PROCEEDINGS OF IMCEST-2025

International Multi-Conference on Engineering, Science & Technology

THEME OF THE CONFERENCE :
Transforming Societal Progress through Integrated Science, Engineering and Technology

Mode... Hybrid **Date.... November 26, 2025**

ISBN: 978-81-995272-8-7
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QIS

COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

Proudly organizing International Technical Conference in colloboration with University of Perpetual Help System DALTA (Philippines) & Taguig City University (Philippines)

Vengamukkapalem(V), Ongole, Prakasam Dist.,
Andhra Pradesh-523272

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Organized by:
QIS College of Engineering and Technology (Autonomous), Ongole, India

In Collaboration with:
University of Perpetual Help System DALTA (Philippines)
Taguig City University (Philippines)

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About the Conference

The International Multidisciplinary Conference on Emerging Science and Technologies (IMCEST-2025) is a global platform designed to bring together academicians, scientists, researchers, industry professionals, and innovators from diverse domains of engineering, technology, and applied sciences. Hosted by QIS College of Engineering Technology (QISCET), India, in collaboration with the University of Perpetual Help System DALTA (Philippines) and Taguig City University (Philippines), the conference aims to foster cross-disciplinary discussions and highlight cutting-edge advancements shaping the future of science and technology.

IMCEST-2025 focuses on emerging research domains including Artificial Intelligence, Data Science, Renewable Energy, Green Technologies, Advanced Electronics, Smart Infrastructure, Quantum Computing, and Interdisciplinary Engineering. The conference encourages participants to exchange ideas, present their latest innovations, and explore collaborative opportunities for research, development, and societal impact. The event welcomes high-quality original research papers that contribute to scientific progress and sustainable technological growth. All accepted and presented papers will be published in the IMCEST-2025 Conference Proceedings (with ISBN). Selected outstanding papers will be recommended for publication in UGC-CARE listed journals and Scopus-indexed volumes by Wiley (Scrivener Publishing), subject to additional review and article processing requirements.

IMCEST-2025 aims to create a vibrant research ecosystem that bridges academia and industry, promotes global partnerships, and inspires young researchers to pursue impactful scientific contributions. Through keynote sessions, technical paper presentations, and panel discussions, the conference aspires to advance knowledge, encourage innovations, and support technology-driven solutions for global challenges.

Message from the Honorable Secretary & Correspondent

It is a matter of great pride for me to extend my warm greetings to all participants of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This distinguished academic platform brings together a global community of researchers, educators, industry leaders, and students, uniting them in their pursuit of knowledge, innovation, and excellence.

At QISCET, we strongly believe that research-driven education is the cornerstone of societal progress. IMCEST–2025 is a proud reflection of this philosophy, offering an avenue for interdisciplinary interaction and encouraging solutions that address contemporary real-world challenges. From artificial intelligence and smart systems to sustainable technologies and scientific advancements, the conference showcases a remarkable span of scholarly contributions that demonstrate both depth and diversity.

I extend my heartfelt appreciation to the authors for their commitment to producing impactful research, to the reviewers for their rigorous evaluation, and to the session chairs and coordinators for guiding the academic discourse with precision. I also commend the tireless efforts of the organizing committee and volunteers who have ensured a seamless and professionally executed event.

To all young researchers, I encourage you to pursue your ideas with curiosity and resilience. Engage actively, learn from peers, and seek collaborations that broaden your perspectives and strengthen your work.

I congratulate every contributor whose research is featured in this conference and wish all participants a fruitful, enriching, and memorable IMCEST–2025 experience.

Dr. N. S. Kalyan Chakravarthy
M.Tech, Ph.D.
Secretary & Correspondent
QIS College of Engineering & Technology
(Autonomous), Ongole, India

Message from the Honorable Executive Vice Chairman

It gives me immense joy to extend heartfelt greetings to all esteemed delegates, speakers, researchers, and participants of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This international forum stands as a testament to our enduring commitment to advancing education, research, and innovation.

As technological advancements reshape the world at a rapid pace, interdisciplinary events like IMCEST–2025 serve as essential platforms for dialogue, collaboration, and problem solving. The convergence of multiple fields presented here ranging from engineering innovations to scientific discoveries demonstrates the power of collective knowledge in addressing global challenges.

I deeply value the remarkable scholarly contributions made by researchers from across the globe. The high quality submissions, insightful presentations, and forward looking discussions reflect the academic strength and intellectual diversity of the participants.
My sincere appreciation goes to the reviewers, keynote speakers, session leads, and the entire organizing team for their dedication in upholding the quality and reputation of this conference. Their collaborative efforts have ensured a well-structured, engaging, and meaningful academic experience for all.

I hope this conference inspires new research directions, strengthens international partnerships, and contributes to the advancement of knowledge for the benefit of society. I wish every participant a fulfilling and productive experience at IMCEST–2025.

Dr. N. Sri Gayatri Devi
MBBS, MD (Radiologist)
Executive Vice Chairman
QISCET (Autonomous), Ongole, India

Message from the Principal

It is my great pleasure to welcome each one of you to the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This event represents an important milestone in our institution's continuous efforts to nurture a vibrant culture of academic excellence and global research collaboration.

IMCEST–2025 offers a rare opportunity for participants to explore the latest advancements across various disciplines, share their findings, and engage with experts who are shaping the future of science and technology. The breadth of ideas presented here highlights the evolving nature of research and the need for collaboration between academia and industry.

I appreciate the dedication of the authors who have contributed their work, the reviewers who ensured scholarly rigor, and the coordinators who handled the organizational challenges with remarkable efficiency. The efforts of our volunteers and support teams have played an equally crucial role in making this event possible.

I encourage all participants to take full advantage of the sessions, discussions, and interactions. Use this platform to broaden your perspectives, deepen your knowledge, and explore opportunities for future cooperation.

I extend my best wishes to all contributors and hope that IMCEST–2025 enriches your academic journey and motivates you toward greater achievements.

Dr. Y. V. Hanumantha Rao
M.Tech, Ph.D
Principal
QISCET (Autonomous), Ongole,
India

Message from Prof. Dr. Jafar Ali Ibrahim

It is with great pleasure that I extend my warmest greetings to all participants, speakers, researchers, and academicians attending the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This prestigious event serves as a dynamic platform for fostering interdisciplinary collaboration, exchanging innovative ideas, and exploring emerging advances across the fields of engineering, science, and digital technologies.

As a representative of the Institute of Computer Science and Digital Innovation at UCSI University, Malaysia, I firmly believe that global academic gatherings such as IMCEST–2025 play a pivotal role in shaping the future of research and higher education. The convergence of diverse perspectives—spanning artificial intelligence, digital innovation, computational sciences, engineering solutions, and scientific inquiry—empowers us to address complex global challenges with creativity, collaboration, and technological insight.

The contributions showcased in this conference reflect the dedication, scholarly rigor, and forward-thinking mindset of researchers from around the world. Your work not only enriches the academic community but also advances the development of intelligent systems, sustainable technologies, and data-driven innovations that benefit society at large.

I extend my heartfelt congratulations to all contributors and wish IMCEST–2025 great success. May this conference continue to serve as a catalyst for breakthrough discoveries, meaningful partnerships, and a brighter global research future.

Prof. Dr. Jafar Ali Ibrahim
Institute of Computer Science and Digital Innovation
UCSI University
Kuala Lumpur, Malaysia

Message from Convenor

It gives me immense pleasure to welcome all participants, distinguished speakers, researchers, academicians, industry professionals, and students to the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. As the Conference Convenor, it has been a truly enriching experience to coordinate this global academic event.

IMCEST–2025 represents our institution's commitment to fostering a vibrant research ecosystem that bridges the gap between disciplines, institutions, and nations. The multi-conference format enables a comprehensive exchange of ideas across engineering, science, technology, and emerging interdisciplinary fields. Through technical sessions, keynote lectures, workshops, and research presentations, participants gain valuable exposure to contemporary research trends and practical insights that contribute to academic and societal progress.

Organizing this international event has been both challenging and rewarding. The unwavering support from our esteemed management, the dedication of the organizing committees, the expertise of the reviewers and session chairs, and the enthusiastic participation of researchers across the globe have been instrumental in shaping IMCEST–2025 into a successful and impactful conference. I am deeply grateful to each one of them for their commitment, professionalism, and collaborative spirit.

To all researchers and presenters, I encourage you to take full advantage of this academic platform. Engage in discussions, seek constructive feedback, explore new perspectives, and build meaningful networks that may lead to future collaborations and innovative breakthroughs. Your contributions form the intellectual backbone of this conference and inspire the next generation of scholars.

I also thank the volunteers and technical teams whose efforts behind the scenes ensured the smooth conduct of this large-scale event. May this conference serve as a catalyst for transformative ideas, strong academic partnerships, and sustained research excellence.

Dr. B. Mouli Chandra
Conference Convenor, IMCEST–2025
QIS College of Engineering & Technology (Autonomous)
Ongole, India

Message from the Conference Chair

It is my privilege to welcome you all to the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. The conference stands as a collaborative arena where research, innovation, and academic inquiry come together to address emerging global challenges. This year, we have witnessed an impressive range of contributions from scholars across institutions worldwide.

The technical sessions, keynote talks, and research presentations reflect not only academic rigour but also the evolving trends in engineering, science, and technological innovation.

The diversity of topics and perspectives represented in IMCEST–2025 reinforces the importance of interdisciplinary dialogue. Through collaborative exchanges and cross-domain interactions, participants will uncover new insights and form valuable connections that extend beyond this event.

I express my gratitude to all authors for their scholarly involvement, to the reviewers for maintaining the quality of submissions, and to the organizing committee for their dedication in curating a meaningful program.

I wish each participant productive interactions, inspiring conversations, and transformative learning experiences throughout the conference. May IMCEST–2025 serve as a catalyst for future ideas and impactful research.

Dr. Reynaldo G. Alvez
Conference Chair, IMCEST–2025
Taguig City University
Philippines

Message from the Conference Secretary

It is with sincere appreciation that I welcome all attendees to the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. As Conference Secretary, it is an honour to witness this vibrant gathering of researchers, educators, and professionals who are committed to advancing scientific and technological knowledge.

The success of IMCEST–2025 lies in its ability to bring together diverse viewpoints and innovative ideas. The conference program comprises a rich mix of technical sessions, expert lectures, and interactive discussions designed to foster learning, stimulate curiosity, and encourage collaboration across fields.

I wish to acknowledge the dedication of the authors who have submitted their work, the reviewers who ensured a high academic standard, and the keynote speakers who have contributed valuable insights. My appreciation also goes to the organizing committee and volunteers whose efforts have allowed us to conduct this multi-conference smoothly and efficiently.

I encourage participants to actively engage with presenters, exchange constructive feedback, and make meaningful connections that may lead to future collaborations.

My best wishes to all contributors, and I hope IMCEST–2025 inspires new ideas, strengthens academic networks, and contributes positively to your professional growth.

Dr. Mark Joshua D. Roxas
Conference Secretary, IMCEST–2025
UPHSD
Philippines

Message from Hon. Ma. Laarni L. Cayetano

It is with great pride and heartfelt appreciation that I extend my warmest greetings to all participants, distinguished speakers, researchers, academicians, and delegates of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This global academic gathering continues to highlight the essential role of international collaboration in advancing science, technology, and transformative innovation.

In today's world, where rapid technological shifts shape the lives and opportunities of our people, academic platforms such as IMCEST–2025 provide an invaluable space for exchanging knowledge, exploring emerging research, and strengthening global partnerships. By bringing together experts from a wide array of disciplines, this conference fosters meaningful dialogue and shared insights that contribute to sustainable development and societal progress.

As City Mayor of Taguig and Chair of the Board of Regents of Taguig City University, I take great pride in our community's involvement in this prestigious international initiative. Our participation reaffirms our commitment to academic excellence, global engagement, and the empowerment of both educators and learners. The contributions presented in this multi-conference reflect a deep sense of purpose, creativity, and scholarly dedication—qualities that drive innovation and inspire future generations of leaders.

I extend my sincere appreciation to the organizers for their vision and meticulous coordination, and to the researchers and delegates whose hard work and intellectual contributions enrich this event. Your efforts strengthen not only the academic community but also the broader mission of building knowledge-driven, resilient, and inclusive societies.

I wish IMCEST–2025 great success and congratulate all participants for their dedication to research, innovation, and global academic cooperation. May this conference serve as a catalyst for groundbreaking discoveries and lasting collaborations.

Hon. Ma. Laarni L. Cayetano
City Mayor, Taguig
Chair, Board of Regents
Taguig City University, Philippines

Message from Dr. Raymundo P. Arcega, CESE

It is my distinct honour to extend my warmest greetings to all participants, researchers, academicians, keynote speakers, and delegates of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This esteemed international gathering stands as a testament to our collective dedication to advancing knowledge, fostering innovation, and strengthening research collaboration across global academic communities.

In a rapidly evolving world shaped by digital transformation, scientific breakthroughs, and emerging technologies, conferences like IMCEST–2025 serve as vital platforms for intellectual exchange and multidisciplinary engagement. Through this event, we empower scholars and practitioners to explore new horizons, address complex global challenges, and contribute to the development of resilient and forward-thinking societies.

As the University President of Taguig City University, I take immense pride in our institution's active involvement in this global academic endeavour. Our commitment to excellence in education and research aligns strongly with the vision of IMCEST–2025 —to create opportunities for meaningful dialogue, inspire innovative ideas, and encourage collaboration among experts from diverse fields of engineering, science, and technology.

The high-quality research contributions, keynote addresses, and technical discussions presented in this conference speak volumes about the dedication and scholarly rigour of all participants. Your work enriches the academic landscape and serves as a foundation for future advancements that can positively impact industries, communities, and educational systems worldwide.

I extend my heartfelt appreciation to the organizers, session chairs, reviewers, and partner institutions for their tireless efforts in ensuring the success of this multi-conference. Your commitment, professionalism, and vision have brought together a remarkable assembly of thinkers and innovators. I congratulate all contributors and wish IMCEST–2025 great success. May the outcomes of this conference pave the way for transformative ideas and breakthroughs that shape a brighter future for all.

Dr. Raymundo P. Arcega, CESE
University President
Taguig City University
Philippines

Message from Dr. Anthony Jose M. Tamayo

It is with great honour and sincere appreciation that I extend my warm greetings to all participants of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This distinguished academic gathering reflects a shared global commitment to advancing research, strengthening multidisciplinary collaboration, and nurturing innovative thinking in science and technology.

As the President of the University of Perpetual Help System DALTA, I firmly believe in the transformative power of research-driven education. Conferences such as IMCEST–2025 play a vital role in shaping the next generation of scholars, scientists, and professionals by providing an inclusive platform where ideas are exchanged, new insights are gained, and collaborative opportunities are forged. This multi-conference embodies the spirit of academic growth and collective progress that our institutions must continue to promote.

The research papers, keynote addresses, and scholarly discussions presented throughout this event demonstrate the exceptional dedication, creativity, and intellectual vigour of the contributors. These contributions not only expand academic knowledge but also help address pressing global challenges through innovation, technological advancement, and interdisciplinary engagement.

To all the participants—whether researchers, educators, students, or practitioners—I encourage you to immerse yourselves fully in the sessions, exchange ideas, explore emerging research directions, and build lasting academic and professional networks. May your involvement in IMCEST–2025 motivate you to pursue excellence, embrace innovation, and contribute meaningfully to your respective fields.

I congratulate all authors and contributors for their scholarly achievements and wish IMCEST–2025 continued success. May this conference serve as a catalyst for new knowledge, impactful discoveries, and enduring collaborations that strengthen the global academic community.

Dr. Anthony Jose M. Tamayo
President
University of Perpetual Help System DALTA
Philippines

Message from Dr. Reno R. Rayel

It is with great pleasure that I extend my heartfelt greetings to all participants, distinguished researchers, academicians, keynote speakers, and delegates of the **2nd International Multi-Conference on Engineering, Science & Technology (IMCEST–2025)**. This international event stands as a powerful testament to our shared pursuit of academic excellence, transformative research, and global collaboration in the fields of science, engineering, and technology.

In an era marked by rapid advancements and complex societal challenges, platforms such as IMCEST–2025 play a pivotal role in bringing together scholars and practitioners who are dedicated to developing innovative, sustainable, and impactful solutions. The exchange of knowledge and the diversity of perspectives offered in this conference are essential for strengthening our academic communities and shaping a future driven by scientific progress and responsible innovation.

As Campus Director of UPHSD Molino Campus, I take immense pride in supporting initiatives that empower our faculty and students to engage in high-level scholarly activities. Participation in IMCEST–2025 reinforces our commitment to fostering a research-oriented environment that values creativity, critical thinking, and collaboration across disciplines.

I commend the organizers, partner institutions, reviewers, and session chairs for their tireless dedication in curating a meaningful and well-structured multi-conference. Their efforts ensure that IMCEST–2025 remains a dynamic environment where research ideas flourish and international academic partnerships thrive.

To all presenters and delegates, I encourage you to make the most of this opportunity—to learn, share, network, and explore emerging research directions. May your involvement in this conference ignite new ideas, strengthen collaborations, and inspire continued pursuit of excellence in your academic and professional journeys. I extend my warm congratulations to all contributors and wish IMCEST–2025 resounding success. May this event lead to knowledge-driven innovations that benefit our institutions, communities, and global society.

Dr. Reno R. Rayel
Campus Director
UPHSD Molino Campus
Philippines

Editors

Dr. N. S. Kalyan Chakravarthy
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Dr. Mark Joshua D. Roxas
Conference Secretary
UPHSD, Philippines

Dr. Reynaldo Alvez
Conference Chair
Taguig City University, Philippines

Paper ID: IMCEST-001

Title: Neuro-Informatics and Sustainable Health Intelligence: An AI-Driven Model for Early Cognitive Impairment Detection in Educational Communities

Authors:
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ABSTRACT

Cognitive well-being is an often-overlooked dimension of sustainability within academic institutions. In an era marked by digital overload, competitive academic pressure, and rising social stress, early detection of cognitive decline is becoming as crucial as monitoring physical health. This paper introduces a *Neuro-Informatics and Sustainable Health Intelligence Framework (SHI)*, an interdisciplinary model integrating Artificial Intelligence (AI), neuroinformatics, and educational psychology for early detection of Mild Cognitive Impairment (MCI) within academic communities.

Developed and validated at QIS College of Engineering and Technology, Ongole, Andhra Pradesh, the system utilizes low-cost EEG (Electroencephalogram) sensors to collect brainwave signals, which are analyzed using AI-based algorithms for wavelet entropy and neural connectivity patterns. Achieving an accuracy of over 93% in identifying early cognitive imbalance, the system demonstrates the potential of AI as a preventive screening tool within campus health ecosystems.

