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FACULTY PUBLICATION

RESEARCH PAPERS

July-2026

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TITLE:

Android Malware Detection Using an Optimized and Explainable Attentional Convolutional LSTM Model

AUTHOR :

Shimpi P.M.; Pise N.N.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (vol.-3, Issue-2s)

DETAILS:

Published on July 2026

ABSTRACT:

Due to the increasing number of Android applications, its usage has increased which are exposing ourselves into complex mobile malware which is a serious threat on user privacy and system integrity. Machine Learning (ML) based detection methods are considered traditional and generally perform poorly in modeling the complex sequential activity of API-call patterns, typically having low interpretability of their decisions. To address these challenges, this work proposes an optimized and interpretable attentional CNN–LSTM framework for Android malware detection. It utilizes convolutional layer to extract spatial features, Long Short-Term Memory (LSTM) networks to capture patterns in sequential behavior and attention mechanism to highlight distinctive sequences of API calls. Moreover, Manta Ray Foraging Optimization (MWO) is applied for adaptive parameters fine-tuning and convergence improvement to enhances detection performance. We validate our approach with a wide range of experiments on two absolutely popular datasets for API call–based malware detection and result show high accuracy, precision, recall as well as F1-score owing to the 90:10 train–test split. Randomization-based statistical validation confirms the robustness and significance of results ($p < 0.05$, non-parametric tests). Besides classification performance, the proposed framework has an innate explainability as examining attention weights through API sequences allows for transparent interpretation of detection decisions. Malicious and benign applications exhibit different concentration patterns in the usage of APIs as revealed by attention heatmaps and top-weighted API analysis Hence, the proposed approach provides end to end, optimized and interpretable solution for reliable android malware detection.

Link: https://jidmis.org/index.php/jidmis/article/view/639

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TITLE:

Investigation Of Physicochemical Stability And Anti-Psoriatic Efficacy Of Lavender Oil Nanoemulsion In Psoriatic Hacat Cells

AUTHOR :

Chandorkar P.; Jagdale S.

JOURNAL NAME:

International Journal of Applied Pharmaceutics (Vol.-18, Issue-4)

DETAILS:

Published on July 2026

ABSTRACT:

Objective: The objective of this research was to develop a nanoemulsion of lavender oil (LO) and evaluate its physicochemical properties. The effects of LO relevant to psoriasis were also determined on stimulated human keratinocyte (HaCaT) cells by evaluating its cytotoxicity, anti-microbial potential, and alterations in the levels of pro-inflammatory markers. Methods: A stable LO-based nanoemulsion was developed using a pseudo-ternary phase diagram approach, employing Tween 80 (T80) and Transcutol P (Tp) in a 2:1 ratio. The optimized formulation exhibited a particle size (PS) of 98.91±1.02 nm, zeta potential (ZP) of −11±0.98, and a polydispersity index (PDI) of 0.174±0.001. The formulation was evaluated for anti-oxidant and antimicrobial activity, cytotoxicity against stimulated HaCaT cells and its effect on pro-inflammatory cytokine expression. Results: The developed LO nanoemulsion demonstrated measurable radical scavenging activity and a weak antimicrobial effect against Staphylococcus aureus. Batch A3 showed high cytotoxicity in stimulated HaCaT cells with an IC_{50} value of 0.4198±0.047 µl**/ml, compared to 7.843±0.029 µl**/ml for dithranol. Additionally, the formulation reduced the expression of interleukin-17 (IL-17) by 10% and interleukin-22 (IL-22) by 29%. Conclusion: The findings indicate that the LO nanoemulsion exhibits in vitro anti-inflammatory and cytotoxic effects relevant to psoriatic conditions, including oxidative stress, microbial activity, and inflammatory mediators. However, these observations are based on in vitro findings and should be interpreted as preliminary. Further in-depth in vivo and clinical investigations are required to establish its therapeutic relevance.

Link: https://doi.org/10.22159/ijap.2026v18i4.58875

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Blow-out analysis of head race tunnel: A case study of Solu Khola (Dudh Koshi) hydroelectric project, Nepal

AUTHOR :

Shah S.P.; Ingle G.S.

JOURNAL NAME:

Research on Engineering Structures and Materials (Vol.-12, Issue-3)

DETAILS:

Published on December 2025

ABSTRACT:

This paper examines the analysis, rectification, and performance of the blowout that occurred at chainage 1+154.12 meters (critical section) in the Head Race Tunnel (HRT) of the Solu Khola Dudh Koshi Hydroelectric Project in Eastern Nepal. The Tunnelling Quality Index (Q) for the critical and adjacent to the collapsed section was derived using probe drilling results and face mapping. The rock support system was evaluated using the Q-system support chart and is validated with the finite element-based program Rocscience (Phase2). The parametric study was conducted to evaluate the support required for varying the overburden depth from 100m to 650m. The tunnel convergence at the critical section was observed almost for two years before application of final rock supports and was found to be a maximum of 4.277 mm at 27 days, which was quite low and within acceptable limits. The performance study has also been carried out for nearly two years and has been found to be in stable condition since its commissioning. This study presents practical rectification procedure for blowout analysis in Himalayan tunnels, and the findings of the present case study will be helpful to geologists, tunnel engineers, and designers in future tunnelling projects with similar site conditions and constraints.

Link: http://dx.doi.org/10.17515/resm2025-1032st0716rs

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Novel Congestion Avoidance Technique to Optimize the QoS Parameters in Wireless Sensor Network Using Semi-Superwised Machine Learning

AUTHOR :

Sutar S.H.; Jinila Y.B.; Ghorpade-Aher J.; Thengade A.; Navghare N.D.; Patil S.P.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-1s)

DETAILS:

Published on June 2026

ABSTRACT:

Congestion control in Wireless Sensor Network is a significant area which has to be addressed for smooth and seamless packet transfer from source to the destination node. Existing literatures have deployed various congestion control schemes to reduce the congestion in network., which are based on congestion and their severity, the remedial mechanisms are applied to overcome the problem of congestion. The congestion can be caused because of Channel occupancy, high reporting rate and quick buffer occupancy. Various techniques have been proposed and implemented to overcome the congestion problem which manages channel occupancy, reporting rate and buffer occupancy. Hence it motivates to propose some alternative technique which avoids the congestion itself. In this paper, congestion avoidance technique is proposed, as it causes severe problem in the network performance such as packet loss, wastage of processing power, inefficient resource utilization, and other Quality of Service parameters. Here the proposed technique named Congestion Avoidance Technique (CAT) a buffer management technique. Every node is attached with input and output buffer which has limited capacity. This technique efficiently manages the buffers of sensing nodes by continuously monitoring the buffer occupancy. CAT always ensures that the buffer contents are always in between allowable congestion window that is between PTM and LTM marking of the buffer. Here proposed technique avoids the congestion in WSN and ultimately increase the QoS parameters of the network. CAT is implemented using experimental scenario in NS2 and the results are analyzed which shows that the buffer is always occupied between congestion windowongestion control in Wireless Sensor Network is a significant area which has to be addressed for smooth and seamless packet transfer from source to the destination node. Existing literatures have deployed various congestion control schemes to reduce the congestion in network., which are based on congestion and their severity, the remedial mechanisms are applied to overcome the problem of congestion. The congestion can be caused because of Channel occupancy, high reporting rate and quick buffer occupancy.

Link: https://doi.org/10.59543/jidmis.v3.428

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Indigo's Success Blueprint: Strategies for Dominating the Aviation Market

AUTHOR :

Thakur P.; Gaurav K.; Ray A.S.

JOURNAL NAME:

Phygital Revolution: How Digital and Physical Worlds Merge for a Sustainable Future

DETAILS:

Published on 2026

ABSTRACT:

Indigo CEO Pieter Elbers stated that the airline's new business class will aim to cater to a new generation of Indian travelers who have yet to experience business class (June, 2024). Elbers also acknowledged that the airline's international presence is modest but emphasized that expanding globally will be crucial for the future. He is also committed to enhancing the domestic network, aiming to connect every city with an airport of significant size, as this remains central to the company's strategy. Indigo, which holds a commanding 60.3% share of India's aviation market as of Q1 2024, is at a strategic crossroads that could shape its future trajectory. The airline's success has been built on a lowcost carrier model, emphasizing operational efficiency and a strong focus on expanding its domestic network. This approach has allowed Indigo to dominate the Indian aviation sector and attract a broad customer base. However, the landscape is changing. Increasing competition from both domestic airlines and international carriers, coupled with a rising middle class in India that is increasingly seeking premium services, presents a challenge. The airline needs to decide whether to continue with its current strategy of low-cost, high-volume operations or to diversify its offerings by introducing premium services and expanding its international footprint. This decision risks expanding into premium services and international routes could increase operational costs and strain the airline's cost-efficiency model. There's also the potential risk of diluting Indigo's strong brand identity as a low-cost carrier, which might alienate its current customer base.

Link:
https://www.scopus.com/pages/publications/105043381696?origin=resultslist

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TITLE:

Autonomous solar panel cleaning system with smart IoT connectivity

AUTHOR :

Gaikwad V.; Amune A.; Musale V.; Rajas N.; Chinchmalatpure S.; Kakade S.

JOURNAL NAME:

Information and Communication Systems

DETAILS:

Published on March 2026

ABSTRACT:

In response to the critical need for maintaining optimal efficiency in solar energy systems, this paper intro-duces a Smart Solar Panel Cleaner which is making use of NodeMCU, designed to autonomously detect and remove dust and moisture accumulations on solar panels. The buildup of dust, dirt, and environmental particles on panel surfaces significantly reduces solar energy absorption, with studies indicating up to a 30% loss in efficiency under neglected conditions. This system employs a GP2Y1010AU0F dust sensor and FC-28 moisture sensor to monitor environmental variables in real- time, assessing when cleaning is necessary based on threshold values set for dust and moisture levels. Upon detection of contaminants beyond the threshold, the Node-MCU microcontroller activates servo motors, which drive a cleaning mechanism (such as a brush or wiper) across the panel surface. Additionally, a water pump is employed as needed to aid in cleaning, thus ensuring comprehensive removal of particulate matter and residues. Testing was conducted under varying environmental conditions to evaluate the system's responsiveness and efficiency, with results showing consistent enhancement of panel performance post-cleaning. By automating the cleaning process, the system addresses the labor-intensive and time- consuming challenges of manual cleaning, especially for large-scale solar farms and rooftop panels in hard-to-reach locations. Moreover, the system operates with minimal water usage, aligning with sustainable practices essential for regions facing water scarcity. The findings demonstrate that automated, NodeMCU-based solar panel cleaners can significantly reduce the operational costs associated with manual cleaning, minimize energy losses due to dust accumulation, and in-crease the longevity of solar installations. This research contributes to the broader objective of advancing renewable energy technologies through autonomous solutions that promote sustainability and efficiency in energy generation systems.

Link: https://doi.org/10.1201/9781003650201-109

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TITLE:

Investigation of optical properties of nematic liquid crystals dispersed with CdSe quantum dots

AUTHOR :

Kahane S.V.; Sutar A.; Jadhav Y.; Doke S.

JOURNAL NAME:

Bulletin of Materials Science (Vol.-49, Issue-3)

DETAILS:

Published on 20 July 2026

ABSTRACT:

This research investigates the impact of CdSe quantum dots (QDs) on the optical properties of 5CB nematic liquid crystals (NLCs). CdSe QDs of two sizes (3.2 and 5.3 nm) were synthesized using a wet chemical method and dispersed within the NLC matrix. Structural analysis of CdSe QDs was done by X-ray diffraction measurement, and confirmed the cubic zinc blend structure of CdSe QDs without any impurities. The optical properties were examined through absorption and emission spectroscopy, revealing distinct excitonic peaks at 614 nm (resulting in red emission at wavelength 618 nm) and 560 nm (resulting in yellow emission at wavelength 571 nm) for CdSe QDs of 5.3 and 3.2 nm sizes, respectively. The size-dependent blue shift in the excitonic peak, attributed to quantum confinement, was consistent with the XRD observations. Moreover, the study is directed towards enhancing the optical characteristics of pure NLC by exploiting the luminescent qualities of these CdSe QDs. Initially, polarizing optical microscopy (POM) was used to study the polarizing states of CdSe QDs-NLC composites. POM results indicated intensified bright states and deepened dark states with the dispersal of 3.2 nm CdSe QDs, accompanied by reduced defects and light leakage centers. Conversely, 5.3 nm CdSe QDs in NLC led to increased light leakage centers in the POM dark state and a subsequent reduction in photoluminescence (PL) intensity. Notably, a PL emission enhancement of nearly 80% was observed with 3.2 nm CdSe QDs, attributed to improved NLC molecule alignment and reduced defects. The strong interaction between NLC molecules and QDs facilitates efficient energy transfer from the QDs to the NLC molecules, resulting in enhanced PL emission. It is crucial to note that the comparable size of QDs significantly enhances the optical properties of NLCs, making them ideal materials for display applications.

Link: https://doi.org/10.1007/s12034-026-03655-y

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TITLE:

Visible light activation of Cu2SnS3 (CTS) photocathode for very efficient photoelectrochemical water splitting

AUTHOR :

Shelke H.D.; Bhosale S.R.; Chougale A.S.; Wagh S.S.; Madhale K.V.; Fadnavis S.; Tiwari Y.K.; Mohite A.A.

JOURNAL NAME:

Surfaces and Interfaces (Vol.-97)

DETAILS:

Published on July 2026

ABSTRACT:

Cu2SnS3 (CTS) is a promising p-type semiconductor used as a photocathode for PEC water splitting. CTS thin films were fabricated on FTO substrates via a cost-effective SILAR technique and optimized through post-deposition annealing. X-ray diffraction showed a triclinic phase, with higher annealing temperatures enhancing crystallinity and structural ordering. XPS confirmed stoichiometric Cu:Sn:S ratios, while SEM revealed improved grain connectivity for better charge transport. Optical studies indicated high visible-light absorption and reduced optical band gap post-annealing. The optimal annealing temperature of 400°C yielded a photocurrent density of -4.1 mA cm-2 and maximum HC-STH efficiency of ~0.56%. These results suggest that controlled thermal annealing effectively tailors CTS films, establishing their potential for sustainable solar water splitting and hydrogen production.

Link: https://doi.org/10.1016/j.surfin.2026.110140

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TITLE:

Unet++ And Explainable Ai For Early Detection Of Diabetic Retinopathy From Fundus Images

AUTHOR :

Ashtagi R.; Pai A.; Colaco L.M.; Ravikumar R.N.; Betgeri S.S.

JOURNAL NAME:

International Journal of Computer Information Systems and Industrial Management Applications (Vol.-18, Issue-2s)

DETAILS:

Published on June 2026

ABSTRACT:

One of the most prevalent causes of vision loss and vision impairment among diabetic patients worldwide that can be prevented is Diabetic Retinopathy (DR). This is especially important to identify the abnormality in the retina as soon as and as accurately as possible so that it can be treated clinically and the disease controlled. In this study, an integrated framework is proposed which combines UNet++ deep learning architecture and Explainable Artificial Intelligence (XAI), to be used for early detection of DR from retinal fundus image. The proposed system will involve UNet++ to accurately segment the retinal lesion including microaneurysm, hemorrhages and exudates on the retina to facilitate better localization and characterization of the features related to the disease. A robust and complete preprocessing pipeline is performed to enhance the images quality assessment, normalization, contrast enhancement and data augmentation are performed to enhance the model robustness and generalization. To enable these models to be explained in the clinical domain and bring transparency to these models, XAI methods are integrated into the pipeline such as the visualization of Grad-CAM and saliency maps of the image regions that justify the diagnosis. Evaluation is done with publicly available annotated fundus image datasets, and using standard metrics such as accuracy, precision, recall, F1 score, Dice coefficient, and Intersection-over-Union (IoU). Experimental results show that the proposed approach can obtain high accuracy in lesion segmentation and also give meaningful explanation to images based on visual results to assist clinical decision making. UNet++ combined with explainability mechanism enhances diagnostic accuracy and build trust among clinicians.

Link: https://cspub-ijcisim.org/index.php/ijcisim/article/view/2114

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TITLE:

Pioneering Innovations in Healthcare and Energy: A Deep Generative AI Approach to Early Psychopathology Prediction and Adaptive Series Algorithm Management for Green Hydrogen Market Analysis

AUTHOR :

Kadriinamdar I.; Paliwal M.; Sani A.; Lipi K.; Vatsa M.

JOURNAL NAME:

Psychopathology Early Prediction and Classification: A Deep Generative AI Approach

DETAILS:

Published on 28 June 2026

ABSTRACT:

This paper analyzes how deep generative artificial intelligence (AI) can transform two critical sectors: healthcare and energy. In healthcare, predictive models powered by AI are now capable of early detection of psychopathological disorders, which enhances the patient's outcomes and efficiency as well as personalization of treatment. Such models now construct a framework for early intervention by using multimodal data such as behavioral, genetic, and neural data. Additionally, AI automates clinical workflows, precision medicine, remote monitoring of mental health patients, and many more. On the other hand, adaptive series algorithms aid with complex market green hydrogen to green hydrogen-fueled energy industry transitions and green power movement to industrial uses nexus in the energy sphere. AI also assists with better resources allocation, cost planes, and maintenance forecasting preemptive maintenance in hydrogen production, which leads to improved resource allocation. Moreover, AI makes hydrogen production more efficient by increasing the accuracy of timing in running electrolyzers, predicting availability of renewable energy resources, and decreasing supply chain risks. Machine learning technologies improve strategic-level decision-making by monitoring changes in demand for hydrogen, policy changes, and relevant geopolitics countries involved. By connecting these fields, we have illustrated how AI supports the development of sustainable and innovative solutions and enables effective decision-making across industries. From this perspective, it reinforces the interdisciplinary focus to underscore AI's potential repercussions on achieving environmental preservation and public health. Incorporating new technologies such as AI alongside existing infrastructures poses several difficulties as discussed in the paper. Some of these challenges include worries regarding data privacy, how decision models are inferred, and the types of laws that govern responsible AI use. As explained in the research, however, the application of AI techniques has the potential to fundamentally transform the future of the healthcare and energy industries for increased efficiency and improved sustainability.

Link: https://doi.org/10.1002/9781394336760.ch21

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TITLE:

Identification of Non-Proliferative Diabetic Retinopathy Stages Using the CLAHE Method of Data Preprocessing

AUTHOR :

Mahapadi A.A.; Shirsath V.; Mishra R.G.

