the most widely used and common methods for glaucoma detection. Because it is feasible to identify DFIs in a unique way that is appropriate for significant examinations, DFI has become a preferred tool for diagnosing serious glaucoma. The default system in a glaucoma screening programme assesses whether the image has glaucoma symptoms. The algorithm will only send photographs to optometrists for additional review if it deems them suspicious. Only photos that the algorithm deems suspicious will be sent to the optometrist for additional examination. When optical nerve fibres are damaged, the structure of the Optic Disc is changed, which causes the cup region to increase (the neuro- retinal border to shrink), also referred to as cupping. In order to diagnose glaucoma, several measurements are assessed, such as the vertical cup to disc ratio (CDR)in addition

to disc width, since cup enlargement in relation to OD is one of the most prevalent signs of the condition. Among the clinical characteristics of the diagnosis of glaucoma, CDR is a prominent issue for clinicians. However, both the automatic separation of the disc and cup into fundus images and clinical assessment by manually labeling the cup and disc of each image take time. The retinal image of interest (ROI), which offers the first little image that requires very little evaluation time, can be extracted if you disagree with the disc and cup being separated. In this article, the ROI image is used as an input to a convolutional neural network.

Unlike natural images, the sickness pattern in DFIs for glaucoma diagnosis is nuanced and complex. Finding places with remarkable appearances (such as texture, form, or colour) is related to the task of evaluating natural scenery. In contrast, glaucoma anomalies can only be identified by the tester and information.

A modern scientific study that looks into biased data representation is called DL. In order to produce more confusing and ultimately more useful presentations, DL structures are made by combining several linear-indirect data conversions. Deep learning structures called convolutional neural networks are now being used effectively for image recognition and programming. DL structures, which incorporate a range of design and training procedures, are an extension of multilayer neural (NN) networks in order to remain competitive. These techniques include robustness, sequence learning, and spatial consistency. This study's main goal is to use deep CNN to precisely capture the most profound features of glaucoma.

2. Literature Review

The absence of brain cells and optic nerve fibers is assigned of glaucoma. The size of the optic cup in relation to the optic disc and the rim of the central nervous system can be used to quantify this loss. The majority of published research focuses on fundus imaging-based optical nerve head quality testing. For instance, Wong et al. provided a standard method for calculating CDR after obtaining an optic disc mask and an opticcup. They tested this technique on 104 images and found that it produced arrange of basic fact results by as much as 0.2 CDR units. Using a CDR testing system for large pixels, Cheng et al. introduced an alternative optic disc and optical cup segmentation approach. They used their algorithm to identify regions in 650 photos in the two datasets that were below the 0.800 and 0.822 curves. In order to automatically distinguish between glaucomatous fundus images, we developed and trained CNN's six-layer structure from scratch, which consists of two fully integrated

layers and four convolution layers. Two secret archives, ORIGA- (light) with 650 photographs and SCES with 1676 images, were used for our studies. In addition to selecting 99 randomly selected photos and analysing the remaining 551 images, researchers trained the CNN design on the ORIGA website [16]. They used all 1676 images from the SCES website for testing and 650 images from the ORIGA website for training. The SCES website offers 1676 fundus images, 46 of which are glaucomatous, compared to 168 glaucoma photos and 482 common fundus pictures on the ORIGA website. Data inequality is the main effect. Another drawback of this study is that because the ORIGA and SCES datasets aren't publicly accessible, the obtained results are difficult to replicate.

3. Proposed Methodology

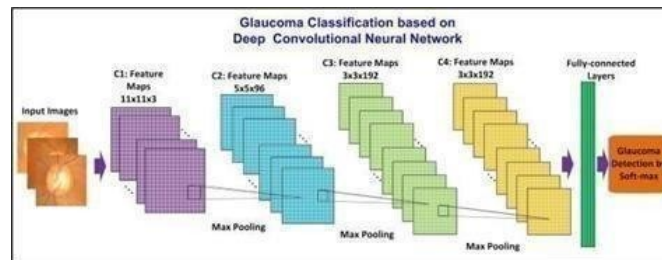


Fig. 1. Systematic review of proposed convolutional neural network- based glaucoma diagnosis. The suggested DL structure is made up of six distinct sections: four flexible layers and two completely linked layers

The deep learning framework suggested for the project is based on CNN. Figure 1 shows the six layers that make up CNN's network. While the last two are fully linked, the first four are convolutional. To identify glaucoma, the fully linked end layer's output is sent into a top-notch tissue machine. Response-standard layers and overlapping layers are both used in our recommended reading structure. These are commonly used to assist in training small features using random image samples. By simultaneously altering the feature detector and the image, the attribute inside the picture may have been integrated there. Assume that the input and output for CNN's n th layer are $H(n-1)$ and $H(n)$. Set $H(N)$ to be the final N layer output and $H(0)$ to be a replica of the 2D input image. In layer n , let the input and output maps have sizes of $M(n-1) \times M(n-1) \times I$ and $M(n) \times M(n) \times O$, respectively. Q_1 and Q_0 stand for the input and output maps of the n th layer, respectively.