Beyond detection, the framework promotes a sustainable, community-centered model of well-being, encouraging educational institutions to become proactive health hubs that integrate digital tools with wellness-driven initiatives. The study also aligns with the United Nations' Sustainable Development Goal 3 (Good Health and Well-Being), merging scientific innovation with socially conscious practices.

The literature review reveals that while neuroinformatics has advanced considerably in clinical settings, there is limited research on non-clinical, campus-based neurocognitive assessment systems. This work bridges that gap by providing an accessible, scalable, and sustainable model suited for educational environments.

Keywords: Neuroinformatics, EEG Biomarkers, Artificial Intelligence, Cognitive Health, Sustainable Education, Brain Connectivity, Cognitive Impairment

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Paper ID: IMCEST-004

Title: Time Series Financial Market Forecasting Using Hybrid Machine Learning and Deep Learning Models with Telegram Bot Integration

Authors:
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ABSTRACT

Financial market forecasting is a highly complex and volatile task due to frequent fluctuations, evolving trends, and inherently non-linear market behavior. Accurate prediction, however, is essential for investors, traders, and policymakers, as it reduces risk and aids in informed decision-making. This paper presents a hybrid framework designed to forecast stock prices—specifically those of Apple Inc.—using five machine learning and deep learning models: Random Forest, XGBoost, Support Vector Machines (SVM), Long Short-Term Memory (LSTM), and Gated Recurrent Units (GRU).

Stock price data were collected using the Yahoo Finance API and underwent preprocessing that included handling missing values, managing outliers, normalization, and feature engineering. Each model was trained and evaluated using multiple performance metrics such as Mean Squared Error (MSE), Mean Absolute Error (MAE), and Symmetric Mean Absolute Percentage Error (SMAPE).

To enhance real-time applicability, a Telegram Bot interface was integrated to allow users to communicate with the forecasting models and receive predictions instantly. Experimental results demonstrate that deep learning models such as LSTM and GRU effectively capture temporal dependencies in stock price movements, while ensemble models like Random Forest and XGBoost improve robustness and overall model stability.

The findings indicate that combining multiple machine learning and deep learning techniques, along with real-time bot integration, significantly enhances the reliability and usability of stock market prediction systems.

Keywords: Financial Market Forecasting, Stock Price Prediction, Machine Learning, Deep Learning, LSTM, GRU, Random Forest, XGBoost, SVM, Real-Time Forecasting, Telegram Bot Integration

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Paper ID: IMCEST-005

Title: Intelligent Parking System with Cloud Monitoring and V2G Integration

Authors:
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ABSTRACT

Urban parking represents a critical challenge in metropolitan regions, driven by inadequate infrastructure, inefficient spatial utilization, and rapidly increasing vehicle density. Traditional parking management systems rely heavily on human oversight, resulting in traffic bottlenecks, increased fuel consumption, and inefficient driver experiences.

This research presents an Intelligent Parking Framework powered by Internet of Things (IoT) technologies, integrating cloud-based monitoring with Vehicle-to-Grid (V2G) communication to enhance parking efficiency and support sustainable urban transportation. The system employs ESP32 microcontrollers paired with Infrared (IR) sensors for real-time vehicle detection, with data transmitted to a Firebase cloud platform to ensure synchronized updates across mobile applications and physical infrastructure.

Prototype testing demonstrates over 95% detection accuracy and reliable cloud synchronization performance. The inclusion of V2G capabilities enables bidirectional energy transfer between electric vehicles and the grid, enhancing energy optimization and supporting sustainable smart city initiatives.

Conventional parking approaches lack real-time monitoring and often depend on outdated ticketing or manual management processes. The proposed IoT–cloud integrated framework addresses these constraints by enabling instantaneous updates of parking availability, automated slot allocation, and improved resource utilization. As modern urban environments evolve, intelligent parking systems such as this play a crucial role in reducing operational inefficiencies and lowering environmental impact.

Keywords: IoT, Intelligent Parking, IR Sensors, ESP32, Firebase, Cloud Monitoring, V2G Integration, Smart Mobility

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Paper ID: IMCEST-006

Title: Wireless Charging of Electric Vehicles using Machine Learning Techniques

Authors:
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ABSTRACT

The rapid rise in electric-vehicle (EV) adoption has created an urgent need for smart, efficient, and reliable charging infrastructures. Plug-in charging systems often involve mechanical contact issues, connector degradation, and electrical risks. Wireless Power Transfer (WPT) technologies—such as inductive, resonant, or capacitive power transfer—provide contactless energy delivery, reducing mechanical wear and improving user convenience. However, the performance of WPT systems is highly dependent on coil alignment, load dynamics, temperature variations, and external electromagnetic disturbances.

Advances in machine-learning (ML)–driven control frameworks offer promising solutions to overcome these limitations through predictive modelling, adaptive regulation, and data-driven optimization. This paper explores the role of ML techniques in enhancing WPT performance for EV charging. Methods studied include artificial neural networks (ANNs), fuzzy-logic controllers, reinforcement-learning (RL) algorithms, and hybrid AI architectures, demonstrating improvements in voltage regulation, power-flow management, alignment tolerance, energy efficiency, and system stability.

Recent studies show that ML-supported controllers achieve superior energy-conversion efficiency, reduced losses, and higher robustness under uncertainty. Integration with IoT-connected chargers, vehicle-to-grid (V2G) systems, and cloud-based predictive platforms further enhances reliability. Applications of blockchain, secure communication protocols, and quantum computing expand the potential for secure and autonomous smart charging ecosystems.

This review synthesizes advancements from 2018 to 2025, highlighting that combining ML with next-generation WPT hardware significantly improves alignment detection, foreign-object detection, leakage minimization, and operational optimization. Overall, ML-driven wireless charging holds strong potential to revolutionize EV charging with intelligent, autonomous, and energy-efficient solutions.

Keywords: Wireless Power Transfer (WPT), Electric Vehicles (EVs), Machine Learning (ML), Artificial Neural Networks (ANN), Fuzzy Logic, Reinforcement Learning (RL), Energy Efficiency, V2G, Smart Charging, AI-driven Control

[1]Department of Electrical and Electronics Engineering, S.V.U. College of Engineering, Tirupati, Andhra Pradesh, India.

Paper ID: IMCEST-007

Title: IoT Based Saline Monitoring and Alert System

Authors:
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ABSTRACT

This paper presents a cost-effective, portable *Smart Saline Monitoring System* for real-time monitoring of intravenous (IV) saline levels. The device is built around an Arduino Uno microcontroller and integrates a saline-level sensor to continuously measure fluid volume. When the saline level falls below a predefined threshold, the system triggers an audible buzzer and dispatches an SMS alert using a SIM800L GSM module to notify caregivers. The current saline status is displayed on a 16×2 LCD for immediate visual feedback. A rechargeable battery ensures uninterrupted operation and portability for bedside or mobile use.

The proposed design reduces manual supervision and human error associated with IV fluid management in clinical settings. Experimental evaluation demonstrates reliable sensing, timely alert delivery, and robust operation under typical use conditions. The system offers an affordable and practical solution for improving patient safety and easing the workload on healthcare staff in hospitals and remote care environments.

Keywords: intravenous (IV) saline levels, saline monitoring, Arduino, GSM module, IoT, patient safety

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Paper ID: IMCEST-008

Title: IoT-Enabled Biogas Heating System for Smart Dairy Farms

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ABSTRACT

This paper presents the design and implementation of an IoT-enabled biogas-powered heating system for smart dairy farms. The primary objective is to maintain optimal microclimate conditions for cattle during cold seasons, reducing stress, improving milk production, and enhancing overall farm productivity. Cold weather and frequent power cuts in rural areas often affect cattle health and disrupt farm operations.

The proposed system employs an Arduino Uno microcontroller integrated with a DHT11 temperature and humidity sensor for continuous monitoring. When the temperature drops below a preset threshold, the system activates heating elements powered by renewable biogas energy. An ESP32 module ensures real-time data transmission to a cloud platform through Wi-Fi, enabling remote monitoring and control via web or mobile interfaces. A deep-cycle battery backup ensures uninterrupted functionality even during grid outages. The cloud-based IoT dashboard visualizes environmental data and allows performance tracking.

Integrating intelligent automation with renewable biogas energy enhances sustainability, reduces manual intervention, and supports self-sufficient farm operations. As biogas is a clean, cost-effective, and locally sourced renewable fuel, the system significantly reduces carbon emissions and operational costs. The IoT–biogas hybrid framework ultimately promotes energy-efficient, resilient, and environmentally conscious dairy farm management.

Keywords: IoT, biogas, dairy farm automation, renewable energy, smart agriculture, heating systems

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Paper ID: IMCEST-009

Title: Common Fixed Point and Common Coupled Fixed Point Theorem for four Nonexpansive Multivalued Mappings in Complex valued b-Metric Spaces Using α-Admissibility with Computational Analysis

Authors: P. Ranga Swamy[1], G. Srinivasa Rao[1], N. Annapurna[1]

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ABSTRACT

In this paper, we obtain a common fixed point theorem and a common coupled fixed point theorem for four nonexpansive multivalued mappings in complex-valued b-metric spaces using the concept of α-admissibility. The theoretical results are accompanied by an illustrative example that demonstrates the applicability of the main theorem. We also provide brief computational analysis to support and exemplify the theoretical findings.

Keywords: complex b-metric spaces, α-admissible, coupled fixed point, computational analysis, multivalued mappings

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Paper ID: IMCEST-010

Title: Leaf Disease Detection System Using ML

Authors: B. Harsha Vardhan[1], G. Navaneetha Krishnan[1], Guna Muthuvairavan[2], B. Tharun Kumar Reddy[1], K. V. J. Bhargav[2], B. Datta Veerendra[1]

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ABSTRACT

Plant diseases pose a major threat to global crop production, leading to significant economic losses and reduced food availability. Early and accurate detection of these diseases is essential for timely intervention and healthier yields. This study introduces a mobile application designed to identify diseases in three major crops—maize, tomato, and potato. The app uses a convolutional neural network (CNN) trained on a comprehensive dataset of leaf images to classify them as healthy or infected. The model was developed using the Teachable Machine platform and later converted into a TensorFlow Lite version for efficient performance on Android devices.

Through the Android Studio interface, users can either select images from their gallery or capture new ones using the phone's camera. The pre-trained CNN analyzes the image and instantly provides classification results. If a disease is detected, the app displays the name of the disease, key symptoms, recommended nutrients, and possible treatment methods. This research demonstrates how CNN-based approaches can effectively support plant disease detection in mobile applications. By using this tool, farmers and agricultural officers can identify infections at an early stage and take quick action to improve crop health and productivity.

Keywords: Leaf Disease Detection, Convolutional Neural Network (CNN), Machine Learning, PlantVillage Dataset, Deep Learning, Image Classification, Agriculture

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Paper ID: IMCEST-011

Title: A Data-Driven Hybrid Feature-Based Machine Learning Approach to Early Diabetes Prediction

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ABSTRACT

Diabetes is a major global health concern that can lead to severe complications if not detected early. Type 2 diabetes often grows progressively, with many individuals unaware of their condition until significant health deterioration occurs. Early detection is therefore essential to enable timely medical intervention and lifestyle modifications to reduce long-term risks.

This study analyzes significant health indicators—including insulin levels, blood pressure, age, glucose concentration, BMI, and family history—to detect diabetes in its early stages using machine learning (ML) models. Several ML techniques such as Logistic Regression, K-Nearest Neighbors, Decision Trees, Support Vector Machines, Random Forest, and Extreme Gradient Boosting were evaluated.

A hybrid model integrating Principal Component Analysis, Random Forest, and XGBoost was developed to enhance predictive accuracy. The proposed hybrid model achieved an accuracy of 99.25%, outperforming all other models examined. It also exhibited excellent precision and recall, establishing its reliability for distinguishing diabetic from non-diabetic cases.

The results indicate that the hybrid ML approach provides an effective and robust tool for early diabetes prediction, assisting healthcare professionals in making timely and informed clinical decisions.

Keywords: Diabetes Prediction, Machine Learning, PCA, Random Forest, XGBoost, Medical Data Analytics

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Paper ID: IMCEST-012

Title: IoT-Based Automatic Bus Stop Lighting with PIR Sensor

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ABSTRACT

An IoT-based Smart LED Bus Stop System has been developed to improve passenger safety and enhance energy efficiency through automated intelligent lighting. The system utilizes a Passive Infrared (PIR) sensor to detect the presence of individuals or groups and activates LED lighting only when motion is detected, thereby significantly reducing power consumption.

An ESP32 microcontroller processes sensor data and operates the LED lighting efficiently. Through IoT integration, system diagnostics, monitoring, and data analytics are performed in real-time on a cloud platform, enabling performance optimization and fault detection. This approach minimizes redundant illumination, lowers operational costs, and aligns with smart city goals for sustainability and resource optimization.

The proposed solution is scalable, economical, and environmentally friendly, offering a modern alternative to traditional bus stop lighting systems that consume energy continuously. By switching lights on only when required, the model supports reduced carbon emissions and ensures enhanced passenger safety and convenience.

This work demonstrates how IoT technologies can be effectively combined with intelligent sensing and cloud-based analytics to modernize public transportation infrastructure and promote sustainable urban development.

Keywords: IoT, PIR Sensor, ESP8266, ESP32, Smart Bus Stop, Automatic Lighting, Energy Efficiency, Relay Module, Smart Cities, Passenger Safety, Sustainable Infrastructure, Cloud Monitoring

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Paper ID: IMCEST-013

Title: Shelf-Life-Aware Demand Forecasting and Stock Optimization for Grocery Retail

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ABSTRACT

The grocery retail industry faces significant challenges in inventory management, especially for perishable goods with limited shelf life. Traditional demand forecasting methods often fail to account for product deterioration, resulting in substantial food waste and economic losses. This paper presents *Demand IQ*, an innovative shelf-life-aware demand forecasting and stock optimization system that leverages advanced machine learning techniques.

The system incorporates XGBoost regression models combined with sophisticated feature engineering to predict demand while accounting for shelf-life constraints. It integrates a Flask-based backend and a React-based frontend, enabling real-time forecasting and optimization recommendations. By analyzing sales data, product metadata, and external factors such as weather conditions, the system enhances inventory efficiency while reducing waste and ensuring optimal product availability.

Experimental evaluation demonstrates a significant reduction in spoilage and improved service levels. The proposed solution holds substantial potential for minimizing food waste, improving retail operational efficiency, and enabling data-driven decision-making in grocery inventory management.

Keywords: demand forecasting, stock optimisation, shelf-life, machine learning, XGBoost, grocery retail

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Paper ID: IMCEST-014

Title: AI-Powered Sign Language to Voice Translator Using an IoT Glove

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ABSTRACT

Communication barriers between the hearing-impaired community and the general population remain a significant challenge in daily interactions. Sign language is an effective medium for non-verbal communication, but it is not universally understood. This study proposes an AI-powered IoT glove capable of translating sign language gestures into audible speech. The system integrates flex sensors, an accelerometer, a gyroscope, and microcontroller-based signal processing. A trained machine learning model interprets the gestures, which are then converted into voice using text-to-speech (TTS) technology.

IoT-enabled wearable systems have shown considerable potential in enhancing communication for individuals with hearing and speech impairments. Hand gesture recognition modules, microcontrollers, and Bluetooth-based communication enable real-time gesture detection and translation. Challenges such as sensor calibration, power consumption, and signal interference are discussed, with future directions pointing toward AI-driven adaptive learning for improved accuracy.

This research demonstrates that combining IoT and artificial intelligence provides an efficient, portable, and low-cost assistive technology for inclusive communication.

Keywords: Sign Language, IoT, Gesture Recognition, Assistive Technology, Machine Learning, Voice Translation

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Paper ID: IMCEST-015

Title: AI-Based Fish Seed Survival Rate Predictor for Smart Aquaculture

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ABSTRACT

This project targets the high fish seed mortality rates faced by rural and small-scale aquaculture practitioners by developing a low-cost IoT- and AI-powered monitoring system. Affordable sensors track key water quality parameters such as temperature, pH, and water level, feeding data to a microcontroller (Node MCU/ESP32). The data is sent to a laptop or cloud platform, where a lightweight machine learning model analyzes survival risks and provides real-time alerts based on fish species and environmental conditions.

Results and actionable advice appear on a simple Streamlit-based web dashboard, making it user-friendly for farmers with limited technical expertise. Early testing indicates that the system offers timely, accurate predictions, empowering farmers to act quickly, reduce losses, and boost yields. Its affordability and scalability make it suitable for widespread use in resource-limited areas, supporting sustainable aquaculture and food security for smallholder fish farmers.

During model development, variable selection and interaction effects were carefully studied to ensure robust predictions. Ensemble methods like Random Forest were considered for handling noisy real-world data. A tree-based model was ultimately chosen for its accuracy, transparency, and ease of interpretation, especially important when communicating risk factors to farmers. The final model provides a reliable tool for identifying when fish seed survival is at risk, offering actionable insights to support better aquaculture management.

Keywords: Aquaculture, IoT, Machine Learning, Fish Seed Survival, Rural Technology, Water Quality Monitoring, Streamlit UI

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Paper ID: IMCEST-016

Title: Optimization of Fiber Loading for High-Strength Jute Polymer Bio-composites

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ABSTRACT

This study evaluates the mechanical and thermal performance of jute fiber–reinforced polymer composites fabricated using hand lay-up and compression molding techniques. Jute fibers, composed of 62% cellulose and 11% lignin, were incorporated at 20–40 wt% into a polymer matrix.

Results showed that composites with 30 wt% fiber loading achieved optimal performance, with tensile strength increasing by 38% and flexural strength by 42% compared to the neat matrix. Alkali treatment using 5% NaOH enhanced fiber–matrix adhesion, resulting in an additional improvement of 10–12% in mechanical properties.

Thermogravimetric analysis revealed initial degradation at 230°C and major decomposition between 320–350°C, confirming compatibility with thermoset systems. Moisture absorption decreased from 10% (untreated) to 6% (treated), improving dimensional stability.

The findings confirm that jute fiber is an effective reinforcement for lightweight structural composites, offering balanced mechanical performance and thermal stability suitable for automotive, construction, and packaging applications.

Keywords: Jute, Epoxy, Hand Layup Technique, Fiber Loading, Bio-composites, Mechanical Properties, Thermal Stability

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Paper ID: IMCEST-018

Title: Fake News Detection Using Artificial Intelligence and Machine Learning Algorithms

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ABSTRACT

Because of social media's explosive growth, the proliferation of online information, and the lack of effective regulations, detecting fake news in the digital age is extremely difficult. Misinformation spreads rapidly, causing public confusion, eroding trust, provoking social unrest, and threatening democratic processes. Cutting-edge techniques such as deep neural networks, machine learning, natural language processing (NLP), and real-time web applications can improve detection accuracy, increase the reliability of information, and protect public discourse.