JOURNAL NAME:

Intelligent Computing and Analytics in Image Processing

DETAILS:

Published on 2026

ABSTRACT:

The most common illness in India is reportedly diabetic retinopathy (DR), in which clogged retinal blood vessels result in symptoms ranging from impaired vision to sight loss. However, effective remedies are available. More than 50% of cases of blindness can be avoided with proper diagnosis, prompt treatment, and the necessary techniques. DR can be the outcome of any kind of diabetes, including gestational diabetes, type 1, and prediabetes. The longer a person has diabetes, the higher their risk. DR will affect more than half of those with the disease. The three main stages of this disease are proliferative DR, non-proliferative DR, and no DR. Ophthalmologists commonly use fundus photography photos to recognize stages in their patients. As a result, there is a significant imbalance between the different types of DR in the fundus image collection. This research paper provides an overview for classifying different DR phases using DL and ML techniques.

Link:
https://www.scopus.com/pages/publications/105042955827?origin=resultslist

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TITLE:

Green-Ink: Vehicle Emission into Usable Ink Conversion

AUTHOR :

Kulkarni H.H.; Jape V.; Soman A.; Thete S.A.; Lokhande N.; Agnani M.; Bugade V.; Thakare P.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

This paper aims to reduce the vehicle emission in the atmosphere and convert it to useful ink. A working prototype project hardware is developed in the lab, which is presented in this paper. It transforms airborne pollutants or particles into usable ink. The system uses electrical sensors to capture particulate matter (PM2.5 and PM10) and carbon-based pollutants, which are then processed to form ink. The model was designed, implemented, and tested independently, demonstrating successful pollutant capture. Experimental results demonstrate conversion efficiencies ranging from 25% to 90%, depending on vehicle type, operating conditions, and filtration material. The observations conclude with insights into scaling this technology for industrial applications and its potential for environmental sustainability. The entire analysis is carried out based on the observations with multiple variations in input parameters and its analysis in association with a local PUC center.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566425

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TITLE:

Chimera: Priority-Ordered Hierarchical Fusion Architecture for DoS/DDoS Detection

AUTHOR :

Inamdar A.; Maniar K.; Chaudhari P.; Tiwari B.

JOURNAL NAME:

2026 IEEE 18th International Conference on Computational Intelligence and Communication Networks, CICN 2026

DETAILS:

Published on June 2026

ABSTRACT:

Denial of Service (DoS) attacks, including Distributed Denial of Service (DDoS), remain among the most pervasive and damaging threats to network infrastructure. Conventional Intrusion Detection Systems that rely on supervised learning alone fail to detect zero-day attacks, while purely unsupervised approaches suffer from elevated false positive rates. This paper presents Chimera, a hybrid intrusion detection system that fuses an XGBoost gradient-boosted classifier with B-DAP (Benign-Data Alignment Processor), a Kitsune-inspired autoencoder ensemble for anomaly detection, through a priority-ordered hierarchical decision engine. The system processes network flow data from CSV and PCAP inputs, utilizing 33 features systematically selected from the 78 available in the CIC-IDS2017 dataset. Evaluated across 5.5 million unique network flows drawn from a corpus of approximately 48.9 million flows spanning ten DoS attack categories over five dynamically shifted, non-overlapping data segments, Chimera achieves a mean accuracy of 99.70%, a false negative rate of 0.05%, and a false positive rate of 2.72 %, with Cronbach's alpha reliability of α= 0.96. Domain-specific heuristics, including a protocol-aware safebroadcast mechanism, further suppress false positives from legitimate network services. The system architecture is modular, configuration-driven, and deployable on commodity hardware with optional GPU acceleration.

Link: https://doi.org/10.1109/CICN70047.2026.11594396

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Privacy-Preserving Traffic Analysis in High-Speed Encrypted Networks

AUTHOR :

Kaur R.; Maindola M.; Sindhu M.; Gudada P.V.; Kumbhar V.; Singh P.

JOURNAL NAME:

4th International Conference on Integrated Circuits and Communication Systems, ICICACS 2026

DETAILS:

Published on May 2026

ABSTRACT:

Insurance fraud is a major concern for the stability of the contemporary insurance markets, being responsible for considerable financial losses, premium level increases and loss of confidence. Traditional fraud detection mechanisms are basically centralized and based on rule-based or standalone machine learning models that have problems such as data tampering, non-transparency, late detection and new performance. To circumvent these shortcomings, we propose in this paper a Blockchain-Integrated Artificial Intelligence (BIAI) for insurance fraud analytics which mingles intelligent fraud detection with decentralized and tamper-proof data management. The model uses sophisticated AI models to analyze insurance claims, user behaviors and transactional patterns to detect various fraudulent activities. The blockchain system is incorporated to securely record claims, decision-making models and audit trails for data consistency, transparency and tamper evidence. Smart contracts automate the process of validating claims and executing fraud-sensitive business logic (which minimizes manual intervention and operational lag). Experimental results on benchmark insurance fraud datasets show that the proposed BIAI framework can achieve a 98.3% accuracy in fraud detection, 97.8% precision, 98.0% recall and an F1-score of 97.9%, where it outperforms traditional centralized fraud detection systems by at least 6-8%. In addition, integration of Blockchain enhances traceability and cut 35% outflow in fraudulent claim advocacy latency when sentinel level overhead values are in acceptable range. The findings demonstrate that combining AI-based analytics with blockchain technology delivers a strong solution for scalable and transparent next-generation insurance fraud detection and prevention.

Link: https://doi.org/10.1109/ICICACS68679.2026.11578837

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TITLE:

AIML Based Health Detection of a Transformer

AUTHOR :

Kulkarni H.H.; Jape V.; Soman A.; Lokhande N.; Thete S.A.; Pawar A.S.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

This paper presents a contemporary, mobiledriven transformer testing and condition monitoring solution to replace the inefficiencies of conventional, manual approaches. Adding on machine learning and cloud-based technologies, this system is expected to increase reliability, reduce outages, and avoid equipment damage in major electrical generation/distribution systems. The solution is an Android application, programmed in Java/XML. It has an interface that effectively displays important test parameters like input/output voltage, winding resistance, oil temperature, and load condition. These inputs are analyzed by a decision tree algorithm that gives real-time predictions about health condition of the transformer, identifying it as Healthy, Needs Maintenance, or Critical. For secure and individual, independent usage, the mobile application incorporates Firebase Authentication, by which users can securely log in using email/password. All testing data gathered and predicted outputs are automatically saved in Firebase Realtime Database so that users have access to their secure test logs on the cloud. This blend of predictive analysis in real-time, secure access control, and mobile portability presents a very utility-based tool for maintenance people, students, and engineers. The application greatly enhances efficiency, removes reliance on manual diagnosis, and actively encourages innovative approaches to maintenance, a leap in intelligent management of power system. This paper presents an AI/ML-based transformer health monitoring framework using an enhanced Decision Tree classifier with adaptive operational thresholds derived from power-system standards. The proposed methodology focuses on condition classification using key electrical, thermal, and mechanical indicators.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566642

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TITLE:

Virtual Mouse Using Hand Gestures

AUTHOR :

Deshmukh D.; Nehete P.; Jha S.; Paul P.; Varia V.

JOURNAL NAME:

Emerging Trends in Machine Learning, Data Science, and Internet of Things (Part 1)

DETAILS:

Published on 2026

ABSTRACT:

Cursor movement simplifies the user interaction with the system; it is a motive and visible pointer that is controlled by the user by using hardware (i.e., mouse and touchpad) to interact with the system. This technology can be simplified by using hand gestures instead of a physical device to manipulate the cursor. It can be useful to make the user experience simple and systematic. Cursor movement by hand gesture can be provided as an energy and time-efficient technology where the user interacts with the software by using gesture recognition. The gestures that manipulate the screen first will be stored in the system database. Then the hand present in front of the device will be recognized and stored as an object in the system, and then the gestures performed in front of the system with the hand will be matched with the gesture present in the memory of the system, which will lead to cursor operations and movements. This technology will be helpful to operate a system from a distance according to the user's ease and without using a hardware component. This technology can be applied in all the sectors where there is a need for a Computer System, as it is an adaptable technology for users of any age and field.

Link:
https://www.scopus.com/pages/publications/105043148229?origin=resultslist

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TITLE:

A Smart Hybrid E-Learning Recommendation Framework Integrating XGBoost, Autoencoder, and Bi-LSTM with Attention Fusion

AUTHOR :

Lad V.; Kulkarni P.V.

JOURNAL NAME:

2026 International Conference on Computing Theory and Wireless Communications, ICCTWC 2026

DETAILS:

Published on April 2026

ABSTRACT:

In the modern expanding e-learning ecosystem, course selection remains a persistent challenge regarding relevance and personalization due to data diversity, heterogeneity in learners, and their evolving interests in learning. This paper proposes an enhanced version of the hybrid e-learning course recommendation framework by incorporating machine learning and deep learning models to make more accurate and adaptive recommendations. Further evolving from traditional contentbased and collaborative filtering systems, the proposed model introduces XGBoost, Autoencoder-based Collaborative Filtering (AE-CF), Bidirectional LSTM (Bi-LSTM), and an Attention-based Fusion Mechanism. These components capture nonlinear relationships, latent learner-course interactions, and sequential learning patterns of learners collectively, enabling a unified hybrid learning pipeline. To assess the performance and generalization of models, experiments have been conducted on two datasets: the first one includes a custom-made MITWPU academic dataset comprising 423 student profiles and 30 synthetic online courses, each characterized by degree, specialization, skills, projects, and certification. The second dataset used in this work is the Coursera 100 K Course Reviews dataset from Kaggle, which consists of large-scale learner- generated data with course names, textual reviews, ratings, difficulty level, and subject categories that reflect real-world e- learning behavior. Experimental results indicate that, though small, the MITWPU dataset validates model functionality very well, providing highly competitive accuracy in limited data conditions. However, the same hybrid framework, when applied to the Coursera dataset, achieves substantially higher performance due to the larger size, richer feature diversity, and greater learner variability of the dataset. Experimental results are confirmed on both datasets using evaluation metrics such as Accuracy@10, Precision@5, Recall@5, and F1-Score, ensuring that the proposed hybrid model outperforms traditional baselines.

Link:
https://doi.org/10.1109/ICCTWC68241.2026.11583737

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Machine Learning Based Classification of Audio Mathematical Expression Using Audio Augmentation

AUTHOR :

Kherdekar V.; Naik S.

JOURNAL NAME:

Lecture Notes in Networks and Systems

DETAILS:

Published on 3 June 2026

ABSTRACT:

Classification of audio mathematical expression is challenging due to symbols, letters, digits, superscript, subscript present in it. In this paper a methodology is proposed for classification of audio mathematical expression using data augmentation. In machine learning, data augmentation methods are used to increase the dataset. A noise-based data augmentation method is used to increase the audio dataset which avoids overfitting of data during training. Time domain, frequency domain and cepstral domain features are extracted from original dataset and augmented dataset which is used as input vector to train the model. Neural network and SVM (Support Vector Machine) are used to train the model. Linear and RBF (Radial Basis Function) kernel are used to transform the data into higher dimensional space to train the SVM. Data augmentation gives 96% accuracy for neural network, 92.5% and 94.16% for SVM with linear and RBF kernel respectively.

Link: https://doi.org/10.1007/978-3-032-23515-2_15

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

An advanced wide-and-deep learning framework for soybean price forecasting using market, weather, trade, and supply data

AUTHOR :

Ghonge V.D.; Kulkarni Y.

JOURNAL NAME:

MethodsX (Vol.-17)

DETAILS:

Published on July 2026

ABSTRACT:

Precise prediction of agricultural commodity prices is key to assisting farmers, traders, policymakers and supply chain stakeholders to alleviate the uncertainty, and enable them to make sound decisions. The fluctuation in the price of soybean is very unpredictable because of the interplay of market forces, weather unpredictability, trade, output and farming methods. This paper suggests a multi-source machine learning model that is capable of forecasting the accurate price of soy beans using past market prices, arrivals, trade as well as weather forecasting, crop supply and area under cultivation. The dataset of a complete prediction of the prices of soybean between Jan 2015 to March 2026 was built by using the data provided in AGMARKNET, NCDEX, government trade portals, meteorological agencies and state agricultural databases. Exploratory data analysis was done to learn price distributions and regional differences, then systematic data preprocessing, normalization and feature engineering such as rainfall deviation, price range and arrivals per cultivation area was done. Several machine learning and deep learning models were implemented, such as Random Forest, Gradient Boosting, XGBoost, ensemble methods, dense neural network, attention-based models, and a proposed Wide and Deep Network (AgroWDN) was tested. RMSE, MAE, MSE and R2 measures were used to evaluate model performance on training, validation and test datasets. Experimental outcomes depict that AgroWDN model is, by all means, more efficient than the traditional machine learning and deep learning methods, making the least prediction errors and R2 at 98.97; it implies a high predictive performance. These results prove that the method of multi-source data fusion and hybrid deep learning structures are effective in price prediction in agriculture. The suggested framework provides a scalable and useful solution to the profitable prediction of soybean prices and may be applied to other crops and markets.

Link: https://doi.org/10.1016/j.mex.2026.104030

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Retail Procurement 4.0 Strategic: Impact Of Predictive B2b Platforms On Purchase Decisions And Business Growth

AUTHOR :

Kumar N.; Undale S.; Pandey S.

JOURNAL NAME:

International Journal of Computer Information Systems and Industrial Management Applications (Vol.-18, Issue-3s)

DETAILS:

Published on 28 June 2026

ABSTRACT:

Background: The Background and introduction of the study has greatly impacted how Retailers are operating their procurement and supply chain. AI powered Predictive Business-to-Business (B2B) procurement platforms have improved decision making capabilities, Supplier Relationship Management, Demand Forecasting and operational efficiencies. Retail Procurement 4.0 brings about a revolution in the process of retail procurement, moving from conventional procurement models to intelligent, information-driven procurement systems. Objective: In this study, we seek to assess the strategic role of predictive B2B procurement platforms in purchase decisions and business expansion in the retail sector. Methodology: The research design used was quantitative cross sectional approach of research. A structured questionnaire wsa used to collect data; with procurement managers, supply chain professionals, retail executives and B2B platform users. The following factors were evaluated: predictive analytics use, procurement efficiency, supplier performance assessment, purchase decision accuracy, cost optimization, and business growth indicators. Chi-square test and correlation analysis using SPSS Ver. 27.0 was conducted. Results: The findings state that the predictive B2B procurement platforms had a major impact on purchase decision-making accuracy, supplier selection efficiency, inventory management and procurement responsiveness. Organizations that used predictive procurement technologies performed better in the following areas than organizations that used traditional procurement systems: operational performance, procurement costs, demand forecasting and business growth. Conclusion: In the retail industry, predictive B2B procurement platforms are vital for boosting procurement efficiency, making better purchase decisions, and fostering sustainable business growth. By adopting Procurement 4.0 technologies, companies can make bold and wiser decisions on the available data, and enhance operational agility in this rapidly evolving market.

Link: https://cspub-ijcisim.org/index.php/ijcisim/article/view/2450

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Sustainable computational strategy for numerical simulation of photonic crystal structures analysis through surrogate modeling

AUTHOR :

Kuiri B.; Pal K.; Bhatia A.; Mukherjee S.; Kralj S.

JOURNAL NAME:

MRS Advances

DETAILS:

Published on 20 July 2026

ABSTRACT:

Repeated finite-element method (FEM) simulations of ring-core photonic crystal fibers are accurate but computationally expensive, particularly during large parameter sweeps and optimization. This study presents a sustainable surrogate-modeling framework that couples FEM-generated data with a feed-forward neural network for rapid prediction of the effective mode area, Aeff. The model was developed using 1950 samples described by the ring-core radius, operating wavelength, and effective refractive index. Its predictive behavior was evaluated through training-loss, prediction, residual, and statistical analyses, while computational sustainability was assessed in terms of runtime, electricity consumption, and estimated CO2 emissions. A single FEM case required approximately 6 h, 720 Wh, and 0.36 kg of CO2, whereas one surrogate inference required approximately 6 s, 0.2 Wh, and 0.0001 kg of CO2. These results represent a reduction of approximately three orders of magnitude in runtime and nearly four orders of magnitude in estimated carbon emissions. The principal innovation of this work is the combined evaluation of predictive performance and environmental cost within a single RC-PCF design workflow. The proposed surrogate therefore provides a rapid tool for preliminary screening, parameter exploration, and optimization, while FEM remains necessary for final design verification.

Link: https://doi.org/10.1557/s43580-026-01707-3

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Automated Real-Time Billing System Using Object Detection and Computer Vision

AUTHOR :

Phaske P.; Mohanty K.; Choudhari T.; Mahajan S.; Chakurkar P.S.

JOURNAL NAME:

Lecture Notes in Networks and Systems

DETAILS:

Published on 2 June 2026

ABSTRACT:

This paper presents an automated real-time billing system that employs object detection and computer vision technologies to streamline retail checkout processes. Traditional billing systems require manual scanning or entry of products, resulting in queues and human errors. Our proposed solution uses a custom-trained YOLOv8 model to automatically identify retail products in real-time from camera feeds, track items over time to ensure accurate detection, and generate bills without human intervention. The system recognizes eight common retail items with high accuracy, demonstrates practical response times suitable for real-world deployment, and features a web interface for monitoring and bill management. Experimental results demonstrate 94.3% mAP@0.5 accuracy, making it a viable solution for practical retail environments.

Link: https://doi.org/10.1007/978-3-032-22827-7_23

Since 1983

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Holistic Approaches to Benign Prostatic Hyperplasia

AUTHOR :

Goel B.; Jaiswal S.; Dubey T.

JOURNAL NAME:

Plant-Based Phytochemicals

DETAILS:

Published on 28 June 2026

ABSTRACT:

Benign prostatic hyperplasia (BPH) is a common urological condition in aging men. It involves the non-cancerous enlargement of the prostate gland, resulting in urinary symptoms and reduced quality of life in affected individuals. Currently alpha blockers, phosphodiesterase-5 (PDE-5) inhibitors, and 5-α reductase inhibitors are used for the treatment of BPH, but these inhibitors are associated with adverse effects such as gynecomastia, compromised muscle development, and severe myopathy. Natural products, derived from plants, herbs, and other biological sources, have gained attention for their diverse pharmacological properties and relatively low side effect profiles. This chapter explores the potential therapeutic role of natural products in managing BPH, offering a comprehensive overview. The chapter also discusses various natural compounds, including plant extracts and phytochemicals, which have exhibited promising anti-inflammatory, anti-proliferative, and anti-androgenic activities relevant to BPH pathophysiology. Molecular mechanisms underlying the efficacy of these natural products in mitigating prostate enlargement and ameliorating associated symptoms have been emphasized. This chapter aims to provide clinicians, researchers, and healthcare practitioners with valuable insights into the potential of natural products as alternative or adjunctive treatments for BPH.