The intake of n -th layer will be result from $(n-1)$ th layer, $Q_n = Q_{n-1}$ and $M_n = 101, M_{n-1}$. Let H_n represent the j -th output-element-map with $0 \leq j \leq M_n - 1$. n -th layer, which indeed maps output

element for the (n-1)-th layer, $H^{(n)}$ i-th input-layout-may play out n. Conclusively, the outcome can be found as [8]:

$$H_n = f(S_i H_{i(n-1)} * w_{ij}(n) + b_j(n))$$

Where $w_{ij}(n)$ is the kernel that connects the i-th incoming maps to its j-th throughput map.

A. *Overlapping-pooling Layers*

On CNN, merging layers summarize feature statistics in the image area. The composite layer is composed with a grid of constituent parts isolated by p pixels, all of which reduces the size of the region centered on the merging unit. We find the local integration of the area where $p = s$. If $p < s$, we have as cattering, which can help with overfilling. As shown in Fig.1, the mass consolidation layers follow both the response setting layers and the conversion layer in our learning structure.

B. *CNN-Based Glaucoma Categorization*

The result of the last two completely integrated layers is inserted in the soft-max classifier to predict magnitude of glaucoma, as illustrated in Fig. 1.

1) *Region of Interest (ROI) Extraction*

In our study, we used ROI images as an intrinsic component of CNN, which produces the first compact image that can be analyzed faster than taking a part a disc and a cup [5]. The ROI where the optic nerve head is located is determined by selecting the grid with the highest probability after the retinal fundus image is divided into groups in the same way as the previous ARGALI. We employ the technique to successfully separate the ROI in a retinal fundus image since it accurately identifies the acceleration process and improves glaucoma detection performance. After the ROI was released, the output result was reduced to a sample with a static quality of $256 * 256$ [19]. Finally, to minimize the influence of light change on all pixels, the mean to all pixels in a disc image is retrieved from each pixel. This method now incorporates a front processing step to minimize or remove the shiny edge, including the core area of cutting circular and trim radius.

Cessation and Data Add-Ons By altering label storage and halting model compilation, people use data augmentation to combat picture saturation and prevent needlessly growing the database.

Cessation: In our proposed in-depth analysis, we use a pause between two fully integrated layers. Flip each hidden neuron's outcome to zero, which maybe 0.5, to stop. In CNN, neurons with impairments do not participate in backwards transmission or progress. Every neuron is used during testing, and their

effects are amplified by 0.5.

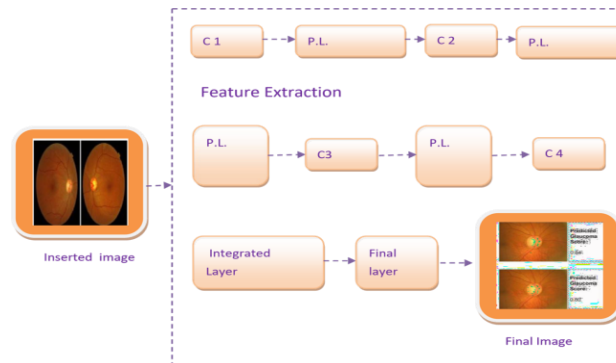


Fig.2. Structural diagram for predicting glaucoma using CNN algorithm

Data Add-ons: Our network will incur significant overload if we do not use data growth. Image translation and horizontal display are performed as part of the data extension. Data augmentation is accomplished during training by dragging 224 * 224 random packs on 256 * 256 pictures, encompassing their horizontal displays, while coaching our networks on such handouts. During the experiment, CNN forecasts its release of five 224 * 224 leaflets, comprising four corner parts as well as a centre area, along with their lateral visibility and a predictor of the network's soft layer on these ten leaflets. This test approach will be referred to as a multi-view test (MVT).