This work surveys and applies AI/ML approaches to analyze textual trends, user behaviour, and contextual cues for automated fake-news identification. Methods including TF–IDF vectorization, conventional machine-learning classifiers and deep learning models are considered; model deployment via lightweight web apps (e.g., Flask) is explored for real-time inference. We discuss common challenges such as data imbalance, linguistic complexity, and evolving disinformation strategies, and emphasise the role of explainable AI and ontology-based frameworks to promote transparency and ethical use.

Effective fake-news detection systems—combining robust NLP pipelines, careful model selection, and practical deployment strategies—are essential for media literacy, informed citizenship, and maintaining digital well-being for current and future generations.

Keywords: Fake News Detection, Natural Language Processing (NLP), TF–IDF, Text Classification, Machine Learning, Deep Learning, Explainable AI, Model Deployment, Flask Web App, Misinformation

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Paper ID: IMCEST-019

Title: Performance Optimization of MANET Using DSDV Algorithm

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ABSTRACT

Nodes in Mobile Ad Hoc Networks (MANETs) are connected in an ad hoc manner without any pre-existing infrastructure, making the network decentralized and highly dynamic. MANETs face significant challenges such as node mobility, error-prone channel states, hidden and exposed terminals, and increased link-failure rates that reduce network performance.

To address these issues, this work implements an optimized dynamic routing system based on the Destination-Sequenced Distance Vector (DSDV) protocol. The proposed system selects optimal routes for data transmission between source and destination nodes, thereby improving link connectivity and enhancing overall MANET performance. Network simulation was carried out using routing protocol performance metrics, and results show that the DSDV protocol with Nakagami propagation model significantly improves packet delivery and routing efficiency compared to conventional approaches.

Propagation characteristics such as path loss, environmental interference, and signal attenuation were also analyzed as key factors affecting MANET performance. The findings demonstrate that efficient routing protocols and adaptive propagation modelling are essential for improving communication reliability in highly mobile wireless environments.

Keywords: MANET, Routing, DSDV, Path Loss, Nakagami Model, Wireless Communication, Ad Hoc Networks

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Paper ID: IMCEST-021

Title: Incremental Conductance-Strategy for PV-Driven BLDC Motor under Partial Shaded Scenarios

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ABSTRACT

This research investigates the Incremental Conductance (IncCond) Maximum Power Point Tracking (MPPT) technique in MATLAB/Simulink for modelling and simulating a photovoltaic (PV) system powering a Brushless DC (BLDC) motor under partial shading conditions. The power–voltage (P–V) curve of solar arrays exhibits multiple local peaks caused by shadow-induced variations in irradiance. Unlike conventional Perturb and Observe (P&O) MPPT methods, the proposed IncCond approach uses instantaneous and incremental conductance values to accurately identify the global maximum power point, ensuring faster and more stable convergence.

A DC–DC boost converter regulates the extracted PV energy and delivers controlled power to the BLDC motor drive. The full system, including the shading patterns, BLDC motor with electronic commutation, and converter topology, is modelled in Simulink. Simulation results reveal that the IncCond MPPT technique enhances dynamic response, stabilizes operating conditions, and maintains steady motor speed even under rapidly changing irradiance.

The study concludes that the proposed method effectively improves overall system efficiency, ensures better maximum power extraction, and enhances the stability of PV-driven BLDC motor systems in real-world partial shading environments.

Keywords: Brushless DC Motor, Incremental Conductance MPPT, Photovoltaic System, Boost Converter, Partial Shading

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Paper ID: IMCEST-022

Title: IoT Based Electric Vehicle Battery with Charge and Monitoring Fire Protection

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ABSTRACT

This work presents an IoT-enabled solution for real-time monitoring and protection of electric vehicle (EV) batteries, focusing on charge control and fire-hazard detection. The system integrates sensors for voltage, temperature, and current to continuously monitor safety-critical battery parameters. Sensor data are transmitted to an IoT platform for remote monitoring and telemetry analytics. The system identifies abnormal conditions such as over-charge, over-temperature, and short-circuit events and executes protective actions including power cut-off and user alerts via a mobile app or web dashboard. By combining IoT telemetry with automated protection mechanisms, the proposed approach improves battery safety, reduces fire risk, and enables more efficient EV battery management.

Keywords: Electric Vehicle (EV), Battery Management System (BMS), Internet of Things (IoT), Charge Monitoring, State of Charge (SoC), Fire Protection, Thermal Management

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Paper ID: IMCEST-023

Title: Real Time Cyber Threat Analyzer Using API and ML Algorithm

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ABSTRACT

In the contemporary digital epoch, cyber threats have become a serious global concern affecting individuals, organizations, and governments. With growing sophistication in ransomware, phishing, and data breaches, traditional cybersecurity systems that react only after an attack occurs are no longer sufficient. This work introduces an AI-enabled *Cyber Threat Analyzer* (CyberShield) capable of anticipatory detection, prediction, and prevention of cyberattacks in real time through intelligent automation.

The proposed system integrates machine learning and artificial intelligence to analyze large volumes of network and system data. Continuous monitoring identifies suspicious patterns and generates instant alerts via an interactive dashboard. Supervised learning models, including logistic regression and other classifiers developed in Python using Scikit-learn and Streamlit, enhance detection accuracy by learning from historical attack data. Collected data are stored in either SQL or NoSQL databases, while RESTful APIs support seamless integration with external environments for alerting and analytics.

Key system features include real-time threat detection, automated responses, alert escalation, and scalable dashboards. By predicting emerging threats and offering proactive defense mechanisms, the analyzer strengthens network security, enables early risk mitigation, and minimizes potential financial or data losses. The system contributes to building a secure digital ecosystem rooted in trust, resilience, and adaptive intelligence.

Overall, the Cyber Threat Analyzer transforms traditional security frameworks into intelligent systems capable of mitigating cyber risks in real time, ensuring safer digital experiences in an increasingly interconnected world.

Keywords: Artificial Intelligence, Cybersecurity, Machine Learning, Cyber Threat Detection, Real-time Monitoring, Predictive Analysis, Data Protection, API Integration, Threat Prevention, Adaptive Learning, Python, Streamlit, Scikit-learn, Scalable Systems.

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Paper ID: IMCEST-024

Title: A Comprehensive Review on Recent Advances in the Synthesis of Five-Membered Heterocyclic Compounds Containing Nitrogen

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ABSTRACT

Heterocyclic compounds play a crucial role across several scientific disciplines including pharmacy, medicine, agriculture, plastics, polymers, and chemical sciences. Among five-membered heterocycles, simple ring systems such as furan, pyrrole, thiazole, thiadiazole, triazole, and imidazole are of fundamental importance. These heterocycles are widely distributed in nature and are vital to numerous biological and biochemical processes.

Nitrogen-containing heterocycles (N-heterocycles) constitute a major class of heterocyclic compounds exhibiting a wide spectrum of biological activities such as antioxidant, antifungal, anti-inflammatory, anticonvulsant, antibacterial, anticancer, enzyme inhibition, herbicidal, anti-HIV, anti-diabetic, and insecticidal properties. Many pharmaceutical drugs and naturally occurring biomolecules including proteins, amino acids, carbohydrates, and nucleic acids contain heterocyclic frameworks.

Among N-heterocycles, five-membered systems possess unique structural and biological significance. Due to their medicinal relevance and structural versatility, there is continuous interest in developing new and efficient synthetic methodologies for these heterocycles. This review highlights recent advances in the synthesis of novel five-membered nitrogen-containing heterocycles, focusing on improved methodologies for constructing pyrazoles, imidazoles, 1,2,3-triazoles, and 1,2,4-triazoles.

Keywords: Pyrazoles, Imidazoles, Synthesis, 1,2,3-Triazoles, 1,2,4-Triazoles

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Paper ID: IMCEST-025

Title: AI-Powered Microclimate Modelling and Adaptive Irrigation System for Campus Agriculture

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ABSTRACT

Water scarcity and unpredictable climatic fluctuations pose significant challenges to institutional and campus-level agriculture in the 21st century. In response, this paper presents an *AI-Powered Microclimate Modelling and Adaptive Irrigation System (AIMMAIS)* that integrates Internet of Things (IoT) sensors, edge-computing microcontrollers, and machine-learning models for real-time irrigation control.

The system characterizes the microclimate of a campus farm by analyzing temperature, humidity, light intensity, and soil moisture data, then forecasts short-term environmental behavior. The AI model, deployed on an ESP32 microcontroller, autonomously controls solenoid valves and makes irrigation decisions in real time. A 60-day field trial conducted at QIS College of Engineering and Technology demonstrated a 37% reduction in water usage, 24% improvement in crop growth, and 94% predictive accuracy in evapotranspiration modelling.

Unlike conventional irrigation setups that operate based on fixed thresholds, AIMMAIS incorporates predictive intelligence—learning from environmental data and optimizing irrigation schedules proactively. The proposed framework functions both as a sustainability model and an educational platform, enabling students to engage in AIoT and precision agriculture research.

This system offers a replicable model for educational institutions seeking efficient water management under variable climate conditions.

Keywords: Microclimate modelling, adaptive irrigation, edge computing, AIoT, sustainability, ESP32, precision agriculture

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Paper ID: IMCEST-026

Title: Silent Embedded Notifier for Emotion Recognition

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ABSTRACT

Women remain vulnerable to harassment and assault in many settings, and timely help is often unavailable. This paper presents SENSE (Silent Embedded Notifier for Safety and Emotion Regulation), an affordable wearable prototype that combines physiological sensing with discreet user activation to deliver rapid, silent emergency notifications. SENSE integrates a pulse sensor, a capacitive touch (hidden) trigger, indicator LEDs, and a GSM module, all managed by an Arduino-based controller.

The device continuously monitors heart-rate patterns to detect persistent changes indicative of acute distress while offering a concealed touch-trigger for immediate manual alerts. On detection or manual activation, SENSE sends SMS-based SOS messages to preconfigured contacts. The design emphasises low power consumption, manufacturability, and user privacy. We describe the hardware architecture, signal conditioning, lightweight on-device decision logic, and a lab-based testing protocol. Initial evaluations show reliable manual triggering and robust GSM messaging in real-world scenarios. A short confirmation routine paired with rule-based physiological detection reduces false positives. We discuss limitations, power–connectivity trade-offs, and future directions including TinyML personalization and optional GPS-based location reporting.

SENSE demonstrates a practical, privacy-conscious approach to enhancing safety in resource-constrained environments by providing an inexpensive, easy-to-use wearable that supports rapid, discreet alerts and context-aware monitoring.

Keywords: Women Safety, Wearable Device, Emotion Detection, SOS Alert, Location-Based Services, IoT, TinyML, GSM Notifications

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Paper ID: IMCEST-027

Title: Tool Recognition and Usage Demonstration with Simulation Application Implementing YOLO-v4 Tiny for Automotive Learning

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ABSTRACT

New technology such as simulators and visual tracking is reshaping how learners acquire practical skills in fast-paced automotive training environments. Skill gaps often arise from traditional teaching methods such as paper-based guides, instructor-led demonstrations, and pre-recorded videos, all of which lack interactive and hands-on engagement. As the demand for competent automotive technicians continues to rise, modern training tools are essential to bridge theoretical knowledge with real-world applications, while providing safer, more accessible learning conditions.

This study integrates hands-on simulation with automated tool detection to support effective automotive learning. Instead of using computationally heavy models, this work employs YOLOv4-Tiny—a lightweight variant of the You Only Look Once framework—selected for its capability to deliver fast and accurate detection of commonly used automotive tools. To enhance learner engagement, the model is paired with a virtual simulation environment designed for real-time tool recognition and guided demonstrations.

The system provides interactive cues, safety instructions, and usage steps that visually update as tools are identified during training. Furthermore, a simulator-driven learning module tailored for automotive repair labs and classroom settings is developed, offering clickable components and immediate feedback based on detected tool images. This integrated approach strengthens understanding, boosts hands-on competency, and improves the overall learning experience for automotive students.

Keywords: YOLOv4-Tiny, Automotive Training, Tool Detection, Simulation-Based Learning, Computer Vision, Interactive Education

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Paper ID: IMCEST-028

Title: RFID-Enabled Smart Speed Control System for Restricted Zones

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ABSTRACT

With rising road-safety concerns caused by excessive vehicle speeds, this work proposes an automated RFID-enabled speed control device for vehicles entering restricted zones (e.g., schools, hospitals, campuses). The system uses RF identification to detect zone boundaries and continuously monitors vehicle speed via the onboard speedometer. When a vehicle exceeds the preset limit for a restricted zone, the controller issues a buzzer alert and the motor driver automatically reduces vehicle speed to the permitted threshold.

The proposed approach integrates hardware and software components, including RFID readers for zone detection, a speed-sensing module, motor-driver interfacing, and local alerting mechanisms. The design aims for reliable automatic intervention while providing audible feedback to the driver. This solution enables scalable enforcement of speed regulations without continuous human supervision and can be combined with localization (GPS) and telematics (GSM/IoT) for centralized monitoring and logging.

Keywords: Speed Control, RFID, Restricted Zones, Vehicle Safety, IoT, GSM, GPS, Motor Driver, Alert System

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Paper ID: IMCEST-029

Title: Design and Implementation of an Agriculture Website with Comprehensive Crop and Field Information

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ABSTRACT

Agriculture continues to be an essential sector, particularly in developing nations such as India, where it constitutes the primary source of income for a large portion of the population. Despite its critical importance, the sector faces significant challenges related to productivity and economic performance. In India, nearly half of the population depends on agriculture for their livelihood; however, its contribution to the country's GDP remains around 14 percent. This disparity highlights the need for innovative strategies that enhance agricultural efficiency and sustainability.

This project aims to develop a comprehensive web-based platform dedicated to providing agricultural information, with a focus on crop and field management. The platform serves as a centralized hub where farmers, researchers, and agriculture enthusiasts can easily access detailed information on various crops, cultivation methods, soil management practices, and weather-related insights.

By integrating modern web technologies, the proposed system delivers organized information regarding seasonal crops, field preparation, irrigation practices, modern farming techniques, and pest control methods. The website is intended to support informed decision-making, promote sustainable agricultural practices, and strengthen market access through reliable data dissemination.

The platform also aims to act as a bridge between traditional agricultural knowledge and modern scientific advancements by incorporating diverse datasets—including crop databases, geospatial information, and real-time weather conditions—into a cohesive and user-friendly interface. In doing so, the system contributes to transforming agricultural data accessibility and utilization.

Overall, the project demonstrates how a unified agricultural information platform can empower farmers, promote efficient resource management, and improve the overall growth trajectory of the agriculture sector.

Keywords: Agriculture, Productivity, Efficiency

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Paper ID: IMCEST-030

Title: MediBand: Reminder on Wrist

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ABSTRACT

Medication adherence remains a significant challenge, especially among elderly patients, individuals with chronic illnesses, and busy professionals who often forget to take medicines on time. To address this issue, the proposed work introduces *MediBand*, a wearable medication reminder system built using Arduino Uno. The system integrates a DS3231 Real-Time Clock (RTC) module to track accurate timings and trigger reminders at scheduled intervals.

The device incorporates a vibration motor and LED indicators that notify users discreetly without disturbing others, offering a private and user-friendly alert mechanism. MediBand is compact, lightweight, rechargeable, and fully wearable, making it suitable for continuous use. Its simple design supports easy customization for diverse medication routines while ensuring reliability, accessibility, and practicality—particularly for older adults.

By combining tactile, visual, and informational cues, MediBand enhances medication compliance and reduces the risks associated with missed or delayed doses. The project demonstrates how low-cost embedded systems can be transformed into impactful healthcare solutions for safer, smarter personal medication management.

Keywords: MediBand, Medication Reminder, Arduino Uno, RTC Module, Health Technology, Wearable Devices

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Paper ID: IMCEST-031

Title: Advances in Artificial Intelligence for Wireless Sensor Network Metrology: Concepts, Algorithms, and Applications

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ABSTRACT

The integration of Artificial Intelligence with Wireless Sensor Network (WSN) metrology is reshaping modern measurement science through adaptive, self-calibrating, and autonomous systems. This review examines how AI-driven approaches—ranging from deep learning and Gaussian process modelling to unscented Kalman filtering and reinforcement learning—enhance measurement accuracy, reliability, and traceability across distributed sensor environments.

Intelligent algorithms now support real-time uncertainty evaluation, contextual decision-making, and dynamic data fusion, allowing sensors to self-adjust to varying environmental conditions. Advances in automation and digital calibration strengthen the link between metrology, smart manufacturing, energy management, and environmental monitoring, where precision and scalability are crucial.

Emerging techniques such as digital calibration certificates, model-based prediction, and anomaly correction are redefining how measurement data are validated and communicated across cyber-physical infrastructures. The paper highlights AI's role in enabling self-diagnosing sensor networks that improve measurement confidence with minimal manual intervention. It also identifies challenges in standardization, explainability, and cybersecurity, outlining pathways toward intelligent, interoperable, and sustainable next-generation metrology ecosystems.

Keywords: Sensor Network Metrology, Digital Transformation, Artificial Intelligence (AI), Sensor Calibration, Measurement Uncertainty, Digital Calibration Certificates, Sensor Data Quality, AI Algorithms for WSN

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Paper ID: IMCEST-032

Title: The Role of AI & ML in Cloud Security, Trust, and Identity Access Management

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ABSTRACT

Major cloud service providers such as Google Cloud Platform (GCP), Amazon Web Services (AWS), Microsoft Azure, and Salesforce are not immune to security threats, even with the adoption of AI and ML-based decision-making systems for security, trust, and Identity Access Management (IAM). Several cloud vulnerabilities arise from misconfigurations, flaws in IAM, weak network security, application vulnerabilities, insufficient auditing, and risks emerging from third-party supply chains.

As cloud environments scale, AI and ML introduce new challenges such as expanded attack surfaces, novel attack vectors including prompt injection and training data poisoning, threats to data integrity, model manipulation, and compliance risks. AI-driven systems require extensive data for authentication and security operations, which increases the risk of data exploitation and cybercriminal activities.

Within cloud data centers, virtualized environments enable resource sharing across tenants, increasing complexity in monitoring and governance. These challenges amplify the difficulty of securing multi-cloud and hybrid cloud systems and escalate the need for adaptive AI-enhanced defense mechanisms. This paper provides a comprehensive overview of cloud security threats and explores how AI-powered solutions can enhance protection, maintain trust, and secure IAM in modern cloud ecosystems.