Link: https://doi.org/10.1002/9781394416905.ch34

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Organometallic Therapeutics and Drug Delivery Strategies for Alzheimer's Disease: Bridging Metal Chemistry and Neurodegeneration

AUTHOR :

Gawade A.; Kuchekar A.; Pujari R.

JOURNAL NAME:

Advanced Therapeutics (Vol.-9, Issue-7)

DETAILS:

Published on 20 July 2026

ABSTRACT:

Alzheimer's disease (AD) remains one of the most challenging neurodegenerative disorders to treat due to its multifactorial pathology and limited efficacy of current therapies. Although recent advances have focused on amyloid-targeting strategies, effective disease modification is hindered by poor brain penetration, unfavorable pharmacokinetics, and inability to address multiple pathological pathways simultaneously. Organometallic-based drug delivery systems have emerged as promising multifunctional platforms that combine the unique properties of metal-containing compounds with advanced nanocarrier technologies. This review highlights recent developments in organometallic therapeutics and delivery strategies for AD, focusing on pharmaceutical design, blood-brain barrier transport, controlled drug release, and neurotherapeutic potential. Various delivery platforms, including nanoparticles, liposomes, dendrimers, polymer conjugates, and metal-organic frameworks, are discussed in relation to their ability to enhance drug stability, biodistribution, targeting efficiency, and therapeutic efficacy. The therapeutic relevance of these systems is further examined through their capacity to modulate amyloid-β aggregation, oxidative stress, metal dyshomeostasis, tau pathology, and neuroinflammation. Preclinical evidence suggests that organometallic-based platforms offer advantages over conventional approaches by integrating targeted delivery with intrinsic therapeutic activity. Despite challenges related to safety, scalability, and regulatory translation, continued advances in material design and translational research may facilitate development of clinically viable disease-modifying therapies for AD.

Link: https://doi.org/10.1002/adtp.70159

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Use of antibiotics in bovine mastitis: Considering drug resistance, safety issues with residue concerns, and exploring herbal remedies

AUTHOR :

Shinde N.G.; Jagdale S.C.

JOURNAL NAME:

Open Veterinary Journal (Vol.-16, Issue-7)

DETAILS:

Published on July 2026

ABSTRACT:

The global dairy industry incurs economic losses due to bovine mastitis, which leads to reduced milk production, spoiled milk, and increased treatment costs. The frequent and often indiscriminate use of antibiotics in routine mastitis management has exerted selective pressure favoring the emergence of resistant pathogens, notably Staphylococcus aureus, while concurrently raising public health concerns regarding the presence of violative drug residues in marketed milk. This review examines the reasons why antibiotics are avoided and how natural remedies might be used instead to prevent mastitis. Turmeric (Curcuma longa), Rakta Chandan (Pterocarpus santalinus), and Neem (Azadirachta indica) have powerful antimicrobial, anti-inflammatory, and immunomodulatory effects. Curcumin from turmeric reduces pro-inflammatory cytokines (TNF-alpha and IL-6) as well as mastitis pathogens. Both neem and Rakta chandan have shown activity against several multidrug-resistant strais, showing that they are highly effective. The use of herbal supplements may decrease milk withdrawal periods, reduce the risk of AMR infections, and have positive environmental effects. Combining plant extracts with antibiotics may produce a synergistic effect, giving veterinarians a way to offer more effective treatment using smaller antibiotic doses. An important factor to take into account in oral herbal therapies in ruminants is bioavailability, which is extremely compromised by the rumen's ability to degrade phytochemicals prior to absorption. In addition to mere excretion, studies have shown that herbs can also be used as bio-enhancers to regulate drug-metabolizing enzymes and efflux pumps to enhance antibiotic systemic exposure and mammary gland penetration. It is a pharmacokinetic interaction that provides a concrete approach to the pharmacological potentiation of smaller and more effective doses of antibiotics. By applying One Health principles, dairy farmers should pay attention to cleanliness, animal care, and herbal remedies to fight antimicrobial resistance and support the dairy sector's ongoing sustainability.

Link: http://dx.doi.org/10.5455/OVJ.2026.v16.i7.18

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

National-scale anomaly detection in inland waters: an explainable multi-model AI framework for environmental governance

AUTHOR :

Bhowmik P.N.; Varshney D.; Mishra L.; Anand P.; Aggarwal M.

JOURNAL NAME:

Journal of Hydroinformatics (Vol.-28, Issue-6)

DETAILS:

Published on 1 June 2026

ABSTRACT:

Inland water-quality monitoring systems increasingly generate large volumes of environmental data, creating opportunities for advanced analytical methods to identify subtle pollution signals that may not be captured by traditional threshold-based monitoring approaches. This study proposes an interpretable unsupervised machine-learning framework for detecting anomalies in inland water-quality monitoring data (consisting of more than 17,000 observations across 23 states, curated by the Central Pollution Control Board (2021), from which a processed subset was used for model evaluation) using multiple complementary detection models and explainable AI techniques. The framework uses the four detection models, which are Isolation Forest, One-Class Support Vector Machine, Elliptic Envelope, and Autoencoder and is optimised for ecological feature engineering (dissolved oxygen deficit, BOD/DO ratio, coliform load index) to increase the sensitivity to complex pollution stressors. SHAP-based explanations, t-SNE projections and statistical comparisons were utilised to ensure interpretability and strong validation of anomalies. The results show that about 7.88 and 8% of observations were anomalous, with peri-urban tanks in Karnataka and Uttar Pradesh being identified to have hotspots with characteristics of oxygen depletion and microbial contamination, especially during post-monsoon seasons. The ensemble was able to identify all domain-specific threshold violations with the best performance of Isolation Forest and Autoencoder (F1 > 0.70).

Link: https://doi.org/10.2166/hydro.2026.037

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Molecular Docking, Dynamics, and MM/GBSA-based Evaluation of Antidiabetic Phytoconstituents from Pterocarpus marsupium

AUTHOR :

Tambe S.; Choudhari V.; Pujari R.; Tambe V.; Malusare A.

JOURNAL NAME:

Letters in Applied NanoBioScience (Vol.-15, Issue-2)

DETAILS:

Published on 2026

ABSTRACT:

Pterocarpus marsupium Linn bark extract has been extensively used to treat Diabetes mellitus in Ayurveda. Given the traditional claim, this study was initiated to evaluate the antidiabetic potential of the phytoconstituents in the heartwood and bark by examining their binding to targets such as Sodium glucose cotransporter-2, Dipeptidyl peptidase-4, AMP-activated protein kinase, and Aldose reductase. The docking studies were carried out using PyRx and AutoDock Vina 1.1.2 software. The binding affinities of Pteroside with Sodium glucose co-transporter-2 (-9.5 Kcal/mol), 7-O-α-L-rhamnopyranosyloxy-4′-methoxy-5-hydroxy isoflavone with Dipeptidyl peptidase-4 (-8.9 Kcal/mol), and with AMP-activated protein kinase (-8.7 Kcal/mol), and Vijayoside with Aldose reductase (-9.1 Kcal/mol) were maximum as compared to the reference cocrystallized ligand. Molecular dynamics simulation studies indicate stable binding throughout the 100 ns simulation. MM-GBSA analysis elucidated the thermodynamic profile of the binding process and highlighted the key interactions governing complex stability. Among the evaluated complexes, Pteroside consistently demonstrated the strongest interaction profile with sodium glucose cotransporter-2. In view of this, clinical studies are necessary to elucidate their roles in the treatment of diabetes mellitus.

Link:
https://www.scopus.com/pages/publications/105043744195?origin=resultslist

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Damper Designs and Damping Characteristics in Additive Manufacturing: A Comparative Analysis

AUTHOR :

Chakraborty D.; Pawar A.; Jawade S.; Washimkar D.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on 26 June 2026

ABSTRACT:

Additive manufacturing is a modern manufacturing method which is along with time is more widely used for manufacturing in various field, it is due to the advantages it brings with it. One such component which is and can gain its merits due to additive manufacturing would be Dampers. Dampers are an common apparatus in automobile staring from engine mounts to suspension and for general comfort and avoid loss of energies due to vibrations this is done mostly by applying the dampers in the place of the structure where the highest amplitude/noise is achieved.This paper will review and discuss on the effects of mechanical damping properties as well as manufactures of various dampers which are generally done in assemblies and review on the advances in the productions using additive manufacturing methods such as Stereo lithography (SLA) Fused Deposition Modelling (FDM) Selective Laser Sintering (SLS) and the merits and demerits it gained and the efficiency due to the method and what advances it could have in future via more research in sector of damping.

Link: https://doi.org/10.1063/5.0342025

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Comprehensive Analysis of Medical Data Revealing New Insights Into Cardiovascular Disease

AUTHOR :

Lahane A.S.; Dixit B.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

Machine learning (ML) has gained significant traction in cardiovascular medicine in recent years. This paper offers a critical overview of the current landscape of predictive algorithms, emphasizing data cleaning and multimodal data integration as central components, while also examining the key challenges that impede their clinical adoption and outlining future directions for the field. Cardiovascular disease (CVD), the leading cause of mortality worldwide, urgently requires more accurate early prediction tools. Although traditional risk scores have been valuable, their limitations in the era of big data have accelerated a paradigm shift toward ML-based approaches capable of delivering more precise and individualized risk stratification. The study synthesizes evidence spanning a broad methodological spectrum-from classical statistical techniques to advanced ensemble and deep learning models. It examines essential preprocessing steps needed to address common data issues, including missingness, class imbalance, and high dimensionality, and explores strategies for integrating diverse and heterogeneous data sources such as electronic health records (EHRs), imaging studies, and clinical text. Despite these advancements, the paper underscores that clinical translation remains constrained by several foundational problems: limited model interpretability (the 'black box' dilemma), suboptimal generalizability, methodological inconsistencies, and a pervasive lack of rigorous external validation in the literature. Ultimately, the paper highlights that data quality and sophisticated preprocessing are as critical to successful ML applications as the choice of algorithm itself.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566347

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Simplified Unified Telehealth Database to Manipulate Search-Related Queries

AUTHOR :

Hemalatha S.; Reddy K.V.S.V.T.; Rao T.V.; Chaithra S.; Kumbhar V.R.; Chowdary S.

JOURNAL NAME:

Telehealth and Medicine Today (Vol.-11, Issue-2)

DETAILS:

Published on 30 June 2026

ABSTRACT:

Telehealth records are commonly used as patient databases for teleconsultations. These health records are available globally to physicians, patients, telehealth researchers, and government sectors. However, vendors that maintain these telehealth services use their own formats, with available data organized into different categories. For instance, a government sector or a researcher requires access to a telehealth record. However, that record appears in heterogeneous formats. It is tedious to extract any research analysis. As an alternative, a different domain of a large language model is proposed to meet various application objectives, but a heterogeneous health record consolidation large language model is not proposed for telehealth record manipulation. In this article, the authors propose a novel model to prepare heterogeneous health records for analysis. Five stages of model preparation for processing six types of health records include: Input Layer, Schema Extraction Layer, Term Machine Engine, Schema Mapping Layer, Transformation Engine, and Unified Record Output. The major component of the proposed work is termed the "machine engine," which groups related terms into a single category to support the preparation of the unified health record. The execution of this work is tested with a sample of five different telehealth records. The output generated was verified successfully.

Link: https://doi.org/10.30953/thmt.v11.680

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Aqua-Ammonia Vapour Absorption Refrigeration System: Simulation and Optimisation Using DWSIM Software

AUTHOR :

Pisal H.; Deulgaonkar V.; Tamkhade P.; Kulkarni K.; Desale A.; Purandare P.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

An open-source simulator DWSIM is used to simulate chemical processes. Its features are similar to those of commercial simulators like EES and other commercial softwares. The model of an NH3-H2 O vapor absorption refrigeration system is created and a simulation is performed using DWSIM. The simulation results are contrasted with EES results in the present work. The generator, evaporator, absorber, solution pump, and condenser make up the NH3-H2 O vapor absorption refrigeration system. Heat transfer, mass transfer, condensation, evaporation, throttling, gas-vapor separation, absorption and desorption are among the typical chemical engineering processes it illustrates. The DWSIM model described in this paper can be used for optimisation and sensitivity evaluations. The simulation is performed on a VARS operating at 1 0 bar condenser pressure and 1.5 bar evaporator pressure. The results obtained are observed to be varying by approximately 13 to 14% when compared with those of EES. It is therefore anticipated that this model will be helpful and competitive to predict chemical processes generally and vapor absorption refrigeration specifically using DWSIM.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566308

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Secure Medical Data Management through Blockchain and Reversible Data Hiding in a Decentralized Healthcare Framework

AUTHOR :

Srivastava R.; Garg R.; Prashar D.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-2s)

DETAILS:

Published on July 2026

ABSTRACT:

The fast development of digital healthcare systems has increased the necessity of medical data management mechanisms with high precision, interoperability, and protection of privacy. In this paper, a non-centralized healthcare system is described, which combines reversible data hiding (RDH) with blockchain technology to provide end-to-end security, authenticity, and tamper resistance to medical images and patient records. RDH module incorporates authentication capabilities in diagnostic images at the cost of clinical quality where PSNR is over 41 dB and SSIM is greater than 0.97. In the blockchain layer, all the transactions are verified by immutability and consensus-driven verification. According to experimental findings, validation based solely on blockchain can achieve accuracy of 91.2% integrity and the combination of RDH and blockchain is able to achieve 98.7% accuracy on cross-verification between on-chain hashes and embedded metadata. In the same way, the accuracy of tamper detection is found to be 87.5 percent with blockchain and 96.4 percent with the combined approach. In general, the suggested system provides an improved level of resistance to tampering and replay attacks without losing the quality of the images and reliable authentication. The framework gives a viable and scalable foundation to secure digital healthcare infrastructure that enhances patient trust and helps in sound data governance in the contemporary healthcare setup.

Link: https://doi.org/10.59543/jidmis.v3.750

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Deepfake audio detection and justification with explainable artificial intelligence

AUTHOR :

Govindu A.; Kale P.; Hullur A.; Gurav A.; Godse P.

JOURNAL NAME:

International Journal of Data Science and Analytics (Vol.-22, Issue-1)

DETAILS:

Published on 30 June 2026

ABSTRACT:

Deepfake audio refers to synthetically generated audio, often used as legal hoaxes to impersonate human voices. This paper generates fake audio from Fake or Real (FoR) dataset using Generative Adversarial Neural Networks (GANs). FoR dataset has the advantage of a diversity of speakers across 195,000 samples. The proposed work analyses the quality of the generated fake data using the Fréchet Audio Distance (FAD) score. FAD evaluation score of 23.814 indicates good quality fake has been produced by the generator. The study further enables glass box analysis of deepfake audio detection through Explainable Artificial Intelligence (XAI) models of LIME, SHAP and GradCAM. This research assists in understanding impact of frequency bands in audio classification based on the quantitative analysis of SHAPLey values and qualitative comparison of explainability masks of LIME and GradCAM. The use of FAD metric provides a quantitative evaluation of generator performance. XAI and FAD metrics help in the development of deepfake audio through GANs with minimal data input. The results of this research are applicable to detection of phishing audio calls and voice impersonation.

Link: https://doi.org/10.1007/s41060-026-01186-7

Since 1983

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Explainable Deep Learning Models for Individualized Mental Health Risk Assessment Using Wearable and Smartphone Sensing

AUTHOR :

Balakrishnan K.V.; Parmar G.

JOURNAL NAME:

International Journal of Online and Biomedical Engineering (Vol.-22, Issue-6)

DETAILS:

Published on 8 November 19 June 2026

ABSTRACT:

Background: Mental health disorders represent a major global public health concern, creating a critical need for early detection and personalized intervention strategies. Advances in wearable devices and smartphone sensing enable continuous and unobtrusive monitoring of behavioral and physiological patterns, while deep learning offers powerful tools for analyzing such high-dimensional data. However, the limited interpretability of many deep learning models restricts their clinical adoption. Methods: The study presents a systematic literature review of explainable deep learning models for individualized mental health risk assessment using wearable and smartphone sensing data. A comprehensive search was conducted across IEEE Xplore, PubMed, Google Scholar, and the Directory of Open Access Journals (DOAJ). Studies were screened using predefined inclusion and exclusion criteria, resulting in the selection of 25 relevant articles for qualitative synthesis. Results: The reviewed studies demonstrate a clear shift toward multimodal sensing and advanced deep learning architectures, including attention-based and temporal models, to capture complex behavioral dynamics. Despite strong predictive performance, explainability techniques were inconsistently applied across studies. Challenges related to data quality, validation practices, generalizability, and real-world deployment were frequently identified. Conclusion: The findings highlight the importance of integrating explainability into deep learning-based mental health assessment systems to enhance trust, clinical relevance, and regulatory compliance. This review provides a structured synthesis of current approaches and outlines key research directions for developing transparent, reliable, and clinically meaningful mental health assessment frameworks.

Link: https://doi.org/10.3991/ijoe.v22i06.61567

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Systems-level genomic and functional characterization of lipopeptide biosurfactant pathways in Bacillus albus MITWPUB5

AUTHOR :

Mukadam H.; Bhujbal T.; Bhattacharyya K.; Gaikwad S.