4. Result and Discussion

We evaluated the glaucoma diagnostic function of the proposed approach using image data sets from glaucoma fundus, ORIGA, SCES.

A. Evaluation Criteria

Here, the effectiveness of glaucoma detection is evaluated by designers using the lower extremity (AUC) receiver operation characteristic curve (ROC). As $TPR = TP / (TP + FN)$, $TNR = TN / (TN + FP)$, where TP and TN represent the count of direct plus indirect negative components, and FP and FN represent negative and positive values, respectively, the curve illustrates the tradeoff between TPR sensitivity (positive positive rating) and TNR specificity (negative positive rating).

B. Experimental Setup

To verify the value of our CNN in glaucoma diagnosis, we compare CNN's supposition with the most recent reconstruction technique. We use the same configuration in the ORIGA database. Out of 600 photos, 99 were randomly selected to make up the training set; the remaining 501 photos were

used for verification. We use all 1676 images from SCES for test execution and 600 images from ORIGA for mentoring. In ORIGA and SCES, our AUC method yielded values of 0.831 and 0.887, respectively. Additionally, the AUC criteria for the advanced reconstructing approach are 0.823 and 0.860, respectively.

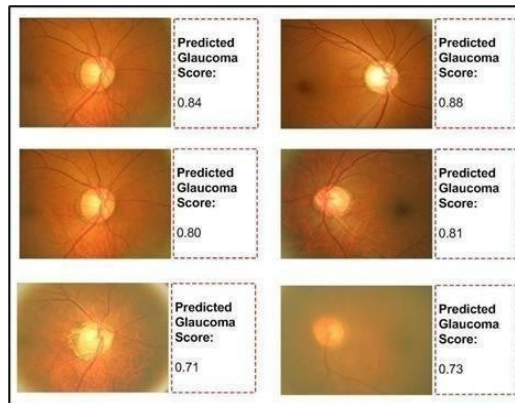


Fig.3. Suggested glaucoma detection method was used to get the sample diagnosis. Each picture of the fundus is obtained by doctors and the predictable labeling that our system allows.

Six model results from this recommended approach are also shown in Figure 3. Every image of the fundus is diagnosed by doctors, and our method forecasts possible labels. In addition to the third line's poor image quality, our approach of diagnosing glaucoma demonstrates the severity and persistence of the condition.

5. Conclusion

In this research, we present a general CNL-based DL architecture for diagnosing glaucoma that can extract the discriminating features that aid in identifying the correlations linked to glaucoma. Six layers make up the selected DL structural design: two fully linked layers and four convolution layers. We use aggregate layers and traditional response layers to avoid overpopulation. The drop-off and data-adding approaches are applied to the suggested deep CNN in order to improve performance. In the future, we hope to use our research on CNN-based DL features to detect arrange of eye conditions.

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Virtual Mouse Website

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Abstract

With the increasing demand for touchless interfaces in human-computer interaction, this paper presents the development of a virtual mouse system implemented as a web application. The proposed system enables users to control their computer cursor using hand gestures captured through a webcam, eliminating the need for physical devices. Leveraging opencv, mediapipe, and Python with the Flask framework, the solution employs real-time hand tracking and gesture recognition to facilitate actions such as cursor movement, left and right clicks, and drag operations. The system uses a custom hand detection algorithm to detect finger positions, interpret gestures, and map hand coordinates to screen space with smooth motion control. Initial experiments demonstrate high accuracy and responsiveness, with smooth cursor navigation and reliable gesture recognition. This project has potential applications in hands-free computing, accessibility for individuals with physical limitations, and contactless user interfaces, making it a versatile tool in various scenarios. This solution demonstrates how hand gesture recognition can enhance human-computer interaction, offering a more hygienic and user-friendly alternative to traditional input devices. Future enhancements will focus on expanding gesture sets and optimizing performance for diverse environments.

Keywords: Touchless Interfaces, Human-Computer Interaction, Virtual Mouse System, Hand Gestures, Webcam, Opendv, Mediapipe, Flask Framework, Real-Time Hand Tracking, Gesture Recognition, Cursor Movement, Accessibility, Contactless User Interfaces, Accuracy, Smooth Motion Control, Hands-Free Computing.

Introduction

The rapid advancement of technology in recent years has transformed the way humans interact with digital devices. Traditional human-computer interaction (HCI) methods, primarily reliant on physical peripherals such as mice, keyboards, and touchscreens, have proven effective but come with certain limitations, particularly in terms of accessibility, hygiene, and user convenience.