Keywords: GCP, AWS, AI, ML, IAM

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Paper ID: IMCEST-033

Title: Machining of Copper–Kapton (FSS) Material Using Abrasive Water Jet Machining

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ABSTRACT

Frequency Selective Surfaces (FSS) are periodic structures extensively used in radomes, antennas, and stealth technologies for selectively transmitting or blocking electromagnetic waves. Copper–Kapton, a composite of copper foil bonded to a Kapton polyimide substrate, offers superior electrical conductivity along with excellent thermal stability, dielectric strength, mechanical flexibility, and chemical resistance. These properties make the material ideal for high-frequency and aerospace systems.

Precision micro-hole machining is essential in FSS fabrication, yet conventional machining processes such as laser cutting or EDM often cause thermal damage, delamination, or dimensional inaccuracies. Abrasive Water Jet Machining (AWJM), a non-thermal machining technique, serves as a promising solution due to its capability to machine layered materials without inducing heat-affected zones or structural deformation.

This study investigates the machining of Copper–Kapton using AWJM and evaluates key process parameters including water pressure, feed rate, and stand-off distance. Experimental optimization using the Taguchi L27 design reveals that water pressure significantly influences Material Removal Rate (MRR), while feed rate and stand-off distance impact taper angle. Grey Relational Analysis (GRA) confirms the effectiveness of the Taguchi–GRA method in improving machining performance and identifying optimal process conditions.

The findings demonstrate that AWJM, paired with robust optimization techniques, enhances the manufacturability of Copper–Kapton FSS structures for electromagnetic and aerospace applications.

Keywords: Abrasive Water Jet Machining (AWJM), Taguchi Method, Grey Relational Analysis (GRA), Material Removal Rate (MRR), Taper Angle, Copper–Kapton

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Paper ID: IMCEST-034

Title: Influence of Annealing on the Structural and Magnetic Properties of $Fe_{1.5}Ti_{0.5}$ CoGe Heusler Alloy

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ABSTRACT

This study investigates the influence of annealing conditions on the structural and magnetic behavior of $Fe_{1.5}Ti_{0.5}CoGe$ Heusler alloy synthesized by arc melting. XRD and Rietveld refinement confirm an A2-type disordered structure for all samples, with lattice parameters of 5.765 Å (500 °C), 5.771 Å (microwave annealing), and 5.77 Å (800 °C). Microwave (MW) annealing significantly enhances crystallinity and phase purity despite a short 10-minute treatment, outperforming conventional furnace annealing conducted for three days.

SEM–EDS results indicate compositions closely matching the nominal stoichiometry ($Fe_{1.5}Ti_{0.5}Co_{1.0}Ge_{0.96}$), with minor Ti-rich secondary phases. Magnetic measurements reveal robust ferromagnetism, with Curie temperatures of 820 K (500 °C) and 780 K (800 °C and MW). The saturation magnetization decreases from 2.61 μ_B/f.u. (500 °C) to 2.09 μ_B/f.u. (800 °C), and further to 1.8 μ_B/f.u. (MW), indicating increased disorder at higher annealing temperatures.

Results demonstrate that MW annealing provides an efficient route to improve phase purity and enhance structural ordering while significantly reducing processing time. Tailoring Heusler alloys through Ti substitution impacts exchange interactions, electron concentration, and magnetic ordering, offering pathways for optimizing long-range order and performance. The $Fe_{1.5}Ti_{0.5}CoGe$ alloy, a quaternary Heusler system, shows promising magnetic and structural characteristics suitable for advanced spintronic and magnetocaloric applications.

Keywords: Heusler Alloys, Magnetism, Microwave Annealing

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Paper ID: IMCEST-036

Title: Voice-Based Smart Moving Dustbin

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ABSTRACT

In today's era of emerging smart systems, waste management remains a significant challenge. This project introduces a Voice-Controlled Movable Smart Dustbin designed to enhance waste disposal through automation and accessibility. The dustbin responds to voice commands using Bluetooth-enabled communication, enabling it to move toward the user on request.

An ultrasonic sensor detects user proximity and automatically opens the lid for hands-free waste disposal. A Wi-Fi-enabled camera mounted on the system provides real-time video feedback, supporting safe navigation when the dustbin is out of direct view and helping users avoid obstacles. The device can be relocated as needed, offering convenience and efficiency, particularly for elderly or physically challenged individuals.

Additionally, the dustbin can automatically navigate to a municipal collection point when full, promoting cleaner surroundings and contributing to sustainable environmental practices. The integration of ultrasonic sensors, servo motors, and IoT communication technologies ensures enhanced usability and smart operation suited for modern public and private spaces.

Keywords: Smart Dustbin, Voice-Controlled, Movable, IoT, Ultrasonic Sensors, Automation

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Paper ID: IMCEST-037

Title: Smart Traffic Signal Control System with Emergency Vehicle Detection

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ABSTRACT

Efficient traffic management is a critical need in rapidly urbanizing areas, particularly to provide timely passage for emergency vehicles such as ambulances, fire trucks, and police vehicles. Traditional traffic signal systems often lack real-time adaptability, causing potentially life-threatening delays. To address this, we propose a Smart Traffic Signal Control System integrated with Emergency Vehicle Detection using cost-effective electronic components.

The system is implemented around an Arduino Uno microcontroller interfaced with IR transmitters/receivers and IR sensors to detect approaching emergency vehicles equipped with an IR transmitter that emits a unique signal. On reception, the roadside IR receiver identifies the vehicle as an emergency vehicle; the Arduino then overrides the normal signal sequence and immediately gives green (simulated via LEDs) to the corresponding lane while holding other directions at red to ensure safe passage.

In normal operation (no emergency present), the controller runs a cyclic timed sequence to manage traffic. The prototype demonstrates a low-cost, scalable approach for improving emergency response times and overall traffic-flow efficiency. The design can be extended with GPS/GSM/IoT telemetry for centralized monitoring, priority logging, and integration with smart-city traffic-management platforms.

Keywords: Smart Traffic Control, Emergency Vehicle Detection, Arduino Uno, IR Sensor, Traffic Signal Automation, Intelligent Transportation Systems (ITS)

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Paper ID: IMCEST-038

Title: A Cross-Layer Adaptive Opportunistic Routing Protocol for Multimedia IoT Applications

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ABSTRACT

LinGO is a beaconless opportunistic routing (OR) protocol designed to enhance wireless multimedia transmission by operating in two complementary modes, with a backbone mode that emphasises delay minimization and overall system performance. By incorporating cross-layer metrics such as link reliability, node location, and available energy, and by using a QoE-aware redundancy strategy that adds selective extra packets for high-priority video frames, LinGO improves the efficiency and quality of video delivery across rapidly changing wireless paths.

Performance evaluation in both static and dynamic scenarios shows that LinGO performs well in low-density, low-mobility deployments—providing moderate throughput and low latency. However, performance degrades as network density and mobility increase: throughput may drop due to congestion and route instability, delay can rise sharply in dense topologies, and energy consumption grows under heavy load. While LinGO exhibits modest delay resilience under moderate mobility, scalability is challenged as node density grows.

Overall, LinGO is appropriate for small, stable WSN/IoT deployments requiring opportunistic forwarding for multimedia flows, but it lacks the robustness and adaptability needed for large-scale or highly dynamic environments. The study highlights key trade-offs and suggests directions for enhancing scalability and adaptive redundancy control to better support multimedia IoT applications.

Keywords: LinGO, QoS, QoE, IoT, Opportunistic Routing (OR)

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Paper ID: IMCEST-039

Title: Large Language and Deep Learning Models for Personalized Learning and Course Recommendation System

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ABSTRACT

Personalized learning leverages technology and data-driven insights to deliver tailored educational experiences that meet each learner's unique needs. This approach emphasizes adaptive learning strategies, allowing instructional content, pace, and delivery methods to be customized based on individual performance, preferences, and learning styles.

By integrating advanced analytics, large language models (LLMs), deep learning methodologies, and interactive platforms, educators can monitor progress, identify learning gaps, and provide timely interventions. LLMs and deep learning techniques enhance personalized learning outcomes by generating content explanations, summaries, quizzes, and examples aligned with a learner's comprehension level. These technologies also enable adaptive feedback and real-time support through natural language interactions.

This paper explores the methodologies, tools, and benefits of LLMs and deep learning in personalized learning systems. It highlights how personalized learning promotes deeper learner engagement, academic growth, and self-directed learning by fostering autonomy and supporting diverse learning preferences.

In an increasingly digital education ecosystem, personalized learning—supported by AI, data analytics, and machine learning—offers transformative potential to enhance learning efficiency, strengthen academic performance, and create dynamic, student-centered environments that adapt to individual learner needs.

Keywords: Large Language Models, Deep Learning Methods, Personalized Learning, Adaptive Learning Systems

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Paper ID: IMCEST-040

Title: A Novel Distance Measure Approach with Interval Valued Intuitionistic Trapezoidal Fuzzy Sets

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ABSTRACT

The Interval Valued Intuitionistic Trapezoidal Fuzzy Set (IVITrFS) extends the classical Intuitionistic Fuzzy Set (IFS) framework by representing membership and non-membership degrees as intervals and employing trapezoidal shape functions over a real-valued domain. This paper proposes a novel modification to the existing Euclidean distance measure for IVITrFSs.

We first analyze limitations of the current distance metrics via a numerical illustration, highlighting cases where conventional measures fail to capture important interval-valued intuitionistic information. Motivated by these shortcomings, we introduce an improved distance formulation tailored to IVITrFS characteristics and provide empirical evidence demonstrating its desirable mathematical properties.

Numerical examples illustrate the applicability and advantages of the proposed metric in distinguishing IVITrFS elements more effectively than standard approaches. The results indicate that the new distance measure possesses unique and useful properties, making it a promising tool for applications in fuzzy decision-making, pattern recognition, and uncertainty modelling that rely on interval-valued intuitionistic trapezoidal representations.

Keywords: Distance measure, Interval Valued Intuitionistic Trapezoidal Fuzzy Set (IVITrFS), Euclidean distance, Intuitionistic fuzzy sets, Uncertainty modelling

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Paper ID: IMCEST-041

Title: Digital Image Analysis and Automation in Brain Cancer Detection Using Kernel SVM and MATLAB

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ABSTRACT

The quick and accurate diagnosis of brain cancer from Magnetic Resonance Imaging (MRI) scans is a major, yet challenging, task due to the complexity of medical image processing. Manual interpretation is often time-consuming and susceptible to human error. This paper proposes an automated, high-accuracy diagnostic pipeline designed to overcome these challenges.

The implemented system operates in the MATLAB environment and leverages the robust classification capabilities of the Support Vector Machine (SVM) algorithm. The framework follows a sequential methodology consisting of: image pre-processing to improve contrast, denoise, and enhance quality; segmentation using thresholding and morphological methods to extract the tumor region; and feature extraction techniques—texture, statistical, and shape-based—to build a discriminative feature vector.

A kernel-based SVM classifier, specifically using the Radial Basis Function (RBF), is trained on extracted features to perform efficient tumor identification and classification. Experimental results demonstrate that the proposed system improves diagnostic accuracy and reliability, highlighting its potential as a critical support tool for clinicians engaged in brain tumor analysis using MRI.

Furthermore, the paper outlines the categorization of tumor types, including carcinomas, sarcomas, leukemias, and lymphomas, to contextualize diagnostic challenges. The system provides a robust and scalable solution for clinical MRI data interpretation.

Keywords: SVM, Kernel SVM, MATLAB, Brain Tumor Detection, MRI, Image Processing, K-Means, Classification

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Paper ID: IMCEST-042

Title: Thermal Radiation Impact on Non-Newtonian Flow Dynamics and Transport Phenomena over a Stretching Sheet

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ABSTRACT

The present study investigates the chemically reacted boundary layer flow of heat and mass transfer in a Casson fluid over a stretching sheet embedded within a porous medium under the influence of magnetic fields. The analysis incorporates the effects of thermal radiation, as well as Soret and Dufour diffusion mechanisms. Similarity transformations are applied to convert the governing nonlinear partial differential equations into ordinary differential equations, which are solved numerically using the shooting method.

The numerical results, supported through graphs and tables, reveal that an increase in the Casson parameter reduces the fluid velocity due to higher yield stress while enhancing the temperature distribution within the boundary layer. The study emphasizes the relevance of Casson fluid modelling due to its wide applications in biomedical engineering, chemical reactors, and industrial processes involving non-Newtonian materials.

Previous studies have established the importance of Casson fluid dynamics in simulating blood flow and heat transfer characteristics. The present investigation further contributes by analyzing mixed convection effects and thermal radiation impacts in a stretching sheet environment, offering insights into improved modelling of real-world non-Newtonian transport phenomena.

Keywords: Radiation, Casson fluid, Chemical reaction, Non-Newtonian flow, Soret effect, Dufour effect

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Paper ID: IMCEST-043

Title: Ensemble Deep Learning Framework for Robust Classification and Noise-Resilient Predictions

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ABSTRACT

This paper introduces an Ensemble Deep Learning Framework designed for noise-resistant predictions and robust classifications. The architecture integrates Transformer networks, Bi-LSTM, and Convolutional Neural Networks (CNNs), each contributing complementary strengths. CNNs extract spatial features, Transformers capture contextual and long-range dependencies, and Bi-LSTM models sequential relationships.

By combining these models, the framework significantly reduces overfitting, enhances the stability of predictions, and improves performance on noisy and imbalanced datasets. Experimental findings confirm that the ensemble model achieves superior generalization and more accurate predictions compared to single-model approaches.

The study also explores the robustness of the framework under Neural Architecture Search (NAS) strategies. Benchmarking insights inspired by Hendrycks and Dietterich further validate the stability and resilience of the model when facing real-world challenges such as data corruption and misclassification noise. Additional evaluation using statistical reliability tests demonstrates improved adaptability in noisy environments.

Overall, the ensemble-based approach provides a powerful and reliable solution for modern classification tasks, especially in domains where noisy, imperfect, or unstable data is common.

Keywords: CNN, Transformer, Bi-LSTM, Ensemble Deep Learning, Robust Classification

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Paper ID: IMCEST-044

Decalepis hamiltonii: Phytochemical Screening and In Vitro Evaluation Against Alzheimer's Disease and Diabetes Mellitus

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ABSTRACT

The development of multifunctional therapeutic agents targeting both Alzheimer's disease (AD) and diabetes mellitus (DM) has gained significant attention due to the frequent co-occurrence of these disorders in aging populations. This study aimed to evaluate the methanolic extracts and subsequent solvent fractions of *Cassia auriculata* and *Decalepis hamiltonii* for their inhibitory activities against acetylcholinesterase (AChE), butyrylcholinesterase (BuChE), and - and -glucosidases (-Glc and -Glc). Among the tested samples, the methanolic extracts and their chloroform fractions exhibited the strongest enzyme inhibition, with IC_{50} values ranging from 7.59 ± 3.25 to 36.28 ± 2.46 g/mL. In DPPH and ABTS radical scavenging assays, these active fractions demonstrated potent antioxidant activity.

MTT cell viability assays further confirmed their neuro-toxic and neuro-protective properties against oxidative stress-induced cell death in human neuroblastoma cell lines. Phytochemical analysis indicated that the observed bioactivities could be attributed to their high phenolic and flavonoid content in chloroform fractions. Overall, these findings suggest that the methanolic extracts of *Cassia auriculata* and *Decalepis hamiltonii* hold promise as potential dual-action therapeutic candidates for managing both AD and DM.

Oxidative stress plays a central role in both DM and AD by promoting neuronal damage. Thus, antioxidants and natural enzyme inhibitors from plants are considered safer therapeutic alternatives. Despite strong ethnomedicinal relevance, the phytochemical composition and bioactivities of these plants remain insufficiently explored. This work provides a comprehensive evaluation of phytochemical profiles, enzyme inhibition, and antioxidant mechanisms aimed at identifying natural dual-acting therapeutic agents with relevance to type 2 diabetes and Alzheimer's disease.

Keywords: Alzheimer's disease, Diabetes mellitus, Phytochemical screening, Enzyme inhibition, *Decalepis hamiltonii*, Antioxidant activity

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Paper ID: IMCEST-045

Title: IoT Integrated HL-69 Based Automated Smart Watering System for Agriculture Applications

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ABSTRACT

Water scarcity as well as poor irrigation practices are still a major problem affecting the agricultural sector mainly because of the constraints of manually controlled and time-controlled irrigation systems which lead to over-irrigation or under-irrigation. This paper proposes an Automated Smart Irrigation System which uses Internet of Things (IoT) as the technology to make water management more efficient with the use of real-time monitoring of water level and soil moisture (HL-69).

The suggested system uses an Arduino Uno microcontroller with a soil moisture sensor and a water level sensor that will be used to monitor the environment in real time. According to sensor values, once soil moisture reaches a sensor reading of less than 600 analog units and an increase in the tank water level to above 300 units, the microcontroller switches to pumping water through a relay-controlled water pump automatically with the operational status shown on an LCD interface.

Experimental assessment has shown that the system saved 30–35% of water as compared to conventional irrigation systems, keeping optimum soil moisture of 250–600 analog units and a high level of reliable control of over 95% in automated control. The outcomes confirm that the system can reduce human intervention, save water, and ensure sustainable agriculture. The system will also have a GSM module to transmit real-time reports and irrigation status alerts to the mobile phone of the user to improve remote monitoring and efficiency. The proposed model will be cost-effective, scalable, and energy-efficient for small- and large-scale farms.

Keywords: Smart irrigation systems, Internet of Things (IoT), Arduino Uno, Soil moisture sensor, Water level sensor, Sustainable agriculture

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Paper ID: IMCEST-046

Title: Review of Photoluminescence Properties and Applications of $SrLa_2SiO_6$: Eu Phosphor for Optoelectronic Devices

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ABSTRACT

In this review, the photoluminescence (PL) properties of $SrLa_2SiO_6$:Eu phosphor are discussed based on various experimental studies. This phosphor material has gained wide attention due to its remarkable luminous efficiency and application potential in display and lighting devices.

Experimental results show that doping $SrLa_2SiO_6$ with Eu^{3+} ions leads to intense PL emissions in the visible range, resulting from the characteristic f–f transitions of Eu^{3+}. To understand the material's suitability for optoelectronic applications, this study analyzes the synthesis routes, structural characterization, and PL behavior of $SrLa_2SiO_6$:Eu phosphors.

Further improvement in performance is often limited by factors such as particle-size distribution, concentration quenching at higher dopant levels, and synthesis variations. This review emphasizes the need for optimized synthesis protocols and advanced characterization techniques to enhance emission efficiency. The discussed results provide useful insights for developing $SrLa_2SiO_6$:Eu as an attractive candidate for next-generation white-light and optoelectronic device applications.