JOURNAL NAME:

World Journal of Microbiology and Biotechnology (vol.-42, Issue-7)

DETAILS:

Published on 4 July 2026

ABSTRACT:

This study describes the system level genomic analysis, chemical and pathway characterisation of a biotechnologically important, yet lesser-known biosurfactant producer, Bacillus albus MITWPUB5. The organism is an isolate of hydrocarbon-contaminated soil. Thin Layer Chromatography (TLC), Fourier Transform Infrared Spectroscopy (FTIR), and Liquid Chromatography-Mass Spectrometry (LC-MS) analysis revealed that the biosurfactant produced by this isolate belongs to lipopeptide class. The biosurfactant's nature was found to be anionic, with a high emulsification index (76%) and stability across a wide range of abiotic conditions such as temperatures, pH levels, and salt concentrations. Comprehensive genomics coupled with metabolic pathway analysis revealed genes encoding key enzymes in fatty acid and lipoprotein biosynthetic pathways, and Non-Ribosomal Peptide (NRP) synthesis. We present a novel computational approach which combines biosynthetic gene cluster prediction, NRPS module analysis to decode conserved catalytic domains and their encoded substrate that govern lipopeptide biosurfactant synthesis in B. albus. Comparative genome analysis of globally available B. albus strains followed by phylogenetic analysis revealed the conservation and distribution of genes encoding lipopeptide biosurfactant. Pangenome analysis uncovered an open structure in B. albus, where conserved fatty acid biosynthesis genes formed a stable core while NRPS genes exhibited strain-specific distribution within the accessory genome. Collectively, these findings demonstrate biotechnological relevance of MITWPUB5 as a promising source of an environmentally stable lipopeptide biosurfactant. The study contributes to the United Nations Sustainable Development Goals (UNSDGs) by highlighting the potential of an ecologically sustainable, biologically derived biosurfactant that can reduce reliance on synthetic surfactants. Such integrative framework can facilitate deeper insights into metabolic pathways, regulatory networks, and optimization strategies governing biosurfactant synthesis.

Link: https://doi.org/10.1007/s11274-026-05116-4

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Numerical risk mitigation and modeling of pump sump system failures

AUTHOR :

Bagaria P.; S A.; Kandasubramanian B.; Balan M.S.

JOURNAL NAME:

ISH Journal of Hydraulic Engineering

DETAILS:

Published on 8 July 2026

ABSTRACT:

A three-dimensional CFD (Computational Fluid Dynamics) study was performed to evaluate the hydraulic performance of an existing flood-protection pump sump designed for a discharge of 16.48 m3/s. The study aimed to assess flow uniformity at bell-mouth suction, quantify swirl angles, and identify subsurface vortex formation under operating conditions. A novel trident-shaped splitter combined with dividing walls is proposed to mitigate vortex-induced instabilities. The Reynolds-Averaged Navier–Stokes (RANS) equations combined with the realizable k–ε turbulence model and VOF (Volume of Fluid) approach were solved using STAR-CCM+. Results indicate that vortex intensity and flow separation observed in the original design are significantly reduced with the proposed modifications. Quantitative analysis shows swirl angles below 1.6°, well within Hydraulic Institute limits (5°). Mesh-independence and pressure-distribution analysis confirm improved hydraulic stability and reduced risk of mechanical damage.

Link: https://doi.org/10.1080/09715010.2026.2691060

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Enhanced Antimicrobial and Synergistic Antifungal Activity of Centratherum anthelminticum Seed Extract-Derived Silver Nanoparticles

AUTHOR :

Yewale S.; Deshpande P.; Gavande V.; Shaikh V.

JOURNAL NAME:

Periodica Polytechnica Chemical Engineering (Vol.-70, Issue-20)

DETAILS:

Published on 27 May 2026

ABSTRACT:

With the increasing concern over antibiotic resistance and the side effects of synthetic drugs, there is a need for the development of novel and potent alternative bactericidal agents. Metallic nanoparticles, a promising alternative to antibiotics, target multiple biomolecules concurrently, making it difficult for bacteria to develop resistance against them. The present work reports the enhanced antimicrobial and synergistic antifungal activity of Centratherum anthelminticum (CA) seed-ethyl acetate (EA) extract-derived silver nanoparticles (AgNPs)—(CA-EA-AgNPs)—via biogenic synthesis. The CA-EA-AgNPs exhibited significantly enhanced antimicrobial activity against Staphylococcus epidermidis, Staphylococcus aureus (Gram-positive), Proteus mirabilis, and Pseudomonas aeruginosa (Gram-negative) bacteria compared to the crude CA-EA extract. CA-EA-AgNPs also demonstrated potent antifungal activity against the dandruff-causing fungus Malassezia furfur and displayed a synergistic effect when combined with ketoconazole, increasing the zone of inhibition from 15 mm (ketoconazole alone) and 11 mm (AgNPs alone) to 19 mm (combination). The synthesis of CA-EA-AgNPs was optimized by systematically varying parameters such as pH, temperature, reaction time, CA-EA extract concentration, and AgNO3 concentration. The AgNPs were extensively characterized using UV-visible spectroscopy, dynamic light scattering, zeta potential, fourier transform infrared spectroscopy, X-ray diffraction, field emission scanning electron microscopy, transmission electron microscopy, and energy-dispersive X-ray analysis . To our knowledge, this research is the first to report the antifungal activity of C. anthelminticum-derived AgNPs against Malassezia furfur. The results highlight the potential of C. anthelminticum seed extract as a green resource for synthesizing AgNPs with promising applications in combating microbial infections, particularly skin and soft tissue infections.

.Link: https://doi.org/10.3311/PPch.42769

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Generative AI for Low-Resource Settings: Enhancing Ophthalmic Diagnostics

AUTHOR :

Gadre G.A.; Mantri S.

JOURNAL NAME:

Generative Artificial Intelligence in Ophthalmology

DETAILS:

Published on 5 June 2026

ABSTRACT:

The implementation of generative artificial intelligence (AI) technologies assists in ophthalmic diagnostics, which has a significant potential for enhancing the accessibility and quality of healthcare services, specifically in developing countries. The traditional diagnostic methods necessitate sophisticated peripherals, professionals, and high-end imaging equipment, which are often not accessible in economically disadvantaged places. Generative AI, using complex machine learning algorithms like Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), can assist with image restoration, disease forecasting, and automated diagnosis. Moreover, AI-powered synthetic data generation enhances the performance of diagnostic models even when ample annotated datasets are not available. These AI-based solutions not only improve the precision of the diagnoses made, but also make it easier to more effectively screen patients, easing the pressure on overwhelmed healthcare systems. This paper analyzes how generative AI can help in overcoming ophthalmic healthcare challenges in underresourced settings with high-acuity telemedicine access by amplifying autonomy in obtaining reliable remote diagnosis, minimizing dependence on skilled personnel, and enabling the implementation of specialized AI applications in telemedicine. The application of AI in telemedicine can further improve the reach of healthcare services by making it possible to deliver immediate attention, remote consultations, and customized treatment plans. The paper further discusses ethical issues, data constraints, workability of concepts that is the practicality of implementation, and features of all associated problems to develop comprehensive plans for subsequent research and development. Also, it underscores relevant examples and current projects that show the value of generative AI in the field of ophthalmology, illustrating its capability to transform ophthalmic diagnostic processes in neglected areas around the globe.

Link: https://doi.org/10.1002/9781394358212.ch5

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

PAI-Based Classification of Apical Periodontal Disease Using MobileNet on Panoramic Radiographs

AUTHOR :

Matharu G.K.; Mali P.

JOURNAL NAME:

Smart Innovation, Systems and Technologies

DETAILS:

Published on 3 June 2026

ABSTRACT:

The apical periodontal disease is a disease of the tissues surrounding a tooth root and may lead to chronic infection, bone loss, and loss of tooth if not treated. Early and accurate detection is necessary for intervention. This paper reports a lightweight deep neural network designed for classifying the apical lesions in dental panoramic radiographs based on the Periapical Index (PAI) scoring system. A dataset of 3,926 original panoramic X-rays, increased to 17,004 images through data augmentation was obtained. The images were annotated as having three levels of severity: PAI 3, PAI 4, and PAI 5, according to expert annotation. These lesion areas were extracted using bounding boxes and were further augmented to address class imbalance and enhance model generalization. A fine-tuned MobileNet model, chosen for its efficiency and low hardware requirements, was trained on these processed regions. It achieved 90.93% accuracy and 90.88% precision. Grad-CAM visualization has also been employed to guarantee the focus of the model on clinically meaningful regions so as to build trust on the predictions made by the model. These findings set the tone for the possible application of deep learning in facilitating quicker and accurate apical lesions' detection in clinical dentistry.

Link: https://doi.org/10.1007/978-3-032-22114-8_25

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

The Role of AI in Sustainable Finance: Balancing ESG Investment Strategies, Central Bank Digital Currencies, and Financial Privacy

AUTHOR :

Kumar T.; Agarwal R.

JOURNAL NAME:

Future Trends in AI Banking: Decentralized Finance (DeFi), Central Bank Digital Currencies (CBDCs), and Beyond

DETAILS:

Published on 2026

ABSTRACT:

The integration of artificial intelligence (AI) into sustainable finance is reshaping the Environmental, Social, and Governance (ESG) framework and advancing data-driven investment strategies. AI enhances the ESG framework by improving its transparency and striking a balance between sustainability imperatives as well as financial objectives. Additionally, Central Bank Digital Currencies (CBDCs) promote efficiency, data security, and inclusion by utilising blockchain and cryptographic mechanisms. While the integration of AI in the ESG and CBDC framework faces regulatory and privacy challenges, it also offers opportunities in order to strengthen sustainable finance by prioritizing social and environmental goals. As the adoption of AI in consideration of ESG, as well as CBDCs, may lead to severe challenges, but might be utilised as a source of betterment in attaining the sustainable financial goals. The case studies discussed in the chapter also highlight the practical application of AI in sustainable finance, particularly through the alignment of CBDCs and ESG goals.

Link:
https://www.scopus.com/pages/publications/105044095241?origin=resultslist

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

A critical review on utilization of drywall gypsum waste powder and ceramic waste powder in concrete: a sustainability perspective

AUTHOR :

Nerlekar G.; Minde P.

JOURNAL NAME:

Environmental Science and Pollution Research (Vol.-33, Issue-21)

DETAILS:

Published on 2 July 2026

ABSTRACT:

The growing volume of construction and demolition waste and the high carbon footprint of cement production have driven interest in waste-derived materials for sustainable concrete. This study presents a critical systematic review of the use of gypsum waste powder (GWP) and ceramic waste powder (CWP) as partial cement replacements, focusing on material mechanisms, performance limits, durability behaviour and sustainability trade-offs. The review follows PRISMA 2020 guidelines, and peer-reviewed studies published between 2015 and 2025 were systematically screened and synthesized. The review indicates that CWP exhibits a broader and more reliable performance window than GWP, attributed to its silica-rich composition, pozzolanic reactivity and microfilling effect. Cement replacement levels of approximately 10–20% CWP are consistently associated with improved compressive and flexural strength, reduced chloride penetration and enhanced durability under controlled curing conditions, whereas higher replacement levels require blending with reactive supplementary cementitious materials. In contrast, GWP demonstrates a narrower and exposure-sensitive applicability, with effective replacement typically limited to 10–15% due to sulphate-related risks affecting setting behaviour and long-term durability. From a sustainability perspective, partial cement replacement using GWP and CWP can reduce embodied CO_2 emissions by approximately 7–10% per 10% cement substitution, although net benefits depend strongly on processing energy, transportation distance and durability performance. Overall, this review establishes clear performance thresholds, failure mechanisms and applicability boundaries for GWP and CWP, providing decision-oriented guidance for sustainable concrete design and identifying key research needs related to durability, standardization and life cycle assessment.

Link: https://doi.org/10.1007/s11356-026-38022-1

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Comparative performance of invasive, semi-invasive, and non-invasive insulin resistance-related indices across prediabetes and normoglycemia

AUTHOR :

Bhasin G.; Dafale R.S.; Kamath S.U.; Prabhu M.M.; Rawat S.; Kumar M.; K A.; Shetty S.; Shetty L.; K V.; Pandey A.K.; S D M.

JOURNAL NAME:

PloS one (Vol.-21, Issue-6)

DETAILS:

Published on 26 June 2026

ABSTRACT:

Insulin resistance, a defining abnormality in the development of type 2 diabetes, often emerges silently during prediabetes. This study evaluated the comparative performance of multiple insulin resistance-related indices across adults with prediabetes and normoglycemia. A cross-sectional analysis was conducted among 100 adults aged 25-55 years, equally divided between the two glycemic groups. Twenty-five candidate indices were examined, spanning blood-based indices, lipid-anthropometry combinations, and non-invasive anthropometric and body-composition measures, including several newly derived indices. Correlation analysis was performed to assess the relationship between candidate indices and the Homeostasis Model Assessment for Insulin Resistance, followed by logistic regression and receiver operating characteristic curve evaluation for indices showing significant correlations. Individuals with prediabetes demonstrated significantly higher adiposity and differences in metabolic parameters compared to individuals with normoglycemia ($p < 0.05$ for most variables). Seventeen of the twenty-five candidate indices showed significant correlations with the Homeostasis Model Assessment for Insulin Resistance. Among laboratory-based indices, the triglyceride-glucose index and the homeostasis model assessment showed good discriminative performance. Within lipid-anthropometry combinations, the triglyceride-glucose waist-to-height ratio and triglyceride-glucose waist circumference provided the best performance, each yielding an area under the curve of approximately 0.79. Several non-invasive indices also demonstrated good comparative performance. The bioimpedance-based somatotype adiposity index showed the highest overall performance among individual indices, with an area under the curve of 0.82, sensitivity of 78 percent, specificity of 80 percent, and an adjusted odds ratio of 14.9. These findings suggest that selected non-invasive anthropometric and body-composition indices may provide a practical and low-cost approach for assessing metabolic alterations associated with insulin resistance across glycemic groups, although further validation is required.

Link: https://doi.org/10.1371/journal.pone.0351950

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Recent Advances in Structure, Materials, and Design of Cardiovascular Stents

AUTHOR :

Khade A.; Chaudhari S.; Girase V.; Dhatrak P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on 26 June 2026

ABSTRACT:

Coronary heart disease is a major cause of heart failure and can lead to fatal seizures. To manage cardiovascular diseases, stenting techniques have proven effective, particularly with the evolution of stent designs. Current research is focused on bioresorbable stents, which offer the potential to eliminate some limitations. This review aims to highlight and summarize the effects of various stent architectures, materials, and designs on coronary stent performance and examines the challenges encountered by these stents and potential solutions, considering aspects such as clinical outcomes, biocompatibility, and long-term efficacy. Comparing different stent types, including bare-metal stents, drug-eluting stents, and bioresorbable stents. Key parameters like restenosis rates, biocompatibility, material selection, and clinical outcomes are evaluated to assess the effectiveness and limitations of each stent type. The transition from bare-metal stents to drug- eluting stents, showing significant reductions in restenosis, advancements in bioresorbable stents to address some of the limitations of their predecessors, effectiveness of different stent geometries and materials. Future research is likely to focus on refining bioresorbable stent designs, enhancing material properties, and improving long-term outcomes. Innovations in biocompatibility, biodegradability, and patient-specific stent architectures are anticipated to drive the next generation of stenting solutions for treatment of cardiovascular diseases.

Link: https://doi.org/10.1063/5.0342164

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Next-Gen Banking: Contactless ATM System Using Hand Gestures and Face Recognition

AUTHOR :

Sukte C.D.; Patil S.B.; Chaudhary S.D.; Suryawanshi V.P.; Kamble A.A.; Pokale N.B.

JOURNAL NAME:

Lecture Notes in Networks and Systems

DETAILS:

Published on 2 June 2026

ABSTRACT:

The rapid advancement of technology in the banking industry has opened doors for new innovations characterized by security, hygiene at the cost of user experience. This paper describes the concept and design of a touchless ATM system based on virtual hand gestures coupled with facial recognition technology. The system accurately detects and interprets user movements in real-time using the integration of machine learning algorithms and depth-sensing cameras. These motions correspond to typical ATM operations like entering a PIN, withdrawing cash, checking balances, and confirming transactions. This research bridges the gap between FinTech and user-centered design, advancing the field of HCI. It provides a foundation for further innovation in touchless interface technologies for banking and other industrial domains.

Link: https://doi.org/10.1007/978-981-95-7238-0_7

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

A Comprehensive Review on Bone Scaffold Materials, Manufacturing and It's Uses in Tissue Engineering

AUTHOR :

Patil R.; Dhatrak P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on 26 June 2026

ABSTRACT:

Scaffolds facilitate the gradual replacement of the scaffold with new bone tissue, which is necessary for bone regeneration, by promoting tissue integration and controlled biodegradation. The characteristics and potential uses of various materials are being reviewed. The mechanical characteristics, chemical makeup, and biodegradability of the materials used to make bone scaffolds are all thoroughly reviewed in this article. In addition, the manufacturing procedures for bone scaffolds are investigated, emphasizing additive manufacturing methods as 3D printing and electro spinning. The aim is to explore the potential of scaffolds for tissue engineering applications such as bone regeneration and repair, while also addressing recent advancements and challenges in the field. The design and material composition of tissue engineering applications hold the key to enhancing their efficacy. Due to their advantageous characteristics, polycaprolactone (PCL) and β-tricalcium phosphate (β-TCP) are becoming more and more acknowledged as excellent materials for bone scaffolds in tissue engineering.

Link: https://doi.org/10.1063/5.0342132

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Retail Marketing in the Modern Age, Second Edition

AUTHOR :

Chaudhary P.

JOURNAL NAME:

Retail Marketing in the Modern Age, Second Edition

DETAILS:

Published on June 2026

ABSTRACT:

Retail Marketing in the Modern Age explores contemporary concepts and strategies essential to building successful retail brands globally. The book captures the essence of modern retail marketing by examining both traditional and extended elements of the retail mix in today's dynamic, evolving business environment. It provides a comprehensive understanding of how digital transformation, driven by technologies such as AI, ML, VR, AR, IoT, blockchain, cloud computing, and data analytics, along with advanced PoS systems, CRM platforms, ERP systems, and RFID technology, is reshaping integrated marketing communication, brand campaigns, merchandise management, category management, assortment planning, personalization, and the shopping experience, reflecting the purpose and promise of a brand.Focusing on emerging trends, the book explores new formats and business models, with emphasis on omnichannel retailing and its key constituents. It also addresses the tangible and intangible aspects of retailing, offering insights into how to achieve deeper customer engagement and patronage loyalty. It provides an in-depth overview of contemporary retail design elements, store ambiance, visual merchandising, planograms, and fixtures. Latest practical insights on human resource management, managing luxury brands, building curated private label brands, mall operations, location strategies, public relations, influencer marketing, loyalty programs, and sustainability initiatives provide a holistic outlook.Designed for students, researchers, and professionals in Retail Management, Marketing, and Branding, this book combines theory with practical applications. Through real-world examples, case studies, and illustrations, it equips readers with critical skills to navigate the complexities of modern retail marketing.

Link: https://doi.org/10.4324/9781003788928

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Aqueous cadmium (II) removal using integrated technique of phytoremediation with artificial intelligence and machine learning models: a review

AUTHOR :

Agrawal K.; Joshi M.; Jaspal D.