In scenarios where physical contact needs to be minimized—such as in hospitals, laboratories, and public kiosks there is a growing demand for touchless interaction methods that ensure both usability and safety. This project addresses these challenges by developing a virtual mouse system that enables users to control their computers using hand gestures instead of physical devices. This solution leverages the power of computer vision and artificial intelligence to provide a hands-free experience, utilizing widely accessible hardware like a standard webcam. By detecting and interpreting hand gestures, users can perform essential mouse functions such as moving the cursor, left-clicking, and right-clicking without the need for a traditional mouse or touchpad.

The system is built using a combination of OpenCV, MediaPipe, and PyAutoGUI. OpenCV handles image processing, allowing for efficient capture and analysis of webcam input, while MediaPipe's advanced hand tracking capabilities detect hand landmarks and identify specific finger positions in real-time. PyAutoGUI is utilized to simulate mouse actions based on the recognized gestures, ensuring seamless integration with existing operating systems.

To enhance accessibility, the project integrates a Flask-based web interface, making the system easily deployable on any device with a browser, without the need for additional software installation. This project is not only designed to enhance user interaction but also to expand accessibility for individuals with physical disabilities who may find it difficult to operate traditional input devices. It also addresses the growing need for contactless interfaces in public spaces, especially in the wake of global health concerns that have emphasized the importance of minimizing physical contact. By leveraging widely available technologies, the virtual mouse system demonstrates how touchless interaction can be made practical and accessible for everyday users.

Beyond its immediate applications, the project has the potential to be a steppingstone towards more complex systems that integrate gesture control with augmented reality (AR), virtual reality (VR), and smart home devices. Future enhancements could include the incorporation of machine learning models to improve gesture recognition accuracy, support for multi-hand gestures, and customizable gesture sets tailored to specific user needs. As digital environments become more immersive and interactive, the development of intuitive, touch-free interaction methods will be crucial in enhancing user experience and accessibility. In summary, this project aims to create a robust, user-friendly, and scalable system that transforms how users interact with computers. By replacing traditional input devices with a gesture-based virtual mouse, the system paves the way for a more inclusive and hygienic digital experience, demonstrating the potential of integrating computer vision and AI for next-

generation human-computer interaction

Existing system

Existing systems for human-computer interaction primarily rely on traditional input devices such as keyboards, mice, and touchpads. While these tools have been effective for decades, they present limitations in terms of accessibility and hygiene, especially in shared or public environments. For users with physical disabilities or in scenarios where touch-based input is impractical, such as hospitals and public kiosks, alternative methods are required. Voice control systems, like Google Assistant, Siri, and Alexa, offer hands-free interaction but are often limited by environmental noise and lack the precision needed for detailed tasks, such as navigating complex graphical interfaces. Touchless gesture control systems, like Microsoft Kinect, offer a more hygienic and accessible alternative. However, these systems often require expensive, specialized hardware and have a steep learning curve, making them less accessible to general users. Camera-based gesture recognition software, which leverages computer vision to detect hand gestures using standard webcams, is another emerging solution. Despite its promise, these systems frequently face challenges with lighting conditions, computational demands, and maintaining accuracy in real-world environments. Additionally, while mobile devices can recognize simple gestures through built-in sensors like accelerometers and gyroscopes, these methods are limited to mobile platforms and do not translate well to desktop use where precise control is needed. Collectively, these existing solutions highlight the need for a more accessible, cost-effective, and efficient system that can enable touch-free interaction using widely available hardware, paving the way for more inclusive and versatile human-computer interfaces.

- ☐ Focus on ensuring precise and responsive hand gesture detection for smooth, real-time interaction, even in varying lighting conditions.
- ☐ The system must prioritize user privacy by securely processing webcam data only for gesture recognition without storing or sharing any video data.
- ☐ By using a web-based framework like Flask, the system is easily accessible across different devices without extra installations, ensuring easy scalability and user convenience.

Disadvantage

- ☐ Continuous use of hand gestures for controlling the mouse can cause arm or hand fatigue, especially for prolonged sessions.
- ☐ Real-time hand tracking and gesture recognition can be computationally demanding, potentially affecting performance on low-end devices or causing lag.

- ☐ While hand gestures can work for basic control, they may lack the precision needed for tasks that require fine details, like selecting small icons or text.
- ☐ The hand-tracking system may struggle in low-light or overly bright environments, affecting accuracy and responsiveness.