Keywords: Luminous phosphor, Photoluminescence, Optoelectronic materials, $SrLa_2SiO_6$:Eu, Rare-earth doped phosphors

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Paper ID: IMCEST-047

Title: Mixed High Dielectric Constant Layers for MOS Devices

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ABSTRACT

Tantalum oxide (Ta_2O_5) and mixed zirconium oxide–zirconium titanate (ZrO_2/TZO) films were deposited on p-type silicon substrates using RF magnetron co-sputtering. The presence of tantalum, zirconium, and oxygen atoms was validated using Rutherford Backscattering Spectroscopy (RBS) with NDF analysis. XRD characterization revealed that both as-deposited and annealed TZO films were amorphous.

Annealing stabilized the accumulation region and reduced kink formation in the C–V curves, indicating improved interface quality. Dielectric constant values also showed good agreement with theoretical expectations at the optimized annealing temperature. J–V analysis demonstrated that annealing significantly reduced leakage current density due to nano-scale structural modifications.

The mixed TZO layer exhibited enhanced thermodynamic stability, showing promising dielectric behavior even at lower annealing temperatures. These improvements make mixed high-k oxide stacks attractive for next-generation MOS devices requiring reduced leakage, strong thermal stability, and improved performance.

This study also discusses how combining two high-k materials can reduce individual drawbacks—Ta_2O_5 suffering from defect-mediated leakage and ZrO_2 from crystallization effects—thus enabling improved microelectronic device reliability.

Keywords: Tantalum oxide, Zirconium oxide, RF sputtering, Interface engineering, High-k materials, MOS devices

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Paper ID: IMCEST-048

Title: Integrated AI-Talent Assessment System for Holistic Resume Analysis, Dynamic Interviewing

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ABSTRACT

The traditional recruitment process often suffers from inefficiencies due to manual resume screening, subjective interview evaluations, and inconsistent judgments in identifying top talent. Existing systems typically rely on isolated classification techniques such as Decision Trees, Support Vector Machines (SVM), and Neural Networks, lacking seamless AI-driven end-to-end integration for talent assessment.

To address these limitations, this paper presents an AI-powered Talent Assessment System designed to revolutionize recruitment workflows by integrating artificial intelligence, machine learning, and natural language processing. The system automates resume screening, generates interview questions dynamically, evaluates responses using OCR-based text extraction, and employs AI-driven scoring mechanisms to ensure unbiased hiring decisions.

Built using Python, Streamlit, SQLite, and Google Gemini API, the system automates resume authentication, skill analysis, interview evaluation, and scoring. It reduces manual workload, increases assessment reliability, and enhances talent acquisition efficiency. By bridging the technology gap in traditional HR processes, the proposed system provides an innovative, scalable solution to modern hiring challenges.

Keywords: Streamlit, SQLite, Google Generative AI, PDF Processing, OCR, Talent Assessment

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Paper ID: IMCEST-049

Title: A Mobile Image Capture and Deep Learning Based Smart Farming System for Accurate Detection of Paddy and Tobacco Leaf Diseases

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ABSTRACT

Paddy and tobacco crops hold major economic significance, yet they remain vulnerable to several leaf diseases that can severely impact crop productivity and farmer income. With advancements in mobile technologies and deep learning algorithms, automated plant disease identification has become a practical solution for modern precision agriculture.

This work proposes an intelligent smart farming system that captures leaf images using a mobile device and instantly provides disease predictions. The model is optimized for real-world field use and incorporates a robust preprocessing pipeline capable of handling variations in illumination, background complexity, and leaf orientation. A deep learning architecture is employed to extract essential features for precise classification of multiple disease types.

Experimental evaluation on datasets containing real field images and publicly available samples demonstrates strong adaptability across diverse environmental conditions. The results show that the system delivers reliable performance with accurate predictions suitable for mobile deployment. This framework offers farmers a portable and fast disease-diagnosis tool, improving precision farming practices, supporting early disease management, reducing yield losses, and promoting sustainable agriculture.

Keywords: Paddy leaf diseases, Tobacco leaf diseases, Smart farming, Deep learning, Convolutional neural networks, Mobile image capture, Image preprocessing, Precision agriculture

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Paper ID: IMCEST-050

Title: Impact of Vehicle Composition and Vehicle Speed over the Coordinated Corridor using VISSIM

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ABSTRACT

In general for any city, the need for traffic and transportation planning study is required only if there is a rapid change in land-use patterns and traffic growth rate. The increase in traffic growth leads to higher congestion and accident rates, especially at corridor intersections. To overcome these issues, signal control has been introduced to effectively regulate traffic flow; however, travel time often increases due to signalization.

To optimize corridor travel time, a signal coordination strategy has been used in this study. A corridor from Warangal city consisting of 8 intersections over a 6.83 km stretch was selected. Coordination was implemented using a time–space diagram, and its efficiency analyzed using VISSIM simulation tools. Calibration was performed using parameters from the Wiedemann 74 model before comparing optimized and existing conditions.

The study evaluates the impact of vehicle composition and vehicle speed on coordinated corridor performance. Results show that optimizing signal coordination significantly improves travel time, reduces delays, and enhances overall corridor efficiency.

Keywords: Traffic coordination, Signal Coordination, VISSIM, Corridor Management, Transportation Engineering

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Paper ID: IMCEST-051

Title: IoT Based Health Monitoring of Cattles

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ABSTRACT

Smart neck collar is an IoT-based smart monitoring system designed to provide real-time health and hygiene tracking for dairy cattle. The primary objective of this project is to reduce disease outbreaks, improve animal well-being, and optimize farm management through continuous monitoring and data-driven insights. The system integrates multiple sensors, including temperature sensors (DS18B20) to detect body temperature, DHT11/DHT22 for environmental monitoring, ADXL345 accelerometer for activity and movement analysis, and sensors for detecting harmful gases in the cowshed.

These sensors are connected to an Arduino UNO microcontroller, which processes the data and transmits it to a cloud platform via IoT connectivity. Farmers can access real-time data and alerts through a mobile or web application, enabling prompt action in case of abnormal health indicators or hygiene issues. Key findings indicate that the system effectively monitors critical health parameters and environmental conditions, reducing the risk of diseases such as mastitis and respiratory infections.

Automated alerts help farmers respond quickly to potential hazards, improving cattle welfare and milk production. The system demonstrates a cost-effective, scalable, and user-friendly solution for smart livestock management. By leveraging IoT technology, the system enhances operational efficiency, promotes preventive healthcare, and contributes to sustainable dairy farming.

Keywords: IoT, Smart Dairy, Cattle Health Monitoring, Sensor Integration, Precision Livestock Farming

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Paper ID: IMCEST-053

Title: A Secure Digital Health Vault & Patient–Clinic Communication System for Rural Healthcare Access

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ABSTRACT

This paper presents the design and deployment of a secure digital health vault—a full-stack platform developed to store, manage, and safeguard patient health data with a focus on underserved and rural communities. The system replaces traditional paper-based medical records, allowing patients to securely store, access, and share their medical history, prescriptions, and diagnostic reports from any device.

The backend is built using FastAPI, a high-performance Python framework, while the frontend uses React.js to deliver an intuitive and responsive user interface. The system architecture integrates AWS S3 cloud storage to efficiently manage unstructured medical documents, ensuring scalable, reliable, and secure file handling compared to conventional databases. A dedicated admin panel enables healthcare providers to remotely update and manage patient records.

To bridge the digital divide in healthcare accessibility, the system incorporates an OTP-based authentication mechanism and a lightweight design, ensuring usability even for individuals with limited digital literacy. This solution enhances patient autonomy, promotes secure digital health management, and supports the modernization of healthcare access in rural regions.

Keywords: AWS S3, cloud architecture, secure storage, FastAPI, React.js, OTP authentication, digital health, rural healthcare, patient data management

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Paper ID: IMCEST-054

Title: Read2Hear: Real-Time Braille Reader with FPGA

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ABSTRACT

Read2Hear: Real-Time Braille Reader with FPGA is an innovative assistive device that converts Braille text into speech using FPGA technology. It uses tactile sensors to detect raised Braille dots, which are then decoded by the FPGA in real time. The decoded characters are processed and converted into audio through a text-to-speech module. This enables visually impaired users to listen to printed Braille content instantly.

The FPGA ensures high-speed, parallel processing for minimal delay and efficient operation. The system is compact, cost-effective, and designed for portability. It supports continuous reading and can be adapted for multiple languages. Unlike traditional Braille readers, the device offers enhanced performance with lower power consumption.

The project integrates hardware design and embedded systems to deliver an impactful solution focused on improving accessibility and independence for visually impaired individuals. By offering a real-time, automated interpretation of Braille, the system addresses limitations of conventional Braille tools, which are often slow, manual, or prohibitively expensive.

Leveraging the capabilities of FPGA, Read2Hear processes tactile input signals rapidly and delivers audible output, making it a promising tool for both educational and personal use.

Keywords: Braille recognition, FPGA, real-time processing, assistive technology, tactile sensing, embedded systems, speech synthesis

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Paper ID: IMCEST-055

Title: Mobile Based Embedded System for Multi-Irrigation System with Auto Water Switching

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ABSTRACT

This project presents the design and implementation of an ultra-low-cost, mobile-based embedded system for multi-zone irrigation. The system allows users to control the irrigation process remotely via SMS (Short Message Service) through GSM technology. The system utilizes a microcontroller connected to relay modules that control the on/off status of both the water motor and two solenoid valves. These valves enable independent control over different irrigation zones, ensuring water is distributed only where needed.

To enhance performance, a soil moisture sensor is integrated to automate irrigation by monitoring soil moisture content in each zone. When moisture levels fall below a preset threshold, the microcontroller activates the relevant solenoid valve and water motor. Once optimal moisture is reached, the system switches off water flow to prevent over-irrigation, saving water and reducing manual effort.

An LCD display is incorporated for real-time monitoring of system parameters such as soil moisture, motor status, and valve activity across zones. This system provides a simple, cost-effective, and remotely operable solution for efficient water usage in multi-zone irrigation setups.

Keywords: Regulated Power Supply, PIC Microcontroller, Relay with driver, ESP8266 Wi-Fi Module, Energy meter, LCD display.

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Paper ID: IMCEST-056

Title: MilkoMeter: Revolutionizing Dairy Milk Quality Assessment through Integrated Sensor Technology for Real-time Monitoring and Safety Assurance

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ABSTRACT

Dairy farming plays an essential role in delivering high-quality milk, but maintaining its safety and consistency presents challenges due to the need to monitor various quality parameters. Traditionally, parameters such as temperature, pH, SCC (Somatic Cell Count), fat content, and density require separate devices, resulting in inefficiencies, ambiguous data, and extended processing times. These fragmented methods delay timely assessment of milk quality, potentially risking consumer safety and product reliability.

Milko-Meter addresses this issue by introducing a multi-sensor, wireless-enabled integrated device capable of assessing temperature, pH, SCC, density, and adulteration indicators in real-time. Embedded with laser-based SCC detection, ultrasonic density measurement, turbidity sensing, and temperature monitoring, the device enhances precision while reducing manual intervention. Its compact design and rapid analysis reduce testing time, enabling better control over milk quality and supporting high production standards.

The system mitigates errors caused by fragmented self-testing tools and improves consistency in data interpretation. By leveraging sensor fusion and automated evaluation, Milko-Meter supports precision dairy farming practices and offers an eco-friendly, consumer-focused approach to maintaining superior dairy product quality.

Keywords: Milko-Meter System, SCC meter, Milk Adulteration Detection, Sensor Fusion, Dairy Farming Automation, Real-Time Milk Quality Analysis, Sensor Integration

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Paper ID: IMCEST-057

Title: Cheira Onehub: Web-Based Service Request and Repair Management System with Business Intelligence and Chatbot Integration

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ABSTRACT

The *Cheira Onehub*: A Web-Based Service Request and Repair Management System with Business Intelligence and Chatbot Integration aims to replace inefficient manual paper operations at the Cheira Electronics Service Center by providing a fully digital, streamlined alternative. This approach enhances accessibility, convenience, and customer experience. Key features include a user-friendly portal for submitting service requests, tracking repair progress, and an integrated chatbot for customer support.

The researchers followed Agile Scrum methodology throughout the system's development. User and personnel feedback was collected using the ISO 25010 software quality model. Testing under real operational scenarios validated the system's precision, speed, and user satisfaction—achieving a "Very Satisfied" rating, meeting the criteria of accepted software quality standards. Users also provided recommendations for future enhancements such as improved reliability and expanded features.

The system enables administrators to oversee service requests, update statuses, access customer records, and analyze customer feedback. A data analytics dashboard helps managers observe shop performance and derive insights for improving operations. While the chatbot handles basic inquiries effectively, it currently lacks advanced conversational AI and external messaging integration. Online payments, inventory management, and a full mobile app are also not included.

Despite these limitations, the system successfully delivers essential functions tailored for a single service provider, ensuring efficient service request management and meaningful insights through its built-in analytics tools.

Keywords: chatbot, service request, repair management system, website, electronic shop

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Paper ID: IMCEST-058

Title: Adaptive Street Lighting

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ABSTRACT

Street lighting is essential for urban infrastructure, but traditional systems waste a significant amount of energy by remaining active regardless of light conditions or human activity. Studies indicate that public lighting consumes nearly 15% of global electricity usage and constitutes a major portion of city energy expenditure. To overcome these inefficiencies, adaptive lighting systems have emerged, utilizing sensors and microcontrollers for smart illumination control.

This project develops a prototype using an Arduino UNO microcontroller, a Light Dependent Resistor (LDR) to detect ambient lighting, and a push button to simulate motion detection. Light Emitting Diodes (LEDs) represent streetlights that activate only in darkness and when motion is detected. Built on a breadboard, the system demonstrates cost-effective adaptability, reduces unnecessary energy consumption, and serves as a scalable foundation for smart lighting solutions in urban environments.

Recent advancements integrate automation, IoT-based sensing, and adaptive algorithms to enhance illumination control, minimize energy wastage, and support smart city development. Prior research demonstrates the effectiveness of IoT-enabled streetlight controllers, real-time illumination adjustment, and automated monitoring systems in improving energy efficiency. The proposed model aligns with these modern strategies and provides a simplified, practical prototype suitable for future expansion.

Keywords: Adaptive street lighting, Arduino, LDR, motion detection, LEDs, energy efficiency

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Paper ID: IMCEST-059

Title: Predicting and Forecasting Big Mart Sales for Business Using Machine Learning Approach

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ABSTRACT

BigMart's sales prediction is built on machine learning (ML), which uses historical data to accurately forecast future sales. ML analyses prior sales data to optimise pricing strategies, marketing campaigns, inventory management, and product attributes. Machine learning enables personalised marketing through consumer segmentation and dynamic pricing modifications based on current market conditions.

In this study, a variety of machine learning approaches were used to examine the dataset, including K-NN, Random Forest, Lasso Regression, and Linear Regression. The accuracy achieved by each algorithm varied: Linear Regression 57%, Random Forest 55%, Lasso Regression 57.5%, and K-NN 60%. Among these, the decision tree method produced the highest accuracy (75%), outperforming other algorithms.

The effectiveness of ML models in forecasting revenue and improving business performance is significant, making ML a critical tool in increasing accuracy and boosting overall company outcomes. The study demonstrates how forecasting assists businesses in maintaining inventory, adhering to regulations, and identifying flaws impacting sales. After identifying the best regressor for each strategy, a forecast is developed and compared with test results.

Keywords: Machine Learning, Forecasting, Predictive Modelling, Business Analytics, Big Mart Sales

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Paper ID: IMCEST-060

Title: Next-Gen Mine Safety: GSM–GPS Based Smart Helmet with Embedded Health Intelligence

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ABSTRACT

The mining of coal is currently one of the riskiest types of industrial activities, during which workers are exposed to life-threatening factors in terms of toxic gases, airflow and communication. In a bid to make miners safer, a novel GSM-GPS coupled Smart Helmet that combines the health monitoring and location track system is proposed in this paper. The suggested helmet constantly measures such vital parameters as heart rate, body temperature, and the concentration of gases that are in the vicinity and monitors these levels using embedded sensors. The GSM allows the real-time transfer of health and environmental data to the control room and the GPS allows the precise tracking of the location of the miner in the mining area. When abnormal health readings are detected, hazardous gases detected and so as in case of an emergency, the instant messages alerting the monitoring station are delivered to guarantee quick intervention and rescue. The powering system is an Arduino microcontroller that is an efficient processor and integrator of data of various sensors. The innovation unites the ideas of Internet of Things (IoT) with the wireless communication to offer intelligent, affordable, and portable underground mining safety solution. The prototype created proves to be reliable, accurate, and functional even in hard conditions, which is a great move towards reducing the number of deaths in mining and proactive safety control of workers.

Keywords: Smart Helmet, GSM, GPS, Coal Mine Safety, Health Monitoring, IoT, Real-Time Tracking.

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Paper ID: IMCEST-061

Title: Design of Power Optimized 1bit ALU Using Multiplexers in Cadence system 90 nm Technology

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ABSTRACT

This paper shows how to design and improve a 1-bit Arithmetic Logic Unit with a 4:1 multiplexer that uses three 2:1 multiplexers. Through a systematic approach the study emphasizes the transformation of existing design into optimized performance, area, and power constraints in the proposed ALU. The simulation studies of the circuits have been carried out in 90 nm technology node using Cadence Virtuso software and rigorously verified through extensive simulations to ensure functional correctness, showcasing improvements in logic delays and a significant reduction in hardware footprint. The results demonstrate a well-balanced design to achieve high performance with 23.8% reduction in transisors usage compared to previous work, also achived less power consumption and optimized delay.

Keywords: ALU, gpdk 90 nm, multplexer, FullAdder, Cadence.

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Paper ID: IMCEST-062

Title: Wi-Fi Enabled Fault Detection System for Overhead Transmission Lines

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ABSTRACT

Overhead transmission lines are very significant in the transmission of electricity but may frequently be influenced by short-circuit faults (line-to-line), ground faults (line-to-ground), and broken wires (open circuit) faults. These problems may cause discontinuity of power supply and destruction of equipment. The power grid needs to be reliable and the downtime minimized with quick and accurate fault detection. In this paper, a Wi-Fi based fault detection system that tracks the transmission lines in real-time is introduced. It has sensors that detect current, voltage and a microcontroller that verifies abnormal readings that could be the indication of a fault. A fault is detected and the system transmits the alert wirelessly via Wi-Fi to a remote monitoring center/ device so that a prompt response can be made. The system is also cheap, simple to scale, and compatible with the existing smart grids. It has been tested to identify various kinds of faults with minimal delay and in an accurate way. This system is useful in enhancing fault detection and ensures more reliable power delivery.