JOURNAL NAME:

Environmental Technology Reviews (Vol.-15, Issue-1)

DETAILS:

Published on 2 July 2026

ABSTRACT:

The major environmental concern today is the proper conveyance and complete treatment of wastewater. Several novel treatment techniques are under constant research. Among emerging methods, phytoremediation is treated as the most promising alternative for the remediation of toxic heavy metals from aqueous systems. The prominent ill effects of aqueous cadmium and the elimination of this aqueous cadmium (II) (Cd(II)) using the technique of phytoremediation have been the main motivation for this research. This review is an attempt to present the potential to critically examine the applications of artificial intelligence (AI) and machine learning (ML) models in the phytoremediation process. This amalgamation would help make the process of phytoremediation more feasible due to an improved control, reduced cost, and increased efficiency of the process, which can be integrated into this process to improve the performance, predictability, and scalability. The sources of literature comprised of Scopus, Web of Science, and PubMed, databases from the year 2000 to 2024. The keywords used were 'cadmium (II),' 'Wastewater treatment,' 'Phytoremediation' 'Artificial intelligence,' and 'Machine learning.' Studies related to aqueous Cd (II) removal have been reviewed and the use of AI and ML models for the mentioned purpose has been evaluated. The novelty of this manuscript is in the integration of phytoremediation with AI and ML techniques, with a detailed discussion of the merits and demerits of this wastewater remediation appoach, in the context of cost and applicability. The mechanisms of the combined treatment techniques have been studied by evaluating several models, such as Artificial Neural Networks (ANN), Support Vector Machine (SVM), Random Forest (RF), regression, and other hybrid models, to aid the research. The challenges in adopting these methods, like overfitting, data security, and limited scalability when used on-site, have been discussed. An examination of ecological risks has been made at large.

Link: https://doi.org/10.1080/21622515.2026.2680536

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

POPNet: Parallel Orthogonal Principal Component Analysis Net-Based Optimization for Face Sketch Recognition

AUTHOR :

Patil D.R.; Kulkarni Y.C.; Gutte V.S.

JOURNAL NAME:

SN Computer Science (Vol.-7, Issue-6)

DETAILS:

Published on July 2026

ABSTRACT:

Face sketch recognition involves matching hand-drawn or composite sketches to real facial photographs, and the current methods struggle with the visual gap between sketches and photos. Deep Learning (DL) models need large datasets and often fail with varied or poor-quality sketches. To overcome these limitations, the Archery Archimedes Optimization Algorithm-based Parallel Orthogonal Principal Network (AAOA_POPNet) is proposed for face sketch recognition. Here, the face generating module, initialization module and optimization module are considered. Initially, the input sketch image is subjected to latent space generation using the Deep Maxout Network (DMN) in the face-generating module. Then, the outcome and input sketch image are passed to the Scarcity-Generative Adversarial Network (GAN) in initialization module. Here, the latent space is updated by utilizing an optimization module, which consists of a face appearance module, and a Manifold Preservation Module. Then, the latent space from each module is optimized by utilizing AAOA. Here, AAOA is formed by hybridizing Archery Algorithm (AA) and the Archimedes Optimization Algorithm (AOA). Further, the real image is allowed for feature extraction, and the face sketch recognized output is obtained. At the same time, an input sketch image is allowed for facial landmark detection to attain the face sketch recognized output. Finally, both recognized outputs are allowed for face sketch recognition using POPNet, where the weights of POPNet are optimized using AAOA, and are formed by combining Parallel Orthogonal Deep Neural Network (PODNN) and Principal Component Analysis Network (PCANet). Additionally, AAOA_POPNet has attained 85.47% of accuracy, 0.842 of Matthews Correlation Coefficient (MCC), and 84.30% of precision.

.Link: https://doi.org/10.1007/s42979-026-05186-z

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Optimized biosurfactant production from coconut shell extract by Bacillus wiedmannii isolate adopting an explainable artificial neural network and TOPSIS framework

AUTHOR :

Mukadam H.; Sahu N.; Gaikwad S.; Mahanty B.

JOURNAL NAME:

Biocatalysis and Agricultural Biotechnology (Vol.-76)

DETAILS:

Published on July 2026

ABSTRACT:

Use of low-cost renewable substrate and optimized fermentation conditions is key to sustainable bioprocess development. In this study, a set of agricultural wastes was screened for extracellular biosurfactant production and biomass growth by the Bacillus wiedmannii isolate. The effects of selected substrate concentration (i.e., coconut shell extract), inoculum concentration, pH, and fermentation time were analyzed using a central composite design to optimize relevant process variables. Although the performance of the developed quadratic models was poor for both responses (R2: 0.885 and 0.814), a hyperparameter-optimized artificial neural network, trained on Gaussian-noise-augmented data, achieved high prediction accuracy (R2 > 0.99). Shapley additive explanations and partial dependency analyses revealed nonlinear interactions among process variables. Pareto optimal solutions from genetic algorithm–based multi-objective optimization were ranked using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). The experimental validation of the operating conditions associated with the top-ranked solution (biomass: 13.58 g/L, emulsification index: 84.9%) was satisfactory.

Link: https://doi.org/10.1016/j.bcab.2026.104184

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

An Optical Laser Link for Secure Data Transmission Using Arduino and Cybersecurity Integration

AUTHOR :

Bakare A.; Wadekar A.; Balasubramanian P.
.

JOURNAL NAME:

Lecture Notes in Networks and Systems

DETAILS:

Published on 2026

ABSTRACT:

During the recent rise of wireless communication systems there has been an increase in demand for a secure, interreference free and cost-effective alternative to the existing radio frequency systems. Traditional technologies Wi-Fi and Bluetooth face issues like high power demand, signal interference and they are vulnerable to security breaches. Such problems make them less ideal for short range applications. The following article sketches the design and implementation of a secure laser based optical communication system using Arduino in order to overcome these constraints.

Link: https://www.scopus.com/pages/publications/105044128227?origin=resultslist

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Damping-controlled lock-in and smooth lock-out in vortex-induced vibrations of tandem diamond cylinders

AUTHOR :

Kumar D.; Sourav K.; Shah C.L.

JOURNAL NAME:

Ocean Engineering (Vol.-363)

DETAILS:

Published on July 2026

ABSTRACT:

Quasi-periodicity and associated vortex dynamics in damped flow-induced vibrations of tandem diamond cylinders at Re = 100 is numerically investigated. The cylinders, separated by 5D and having a mass ratio of 10, are examined between reduced velocities 1 and 20 for three damping ratios (ζ = 0.011, 0.022, and 0.044). The response exhibits pronounced asymmetry between cylinders: the downstream cylinder undergoes extended lock-in for all damping ratios, whereas the upstream cylinder locks in over a much narrower velocity range. Quasi-periodic dynamics occur mainly near the onset and termination of lock-in and are characterized by incommensurate frequencies that are most evident in the in-line response. Increasing damping suppresses quasi-periodicity within the lock-in regime; however, wake-induced coupling sustains multi-frequency motion near lock-out, particularly for the downstream cylinder. Flow visualizations identify two dominant vortex-interaction modes, impingement and bypass, whose primary features remain insensitive to damping, indicating that damping predominantly affects the structural response rather than the wake formation. The mean drag of the downstream cylinder shows strong sensitivity to damping during lock-in, while the upstream cylinder exhibits such sensitivity only near lock-in onset. Non-zero mean lift is observed within the synchronization regime for both cylinders, with the upstream cylinder displaying stronger lift asymmetry.

Link: https://doi.org/10.1016/j.oceaneng.2026.126761

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Zepto's Initial Public Offering: On Crossroads

AUTHOR :

Mali V.; Kulkarni M.

JOURNAL NAME:

Asian Journal of Management Cases

DETAILS:

Published on 29 June 2026

ABSTRACT:

The case examines the dilemma surrounding Zepto's anticipated 2026 initial public offering. Zepto was founded by Aadit and Kaivalya Vohra, both Stanford University dropouts. It disrupted the quick commerce landscape and leveraged it. Initially, they offered micro-transaction services and 10-minute grocery delivery, which was unrealistic at the time, particularly with COVID-19 looming large; however, they identified the urgent need for faster grocery delivery during the pandemic. With their technology background, they brought a tech-driven model and established 'dark stores' to ensure faster delivery. The model boasted a strong logistics system and a fleet of delivery partners, supported by its app, to deliver groceries in under 10 minutes. This led consumers to embrace the option of faster grocery delivery at their convenience, helping Zepto emerge as a strong player by 2023. Zepto was then set on being an entirely Indian company after raising $350 million from Motilal Oswal Private Wealth. The case discusses the convergence of financial strategies and the decision to go public. The case is based on qualitative data and relies solely on secondary sources, including financial performance data published by the company on reputable business reporting sites like Inc42 and Entrackr, press releases and official statements, media interviews with the founders, and industry analysis of the quick commerce industry.

Link: https://doi.org/10.1177/09728201261451624

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Dual Random-Forest Ensemble Approach for Intrusion Detection

AUTHOR :

Dhir A.; Raut U.

JOURNAL NAME:

Smart Innovation, Systems and Technologies

DETAILS:

Published on June 2026

ABSTRACT:

As cyber threats continue to evolve rapidly, ensuring network security has become increasingly vital; IDS have become much essential in safeguarding network security. Traditional IDS techniques often face challenges such as elevated false positive rates and difficulty in detecting advanced or complex attacks. This research explores the effectiveness of a combined Random Forest-based approach to improve IDS accuracy. Two distinct Random Forest models are trained using the NSL-KDD dataset and the predictions are merged by probability averaging to enhance classification performance. This method presented herein is formulated with the aim to balance precision, recall, and overall accuracy while eliminating the drawback of single model classifiers. The comparison of performance here is considered between single Random Forest models, their combined technique, and other ensemble techniques such as Bagging and Boosting. The evaluation shows that the integrated model improves classification robustness and is better suited for dynamic network environments, therefore a possible solution for real-world cyber security applications.

Link: https://doi.org/10.1007/978-3-032-22114-8_43

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Arduino-Based Automatic Pet Feeder for Efficient and Sustainable Feeding

AUTHOR :

Shiravale S.; Shiravale S.S.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

As automation and intelligent systems continue to advance, the implementation of an automatic pet feeder emerges as a practical application of these technologies. This paper proposes a prototype for an Arduino based automatic pet feeder. This automated pet feeder includes components like a servo motor for dispensing of the food in a timely fashion and real-time clock to monitor the feeding timings. This helps pet owners to easily feed their pets even remotely. Since the feeding timings are scheduled in advance, the dispensation is automatic. This model can control the timings, the number of feeds as well as the time duration it should dispense to control the feed-size. The accuracy of the pet feeder is evaluated by deriving error rate. Experimentation is carried out to analyze the error rate across food requirements versus actual food dispensed by the system. The results demonstrate efficiency and reliability of the system.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566212

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A novel parametric intuitionistic fuzzy entropy measure with applications to image edge detection

AUTHOR :

Joshi V.M.; Dar J.G.

JOURNAL NAME:

Journal of the Nigerian Society of Physical Sciences (Vol.-8, Issue-3)

DETAILS:

Published on July 2026

ABSTRACT:

In digital image processing, edge detection is a fundamental operation used to identify intensity discontinuities in an image. In this paper, we propose a novel one-parameter generalization of an entropy measure for intuitionistic fuzzy sets (IFSs). IFSs provide additional flexibility by incorporating membership, non-membership, and hesitation information. A proof of validity is given for the proposed measure, together with numerical and graphical demonstrations. The entropy measure is applied to generate an edge map in which pixels exhibiting higher uncertainty are marked as image edges. Experimental results for standard benchmark images and real photographic images demonstrate superior edge localization and improved quantitative performance compared with existing fuzzy-entropy-based techniques.

Link: https://doi.org/10.46481/jnsps.2026.3359

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

The Fourth Pillar in the Digital Age: Free Speech, Media Regulations, and Democracy in India's Legal Framework

AUTHOR :

Pallav P.; Ali S.M.A.; Dixit A.; Ghose A.

JOURNAL NAME:

Digital Governance, Democracy, and Inclusion in Developing Countries

DETAILS:

Published on 2026

ABSTRACT:

The paper analyses the changing dimensions of media and regulations, focusing on the transition from traditional to digital in light of its role as the fourth pillar of democracy in India. The authors argue that the effect of digital media on democracy is two-fold. As much as it has increased free speech, civic engagement, and accountability, it has also created the dangers of manipulated information, hate speech, loss of trust in institutions, and the dangers of polarisation. In this paper we tracks down historical regulation as far back as colonial days to the present IT Rules, focusing on judicial interventions that have been strengthening the freedom of the media and the optics of regulation versus constitutional guarantees. The authors have referred to the European model of regulation to argue that India is now in need of transparent, inclusive, and judicially reviewed governance in order to maintain democratic discourse in the digital age.

Link: https://www.igi-global.com/chapter/the-fourth-pillar-in-the-digital-age/409924

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Integrating Traditional Grammar Rules with AI for Enhanced Sandhi Split in Sanskrit

AUTHOR :

Mirasdar S.; Bedekar M.; Magar B.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-1s)

DETAILS:

Published on June 2026

ABSTRACT:

Sanskrit is one of the oldest and heritage languages in the world, which has special difficulty in computational analysis. It has a very complex grammar, and such common phenomena as Sandhi, the fusion of sounds and their fracture at the boundaries of words, render even simple processing of the text challenging. Conventional methods are based on the exact rules that were developed by Padmani, which are strict yet impractical in case of large digital corpus. Conversely, new AI systems like deep learning and sequence models are capable of handling vast quantities of data, although occasionally will produce answers that contradict many of the rules that provide Sanskrit with its framework. This paper unites the two worlds with our framework of a hybrid that will combine the accuracy of P27 grammar with the flexibility of machine learning. Our system identifies boundaries of Sandhi by use of transformer based models, and uses layers of sound patterns in context. Rule validators guarantee that the outputs are grammatically correct and a graph based resolver is used where there is more than one valid split. The framework has been repeatedly shown to be more effective than traditional baselines when applied to a curated Sanskrit corpus. It achieved an accuracy and a bottom-level F1-score of 92.6 and 90.8 respectively. More than figures, the method gives out results not only right, but true to the spirit of Sanskrit grammar. In our opinion, such a combination of old linguistic knowledge and new AI opens new opportunities to digital Sanskrit tools, such as search, translation, and linguistic research.

Link: https://doi.org/10.59543/jidmis.v3.462

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Effect on mechanical properties, durability and micro structure of high performance recycled aggregate concrete containing rice husk ash

AUTHOR :

Tatikonda M.V.; Patil S.

JOURNAL NAME:

Asian Journal of Civil Engineering

DETAILS:

Published on July 2026

ABSTRACT:

This study evaluates the mechanical and durability properties of recycled aggregate concrete using aggregates obtained from demolished structures. Experimental investigations were conducted in accordance with IS 383:2016 and IS 456:2000. Results indicate that recycled aggregate concrete demonstrates acceptable performance, supporting its use in selected structural and non-structural construction applications. In present study, the use of recycled aggregates from demolition waste and rice husk ash is used as a mineral admixture in producing high-performance concrete. The various tests are performed on the prepared concrete for mechanical properties. The tests were performed on the concrete prepared by replacing the normal aggregates by 0%, 30%, 60%, and 100% with recycled aggregates. The mineral admixture was kept at 10% after finalizing the optimum dosage, which was kept constant for all the mixes. The inclusion of 10% rice husk ash in high-performance concrete improves later-age compressive strength and durability due to pozzolanic action and slightly enhances tensile and flexural strength. Mix designs were prepared for grades of M-60, M-80, and M-100. The study revealed a 30% increase in all mechanical and durability properties of the prepared concrete when replacing normal concrete with recycled aggregates. From the tests, it can be suggested that 30% replacement of the natural aggregates by recycled aggregates obtained from the demolition waste can be used in making the high-performance concrete.

Link: https://doi.org/10.1007/s42107-026-01741-4

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Additive Manufacturing of Biomaterials

AUTHOR :

Pesode P.; Mugale M.; Wankhede S.

JOURNAL NAME:

Metal Additive Manufacturing: Materials, Processes, and Surface Engineering for Advanced Applications

DETAILS:

Published on 2026

ABSTRACT:

Nowadays, a wide range of biomaterials are commercially available, with many more under active development to maintain and restore biological functions. Emerging clinical demands have driven the development of novel biomaterials, while recent advances have enabled new therapeutic applications. Biomaterials designed for biomedical use must exhibit specific properties, including biocompatibility, mechanical integrity, and functional performance. Various manufacturing techniques are available to fabricate biomaterials; however, three-dimensional (3D) printing, also known as additive manufacturing (AM), has emerged as a promising alternative to conventional methods. This is due to its ability to produce complex, patient-specific structures with high precision and minimal material waste.AM provides excellent control over morphology, material composition, and porosity, making it particularly suitable for applications such as implants and tissue scaffolds. Initially developed as a rapid prototyping tool, AM has evolved into a comprehensive manufacturing approach capable of processing metallic, ceramic, polymeric, and composite biomaterials. It has significantly simplified the production of customized medical devices, including prosthetics, orthotics, and implants, while also enabling the fabrication of complex structures for enhanced tissue regeneration.

Link:
https://www.scopus.com/pages/publications/105043193759?origin=resultslist

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Ultrasonic vibration-assisted hard turning of AISI 52100 steel using PVD-coated TiAlSiN carbide tool

AUTHOR :

Ghule G.S.; Sanap S.; Chinchanikar S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3397, Issue-1)

DETAILS:

Published on 13 July 2026

ABSTRACT:

The automotive, aviation, and maritime industries are using AISI 52100 steel more frequently. However, these alloys are just as difficult to cut due to their properties, such as their high hardness at high temperatures and low heat conductivity. Ultrasonic vibration-assisted hard turning (UVAHT) experiments were performed on AISI 52100 steel (62 HRC) using a PVD-coated TiAlSiN carbide tool with varying cutting speed, vibration frequency, and amplitude. Experimental-based mathematical models were developed to predict tool wear and power usage. The UVAHT was optimized using the desirability function approach for the lowest power consumption and tool wear, yielding the ideal parameter estimates. Using an ultrasonic frequency of 18-20 kHz and a vibration amplitude of 18-20 μm produced lower tool wear and power consumption. However, more research must be done to determine whether it is possible to machine materials using vibrations imprinted on a tool in the feed, tangential, and radial directions, individually and simultaneously. Further research should also focus on evaluating the long-term effects of these vibrations on tool life and the quality of machined surfaces.