Proposed System

The proposed system is a virtual mouse that allows users to control their computer using hand gestures, eliminating the need for physical input devices like a mouse or keyboard. The system uses a standard webcam to track hand movements and detect specific gestures, translating them into mouse actions such as movement, clicks, and scrolls. The hand tracking algorithm identifies key points on the hand and interprets gestures like pointing, clicking, or swiping. By using the webcam, the system offers a touch-free solution that works on most devices without requiring additional hardware. The system works in real-time, processing the video feed to track the position of the user's hand and map it to the screen coordinates, allowing users to move the mouse pointer. For clicks, gestures like pinching or tapping are recognized to simulate left or right mouse clicks. The system is designed to be intuitive and easy to use, with minimal setup, making it accessible for individuals with physical disabilities or those in environments where reducing touch is important.

Advantage

- ☐ The hand gesture controls are simple and intuitive, making it easy for anyone to use without a steep learning curve.
- ☐ Users can control the computer without physical contact, making it ideal for hygienic environments or individuals with disabilities.
- ☐ The system only requires a standard webcam, eliminating the need for expensive or specialized hardware.
- ☐ The system is web-based, meaning it can work on most devices with a webcam, without the need for additional software or installation.

Modules

- ☐ Hand Tracking Module
- ☐ Gesture Recognition Module
- ☐ User Interface Module (WebInterface)
- ☐ Webcam Capture and Pre-processing Module

- ☐ Mouse Control Module
- ☐ Calibration and Settings
- ☐ System Performance and Logging Module

Hand Tracking

Tracks hand movements using a webcam to detect gestures in real-time. Hand detection algorithms (using libraries like OpenCV and MediaPipe). Identifying key points (such as finger positions) on the hand. Calculating distances and angles between key points to recognize gestures.

Gesture Recognition

Interprets detected hand gestures and maps them to mouse actions. Identifying gestures like pointing, pinching, and swiping. Mapping gestures to mouse functions like movement, left-click, right-click, and scrolling.

User Interface

Allows users to interact with the system and start/stop hand tracking. A simple web interface built using Flask. Display of system status, such as whether hand tracking is active or idle. Controls for enabling/disabling hand tracking, with options to calibrate or adjust settings.

Web Capture and Preprocessing

Captures real-time video input from the user's webcam and prepares it for processing. Webcam setup and frame capture. Preprocessing to enhance image quality (e.g., resizing, color adjustments). Frame-by-frame processing to detect hand positions in the video stream.

Mouse control

Converts detected gestures into mouse actions (movement, clicks, etc.). Using libraries like pyautogui to move the mouse pointer and perform actions like clicking or scrolling based on gesture recognition.

Calibration and Settings

Allows users to calibrate the system for optimal performance. Adjusting screen resolution, frame rate, and hand sensitivity. User-defined settings for gesture recognition thresholds and smoothness of cursor movement.

System performance and Logging

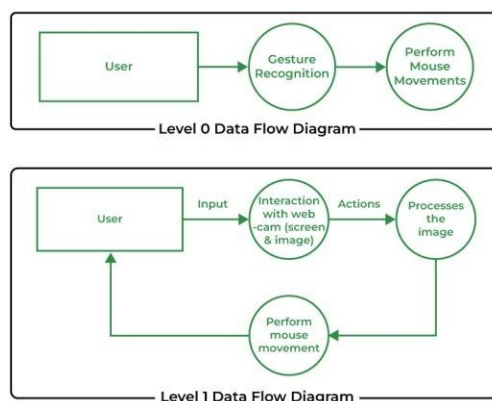
Monitors and logs system performance (FPS, accuracy, etc.) to ensure smooth operation. Logging the system's performance metrics such as frames per second (FPS). Identifying and handling errors or performance drops.

Conclusion

This project created a virtual mouse system that uses hand gestures to control a computer without the need for a traditional mouse or keyboard. By using technologies like OpenCV, MediaPipe, and PyAutoGUI, the system tracks hand movements through a webcam and translates them into mouse actions, such as moving the cursor and clicking. With the use of Flask, the system runs on any web browser, making it easy to use on different devices without needing extra software. We worked on improving accuracy and smoothness to make the experience more user-friendly. This touchless system is helpful for people with physical disabilities, and it can also be used in public places or other situations where contactless control is needed. In conclusion, the project shows how hand gestures can be a practical and accessible way to interact with computers, offering a simple, effective alternative to traditional input. Formal security proof and the performance analysis show that our proposed scheme is provably secure and efficient.

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