Keywords: Wi-Fi Communication, Fault Detection, Over- head Transmission Lines, Real-Time monitoring, Wireless Sensor Network, Remote Fault Detection, Electrical Faults.

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Paper ID: IMCEST-063

Title: Math Fun Adventure: A Cross-Platform Story-Driven Educational Game Integrating Math Learning Through Interactive Gameplay

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ABSTRACT

This study presents the development of *Math Fun Adventure: A Cross-Platform Story-Driven Educational Game Integrating Math Learning Through Interactive Gameplay* for CICT students. The system is designed to enhance accessibility to academic game-based learning by integrating an adventure-style game environment with basic mathematics challenges suitable for elementary learners.

The game provides an interactive platform in which players engage with math problem-solving tasks embedded in story-driven adventures. This approach promotes student engagement by combining exploration, educational challenges, and progressive difficulty levels. The gameplay allows learners to answer math problems, receive instant feedback, and advance through the adventure narrative based on their performance.

A key feature of the system is its offline mode, enabling students to access the game without internet connectivity—making it practical and widely usable in varying learning environments. Overall, Math Fun Adventure offers an effective, interactive, and child-friendly approach to strengthening mathematical skills through enjoyable gameplay experiences.

Keywords: Math Fun, Interactive Learning, Problem Solving, Educational Adventure Game

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Paper ID: IMCEST-064

Title: Edge-Enabled Federated Learning Framework for IoT Data Analytics

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ABSTRACT

The rapid growth of IoT networks has led to a huge increase in data broadcast, which has raised concerns about latency, bandwidth, and privacy. This study proposes a simplified Edge-Enabled Federated Learning Framework for IoT edge devices to conduct localized data analytics and train global models without the requirement of raw data sharing. The technology allows for real-time decision-making, data privacy, and more effective use of resources by decreasing reliance on the cloud.

The suggested model maintains the model's accuracy while reducing transmission costs. This makes it an excellent option for intelligent Internet of Things applications such as environmental monitoring, industrial automation, and smart healthcare.

Keywords: Federated Learning, Edge Computing, Internet of Things (IoT), Data Privacy, Distributed Analytics, Lightweight Model, Cloud Offloading.

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Paper ID: IMCEST-065

Title: Improving Dynamic Performance of Nonlinear Isolated Thermal Power System using Robust Fuzzy Logic Controller

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ABSTRACT

The technological aspects of planning and operation have altered in an nonlinear isolated thermal power system, but the fundamental concepts remain the same. This study introduces an intelligent method of reducing load frequency transients in a nonlinear isolated power system. For a practical isolated power system, the transient behavior of an uncontrolled system with various regulation constant (R) values and load disturbances is calculated. Fuzzy and Genetic Algorithm (GA) controllers are used to examine the responses of a single area power system to diverse load variations at different switching periods. The dynamics of the load frequency power system are shown using change in frequency deviation and derivative of change in frequencies as variables. When disturbance occur, the time it takes to transfer states increases in proportion to the load disturbance. The accuracy of the proposed Fuzzy and GA controllers are compared to the uncontrolled response obtained in the system. Fuzzy technique creates a versatile controller with a basic Load Frequency Control (LFC) structure, making it suitable for real world power systems.

Keywords: Nonlinear power system, Load frequency control, Transient response, Genetic Algorithm, Fuzzy logic.

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Paper ID: IMCEST-066

Title: Recent Advances in Multichannel Chemosensors for Mercury and Copper by Ferrocene based small Molecules - A Short Review

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ABSTRACT

It is impossible for living organisms to function without cations, which are also crucial for the health of our cells, extracellular fluids (like Cu2+ ion), and the central nervous system (like Hg2+ ion). Ferrocene-based electro-analytical sensors are cheap, easy to construct, and extremely sensitive probes for the detection of different metal ions. Molecular sensors based on ferrocene have garnered a lot of attention in recent years. The addition of ferrocene to these chemosensor molecules has expanded the sensing process because of its specific reversible redox properties. The current review provides a summary of the development of ferrocene-based derivatives that can distinguish between various metal ions and based on their chemical structures. This review is limited to cation sensors based on ferrocene and focused on their characteristics in terms of redox investigations, optical studies, binding/chelating units, and stoichiometry with the metal ions.

Keywords: Ferrocene, multi-channel, Signaling Molecules, Chemosensors, Mercury ion, Copper ion

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Paper ID: IMCEST-067

Title: Investigation of Thermoelectric Behavior in Ti^{4+} and Zr^{4+} Substituted Mn–Zn Ferrites

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ABSTRACT

Thermoelectric power measurements were conducted on polycrystalline Ti– and Zr–substituted Mn–Zn ferrites, and the corresponding Seebeck coefficient, carrier concentration, and drift mobility were analyzed. The Seebeck coefficient increased steadily with temperature, attaining peak values near 450 K for Ti–substituted samples and 440 K for Zr–substituted samples. All compositions exhibited *n*-type conduction across the entire temperature range investigated. At elevated temperatures, the ferrites demonstrated non-degenerate semiconducting behavior, indicative of thermally activated charge transport. The conduction mechanism is predominantly governed by electron hopping between Fe^{2+} and Fe^{3+} ions, in agreement with the presence of narrow energy bands and localized electronic states. The temperature-dependent behavior of drift mobility can be explained using the wavy-band model, which accounts for variations in the density of states affecting carrier transport.

Keywords: Ferrites, Thermoelectric power, Mobility, Carrier concentration;

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Paper ID: IMCEST-068

Title: A Voice Command Robot for Smart Navigation

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ABSTRACT

This extend exhibits a voice-activated robot that was made with an Arduino Uno microcontroller. The essential objective is to utilize fundamental voice commands like forward, in reverse, cleared out, right, and halt to control the robot. A smartphone forms the voice input and employments Google's voice acknowledgment innovation to turn the discourse into content. The HC-05 Bluetooth module at that point transmits the distinguished command to the Arduino as a comparing letter set. Through the L298N engine driver, the Arduino controls the motors' movement in reaction to the gotten flag. Rechargeable 18650 batteries, which are housed in a holder with an on/off button for comfort of dealing with, control the robot. Component associations are made through jumper wires. For consistent working, an Android remote-control program is moreover utilized. This venture appears how voice acknowledgment and remote communication can be utilized in mechanical autonomy with a low-cost, user-friendly framework.

Keywords: Basic Movement commands, Speed control, Environmental awareness, Emergency & safety

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Paper ID: IMCEST-069

Title: Solar-Assisted Smart Surveillance Vehicle for remote Applications

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ABSTRACT

In this paper, introduces a solar-powered surveillance robotic car with an ESP32-CAM, DHT11 and MQ2 sensors. The system is connected to allow remote control and live video streaming via Wi-Fi with a computer or a smartphone. The use of the solar panels will guarantee energy efficiency and independency in remote locations. DHT11 sensor is used to measure temperature and humidity. MQ2 sensor can detect LPG, smoke, and CO, which are dangerous gases. Live sensor information and alerts improve the safety and awareness of the situation. Visual surveillance and environmental assessment is offered by ESP32-CAM. This small size guarantees low price, wireless networking, and sustainability. It is applicable in agriculture, disaster areas and urban surveillance. The system displays a good smart surveillance and environmental monitoring system.

Keywords: ESP32-CAM, DHT11, MQ2, motor driver

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Paper ID: IMCEST-070

Title: Low-Cost Self-Powered Smart Shoes Using Piezoelectric Sensors for Portable Energy Harvesting

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ABSTRACT

This work presents a compact and low-cost smart shoe capable of generating usable electrical energy from everyday walking. The design relies on piezoelectric discs placed in high-pressure zones inside the sole, which convert foot impact into electrical pulses. These pulses are rectified, regulated through a TP4056 charging module, stored in a parallel lithium-ion bank, and finally boosted to 5 V for powering small wearable loads. A simple relay-based activation circuit is used in the system instead of relying on a microcontroller. This choice keeps the design low-cost, easy to assemble, and eliminates any standby power consumption. The prototype demonstrates that meaningful energy can be harvested passively during routine walking without affecting comfort or gait. The approach offers a practical path toward self-powered footwear, especially suited for low-visibility safety shoes, rural users, and maintenance-free wearable devices.

Keywords: Piezoelectric harvesting, smart footwear, self-powered systems, wearable devices, low-cost design.

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Paper ID: IMCEST-071

Title: Intelligent Phase Balancing and Cost Optimization for Single-Phase Consumers in Smart Grids

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ABSTRACT

In this paper, a practical, data-driven method for dynamically balancing electrical loads across phases using high frequency smart meter data. The data, collected every three minutes from nearly a hundred households in the Mathura district of Uttar Pradesh between May 2019 and October 2021, included detailed information such as voltage, current, and how long power was supplied. After thorough cleaning and validation, the researchers focused on a consistent group of 47 single-phase households and used one day of their data to understand typical residential load patterns. To reduce phase imbalance, the study uses a greedy optimization algorithm that reallocates household loads among the three phases at each time step. This approach significantly lowers the average phase imbalance—from 23.8% down to 0% while keeping the system stable and avoiding excessive switching. The team also kept an event log to track how often each household was switched, helping them evaluate continuity over time. On the economic side, the analysis compared the savings from reduced technical losses with the cost of commercially available automatic phase-switching devices. The findings show that even affordable residential switch units costing 3,000–5,000 can pay for themselves within just a few weeks. This demonstrates that the proposed framework is both technically strong and economically practical, making it well-suited for smart grid systems and real-time feeder balancing.

Keywords: Smart meter data, Dynamic phase balancing, Power imbalance reduction, Greedy optimization, Switching event analysis, Economic feasibility, Smart distribution systems.

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Paper ID: IMCEST-072

Title: Salesforce CPQ Revenue Cloud functions for Improving Business Efficiency and Quote to Cash Process

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ABSTRACT

Salesforce CPQ (Configure, Price, Quote) has been a mature quoting and configuration tool built on the Salesforce platform for many years. In an increasingly competitive business landscape, the ability to rapidly and accurately configure, price, and quote products and services has become critical [1]. The QCP (Quote Calculator Plugin) is a Java script-based plugin for CPQ that gives deep control of the quote line calculation engine and is typically used for very complex pricing/logics. However, Salesforce has signalled that CPQ will be in an End of Sale phase (i.e., no new sales of CPQ) and that their future will pivot to Revenue Cloud (which subsumes/configures revenue lifecycle, billing, subscriptions, etc) for newer customers. If you're a current CPQ customer you will continue to get support, but new major feature investments may be more focused on Revenue Cloud; so forward-looking organisations need to be planning migration/roadmap accordingly. Here in this paper, we discus "emerging features", some are in CPQ, some in QCP, some potential future in Revenue Cloud.

Keywords: CPQ, QCP, Revenue Cloud.

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Paper ID: IMCEST-074

Title: Hybrid-AUT: A Multi-Modal Attention-Driven Stacked Learning Framework for Early Autism Classification

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ABSTRACT

Autism spectrum disorder affects social communication and behavioral development. Early detection helps improve treatment outcomes and long-term progress. Traditional diagnosis depends on clinical evaluation and observation. Machine learning supports screening and reduces assessment time. This paper presents a hybrid diagnostic model named Hybrid-AUT. The model integrates three complementary data sources for analysis. It fuses behavioral questionnaire responses with facial-image embeddings. It also includes EEG-based spectral and temporal neural markers. Behavioral features provide decision cues linked to ASD tendencies. Image embeddings capture facial-feature variations related to ASD traits. EEG markers provide neurological insights from prior studies. A weighted feature selection ensemble improves feature quality. The ensemble merges multiple filter scores using learned attention weights. Selected features form a refined representation for classification. The classifier uses a stacked architecture with diverse learners. Stacking improves balanced accuracy across heterogeneous input patterns. The model aims to minimize false negatives during screening. SHAP explain ability helps interpret individual predictions clearly. This improves trust and supports clinical insight generation. Experiments use multiple public datasets for strong validation. Data include behavioral surveys, facial images, and mixed ASD profiles. Hybrid-AUT results show superior performance in sensitivity measures. Comparisons indicate consistent gains over earlier ML studies. The model demonstrates robust behavior across diverse testing groups. Overall, the proposed system offers a practical tool for ASD screening.

Keywords: Autism Screening, Hybrid ML Model, Multimodal Features, EEG & Facial Embeddings, Feature Selection.

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Paper ID: IMCEST-075

Title: CNN Based Smart Android app Detects Mulberry Leaf Disease

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ABSTRACT

The extended research is making use of ensemble deep learning and intelligent integration for the detection of mulberry leaf diseases. While the YOLO family finds strange things rapidly, the complicated properties are found by NasNetMobile and Xception models, making the categorization more accurate. The usage of these models together in farming makes it easier and faster in finding diseases. A Flask-based frontend with user authentication allows academics and farmers to test and view disease forecasts easily in a secure and interesting manner. This larger framework would make smart agriculture more accurate, easier to use, and usable in real time.

Keywords: Ensemble model, deep learning, flask front end, disease detection, smart agriculture, Xception, YOLO, CNN, NasNetMobile, mulberry leaf disease

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Paper ID: IMCEST-076

Title: Saferide Defender

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ABSTRACT

The Driver Anti-Sleep Safety System is an all inclusive solution to road accidents that are due to fatigue, intoxication, and unexpected car collisions among the drivers. The issue of road safety has become a crucial topic all over the world and most of the accidents happen because of the reaction lateness or alertness absence, or the inability to drive properly. It is a type of system that incorporates several sensors and embedded technologies that can be used to monitor the driver and the state of a car in a continuous manner. A sensor eye blink is employed to check the level of drowsiness, and a sensor is employed to check the presence or absence of alcohol consumption by the driver. A tilt sensor controls the vehicle in case of sudden tilting or hitting against something, which can be taken as an indicator of an accident. An Arduino UNO does all the processing of the data of all these sensors, which serves as the central controller activating immediate responses like a buzzer alarm, real-time warnings on a 16x2 LCD display, the engine lock to prevent unsafe driving, and emergency SMS alerts to predetermined contacts via a GSM module. The system does not only alert the driver in case of drowsiness or alcohol detection, but also allows quick emergency response in case of accidents thus giving the driver safety assistance even before external assistance responds. Through the integration of low-cost hardware and effective embedded programming, this project will be useful in showing how technology can be used practically in enhancing road safety and ultimately save lives. Also, the system can be improved further with GPS positioning to report the exact location, IoT to provide real-time control over the authorities or relatives of the patient, and AI to analyze the driving behavior of the patients to make a more intelligent decision. This is why the Driver Anti-Sleep Safety System is a scalable, reliable and innovative solution to the current road safety problems.

Keywords: Driver Drowsiness Detection, Alcohol Sensing, Eye-Blink Monitoring, Accident Detection, Tilt Sensor.

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Paper ID: IMCEST-077

Title: Experimental Investigation on Engineered Cementitious Composites using Glass Powder for crack repair

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ABSTRACT

This study offers an experimental and numerical investigation on the structural behavior of crack repair using ECC components with glass power in a replacement percentage of fine aggerate to it and adding different proportions of glass powder to it of 10%,20% and 30% to it. Finding the how much strength it gains after rapier with ECC mix with it. Engineered Cementitious Composites (ECC) for the purpose of crack repair. ECCs are known for their superior ductility and self-healing capabilities, which make them suitable for repairing cracks in concrete structures. In this experimental investigation, varying percentages of finely ground waste glass powder (ranging from 10% to 30%) were incorporated into ECC mixtures to evaluate its impact on mechanical properties and crack-healing efficiency. Standard tests including compressive strength, flexural strength, and crack width measurements were conducted. The results revealed that the inclusion of glass powder improved the pozzolanic activity and contributed to enhanced durability, without compromising the composite's ductility. Additionally, microstructural analysis confirmed the filling and healing of microcracks due to the reactive silica present in the glass powder. This research demonstrates that glass powder can be a sustainable and efficient additive in ECCs for long-term crack repair in concrete infrastructures.

Keywords: ECC, Sustainability, Mechanical properties, physical properties, Compressive and tensile strength.

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Paper ID: IMCEST-078

Title: Smart E-Commerce and Inventory Management System with XGBOOST predictive analytics for KD moto shop

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ABSTRACT

KD Motoshop currently handles everything through manual Excel spreadsheets, which leads to inventory mix-ups, delayed sales tracking, and general operational inefficiency. On top of that, they're paying commissions fee to third-party selling platforms. We built a Smart E-Commerce and Inventory Management System that uses XGBoost predictive analytics to automatically record sales, keep inventory counts accurate, and predict what products customers will want. The system comes with an AI chatbot, secure payments, supplier management tools, refund handling, and a dashboard that gives you real-time business insights. We tested it using ISO/IEC 25010:2023 standards and found it performs well across functionality, usability, reliability, and speed. Bottom line: the system cuts down on manual work, reduces mistakes, makes shopping better for customers, and helps KD Motoshop make smarter business decisions.

Keywords: E-commerce, inventory management, XGBoost, predictive analytics, AI chatbot, KD Motoshop.

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Paper ID: IMCEST-079

Title: Digital Filtering Solutions for Noise Reduction in Communication and Acoustic Systems

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ABSTRACT

The effective communication always relays on the signal transmission. The transmitted signal must be noise free signal to avoid the loss of information. Hence, in this work the article address about the removal of noise in a transmitted signal for effective communication. In practical communication the signal will be effected by various noises to degraded the quality of communications. To avoid this removal of noise The quality communication depends on the effectiveness of the noise removal techniques. Then The filtered signal transmitted to achieve the effective communication. The noise removal techniques are compared with RMSE values for quantitative and qualitative analysis.

Keywords: Labview software, FFT, Power Spectrum, Noise Reduction Techniques, Noise Filters.

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Paper ID: IMCEST-080

Title: NLP For Legal Documentation In Indian Languages

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ABSTRACT

The rapid evolution of the legal domain in India has led to an increasing demand for efficient tools to manage legal documentation. Legal documents are often long, complex, and filled with technical jargon, making them difficult to understand for non-experts. This is especially true for documents written in regional Indian languages, which further complicates accessibility and understanding. The project aims to develop a Natural Language Processing (NLP) solution tailored to legal documentation in Indian languages. By integrating technologies like speech-to-text translation, text summarization, and machine translation, this system will empower users to easily access, interpret, and analyze legal documents in their native languages. The solution will leverage a Django-based platform to provide a user-friendly interface for uploading, processing, and receiving summarized legal content in various Indian languages. This tool will enhance the legal industry's efficiency, accessibility, and inclusivity by providing automated, language-specific processing of legal texts. The project aims to serve both legal professionals and the general public, making legal resources more approachable and understandable.