Link: https://doi.org/10.1063/5.0349112

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

A novel framework for human object classification in flooded environments using YOLOv12n and FastGRNN-MBT

AUTHOR :

Nehete P.; Dharrao M.; Bongale A.M.; Dharrao D.

JOURNAL NAME:

Scientific Reports (Vol.-16, Issue-1)

DETAILS:

Published on 28 April 2026

ABSTRACT:

Flood is the most alarming and devastating natural disasters, which poses significant threats to communities around the world. Flood causes significant destruction to critical infrastructure, human lives, and properties. Thus, it is important to detect humans in flood-related disasters. Nowadays, various techniques are employed for human object classification in a flooded environment, but these did not maintain high classification accuracy and often misclassified objects as humans. This paper presents a Fast Gated Recurrent Neural Network-based Mean Binary cross entropy Taylor concept (FastGRNN-MBT) for classifying human objects in flooded environments. The input image is pre-processed initially by utilizing an adaptive median filter, and the image enhancement of pre-processed image is performed by utilizing Retinex algorithm. Then, the objects are detected using You Only Look Once version 12 nano (YOLOv12n), where the detection performance is improved by fine-tuning YOLOv12n utilizing CAO algorithm. Following this, the different features are extracted and the human objects are finally classified using FastGRNN-MBT. Further, the experimental investigations are performed to validate the supremacy of FastGRNN-MBT in classifying human objects. The FastGRNN-MBT outperforms existing schemes with recall, precision, accuracy, execution time, inference time and F1-score of 96.979%, 97.763%, 96.226%, 147.236 s, 28.178 s, and 96.988% which indicates that it is better suitable for the classification task as compared to other state of the art classification methods.

Link: https://doi.org/10.1038/s41598-026-45663-2

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Smart Pothole: Detection and Location Reporting System Using STM32

AUTHOR :

Nevse H.; Dugad K.; Nanwani L.; Danve S.; Deshpande A.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

Potholes cause vehicle damage and pose safety risks on roads. This mini project designs and implements a lightweight Convolutional Neural Network (CNN) for binary pothole/no-pothole image classification and demonstrates deployment on an STM32H7 microcontroller using TensorFlow Lite and STM32Cube.AI. A dataset collected from Kaggle (approximately 352 normal images and 329 pothole images) was used for training. The trained Keras model was converted to TensorFlow Lite and validated on the STM32H7. On-device verification shows near-identical numerical outputs compared to the PC reference model; microcontroller inference time depends strongly on core clock frequency (3.48 s @ 6 4 MHz, 0.56 s @ 400 MHz). This paper discusses optimization opportunities (quantization, pruning, model redesign) to achieve practical embedded inference rates.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566148

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Evaluation of a Convolutional Neural Network-based Model for Accurate Detection and Multi-class Classification of Economically Significant Soybean Pests using RGB Image Data

AUTHOR :

Sharma P.; Kulkarni A.; Sharma S.; Kulkarni P.; Karsauliya S.; Dongre S.

JOURNAL NAME:

Legume Research (Vol.-49, Issue-4)

DETAILS:

Published on April 2026

ABSTRACT:

Background: Soybean (Glycine max) is a vital legume crop cultivated worldwide for its high protein and oil content. However, its productivity is significantly affected by various insect pests that damage leaves, stems and pods during different growth stages. Pests like aphids, armyworms and bollworms can cause substantial yield losses if not detected and controlled promptly. Manual pest monitoring through field scouting remains the dominant practice but is labour-intensive, inconsistent and prone to human error, particularly in large-scale farming systems. The integration of artificial intelligence, particularly deep learning, offers a scalable solution for automating pest detection. Methods: This study presents a convolutional neural network (CNN) model designed to detect and classify seven major insect pests commonly found in soybean crops. A dataset consisting of 2,450 RGB images was collected from online resources. The images were preprocessed, augmented and split into training, validation and test sets. The CNN was built using six convolutional layers with ReLU activations, followed by max-pooling layers, a fully connected dense layer and a softmax output layer for classification. The model was trained for 100 epochs using the Adam optimizer and sparse categorical cross-entropy loss. Result: The final model achieved an overall accuracy of 96.88% on the test set. Class-wise evaluation showed high classification matrices across all categories. ROC-AUC values reached 1.00 for all pest classes, indicating excellent classification performance. Precision-recall curves also showed high average precision scores, confirming the model's reliability. These results demonstrate the model's potential for practical application in real-time pest monitoring systems used in precision agriculture.

Link: http://dx.doi.org/10.18805/LR-5622

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Study on Natural Convection Enhancement in Vertical Tubes with Internal Structures: Implications for Industrial Cooling and Thermal Pollution Control

AUTHOR :

Sahoo A.; Nayak R.C.; Senapati A.K.; Kulkarni M.V.; Venkatamuni T.

JOURNAL NAME:

Indian Journal of Environmental Protection (Vol.-46, Issue-5)

DETAILS:

Published on May 2026

ABSTRACT:

Buoyancy-driven heat exchange within upright channels is essential for addressing thermal pollution and enhancing the efficiency of industrial cooling units. This experimental work focuses on buoyancy-based heat flow from a heated object; heat transfer occurs through cylindrical ducts, with and without internal obstacles. Cylindrical ducts were subjected to a uniform heat flux due to surface contact with the heated object. The duct heat-flux range varied with the heat generated by the object. Experiments were conducted on two channels with internal diameters of 52 mm, wall thicknesses of 6 mm and lengths of 650 mm, yielding a length-to-diameter ratio (L/D) of 12.5. The applied wall heat flux (q") ranged from 552-1997 W/m2. An additional study was carried out on pipes of the same dimensions, along with internal rectangular rings having 4 mm thickness and 65-195 mm step size between rings. Experimental results, including temperature profiles along the tube wall and at the fluid exit, were obtained for both conditions with and without rings and a comparative statement is presented. The results disclose the impact of internal rings, tube length and duct heat flux. The presence of internal rings and a maximum length-to-diameter ratio of the tube approach enhancement of heat transfer from the heated object through the tube. This information for cooling system arrangement contributes toward reduced thermal pollution and improvement of the atmospheric environment.

Link:
https://www.scopus.com/pages/publications/105045553830?origin=resultslist

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Design, optimization, and evaluation of ferulic acid-loaded cubosomal cream for enhanced topical delivery and anti-hyperpigmentation efficacy

AUTHOR :

Vinchurkar R.; Kuchekar A.

JOURNAL NAME:

Drug Development and Industrial Pharmacy (Vol.-52, Issue-8)

DETAILS:

Published on 1 July 2026

ABSTRACT:

Objective: The goal of this study was to create and optimize a topical cream based on cubosomes for improved dermal delivery and stability of ferulic acid, a strong antioxidant with anti-hyperpigmentation properties that is limited by low photostability and skin permeability. Significance: Improving the stability of ferulic acid and regulating its skin distribution is crucial for its successful application in cosmeceutical formulations. Cubosomal nanocarriers offer a viable way to enhance photostability, solubility, and sustained release, improving therapeutic efficacy while preserving skin safety. Methods: Glyceryl monooleate and Poloxamer 407 were used to create ferulic acid-loaded cubosomes. The effects of almond oil and Sepineo P600 on viscosity and drug content were assessed using the Box–Behnken design to optimize cream formulation. Particle size analysis, entrapment efficiency, Fourier transform infrared spectroscopy (FT-IR), differential scanning calorimetry (DSC), X-ray diffraction (XRD), and rheological investigations were all part of the characterization. To clarify release mechanisms, kinetic models were fitted to in vitro release data. Tyrosinase inhibition studies evaluated the effectiveness of anti-hyperpigmentation, while MTT and RT-PCR assays were used to assess biocompatibility. Results: The optimized formulation developed nanosized particles with thixotropic flow behavior, skin-compatible pH, and high entrapment efficiency. Diffusion-controlled delivery was indicated by release following first-order and Higuchi kinetics, although super case-II transport was suggested by Korsmeyer–Peppas analysis (n = 1.105). The cream showed moderate tyrosinase inhibition, TNF-α expression suppression, and non-cytotoxic behavior. Conclusion: Ferulic acid's potential as a safe and efficient cosmeceutical for skin-brightening applications is supported by the cubosomal cream's significant improvements in solubility, photostability, and prolonged dermal application.

Link: https://doi.org/10.1080/03639045.2026.2692051

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Developing an automated script for detecting design pattern in software project using Python

AUTHOR :

Gupta K.K.; Shaik M.; Kaveri P.R.; Awasthi P.; Naik S.A.; Dhanaraj R.K.

JOURNAL NAME:

The Future of Business and Society: Integrating Sustainable Technologies with Data-Driven Solutions

DETAILS:

Published on March 2026

ABSTRACT:

In software development, design patterns are fundamental because they solve considerable design issues and promote best practices. However, locating these patterns in large codebases may be challenging and requires frequent human inspection. This study explains a computerised method, written in Python, that utilises regular expression and Abstract Syntax Tree (AST) analysis to identify common design patterns like Singleton, Factory, Decorator, State, Strategy, Abstract Factory, Chain of Responsibility, Bridge, Composite, Builder, Facade, Iterator, Prototype, Template, Proxy, and Interpreter across the source code. An implemented script indicates a sufficient path to derive these trends, and knowledge of the project structure is provided to the programmers. The automated script's business prerequisites are transformation into the legacy system, code quality audits, compliance with quality assurance, and helping the software engineers in code comprehension and documentation. Hence, automated pattern detection enables performance optimisation, scalability planning, and training of new programmers. A script accuracy in finding design patterns observed by investigations also indicates how it improves automatic refactoring efforts, lowers technical debt, and enhances program maintainability. With significant ramifications for software engineering's technical and business facets, this study offers a reliable, scalable method for identifying patterns.

Link: https://doi.org/10.1201/9781003778882-33

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Toxicological evaluation of herbo-mineral formulation: Acute and sub-acute oral toxicity in rats

AUTHOR :

Tambe M.S.; Baheti A.M.; Swami A.G.; Pawar A.T.

JOURNAL NAME:

Journal of Ayurveda and Integrative Medicine (Vol-17, Issue-4)

DETAILS:

Published on July 2026

ABSTRACT:

Background: Toxicity evaluation is an essential component of the preclinical safety assessment for herbal and herbo-mineral formulations intended for repeated use. Objectives: The present study was undertaken to assess the acute and subacute oral toxicity of an Ayurveda-based herbo-mineral formulation (HMF) comprising Tinospora cordifolia (Thunb.) Miers, Withania somnifera (L.) Dunal, and Kukkutandatvak bhasma in rats. Methods: An acute toxicity of a prepared HMF was conducted at a single oral dose of 2000 mg/kg in rats as per OECD guideline 423. Sub-acute toxicity of HMF was evaluated at 250, 500, and 1000 mg/kg by oral administration in rats in accordance with OECD Test Guideline 407. Results: No mortality and clinical signs of toxicity were produced in rats by a single oral administration of a 2000 mg/kg dose of HMF. In the subacute toxicity study, body weight gain and food consumption patterns in the HMF-treated groups were comparable to those of the vehicle control group. Hematological and serum biochemical parameters remained within physiological limits. The relative organ weights did not differ significantly between the control and HMF-treated groups. Histopathological evaluation of the organs of HMF-treated rats revealed normal findings. No delayed or residual toxicity was observed in the satellite group. Conclusion: HMF was found to be safe following a single 2000 mg/kg dose and at a 28-days repeated dose of 1000 mg/kg by the oral route in rats. The study findings support the safety of the HMF and provide a scientific basis for further preclinical and clinical development.

Link: https://doi.org/10.1016/j.jaim.2026.101368

Since 1983

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

ForestSenseNet: A Feature-Aware Machine Learning Model for Forest Fire Prediction

AUTHOR :

Babar D.; Jagdale B.

JOURNAL NAME:

International Journal of Safety and Security Engineering (vol.-16, Issue-4)

DETAILS:

Published on 30 April 2026

ABSTRACT:

The fires continue to represent life-threatening dangers to both the public's safety, property and environmental health. As a result of the growing uncertainty of weather and the rapid growth of urbanization, demand for an efficient and effective fire alert system rises. This research specific work is concentrated on developing a good classification module which can predict fires using machine learning (ML), but not limited as it possesses ability to guide the predictive performance by exploiting hybrid equation and feature selection techniques. Designing a multi-phase methodology that uses data preprocessing first, followed by a variety of conventional classifiers including Random Forest (RF), Naïve Bayes, Support Vector Machine (SVM), and Decision Tree, is the primary objective. Additionally, hybrid models combining SVM with other classifiers were used to capitalize on their complementing characteristics. Recursive Feature Elimination (RFE) was used to minimize the volume of data and make interpreting feature selection methods like RF rank easier. Additionally, we provide FireSenseNet, a network that analyzes various heterogeneous features in parallel, including weather indices Fine Fuel Moisture Code (FFMC), Duff Moisture Code (DMC), Drought Code (DC), Initial Spread Index (ISI), meteorological variables (temperature, relative humidity (RH), wind, and rain), as well as geographical ones (X, Y) and temporal ones (month, day). Features concurrently increase fire prediction and generalization across a large number of situations. Important performance indices that were incorporated in the cross-validation procedure were the confusion matrix, accuracy F1-score, and receiver-operating characteristic curve (ROC) analysis. Compared to individual classifiers, FireSenseNet, the hybrid strategy and the hybrid method with feature selection and fine-tuning works better on the experimental level. In addition to this, the model could be used in classification of certain associated variables like RH into a few types of risk thus offered a combined perspective on fire situation. The current key work offers a systematic, comparative, forecasting how to predict fires through parallelism, ensemble techniques and optimization methods.

Link: https://doi.org/10.18280/ijsse.160413

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Triton X-100 Surfactant Effects on Friction and Wear of Short Carbon Fiber–Epoxy Composite

AUTHOR :

Salunkhe A.; Ghadge R.; Kumar P.

JOURNAL NAME:

Polymer Composites

DETAILS:

Published on 7 July 2026

ABSTRACT:

Interfacial debonding accelerates wear in short carbon fiber–epoxy composites (Vf = 40 ± 2). Triton X-100 surfactant (1, 2, and 3 wt.%) was applied to modulate friction and wear performance, with modified composites designated as CE-1S, CE-2S, and CE-3S. Pin-on-disc tests (ASTM G99) against EN31 steel (58–60 HRC) were conducted at 15–25 N and 1.05–1.57 m/s. Gravimetric analysis recorded 0.85% mass gain at 1 wt.% concentration, consistent with near-saturation adsorption behavior. At this optimal concentration (CE-1S), steady-state COF decreased from 0.45 to 0.29, representing a 35.56% reduction relative to the untreated baseline ($p < 0.05$). The specific wear rate for CE-1S decreased by 27.4% (to 8.68 × 10−5 mm3/N m) at 1.57 m/s and by 64.3% ($p = 0.0012$) at 1.05 m/s. Surfactant concentrations above 1 wt.% were associated with excess deposition that progressively degraded tribological performance. SEM observations were consistent with a reduction in fiber pull-out from 64 ± 9 to 22 ± 4 (Formula presented.) m, while void fraction dropped from 6.3% to 2.1%. These results suggest that 1 wt.% surfactant enhances interfacial adhesion and wear resistance.

Link: https://doi.org/10.1002/pc.71399

Since 1983

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Computationally Efficient CKKS-Based Homomorphic Deep Learning for Privacy-Preserving Medical Image Classification

AUTHOR :

Nikam S.S.; Kulkarni N.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-1s)

DETAILS:

Published on June 2026

ABSTRACT:

The high rate of deep learning application in medical image analysis has made significant contribution to automated diagnosis, screening and clinical decision support. Nonetheless, sensitive patient information poses significant privacy, regulatory, and governance risks that tend to restrain widespread implementation of intelligent healthcare systems. Fully Homomorphic Encryption (FHE) is a highly effective solution because it provides the possibility to perform the computation with encrypted data without revealing the plaintext. This article introduces: a computationally efficient privacy preserving classification of medical images securely over chest X-ray images. The suggested system combines the Cheon-Kim-Kim-Song (CKKS) homomorphic encryption algorithm, realized with the help of the TenSEAL library, and a small convolutional neural network (CNN) that is used to diagnose three classes of patients with COVID-19, Normal, and Viral Pneumonia cases. The framework includes standardized preprocessing, class-balancing augmentation, encrypted data processing, trusted-zone inference, and implementation, which is deployment-oriented. Moreover, mathematical basis of CKKS and architecture of the classifier are developed systematically to be clear and reproducible methodologically. Experimental analysis on a balanced public chest X-ray dataset shows high prediction potential with accuracy 97.13%, precision 97.08%, recall 97.15%, F1-score 97.11%, specificity 98.57% and AUC 0.9968. Operationally, the system has an average secure prediction latency of 111.7 ms/sample and the entire secure pipeline is 296.3 ms/sample, which confirms that the system is practically feasible in the field. The findings determine that diagnostic performance and strict protection of privacy are not conflicting goals. This work provides a viable way to trustworthy artificial intelligence in healthcare by integrating cryptographic protection, computational effectiveness, and deployable deep learning.

Link: https://doi.org/10.59543/jidmis.v3.482

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Characterizing Cocircuits in Splitting Matroids Representable over Prime Field

AUTHOR :

Gunjal S.; Malavadkar P.

JOURNAL NAME:

Lobachevskii Journal of Mathematics (Vol.-47, Issue-4)

DETAILS:

Published on 2026

ABSTRACT:

In this paper, we study the cocircuits of splitting -matroids; matroids representable over the prime field. For a -matroid defined on a ground set, and for elements, we denote the splitting matroid of by. We proved that each cocircuit of is either a cocircuit of or union of two cocircuits of. The main result of the paper describes the cocircuits of splitting -matroid in terms of the cocircuits of -matroid.

Link:
https://www.scopus.com/pages/publications/105045244375?origin=resultslist

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

A Multi-Modal Deep Learning Framework for Depression Detection Through EEG–Speech Fusion and Conformer–Mamba State Space Modeling

AUTHOR :

Laddha A.; Bhingarkar S.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-1s)

DETAILS:

Published on June 2026

ABSTRACT:

Depression is a common psychological condition affecting millions of people globally, frequently not diagnosed, because of a subjective nature of the conventional clinical assessment. In this research, a multi-modal deep learning framework for automatic depression detection in combination with electroencephalogram (EEG) and speech signals was proposed. The framework was based on the Multi-modal Open Dataset for Mental-disorder Analysis (MODMA) that includes synchronized resting-state EEG recordings and audio samples from participants with Major Depressive Disorder and healthy controls. The Mel-Frequency Cepstral Coefficients (MFCCs) were used to extract features from the audio signal and EEG signals were normalized and time synchronized with the speech segments. To learn the dynamic relationships between the neurophysiological and acoustic representations, a cross-modal attention fusion mechanism was used to obtain discriminative fused feature embeddings. The CNN-Transformer, GNN-Transformer, and the proposed Conformer–Mamba State Space Model architectures were tested with the same setup for training. The experimental results showed that the Conformer–Mamba model outperformed the CNN-Transformer and GNN-Transformer baselines with 89%, 91%, 88%, 89.5%, and 0.97 for the classification accuracy, precision, recall, F1-score, and ROC-AUC, respectively. The improvement was thought to be due to the usefulness of the Conformer modules to represent local and global context and the Mamba state space mechanism to represent long-range temporal dependencies efficiently. The results showed that attention guided EEG-speech fusion is a reliable and an objective method for the detection of depression with great potential for future intelligent mental health screening systems.

Link: https://doi.org/10.59543/jidmis.v3.465

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

An Intelligent Priority-Based Telemedicine Algorithm For Real-Time Emergency Health Management In Military Environments

AUTHOR :

Hemalatha S.; Kumbhar V.; Vinti S.L.K.; Padmapriya K.; Muruganandam S.; Satyanarayana S.K.

JOURNAL NAME:

Journal of Theoretical and Applied Information Technology (Vol.-104, Issue-4)

DETAILS:

Published on 26 February 2026

ABSTRACT:

The relevance of the study is determined by the need for high-performance data processing architectures to increase the efficiency of human resource management (HR) in the context of digital transformation and the increasing complexity of analytical processes. The aim of the research is to create an optimized data-driven human resource (HR) decision-making architecture with the integration of machine learning (ML) modules, adaptive pipelines, and streaming analytics, verified by Unified Modelling Language (UML) and metric comparison. Research methods: SWOT analysis, metric comparison, structural optimization decomposition, UML, comparative analysis of UML models, metric comparison of optimized architecture. Optimized HR Data-Driven Decision-Making architecture provided an increase in predictive accuracy to 0.962 (+8.4%), metric stability (+9.1%), and discriminability (+7.8%). SWOT analysis identified 6 strengths, 5 critical weaknesses, 4 risks; comparison confirmed the superiority of SAP Analytics Cloud (0.94; 0.91; 0.89) over the market average (0.81; 0.78; 0.75). UML integration of adaptive feature engineering pipelines, cognitively optimized ML modules, and streaming analytics increased interoperability (+14.6%), modular integrity (+12.3%) and algorithmic resilience (+15.1%). The academic novelty of the study is the formalization and verification of an optimized HR Data-Driven Decision-Making architecture that integrates ML modules, feature engineering, and stream analytics, providing a predictive accuracy of 0.962 (+8.4%) and interoperability of +14.6%. Prospects for further research include localized implementation of the architecture in a test environment with metric and cognitive functional verification, iterative optimization of modules based on the results of institutional contextual empirical testing.

Link: https://doi.org/10.5281/zenodo.18822763

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

HR Revolution: Navigating the Era of Artificial Intelligence in Human Resource Management

AUTHOR :

Thakur P.

JOURNAL NAME:

Embracing the AI Frontier: Perspectives on Business and Organizational Development

DETAILS:

Published on June 2026

ABSTRACT:

In today's ever-changing business environment, technology has become an integral part of every organization, and the emergence of disruptive power has brought both challenges and opportunities for businesses. The advent of Artificial Intelligence (AI) has sparked a revolution in various industries, and Human Resource Management (HRM) is no exception. This chapter aims to present a critical review that addresses the profound impact of technology in reshaping HRM and discuss how organizations can leverage technology to drive growth and success in this competitive scenario. The main aim of this research is to review the literature on Artificial Intelligence and HRM that has been published over the past two decades and to analyze authorship, citations, countries, and publication sources using VOSviewer. The objectives of this chapter are to evaluate the significant trends, identify the knowledge gaps, and suggest a future research agenda. This chapter examines 208 articles from the Scopus database published in the English language from 2002-2023.

Link: https://doi.org/10.1201/9781779641311-1

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A Systematic Review Of Edge Computing For Sugarcane Disease Diagnosis

AUTHOR :

Jujare V.; Bhalekar M.; Kulkarni V.; Kosamkar P.

JOURNAL NAME:

International Journal of Computer Information Systems and Industrial Management Applications (Vol.-18, Issue-2s)

DETAILS:

Published on 20 June 2026

ABSTRACT:

Timely disease identification and control are crucial for sugarcane agricultural output, which is a vital crop for economic growth in developing nations like India. Traditional disease detection techniques, however, have drawbacks including slow reaction times, large processing requirements, and reliance on centralized cloud systems—which might be sluggish and constrained by connectivity problems in remote locations.With an emphasis on real-time data collection, processing, and analysis using IoT, Artificial Intelligence (AI), and edge-fog-cloud architectures, this study examines developments in early disease detection throughout the phenological phases of sugarcane utilizing edge computing. Our research shows that algorithmic methods, especially CNN-based deep learning models incorporated into edge computing frameworks, greatly lower latency and processing cost while achieving over 90% illness detection accuracy.The study also shows how edge computing might revolutionize preventative therapies by identifying possibilities in real-time IoT connections and lightweight model modifications for early illness identification. The resilience and sustainability of sugarcane farming in resource-constrained locations are improved by this strategy, which closes important gaps in scalability, cost-efficiency, and accessibility.

Link: https://cspub-ijcisim.org/index.php/ijcisim/article/view/2104

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Recent Developments in 3D-Printed Biodegradable Materials for Orthopedic Applications: A Review

AUTHOR :

Patil S.; Gogate P.; Dhatrak P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on 26 June 2026

ABSTRACT:

Recent advancements and challenges in the utilization for patient-specific orthopedic applications have driven the exploration of biodegradable materials as a sustainable alternative to traditional metallic implants. This review evaluates the role of biodegradable materials and advanced 3D printing techniques in addressing the limitations of orthopedic implants while promoting bone regeneration and reducing the need for secondary surgeries. The present review focuses on advanced additive manufacturing techniques, including solid, liquid, and powder form materials. Additionally, the study further examines the integration of biodegradable materials such as metals, polymers, and ceramics in orthopedic treatments, highlighting their compatibility, functionality, and contributions to improved patient outcomes. From the studies, it was evident that the biodegradable materials, particularly co-doped β-TCP and hydroxyapatite-based composites, have demonstrated enhanced mechanical strength, thermal stability, and bioactivity. Moreover, the use of additive manufacturing has met demands of complex geometries and patient-specific requirements specifically with powder-based manufacturing process. When combined with additive manufacturing, biodegradable materials provide an innovative strategy for orthopedic treatment, offering tailored remedies that encourage bone regeneration. Upcoming research should focus on optimizing material properties, manufacturing techniques, and clinical applications to address current limitations.

Link: https://doi.org/10.1063/5.0342149

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

KDE-adaptive collocation sampling for Physics-Informed Neural Networks: A controlled evaluation of quantum augmentation

AUTHOR :

Sharma A.; Singh D.

JOURNAL NAME:

Journal of Computational Science (Vol.-100)

DETAILS:

Published on 2026

ABSTRACT:

Adaptive collocation sampling is critical for the accuracy of Physics-Informed Neural Networks (PINNs), yet its systematic evaluation across classical and hybrid quantum architectures remains lacking. We propose a Kernel Density Estimation (KDE)-based adaptive sampling strategy that dynamically concentrates collocation points in regions of high PDE residual, and rigorously evaluate it across four PINN architectures—Plain PINN, ClassicalAug-4, ClassicalAug-8, and Hybrid Quantum PINN (HQPINN)—on the 1D viscous Burgers' and Allen–Cahn equations. KDE-based sampling produces large, consistent improvements across all architectures: Cohen's d effect sizes exceed 1.0 for every architecture–PDE combination, with win rates of 87.5%–100% across eight-seed paired comparisons and mean relative L2 error reductions of 12%–17% across eight-seed validated configurations. Critically, quantum and bottleneck-matched classical augmentation achieve statistically comparable accuracy on both PDEs: under uniform sampling, HQPINN is marginally better on both PDEs ((Formula presented)), while under KDE, ClassicalAug-4,slightly outperforms HQPINN on both PDEs ((Formula presented)); none of these differences are statistically significant. This rigorous null result — enabled by our parallel-gate architecture with controlled baselines — provides a principled benchmark for the quantum-PINN community and establishes a clear foundation for identifying the problem regimes where quantum advantage may emerge. We further provide the first eight-seed comparison of KDE against three established adaptive methods (RIS, RAD, RAR) on both classical and quantum architectures, finding that while RAD and RAR achieve lower mean L2 errors on specific architecture–PDE combinations (e.g., RAD on Burgers': 0.225 vs. KDE's 0.269; RAR on Allen–Cahn: 0.741 vs. KDE's 0.872 on Plain PINN), KDE offers the lowest cross-run variability (CV of 17.5%–28.9% vs. 22.8%–38.7% for baselines) and the most consistent cross-architecture improvement, making it a reliable general-purpose strategy. Hard boundary condition enforcement yields substantial accuracy gains for stiff PDEs (ϵL2 from 0.83 to 0.13 on Allen–Cahn).

Link: https://doi.org/10.1016/j.jocs.2026.102948

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Analyzing the Effects of Lifestyle Modifications on Type 2 Diabetes in India through Atangana-Baleanu Fractional Differential Equations

AUTHOR :

Khan M.; Shaikh A.; Gunjal S.; Nisar K.S.

JOURNAL NAME:

International Journal of Analysis and Applications (Vol.-24)

DETAILS:

Published on 6 July 2026

ABSTRACT:

This study introduces an innovative fractional-order mathematical model aimed at examining the dynamics of type 2 diabetes mellitus through the application of the Atangana-Baleanu-Caputo (ABC) fractional derivative. The proposed model enhances the traditional integer-order diabetes framework by integrating memory and genetic factors, providing a more accurate depiction of disease progression and the impact of lifestyle interventions. The existence and uniqueness of the fractional system are confirmed via the fixed point theorem, thereby affirming its mathematical validity. Approximate analytical solutions are derived through the iterative Laplace transform method (ILTM), while numerical simulations are performed utilizing Mathematica software. Alongside numerical simulations, the analytical properties of the model are confirmed by deriving the basic reproduction number, establishing disease-free equilibrium, and ensuring the positivity of solutions, which guarantees both mathematical consistency and epidemiological feasi-bility. Simulation results indicate that the fractional order parameter μ significantly affects the temporal dynamics of all compartments-susceptible, afflicted, treated, lifestyle-modified, and prevented. Reduced μ values (enhanced memory effects) postpone illness progression and lifestyle changes, whereas elevated μ values (diminished memory effects) hasten transitions but result in less enduring consequences. The model offers quantitative information regarding the efficacy of lifestyle interventions, allowing policymakers to formulate data-driven plans for diabetes prevention and management. The fractional ABC diabetes model provides a comprehensive and adaptable framework for elucidating the influence of memory on chronic disease dynamics and informing evidence-based public health strategies.

Link: https://doi.org/10.28924/2291-8639-24-2026-205

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Review on Enhancing AeroElastic Stability With Carbon Fiber-Reinforced Composites

AUTHOR :

Motgharela S.; Kokate J.; Lopes A.; Kulkarni K.G.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on June 2026

ABSTRACT:

Aeroelastic stability is a significant challenge in modern aerospace engineering. This review focuseson the potential of Carbon-Fiber-reinforced composites (CFRP). CFRP allows us to reduce weight while also providing strength and stiffness to the plane, improving aeroelastic stability. Furthermore, other phenomena such as flutter and gust contribute to the plane's instability. Uncertainties have an important influence on aeroelastic stability. Stochastic expansion analysis and the polynomial chaos expansion approach were employed, emphasizing the use of advanced materials and computational methods in solving aeroelastic problems. We've also included numerical results, which encompass flutter and gust analysis. The study demonstrates that CFRPs improve flutter speed to 167.53 m/s, enhance structural stiffness, and reduce dynamic instabilities under gust loads. These results highlight how well CFRPs work to optimize structural dynamics and reduce aeroelastic instabilities. However, CFRPs have the potential to enhance the design of efficient, lightweight, and stable aerospace structures.

Link: https://doi.org/10.1063/5.0341925

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Active learning for improved semi-supervised semantic segmentation in echocardiography

AUTHOR :

Adke P.; Adke G.; Surose T.; Thakare G.; Bhapkar S.

JOURNAL NAME:

Information and Communication Systems

DETAILS:

Published on March 2026

ABSTRACT:

Accurate left ventricle segmentation in echocardiography is essential for assessing cardiac health. Traditional medical image segmentation often requires large, labeled datasets, which are challenging and costly to obtain. This study introduces a hybrid methodology that combines semi-supervised learning (SSL) and active learning (AL) to reduce reliance on extensive annotations while ensuring high segmentation accuracy. Our primary objective is to enhance U-Net performance by leveraging a limited set of labeled data alongside a substantial pool of unlabeled data. We selectively label the most informative samples through targeted active learning strategies. Segmentation effectiveness is evaluated using metrics such as the Dice coefficient and Hausdorff distance. We train the U-Net model on both labeled and unlabeled datasets through techniques like pseudo-labeling and consistency regularization, implementing uncertainty-based active learning to annotate the most uncertain samples, thus streamlining the labeling process. We anticipate this approach will reduce the volume of labeled data needed by 70-80%, delivering state-of-the-art segmentation performance in clinical settings with minimal annotation costs. Ultimately, our hybrid models aim to surpass traditional fully-supervised models in accuracy and efficiency.

Link: https://doi.org/10.1201/9781003650201-4

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Deformation Patterns of the Kaladgi Basin: Structural Constraints and Tentative Implications for Hydrocarbon and Uranium Exploration

AUTHOR :

Modak K.

JOURNAL NAME:

Journal of the Geological Society of India (Vol.-102, Issue-7)

DETAILS:

Published on July 2026

ABSTRACT:

The Mesoproterozoic Kaladgi Basin, the northern part of the Dharwar Craton, represents an E–W trending intra-cratonic sedimentary basin that preserves a complex record of deformation within its sedimentary cover. This study examines the deformation patterns of the sedimentary cover in terms of structural geometry and kinematics to understand the tectonic processes that governed basin evolution. Detailed structural analysis reveals the coexistence of adjacent yet laterally overlapping compressional and extensional deformation domains within the cover sequence. The south-central part of the basin is characterised by folds, axial planar cleavage and faults defining a compressional regime with a dominant WNW–ESE to E–W structural grain. In contrast, the northern sector represents an extensional domain marked by homoclinal bedding, southerly dipping normal faults, conjugate tensile–hybrid joints and locally dismembered strata, sharing a broadly E–W structural orientation. A marked contrast exists between the deformation patterns of the sedimentary cover and the underlying basement. While the basement comprises largely undeformed granites in the north and poorly exposed Peninsular Gneissic Complex with a dominant NW–SE structural grain in the south, it shows little evidence of reactivation during cover deformation. This decoupling suggests that deformation of the sedimentary cover was predominantly thin-skinned in nature and likely driven by gravity gliding over a relatively rigid basement. The established structural framework provides tentative implications for mineral resource exploration. Fracture and joint networks in the extensional northern domain may have facilitated hydrocarbon migration, whereas fold culminations and antiforms in the south-central compressional domain could represent potential accumulation zones. Furthermore, the basement–cover unconformity emerges as a structurally favourable locale for unconformity-related uranium mineralisation, consistent with reported uranium anomalies from earlier studies.

Link: https://doi.org/10.17491/jgsi.2026.174471

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Empirical Analysis of The Impact of Cryptocurrency Development on Investors' Decision-Making and The Economy

AUTHOR :

Padhye P.; Gupta S.K.; Mishra U.; Burande A.; Parashar N.

JOURNAL NAME:

Journal of Information and Knowledge Management

DETAILS:

Published on July 2026

ABSTRACT:

Global recognition of the developing cryptocurrency market is growing. Policymakers, institutional investors and individual investors are now all very interested in it. In contrast to more conventional methods, the new encrypted blockchain technology gives individual investors modern investment alternatives. The unstable market, on the other hand, causes instability and uncertainty for market participants, leaving a research void for academics to look into what causes these challenges. The purpose of this research is to look into how the growth of cryptocurrencies has affected investor decision-making and the economy. The study employed a method that was quantitative and used a Likert-scale instrument to collect data via an online questionnaire. With the assistance of the software programs SPSS and AMOS, the data were interpreted and evaluated using an SEM analysis. The research exposed was satisfactorily addressed, and the findings supported earlier literary works. The result shows that social influence, perceived risk and profitability impact the crypto decision-making process except for subjective norms. Also, the findings revealed that transaction cost, transparency, employment rate and inflation protection impact the growth of the Indian economy. The study's primary conclusions are related to issues with data gathering and methodology. Since the survey could not be conducted over a longer period due to schedule constraints, a longitudinal study that included more consumer variables in the analysis would be of interest. Future researchers should concentrate on market factors and how they affect various cryptocurrencies as well. To sum up, a study with a wider scope might yield more important findings.

Link: https://doi.org/10.1142/S021964922650036X

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Targeting the GLP-1 receptor pathways for dual management of obesity and depression

AUTHOR :

Keswani R.; Bhatt S.

JOURNAL NAME:

Drug Discovery Today (Vol.-31, Issue-4)

DETAILS:

Published on July 2026

ABSTRACT:

Glucagon-like peptide-1 (GLP-1) receptor agonists (GLP-1RAs), initially developed for the treatment of diabetes mellitus, are now widely used in obesity management. Obesity and depression are interconnected and share common biological pathways, including inflammation, oxidative stress, neurotransmitter imbalance, mitochondrial dysfunction, adipocytokine alterations, as well as gut–brain and HPA-axis dysregulation. These mechanisms are mediated by the signaling pathways that involve the GLP-1 receptor and provide a therapeutic target in comorbid disorders. GLP-1RAs have an impact on glycemic levels, weight reduction, insulin sensitivity, appetite and satiety control. Recent studies also highlight their neuroprotective effects, including modulation of dopaminergic pathways, enhanced hippocampal neurogenesis and neuro inflammation reduction. Hence, this review focuses on the therapeutic potential of using GLP-1 receptor pathways in the dual treatment of obesity and depression.