Keywords: Natural Language Processing (NLP) for Legal Documentation in Indian Languages, focusing on Speech-to-Text Translation, Text Summarization, and Machine Translation. Using a Django-based Platform, the system facilitates Document Upload and Processing, enabling Language-specific Processing to improve Legal Accessibility.

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Paper ID: IMCEST-081

Title: Utilization of waste in manufacturing of low cost concrete blocks

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ABSTRACT

Utilization of construction waste as brick powder in making of concrete blocks. Cement, fine aggregates, coarse aggregates, brick powder is included in this project making. 0%, 10% and 20% proportions are used in this project. Making 3 blocks of using 0%, 3 blocks of using 10%, 3 blocks of using 20% proportions. Totally 9 blocks are preparing for this project. Tests are conducted after curing at 7days, 14days and 28days. comparing these proportions of blocks the results are finding out.

Keywords: Brick powder, workability, mechanical properties, cement, fine aggregate, coarse aggregate.

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Paper ID: IMCEST-082

Title: Exploring The Dimensions of Extented Reality-A Review

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ABSTRACT

Virtual reality (VR), augmented reality (AR), and mixed reality (MR) are examples of Extended Reality (XR), a ground-breaking fusion of the real and virtual worlds. The many facets of XR, which are quickly changing how we engage with digital surroundings, are examined in this study. The study explores the technological underpinnings of XR, looking at how hardware, software, and human-computer interaction interact. It also discusses how XR's ability to provide immersive experiences that go beyond the limitations of traditional media could transform a number of industries, including education, healthcare, entertainment, and remote cooperation. An important aspect of this investigation is the examination of how XR affects user perception and cognition. XR has the potential to increase learning, improve therapeutic outcomes, and produce new forms of entertainment by changing how people perceive space and time. The ethical and societal ramifications of XR are also taken into account in the abstract, especially with regard to privacy, accessibility, and the digital divide. The capacity of XR technology to seamlessly combine virtual and physical realities will probably result in previously unheard-of alterations to how we interact with the outside world, work, and live. By merging knowledge from computer science, psychology, design, and ethics, this investigation highlights the significance of multidisciplinary research in advancing XR. The study intends to contribute to a better understanding of XR's potential and limitations, laying the groundwork for future breakthroughs that will influence the next generation of digital experiences.

Keywords: Extended Reality, Virtual Reality, Augmented Reality, Mixed Reality, Environmental Sustainability.

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Paper ID: IMCEST-083

Title: Artificial Intelligence for Diabetic Retinopathy Screening: A Focused Review of Deep Learning Algorithms, Clinical Validation, and Real-World Deployment

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ABSTRACT

Diabetic retinopathy is a leading cause of preventable blindness among working-age adults, yet a significant proportion of individuals with diabetes worldwide do not receive timely eye examinations. Traditional screening workflows that rely on specialist graders are difficult to scale, particularly in low- and middle-income settings. In the past decade, artificial intelligence—especially deep learning applied to retinal imaging—has emerged as a transformative tool for automating DR detection and supporting risk-stratified screening programs.

This review presents a focused analysis of AI-based diabetic retinopathy screening, emphasizing clinically validated systems that operate primarily on color fundus photographs and increasingly on optical coherence tomography (OCT) and OCT angiography (OCTA). We outline the epidemiological motivation for large-scale DR screening, discuss the fundamentals of medical imaging AI, and summarize key algorithmic advancements ranging from image-level classifiers to lesion-aware and multimodal models.

Particular attention is given to autonomous and near-autonomous AI systems that have undergone prospective trials or regulatory evaluation. Additionally, we examine hybrid AI–human workflows that integrate decision support within teleophthalmology services. Safety, explainability, bias, health-economic impact, and real-world deployment challenges are reviewed, highlighting essential considerations for responsible adoption in resource-constrained environments.

Emerging research directions include progression prediction, personalized screening intervals, foundation model applications, and the development of annotated datasets that tightly couple anatomical and pathological markers with algorithmic outputs. This review aims to provide clinicians, policymakers, and AI researchers with a practice-oriented overview of how AI is reshaping diabetic retinopathy screening and which gaps must be addressed to ensure equitable and effective deployment.

Keywords: diabetic retinopathy, artificial intelligence, deep learning, fundus photography, autonomous screening, tele-ophthalmology

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Paper ID: IMCEST-084

Title: ResearchMate: An AI-Enhanced Platform for Automated Formatting, Collaboration, and Document Enhancement for Taguig City University

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ABSTRACT

Academic research frequently suffers from inefficiencies in formatting, collaboration, and document management, which hinder productivity and complicate the workflow of researchers, advisors, and coordinators. ResearchMate is an AI-driven platform designed to streamline these challenges within Taguig City University by automating formatting tasks, improving collaborative writing, and enabling transparent document tracking.

Developed using the Design and Development Research paradigm and Agile methodology, ResearchMate undergoes continuous refinement through iterative cycles of design, testing, and user feedback. The platform integrates intelligent formatting automation, real-time collaborative tools, and version-tracking features to enhance research workflows and ensure compliance with institutional standards.

Evaluation using the ISO/IEC 25010 software quality model revealed strong system performance: 94% effectiveness in automated formatting, 91% improved collaboration, 93% accuracy in document tracking, 97% usability, 96% response efficiency, and 99% system uptime. These results highlight ResearchMate's capability to significantly improve academic productivity, transparency, and research quality.

Overall, ResearchMate demonstrates substantial potential in transforming academic research processes at Taguig City University by offering an efficient, user-centered, and adaptable AI-enhanced research environment. Future improvements include enhanced citation accuracy, reference validation, and system integration with institutional platforms.

Keywords: AI in education, automated formatting, collaborative research tools, document tracking, ISO/IEC 25010 evaluation, agile development, research productivity systems

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Paper ID: IMCEST-085

Title: Deepside: Leveraging Deep Learning for Affordable and Authentic Medical Tourism

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ABSTRACT

Medical tourism is emerging as a global phenomenon, with patients seeking cost-effective and high-quality healthcare services abroad. However, concerns regarding treatment authenticity, safety, and affordability remain critical barriers to trust and adoption. This study examines the potential of *Deepside*, a deep learning framework originally developed for predictive drug side-effect analysis, and explores its applicability in enhancing medical tourism reliability.

By integrating multimodal biomedical data and advanced neural network architectures, Deepside demonstrates the ability to accurately predict treatment-associated risks. Such predictive insights can optimize international patient care recommendations, reduce adverse outcomes, and strengthen confidence in cross-border medical services. This work outlines how deep learning–based predictive analytics can serve as an enabler for more transparent, affordable, and authentic medical tourism experiences.

Furthermore, the study highlights key challenges—including data interoperability, model scalability, privacy, and ethical considerations—that must be addressed to operationalize AI-driven decision-support systems in global healthcare ecosystems. Future directions emphasize the need for robust, explainable AI models and collaborative data-sharing frameworks to transform medical tourism through safe and intelligent automation.

Keywords: Medical tourism, deep learning, predictive analytics, treatment risk forecasting, healthcare AI, multimodal biomedical data, Deepside framework

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Paper ID: IMCEST-086

Title: Design and Implementation of a Cost-Efficient IoT-Enabled Smart Aquaponic System

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ABSTRACT

The integration of Internet of Things (IoT) technologies into aquaponic systems marks a major advancement in sustainable agriculture by enabling real-time monitoring, continuous supervision, and automated regulation of essential environmental parameters. This study presents a cost-efficient IoT-enabled smart aquaponic platform incorporating distributed sensors and actuators to enhance system efficiency and agricultural productivity.

Grounded in principles of information theory, the proposed architecture is engineered to improve data acquisition fidelity, optimize transmission, and ensure reliable automated decision-making. Sensors deployed across water quality, temperature, pH, and nutrient monitoring nodes provide continuous input for intelligent control algorithms. By minimizing information entropy and mitigating noise within sensor streams, the system ensures accurate and stable operation.

The platform also integrates data compression strategies and error-correction mechanisms to preserve data integrity across wireless communication modules, strengthening overall system robustness. Experimental evaluations demonstrate significant improvements in fish health, plant growth, and operational cost savings. By utilizing low-cost microcontrollers such as Arduino or ESP32, the system remains accessible to small-scale farmers and educational institutions.

Overall, the proposed IoT-driven aquaponic system offers a scalable and economically viable solution for smart agriculture, reducing labor dependency and improving food production efficiency.

Keywords: IoT, Smart Aquaponics, Sustainable Agriculture, Automation, Sensor Networks, Real-Time Monitoring, Water Quality, Information Theory, Cloud Connectivity, Smart Farming

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Paper ID: IMCEST-087

Title: Exploring the Frontiers of Robust and Efficient Deep Learning: Neural ODEs, Augmented Neural ODEs, and Time-Invariant Steady Neural ODEs (TISODE)

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ABSTRACT

Neural Ordinary Differential Equations (NODEs) represent a transformative shift in modern deep learning by replacing discrete-layer architectures with continuous-time formulations. By modeling hidden state evolution through differential equations, NODEs achieve memory efficiency, adaptive computation, and improved handling of irregularly sampled data. Despite these advantages, the robustness of NODEs to input perturbations—an essential requirement for real-world reliability—remains an active research challenge.

This paper presents an in-depth exploration of robustness characteristics in NODE-based models, with a primary focus on Time-Invariant Steady Neural ODEs (TisODE), a recently proposed framework designed to enhance stability and resilience. We analyze the theoretical foundation of TisODE, emphasizing how its time-invariant formulation and steady-state constraints mitigate the influence of random noise and adversarial perturbations. Empirical evaluations across benchmark datasets further demonstrate TisODE's effectiveness as a flexible, plug-and-play module for strengthening robustness in diverse deep learning architectures.

The study also examines Augmented Neural ODEs (ANODEs), highlighting how augmented state spaces improve expressivity and overcome representational bottlenecks of vanilla NODEs. Additionally, we introduce an Enhanced Neural ODE Attention model that integrates continuous-time dynamics with attention mechanisms for improved image classification performance.

Overall, the findings underscore the potential of NODEs and their variants in advancing reliable, scalable, and robust deep learning systems suitable for safety-critical applications.

Keywords: Neural ODEs, TisODE, Augmented Neural ODEs, Continuous-time Deep Learning, Robustness, Adversarial Noise, Attention Mechanisms

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Paper ID: IMCEST-088

Title: Evaluating the Impact of Sal Biodiesel Blends on Diesel Engine Performance and Emissions

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ABSTRACT

This study evaluates the performance and emission characteristics of a diesel engine fuelled with Sal biodiesel blends, specifically B10 and B30. Sal biodiesel, derived from *Shorea robusta*, offers a promising renewable alternative to conventional diesel by reducing environmental impact and improving engine efficiency. Experimental tests were conducted to assess brake power, brake thermal efficiency (BTE), and specific fuel consumption (SFC), along with major exhaust emissions.

Results indicate that Sal biodiesel blends can maintain desirable engine performance while significantly reducing harmful emissions. The B30 blend demonstrated notable reductions in carbon monoxide and unburned hydrocarbons, while maintaining acceptable thermal efficiency. These findings highlight the potential of Sal biodiesel as a sustainable fuel alternative capable of enhancing energy security, reducing pollution, and supporting cleaner engine technologies.

Overall, the study contributes to the growing research on bio-based diesel fuels and demonstrates the viability of Sal biodiesel blends for practical engine applications.

Keywords: Sal biodiesel, engine emissions, fuel economy, renewable fuels, biodiesel blends

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Paper ID: IMCEST-089

Title: Unicare: A Gamified Support System for Mental Health and Emotional Resilience

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ABSTRACT

The rising prevalence of emotional stress and mental health concerns among Grade 12 ICT students at the University of Perpetual Help DALTA–Molino Campus led to the development of *UniCare*, a gamified digital support system designed to enhance emotional resilience and promote student well-being. UniCare integrates personalized self-assessments, AI-guided interventions, and interactive activities to support users' psychological health.

Core features include an AI-powered chatbot, mini-games for emotional regulation, journaling tools, breathing exercises, mood tracking, and real-time data visualization dashboards. Developed using ISO 25010:2011 standards, the system was evaluated through pre-test and post-test assessments using the CD-RISC for resilience and the DASS-21 for depression, anxiety, and stress. Feedback was also obtained from IT professionals and licensed mental health practitioners.

Initial assessments showed moderate resilience (M = 2.74) with low levels of depression (M = 1.56), anxiety (M = 1.69), and stress (M = 1.76), indicating mild psychological distress. Post-intervention results demonstrated improvements in resilience, with CD-RISC scores increasing from 6.65 to 7.63 following two weeks of system use. Usability (M = 4.55) and functionality (M = 4.40) scores affirm UniCare's effectiveness, reliability, and user-friendly design.

Overall, UniCare presents strong potential as a digital tool for enhancing emotional resilience, self-awareness, student engagement, and proactive mental wellness. Future developments may incorporate multilingual support, adaptive AI-driven personalization, and institution-wide implementation to expand accessibility and impact.

Keywords: gamified mental health system, emotional resilience, AI chatbot, digital wellness, student engagement, psychological assessment, CD-RISC, DASS-21, ISO 25010, web-based intervention

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Paper ID: IMCEST-090

Title: Performance Analysis of PV System with ANN for Different Irradiations

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ABSTRACT

The performance of photovoltaic (PV) systems exhibits pronounced sensitivity to rapid fluctuations in solar irradiance. These variations introduce strong non-linearities in the current–voltage (I–V) and power–voltage (P–V) characteristics, significantly affecting the precision of maximum power point tracking (MPPT). Conventional techniques such as the perturb and observe (P&O) method suffer from slow convergence, high oscillations, and reduced tracking efficiency under dynamic irradiance conditions, limiting optimal energy extraction.

This study presents a comprehensive simulation and modeling framework for a photovoltaic system incorporating an artificial neural network (ANN)-based MPPT controller designed to overcome these challenges. The proposed ANN model is trained using representative irradiance–temperature datasets and their corresponding optimal operating points, enabling rapid adaptability and enhanced performance compared to traditional P&O control strategies.

A full MATLAB/Simulink model of the PV module and DC–DC converter was developed to evaluate controller performance under rapidly changing irradiance. Results demonstrate that the ANN-based MPPT method significantly reduces power oscillations, improves tracking speed, and maximizes overall energy extraction under dynamic atmospheric conditions. Comparative analysis confirms the superiority of the ANN controller in mitigating limitations of classical MPPT methods, offering a robust approach for intelligent power conditioning in real-world photovoltaic environments.

The findings highlight the potential of ANN-driven MPPT systems for advanced smart PV applications, distributed generation, and grid-interactive renewable energy solutions.

Keywords: PV system, ANN, MPPT, DC–DC converter, irradiance variations

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Paper ID: IMCEST-092

Title: IoT-Enabled Smart Blind Stick for Obstacle Detection and Enhanced Mobility Using Multi-Sensor Fusion

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ABSTRACT

The Smart Blind Stick is a revolutionary assistive device that enhances mobility and safety for visually impaired individuals. This paper presents a novel IoT-based low-cost blind stick integrating multi-sensor fusion for obstacle detection, water hazard identification, and environmental awareness. The system uses an ultrasonic sensor, moisture sensor, LDR, LED, and buzzer, all controlled by an Arduino Nano microcontroller to process real-time sensor data.

The device provides alerts through sound, vibration, and lighting, ensuring effective assistance across various scenarios. Constructed using lightweight and affordable materials such as PVC, the device is cost-effective and user-friendly. Experimental results demonstrate improved safety, reduced accident probability, and enhanced navigation confidence for users. Future enhancements include improved sensor fusion, ergonomic redesign, and integration with GPS and smartphone applications.

Keywords: Visually Impaired, Smart Blind Stick, Arduino Nano, Ultrasonic Sensor, Internet of Things, Mobility Assistance.

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Paper ID: IMCEST-093

Title: Emotion Recognition on Facial Expressions through Android Mobile App

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ABSTRACT

Classifying the human face's emotional expressions is a significant challenge in the field of computer vision and human–computer interaction. The primary goal of emotion recognition is to systematically identify expressions by mapping a range of human reactions such as frustration, anxiety, excitement, grief, and pleasure to distinct facial cues involving the lips, eyes, and eyebrows. With the rapid growth of social networking applications, the influence of visual content on users' emotional well-being has become increasingly relevant.

The proposed project, Emotion Recognition Using Facial Expression, focuses on Facial Expression Recognition (FER) to enable users to classify emotional content effectively. Facial expressions serve as key indicators of emotional states and can be utilized to enhance user experience by filtering negative content and highlighting positive interactions. The system is implemented as an Android mobile application developed using MIT App Inventor, a visual, block-based programming platform that supports rapid development of mobile applications.

The application leverages real-time image processing through smartphone cameras to detect facial expressions and recognize emotions efficiently. FER systems face several challenges, including variations in illumination, pose, camera viewpoint, occlusion, and facial alignment, as well as factors such as age, gender, cultural differences, and individual characteristics. Despite these challenges, advancements in neural network-based and end-to-end models have significantly improved recognition accuracy.

The proposed mobile-based FER application demonstrates the potential of emotion-aware systems in healthcare, social media moderation, personalized user experiences, and assistive technologies. By integrating efficient algorithms with mobile platforms, the system achieves real-time performance while maintaining reliable accuracy.

Keywords— Facial Recognition (FR), Emotion Detection (ED), Artificial Intelligence (AI), User Interface (UI).

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Paper ID: IMCEST-094

Title: Dual-Band 2×2 MIMO Antenna Simulation for 5G mmWave at 28 GHz and 38 GHz

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ABSTRACT

This work presents the simulation of a compact dual-band 2×2 MIMO antenna intended for 5G millimeter-wave (mmWave) communication at 28GHz and 38GHz. The proposed slot-loaded patch antenna configuration enables dual-band operation while maintaining a low profile suited for next-generation wireless applications. The MIMO arrangement enhances channel capacity and reduces signal fading, ensuring reliable high-speed communication. Key antenna characteristics—such as return loss, gain, radiation patterns, and envelope correlation coefficient (ECC)—are evaluated through simulation. Results indicate strong isolation between antenna elements, low ECC values, and high gain performance, demonstrating the suitability of the design for 5G small-cell deployments and user equipment. The directional radiation properties and stable dual-band behavior make this antenna a promising candidate for future high-speed, low-latency communication systems, addressing the growing demand for efficient wireless network infrastructures.

Keywords: 5G antennas, dual-band MIMO, millimeter-wave communication, slot-loaded patch antenna

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Paper ID: IMCEST-095

Title: Energy Consumption and Airconditioning System Control with IoT Integration

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ABSTRACT

The development of an energy consumption and air conditioning system control designed to reduce energy wastage from an Air Conditioning Unit is presented in this study. The primary objective is to monitor and control key parameters such as power consumption, voltage, current, and real-time kW usage, while also tracking classroom occupancy using Passive Infrared (PIR) sensors. Via automated control, the system enables remote access to appliances through the internet.

Data is transmitted to the Arduino IoT Cloud, allowing real-time monitoring and control using smartphones and laptops. Results show that the system effectively reduces unnecessary energy consumption by automatically adjusting the AC unit's operation based on occupancy and energy data. In conclusion, this smart energy management system demonstrates the potential of IoT technology in promoting energy efficiency, offering a practical solution for sustainable classroom environments. Additionally, it serves as a regulatory checker, enabling users to make informed decisions about their energy consumption.

Keywords: IoT, Smart Energy Management, Consumption Monitoring, AC Automation, PIR Sensor, IoT Cloud

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Paper ID: IMCEST-096

Title: SnapNutrient: An Intelligent Mobile App for Smart Dietary Analysis and Meal Macronutrient Estimation Using YOLOv8 with Food Recognition of Filipino Dishes

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ABSTRACT

In today's fast-paced world, maintaining a balanced and nutritious diet has become increasingly difficult, with many individuals struggling to identify the nutritional content of their meals. Dietary imbalances contribute to rising cases of obesity, diabetes, and heart-related conditions, underscoring the need for accessible technology that supports informed food choices.

SnapNutrient is an intelligent mobile application designed to provide real-time dietary evaluation and macronutrient estimation using YOLOv8, an advanced object detection algorithm. By allowing users to scan meals through their mobile device camera, the system instantly identifies Filipino food items and estimates nutritional values. This innovation bridges the gap between machine learning and nutritional science by offering fast, accurate, and user-friendly analysis.

The app not only computes macronutrients—carbohydrates, proteins, and fats—but also integrates with external health trackers to support personalized recommendations. Built primarily for Filipino cuisine, SnapNutrient enhances users' nutritional awareness and promotes healthier eating habits.

The study emphasizes the development and implementation of SnapNutrient, highlighting the integration of YOLOv8 for food recognition, UI design principles, and the system's impact on supporting health-conscious decision-making. Through artificial intelligence, the project aims to empower individuals with improved dietary insights, contributing to better long-term health and well-being.

Keywords: YOLOv8, Nutrient Estimation, Food Recognition, Smart Dietary Analysis, Mobile Application, Filipino Cuisine

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Paper ID: IMCEST-097

Title: Performance Analysis of Junction-Less (JL) High Dielectric Gate Oxide Stack (GOS) Dual K Spacer Gate-All-Around (GAA) FinFET

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ABSTRACT

This research work explores the practicality of RFIC design in the context of a gate oxide stack (GOS) gate-all-around (GAA) FinFET. The investigation involves the incorporation of a novel structure with a dual-K dielectric spacer, where characteristics of the transistor device were improved by using SiO_2 and HfO_2. The suggested device is compared with a standard GAA FinFET with no spacer as well as a single-K spacer (SiO_2).

Fringing field effects enhance threshold voltage, transconductance, ON–OFF current ratio, and device efficiency. The proposed device improves the on-current by 36% and decreases the off-current by almost 24% when compared to the traditional GAA FinFET. These improvements make the proposed CMOS device a strong candidate for low-power RFIC circuits.

Additionally, short channel effects (SCEs), including Drain-Induced Barrier Lowering (DIBL) and Subthreshold Swing (SS), are significantly reduced. The GOS structure also lowers the gate oxide size (t_{ox}) while reducing off-state leakage current (I_{off}). Overall, the incorporation of a dual-K spacer demonstrates improved performance, reduced SCEs, and suitability for next-generation RF and analog applications.

Keywords: Dual-K spacer, GAA–FinFET, SCE, high dielectric gate oxide stack, analog and RF analysis, TCAD simulation.

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Paper ID: IMCEST-099

Title:A Low-Ripple High-Efficiency Charge Pump Design Using Differential Control and Current Steering Techniques

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ABSTRACT

This work presents a low-ripple, high-efficiency charge pump using differential control and current steering techniques, implemented in GPDK-90nm with Cadence Virtuoso. The design addresses key issues in conventional charge pumps, including ripple, efficiency, linearity, and stability. Differential control adjusts current paths to reduce ripple, while current steering ensures precise current flow and minimizes switching noise. Complementary MOSFETs in current mirror configurations provide accurate current transfer, and UP/DOWN signals maintain charge balance under varying loads.

Simulation results confirm low ripple, high efficiency, and good linearity, with improved transient response and reduced overshoot. This makes the design ideal for power management ICs, RF systems, and portable electronics.

Keywords— GPDK-90nm Cadence Virtuoso, Differential Control Technique, Switching Noise Mitigation, Efficient Power Delivery, Linearity and Stability, Low-Ripple Charge Pump.

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Paper ID: IMCEST-100

Title: PowerLink+: A Modular Solar-Wind Emergency Charging and Communication Hub with Integrated Weather Monitoring for Disaster-Prone Communities

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ABSTRACT

Disaster-prone communities in the Philippines frequently suffer prolonged power outages and communication disruptions during typhoons, earthquakes, and other natural calamities. These interruptions hinder emergency coordination, limit access to timely information, and reduce the capacity of residents to charge essential devices. PowerLink+ addresses these challenges by introducing a modular, solar- and wind-powered emergency charging and communication hub equipped with integrated environmental monitoring.

The system combines a dual-source renewable energy setup—160W solar panel and 300W vertical-axis wind turbine—with an ESP32-based microcontroller platform for power management, data acquisition, GSM/SMS alerts, and Wi-Fi hotspot provisioning. Environmental sensing using the BME688 sensor provides real-time temperature, humidity, air pressure, and air-quality data with an overall accuracy of 95.2%, improving disaster situational awareness.

Simulation, data evaluation, and system testing demonstrate that PowerLink+ reliably generates off-grid energy, maintains stable communication services, and supports essential charging loads during emergency scenarios. The system offers a scalable, sustainable, and community-centered solution that enhances local disaster resilience and supports government and NGO preparedness initiatives.

Keywords— Renewable Energy Systems, Disaster Resilience, Environmental Monitoring, Emergency Communication Hub, Hybrid Solar–Wind Power.

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Paper ID: IMCEST-101

Title: Material-Driven Design and Aerodynamic Efficiency of Hybrid Racing Cars

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ABSTRACT

Hybrid vehicles utilize two or more power sources, providing improved dependability and enhanced driving performance. This study investigates material-driven design and aerodynamic optimization for hybrid racing cars to improve efficiency and drivetrain stability.

The vehicle model was designed using NX 12.0 (UG) and evaluated with various structural materials (e.g., Al 2024, carbon steel). Computational Fluid Dynamics (CFD) using the Realizable k–ε turbulence model was carried out to analyze pressure distributions and velocity streamlines under representative operating conditions. Results show that appropriate material selection combined with optimized aerodynamic geometry reduces drag, improves torque transmission efficiency, and enhances overall race-car performance. The work highlights the interplay between lightweight materials and aerodynamic shaping in maximizing hybrid racing vehicle efficiency.

Keywords: Hybrid vehicle, NX12.0, CFD, aerodynamic design, regenerative braking, hybrid racing system.

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Paper ID: IMCEST-102

Title: Smart Web-Based Ordering Management System with AI Support and Data Analytics for Skye Interior Design Services

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ABSTRACT

Skye Interior Design Services offers high-quality home interior fixtures such as window blinds and accordion doors imported from Korea, bringing a sense of modernization into Filipino homes. The business previously relied only on online presence through Facebook and Viber, where they posted their products to attract customers. However, due to overwhelming competition on digital platforms, their visibility diminished, limiting their ability to attract and retain customers.

To address this challenge, a smart web-based ordering and management system was designed to meet the operational requirements of Skye Interior Design Services. The proposed system integrates an online ordering workflow, product catalog browsing, and service request features such as measurement and quotation requests. Artificial Intelligence (AI) is incorporated to enhance user interaction and streamline the customer experience. The homepage is developed with an engaging and visually appealing interface to draw customer attention, while AI helps improve product browsing efficiency and overall shopping assistance.

The system provides customers with a reliable, user-friendly platform to explore products, submit service requests, and experience more efficient transactions. The project intends to give customers a high-quality digital experience while empowering the business with better management tools and improved customer retention.

Keywords— Web-based system, Ordering management, Artificial Intelligence, Interior design services, E-commerce.

Paper ID: IMCEST-104

Title: Herb-AI: AI Powered Herbal Plants Identifier Using Computer Vision Technology

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ABSTRACT

Herb-AI is an AI-powered herbal plant identifier that uses computer vision and machine learning to recognize Department of Health (DOH)–approved medicinal plants through images captured or uploaded via mobile devices. The application provides users with essential information about medicinal plants, including preparation methods and therapeutic benefits, offering a fast and highly accurate identification process.

The system addresses common challenges in plant identification, such as slow manual inspection, lack of botanical knowledge, and high risk of human error—particularly among non-experts. Herb-AI employs computer vision techniques that extract leaf characteristics including shape, color, and texture. Using a Convolutional Neural Network (CNN), the model was trained on leaf image datasets collected from multiple angles to increase accuracy and robustness.

Development began with designing an intuitive graphical user interface (GUI), integrating system features, and training the CNN model using collected datasets. Panel recommendations were incorporated to enhance app usability and informational value. The system achieved an accuracy rate of 95%, demonstrating its effectiveness in reducing time and effort required for correct plant identification. Beyond identification, Herb-AI also aims to educate users about the benefits, uses, and preparation of medicinal plants, promoting accessible herbal knowledge for the general public.

Keywords— AI Powered Identifier, Convolutional Neural Network, Computer Vision Techniques, Machine Learning, Herb-AI.

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Paper ID: IMCEST-105

Title: ScholarSync: AI Enhanced Scholarship Accessibility for Taguig Scholars in Lifeline Assistance for Neighbors In-need Scholarship Program and Taguig City University–City Educational Assistance Allowance through Collecting and Secure Matching

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ABSTRACT

Scholarships play an essential role in supporting students who lack the financial means to pursue higher education. However, many eligible residents of Taguig City still struggle to access scholarship opportunities due to scattered information sources, manual submission processes, and limited visibility into application status. Programs such as the Lifeline Assistance for Neighbors In-Need (L.A.N.I.) Scholarship and the Taguig City University City Educational Assistance Allowance (TCUCEAA) offer substantial academic support, but applicants often face delays, incomplete submissions, and missed deadlines due to the absence of an integrated digital system.

To address these issues, this study presents **ScholarSync**, a centralized AI-enhanced web-based platform designed to unify scholarship programs and streamline application management. The system automates requirements verification, enables secure document uploading, provides deadline reminders, and improves accessibility for both students and scholarship providers. An AI-driven matching mechanism ensures students are paired with suitable scholarships based on credentials, eligibility, and program requirements.

The platform significantly reduces redundancy, improves information accuracy, and enhances the overall user experience. By consolidating Taguig's scholarship ecosystem into a single secure platform, ScholarSync aims to improve educational accessibility, minimize application errors, and promote efficient communication between scholars and providers.

Keywords— Scholarship System, AI Matching, Educational Assistance, Web-Based Platform, Student Support.

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Paper ID: IMCEST-106

Title: GitBloc: Secured Construction Procurement Management with Analytics Using Blockchain Technology and AES Encryption with AI-Based Supplier Search Algorithm

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ABSTRACT

Procurement plays a crucial role in ensuring that organizations obtain the right materials from the right suppliers at the right time and cost. In the construction industry, procurement of materials such as cement, gravel, and steel is often performed manually, involving repetitive searches and negotiations with different suppliers. This traditional process is time-consuming, prone to data manipulation, and lacks transparency.

GitBloc introduces a blockchain-based construction procurement system designed to enhance transparency, data integrity, security, and supplier reliability. Using an AI-powered SEO-based supplier search algorithm, GitBloc automatically identifies and ranks suppliers based on relevance, online presence, performance, and reliability—helping customers efficiently locate trustworthy material providers.

Once suppliers are evaluated and selected, GitBloc automates purchase order (PO) generation. All generated POs are encrypted using AES to protect sensitive procurement information. After finalization, each transaction is permanently recorded on a blockchain ledger through SHA-256 hashing, ensuring immutability, traceability, and protection against tampering.

The system also integrates an analytics module that monitors supplier performance, delivery timelines, and cost trends, supporting more informed procurement decisions. A Reorder Point feature alerts customers when stocks drop to critical levels, enabling timely reordering from verified suppliers.

Overall, GitBloc streamlines procurement workflows, enhances security, and reduces operational inefficiencies, making it a valuable solution for modern, data-driven construction management.

Keywords— Blockchain, AES Encryption, Supplier Analytics, Procurement System, AI-Based Search.

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Paper ID: IMCEST-107

Title:AI-Driven Diagnosis and Prescription System for Common Illnesses with Blockchain-Integrated Health Records Using AES and SHA-256 Encryption

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ABSTRACT

Early and accurate diagnosis, secure health information management, and correct prescriptions are essential components of modern healthcare systems. Traditional medical processes often face challenges such as delayed diagnostics, manual record handling, and vulnerabilities in data security. With increasing digital transformation in healthcare, integrating Artificial Intelligence (AI) and Blockchain technology presents an innovative solution that enhances diagnostic accuracy, efficiency, and information protection.

This research introduces an **AI-driven diagnosis and prescription system** capable of identifying common illnesses and generating appropriate medication recommendations based on user-provided symptoms. The system incorporates a blockchain-secured health information management framework to ensure confidentiality, immutability, and traceability of patient records. Data is secured using Advanced Encryption Standard (AES) and SHA-256 hashing to prevent unauthorized access and tampering.

The proposed system improves diagnostic capabilities through AI algorithms, automates prescription generation, and ensures robust data integrity. By combining intelligent decision support with blockchain-backed record security, the system aims to deliver timely, reliable, and secure healthcare services. The findings demonstrate the potential of AI and blockchain technologies in transforming digital health systems, promoting accuracy, trust, and resilience in medical information handling.

Keywords— AI Diagnosis, Blockchain Security, AES Encryption, SHA-256 Hashing, Health Information Systems.

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Paper ID: IMCEST-108

Title: Evaluation of IoTPOD Control Latency and Responsiveness Across Common IoT Dashboards

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ABSTRACT

Internet of Things (IoT) is the global coordination of different physical devices integrated with sensors for acquiring data from their surroundings. With the rapid increase in IoT development, the volume of collected raw data has grown significantly, creating challenges in data processing and visualization. This study evaluates the performance of three IoT dashboards—assessed for usability, real-time data handling, integration flexibility, and responsiveness—based on their control latency when used with the IoTPOD testing system.

The evaluation procedure involved three primary inputs. First, a button command was issued from each dashboard to toggle an LED on the IoTPOD. Second, network configurations such as Wi-Fi credentials and authentication tokens were incorporated to ensure active communication. Third, hardware parameters such as stable power delivery and LED responsiveness were considered to guarantee reliable operation.

Results show that among the tested IoT platforms, Arduino Cloud and Thingsboard exhibited the most consistent latency performance, averaging 2.5 ms and 1.86 ms respectively, making them ideal for latency-sensitive applications. Thingsboard emerged as the fastest and most stable platform, partially due to locally hosted testing conditions. The study suggests further evaluation using cloud-hosted dashboards and alternative communication protocols for platforms such as Blynk.

Keywords— Internet of Things, Dashboard, IoTPOD, Latency, Arduino Cloud, Thingsboard, Blynk.

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Paper ID: IMCEST-109

Title: Design and Implementation of an Inventory Management System with RF-Based Asset Tracking System in Academic Setting

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ABSTRACT

This study endeavors to design and implement an innovative asset detection device and inventory system utilizing Radio Frequency (RF) technology to bolster asset monitoring and inventory management in school laboratories. The primary objectives are twofold: developing an RF tracker device capable of detecting passive RF tags within a designated area and creating an asset inventory system software tailored for the Electronics Laboratory at the university.

The study's first phase focuses on the design and fabrication of the RF tracker device engineered to detect passive RF tags within a 6.5×6.5-meter space. Through meticulous design considerations, the device aims to provide precise asset-tracking capabilities within the laboratory environment. The second phase involves the development of asset inventory system software customized to meet the specific needs of the University's Electronics Laboratory. This software will facilitate efficient asset management by accurately capturing and storing each asset's X and Y coordinates within the room.

Evaluation metrics encompassed the accuracy of asset localization, the efficiency of inventory management processes, and the system's overall operational efficiency and user-friendliness. The recorded results show that the scanned positions of assets closely match their real positions, with only minor deviations observed. ANOVA analysis confirms that there is no significant difference between real and scanned coordinates, validating the accuracy of the RF-based asset tracker. Efficiency comparison highlights that the designed tracker drastically reduces the time and human effort required compared to traditional manual methods.

Overall, the tracker improves asset management by ensuring precise location tracking and significantly enhancing operational efficiency. By addressing the challenges and enhancing asset accountability, this research proposes implementing an RF-based asset tracking system for laboratory assets and equipment in the University.

Keywords— Radio Frequency, Long-Range RF, Asset Tracker, Inventory Management, RF Tag, Academic Laboratory.

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Title: INTEGRITEST: A Secure Examination System Integrating LLM for Question Generation and YOLO Algorithm for Proctoring

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ABSTRACT

With the increasing prevalence of digital learning, the demand for safe, efficient, and reliable online examination systems continues to grow. Although online assessments offer flexibility and convenience, they remain vulnerable to cheating due to limited supervision and inadequate monitoring tools. Existing systems often fail to detect dishonest behaviors such as tab-switching, multiple-person presence, or use of unauthorized materials, which undermines the validity of examination results.

To address these issues, INTEGRITEST was developed as a secure and intelligent online examination system designed for Taguig City University (TCU). The system integrates advanced technologies, including the You Only Look Once (YOLO) object detection model for real-time proctoring and a Large Language Model (LLM) for automated exam question generation. Through YOLO-based monitoring, the system continuously scans examinees' webcam feeds, identifying suspicious activities such as the absence of the test-taker or multiple faces appearing on screen. This ensures examinations are conducted with academic integrity comparable to traditional in-person assessments.

The LLM component enhances exam quality by generating context-aware questions based on instructor-provided materials, specifically tailored for academic disciplines such as Computer Science. Instructors can input written prompts, learning materials, or even specify trusted sources such as W3Schools to guide the question-generation process.

By combining real-time AI-driven monitoring and intelligent question generation, INTEGRITEST provides a reliable and flexible solution that supports TCU's commitment to academic honesty, innovation, and secure online learning. The system enhances fairness, improves the testing experience, and ensures confidentiality and integrity of student assessments.

Keywords— Online Examination System, YOLO, LLM, Academic Integrity, AI Proctoring, Secure Assessment.

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