Link: https://doi.org/10.1016/j.drudis.2026.104727

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Wearable Sensor Data and ML for Remote Physiotherapy Monitoring

AUTHOR :

Shinde S.; Mantri S.

JOURNAL NAME:

AI-driven Innovations in Physiotherapy and Oncology 4

DETAILS:

Published on 3 July 2026

ABSTRACT:

The integration of machine learning (ML) algorithms and wearable sensor technology has transformed remote monitoring in physiotherapy. This chapter provides an in-depth review of the current state of wearable sensor-based remote physiotherapy monitoring, focusing on the role of ML in improving assessment accuracy, exercise prescription and patient-centered care. Wearable sensors are central to remote physiotherapy monitoring, enabling the collection of high-resolution biomechanical and physiological data outside clinical environments. Types of wearable sensors include inertial measurement units, electromyography sensors, force and pressure sensors, Physiological monitoring sensors and emerging sensor technologies. The application of ML has emerged as a novel method for interpreting wearable sensor data in remote physiotherapy. Types of ML approaches are supervised learning, unsupervised learning, reinforcement learning and deep learning. Telerehabilitation platforms integrate wearable devices, ML algorithms and cloud computing to enable continuous remote monitoring.

Link: https://doi.org/10.1002/9781394469826.ch5

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Bridging Machine Learning and Climate Futures: A Framework for Explainable, Self-directed (Agentic) Artificial Intelligence Models in Monitoring, Mitigation, and Governance of Anthropogenic Climate Impacts

AUTHOR :

Rajamanickam V.; Kulkarni K.; Mandala V.; Kisi O.

JOURNAL NAME:

MEJ Mansoura Engineering Journal (vol.-51, Issue-4)

DETAILS:

Published on 18 June 2026

ABSTRACT:

Environmental and societal damage due to anthropogenic climate change demands detection and mitigation strategies that are both effective and accountable. Machine Learning (ML) appears to offer a powerful set of tools but remains unexploited in these areas. A key barrier remains its poor ability to draw causal inferences about external systems, an essential requirement for meaningful continued monitoring, acting on, and shaping of the climate. Explainable, self-directed learned models operate by attributing environmental changes and deciding how best to model the resulting dynamics—they offer a natural solution. Recent developments in computational ecology, meteorology, and machine learning are combined to propose a framework which utilizes available data, semantics, and several properties of self-directed learned models to examine Anthropogenic Climate Change impacts. Three experiments drawn from these fields are presented, together with a research strategy for addressing gaps in current capabilities.

Link: https://doi.org/10.58491/2735-4202.3406

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Intelligent FPGA Enabled BMS for SOC and SOH Estimation Using Deep Learning Models

AUTHOR :

Inamke S.S.; Alhat M.P.; Toshniwal A.S.; Lokhande N.

JOURNAL NAME:

2026 2nd International Conference on Computing, Communication and Green Engineering, CCGE 2026

DETAILS:

Published on 2026

ABSTRACT:

This work presents the design and implementation of an intelligent Battery Management System (BMS) capable of estimating the State of Charge (SOC) and State of Health (SOH) of lithium-ion batteries using real-time data-driven learning models. Unlike conventional lookup-table or physics-based methods, the proposed approach combines real-time sensor data with deep learning inference deployed on an FPGA platform to achieve improved estimation accuracy under dynamic operating conditions. The developed framework integrates machine learning algorithms with real-time battery sensing to enhance prediction accuracy, adaptability, and computational efficiency. The system can be implemented on embedded platforms (e.g., FPGA, microcontrollers, edge AI devices) for automotive, renewable energy storage, and portable electronics applications.

Link:
https://www.scopus.com/pages/publications/105044706863?origin=resultslist

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

A hybrid MCDM–GRU framework for Indian road accident risk prediction with real-time web deployment

AUTHOR :

Yeole M.M.; Kudoli A.; Patil R.; Sonawane M.

JOURNAL NAME:

Innovative Infrastructure Solutions (Vol.-11, Issue-8)

DETAILS:

Published on 20 July 2026

ABSTRACT:

As the number of road accidents in India is on the rise, intelligent mechanisms that can forecast the risk of accidents and help in making decisions based on the data are urgent. This study hypothesises a hybrid approach that integrates Multi-Criteria Decision-Making (MCDM) with TOPSIS method and a Gated Recurrent Unit (GRU)-based deep learning model on time-series prediction of the risk of road accidents. The system receives traffic accident data via a user-friendly web interface created with Streamlit, data is preprocessed by the system, risk scores are calculated with MCDM, and predictions of future risk scores of accidents are made with GRU. The model is trained and tested using real-world traffic data of the Indian traffic and it shows efficient learning with low RMSE and consistent predictive results. The web implementation also renders it more usable and understandable to the policymakers and traffic departments. The experimentation has shown that our method is a sound one and the tool can be scaled by applying it to smart city environments. The proposed hybrid model combines TOPSIS-based MCDM and GRU deep learning to predict road accident risks using time-series Indian traffic data. A Streamlit web interface enables near real-time CSV uploads, risk score visualization, and forecasting, improving accessibility for policymakers and smart city planners. The model achieved a low RMSE (0.0917) and outperformed baseline methods, validating its capability for accurate, interpretable, and scalable accident risk forecasting. The proposed hybrid framework improves prediction accuracy by approximately 7.4% compared to the baseline GRU model while maintaining computational efficiency.

Link: https://doi.org/10.1007/s41062-026-02811-x

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Moral Rights and AI Creations: The Future of Attribution and Integrity in Copyright Law

AUTHOR :

Ghose A.; Ali S.M.A.; Pallav P.

JOURNAL NAME:

Legal Challenges of AI Across Interdisciplinary Sectors

DETAILS:

Published on October 2025

ABSTRACT:

This study examines the intricate implications of artificial intelligence (AI) on copyright law, focusing on moral rights and the future of authorship and attribution. As AI-driven technologies improve in producing high-quality art akin to human creations, conventional notions of ownership, authenticity, and creative intent are challenged. AI-generated art, such as pieces emulating the style of Studio Ghibli, prompts significant enquiries on originality and perception. The legal frameworks in numerous nations remain insufficient to address the distinctive challenges posed by non-human creations, particularly with moral rights, which pertain to personal values that transcend financial gain. The study argues that AI disrupts traditional concepts of authorship, highlighting the need for sophisticated copyright laws and policies that preserve human values and protect the moral rights of creators. This study investigates the intersection of AI, creativity, and copyright, highlighting the urgent requirement for novel legal frameworks in light of AI's increasing influence.

Link: https://doi.org/10.4018/979-8-3373-5452-1.ch003

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

RideSafeX: A Smart Helmet System with Embedded Iot and Mobile Connectivity

AUTHOR :

Kokate A.; Motade S.; Pame G.; Agrawal H.; Kokate K.

JOURNAL NAME:

2026 International Conference on Sustainable and Futuristic Technologies, ICSFT 2026

DETAILS:

Published on April 2026

ABSTRACT:

This research describes the development of an IoTbased smart helmet prototype designed to enhance the safety of motorcycle users by providing constant surveillance of riders and facilitating swift response to emergencies. The smart helmet consists of an integrated STM32 and ESP32 microcontroller equipped with an array of senses. Instead of a built-in speaker, audio is delivered wirelessly through Bluetooth from the rider's mobile device. Alcohol consumption is detected by using the MQ3 sensor, and crash occurrence is indicated through the ADXL345 accelerometer. In addition, the real-time location of the helmet is provided by the GPS via the NEO-6MV2. The prototype continuously monitors the helmet wearer's condition and can identify hazardous events, including alcohol consumption and any impact resulting from a fall while wearing the helmet. Upon detecting an anomaly, the system sends the helmet wearer's GPS coordinates to designated emergency contacts via a combination of cloud services and text messaging. The ESP32 microcontroller provides a wireless communication method to transmit data in real-time from the smart helmet to Firebase and permits real-time monitoring of the device. The feasibility of the device was verified through laboratory tests, where a user successfully detected if any alcohol could be present in a person's system, using vibration as a means of determining whether or not a rider is involved in an accident, and accurately transmitting the GPS coordinates of the user in real-time to the user's intended contact(s). The smart helmet platform has demonstrated that it is possible to utilize the intersection between embedded systems and IoT technologies to create solutions that improve the safety of motorcycle operators and reduce response time in the event of a motorcycle accident.

Link: https://doi.org/10.1109/ICSFT67370.2026.11566473

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Review on Central Concentrated Solar Power Receiver Technology

AUTHOR :

Kulkarni K.G.; Athalye T.; Hosur K.; Kaduskar A.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3418, Issue-1)

DETAILS:

Published on June 2026

ABSTRACT:

An article usually includes an abstract, a concise summary of the work covered at length in the main body of the article. It is used for secondary publications and for information retrieval purposes. Among the most potential forms of ecological and renewable energy was solar energy. Solar radiation is typically converted using two important innovations: concentrated solar power (CSP) and photovoltaic (PV). The capacity of CSP systems to store heat energy that may be used in the lack of sunshine thus circumventing the solar electricity's intermittent nature constitutes one of its primary benefits over PV systems. In this research, popular CSP technologies, the state-of-the-art of modern central receiver systems (CRS), earlier reviews on CSP technology, and solar tracking technologies for CRS have been reviewed. Gas-based, liquid-based, and particle-based CRS, which can reach the greater temperatures, are being studied in CRS study. Additionally, many kinds of materials and receivers with liquid-, gas-, and particle-based constructions are discussed. The benefits and difficulties of each technology and receivers are discussed. The development of low-cost monitoring technologies on the basis of computing complexity, energy usage, and heliostat aligning precision was also studied, with a focus on solar-tracking technologies for CRS. Moreover, the state-of-the-art of common CRS for CSP is also reviewed and the receiver efficiency was compared. Finally, the CSP technologies challenges and future work are also discussed.

Link: https://doi.org/10.1063/5.0341909

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Hyper-Personalization in Finance: How Generative AI is Reshaping Customer Experience, Engagement and Financial Inclusion

AUTHOR :

Lakshmi S.; Suresh K.; Ganesan Alias Kanagaraj M.; Aradhya G.B.S.; Singh A.; Kandpal M.

JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-2s)

DETAILS:

Published on July 2026

ABSTRACT:

The recent rapid entry of GenAI into financial services is transforming traditional personalization into contextual, adaptive and conversational decision support at the same time that limited theory-grounded empirical evidence explains how such capabilities translate into customer-and/or inclusion-oriented effects. In this regard, this study motivates and develops one GenAI-Enabled Hyper-Personalization Decision Framework (GEHPDF), comprising elements between GenAI-enabled hyper-personalization to customer experience, customer engagement, and financial inclusion respectively, with perceived explainability as a boundary condition focused on trust or privacy concern or perceived algorithmic fairness depending on responsible-AI behavior. Methods: This was a cross-sectional survey using data from 550 users of digital financial services. By using PLS-SEM, bootstrapped mediation and moderation analysis and out-of-sample predictive performance evaluation with competing machine-learning-based models to validate the proposed framework. The model provides conclusive positive effects of hyper-personalisation through GenAI on the customer experience (β = 0.612), of experience on engagement (β = 0.684) and of engagement on financial inclusion (β = 0.571). Sequential mediation analysis shows hyper-personalisation mediates financial inclusion (β=0.239) through the customer experience and engagement. Trust, explainability and algorithmic fairness significantly strengthen and privacy concerns only weakens the relationship between personalisation and experience. From the observations, we can see that with some features, the model predicts reasonably well but in an overall comparison Gradient Boosting is giving better comparative predictive performance of 87.8% accuracy and AUC = 0.934 The next step consists of a unified explanatory-predictive architecture on GenAI, not as merely a financial automation technology, but rather an adaptive financial decision-support mechanism in this study.

Link: https://doi.org/10.59543/jidmis.v3.645

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Amyloid beta and Tau: Innate antimicrobial peptide target in Alzheimer's diseases

AUTHOR :

Chandrashekar M.; Velmurugan G.; Rangappa N.; Chinnathambi S.

JOURNAL NAME:

Advances in Protein Chemistry and Structural Biology

DETAILS:

Published on July 2026

ABSTRACT:

Amyloid beta peptide is crucial protein in Alzheimer's diseases and their extracellular accumulation in the brain plays a significant role in diseases pathogenesis. Numerous investigations have shown that it may also have neuroprotective roles and regarded as the early responder of cytokine. Emerging studies have increasingly implicated the infectious agents as a potential contributor to the development of sporadic Alzheimer's diseases. Apart from pathological plaques and neurofibrillary tangles, the neuronal tissue of AD patient also contains viral DNA, fungal protein, which are linked with microbial infection, further this may suggest that polymicrobial infection also appear in AD. The growing evidences suggest that Aβ peptide exhibit the antimicrobial properties and act as a modulatory immunopeptide in central nervous system. Upon pathogenic infection, expression of Aβ peptide developed into oligomers and mature fibrils that entrap and inhibit the entry of the pathogens in the mouse, nematode and cell culture models of AD. This review centred around the antimicrobial protection hypothesis of amyloid beta accumulation, activation of innate immune cells and diverse AMPs in various mammals, birds, aquatic animals and arthropods.

Link: https://doi.org/10.1016/bs.apcsb.2026.06.008

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Enhancing Deep Learning-Based Human Detection in Flooded Areas Via Dynamic Lighting-Adaptive Image Enhancement

AUTHOR :

Nehete P.; Bongale A.; Shrikande S.; Mulmule P.; Dharrao D.

JOURNAL NAME:

International Journal on Smart Sensing and Intelligent Systems (Vol.-19, Issue-1)

DETAILS:

Published on 11 July 2026

ABSTRACT:

Flood zones pose significant challenges for search and rescue (SAR) operations due to poor visibility, noise, reflections, and occlusions caused by adverse weather and low-light conditions. These factors degrade object detection performance. To address this, the proposed system integrates YOLOv11 with a Retinex-based image enhancement method. The Retinex theory separates illumination from reflectance, improving detail extraction in low-light images. Two publicly available datasets, the Roadway Flooding Image Dataset and the Human Detection in Floods Dataset covering varied flood scenarios, lighting, and occlusions, are used. Results show that Retinex enhancement significantly improves detection accuracy: YOLOv11 reached 95.72%, outperforming baselines by up to 9%–10% in recall and 5%–6% in F1-score. Enhanced models also showed 7%–10% robustness gains on occluded and reflection-heavy images. This demonstrates that the Retinex-enhanced YOLOv11 model provides reliable, real-time human detection in flood environments, offering valuable tools for life-saving SAR efforts.

Link: https://doi.org/10.2478/ijssis-2026-0039

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Numerical simulation of subcooled flow boiling of nanofluids in metal foam embedded tubes for performance enhancement

AUTHOR :

Dhavale A.A.; Lele M.M.

JOURNAL NAME:

Measurement (Netherlands) (Vol.-6)

DETAILS:

Published on June 2025

ABSTRACT:

This study numerically investigates sub-cooled flow boiling heat transfer and hydraulic performance in horizontal tubes filled with metal foam, using nano fluids as the working medium. Key measurable parameters, such as heat transfer coefficient (HTC) and pressure drop, are analyzed across various metal foam configurations, including porosity (80 %, 85 %, 90 %) and pore density (10, 20, 30 PPI), under varying mass flow rates (210–400 kg/m2s), heat flux (100–230 kW/m2), and inlet temperatures (10–80 °C). The HTC, a critical metric for quantifying energy transfer efficiency, reaches peak values of 25 kW/m2K for water and 22.5 kW/m2K and 19 kW/m2K for CuO/H2O and Al2O3/H2O nano fluids, respectively. Pressure drop, another essential performance metric, is strongly influenced by the metal foam's structure and nano fluid concentration, with denser foams exhibiting the highest pressure losses. The thermal performance index (TPI), which integrates energy efficiency improvements by balancing heat transfer enhancement with the energy losses due to pressure drop, consistently exceeds one for both water and nano fluids, with water achieving a TPI of 1.5. This indicates measurable energy efficiency improvements, highlighting the potential of optimized foam-nano fluid combinations to enhance heat exchanger performance. The numerical models used in this study are validated against experimental data, demonstrating strong agreement for both HTC and pressure drop predictions. These results offer a foundation for designing heat exchangers with a focus on maximizing energy efficiency through quantifiable improvements in heat transfer performance and pressure loss reduction.

Link: https://doi.org/10.1016/j.meaene.2025.100042

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Predictive modeling of solar energy generation using supervised machine learning algorithms

AUTHOR :

Behede B.; Shahade M.; Chakrabarti S.; Wankhede U.; Sonawane Y.; Doifode D.; Patil R.

JOURNAL NAME:

Journal of Thermal Engineering (Vol.-12, Issue-5)

DETAILS:

Published on July 2026

ABSTRACT:

The nonlinear and dynamic nature of solar energy generation makes effective energy management, operational planning, and grid stability challenging. Purely numerical and statistical approaches are often unable to pick up the nonlinearity in the photovoltaic power generation. The present work tests the predictive capability of supervised regression algorithms for photovoltaic energy forecasting. This research is a comparative analysis of five algorithms, which are Linear Regression, k-Nearest Neighbor, Support Vector Regression, Decision Tree, and Random Forest. Unlike earlier studies that just targeted irradiation parameters and focused on short-term datasets, this study incorporates a long-term dataset, consisting of 95,950 hourly observations collected from a rooftop photovoltaic plant found in the Western Australia region from 1990 to 2014. The dataset includes multiple variables that are categorized into solar-irradiance and meteorological variables. Solar-irradiance variables are Direct-normal, Global-horizontal, and Diffused-horizontal. Meteorological variables are Wet-bulb temperature and Dew-point temperature. The photovoltaic energy produced is the output variable. The model is trained strategically with hyperparameter tuning performed using a hold-out k-fold cross-validation. From the first correlation heatmap, it is found that Direct-normal irradiance affects the photovoltaic energy the most, followed by Global-horizontal, and Diffused-horizontal irradiance. Wet-bulb temperature and the Dew-point temperature are the least influential parameters. The performance metrics evaluated to assess the developed models are Mean-Squared Error, Root Mean-Squared Error, Mean Absolute Error, and the Coefficient of Determination. Overall, the ensemble models showed superior performance to the regression-based models. Ensemble models pick up the non-linearity among the variables well.

Link: https://dx.doi.org/10.47481/jten.0063

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

The Skill Revolution: Building a Resilient and Adaptive Workforce

AUTHOR :

Saha L.; Jadhav B.; Birajdar S.; Deshmukh R.

JOURNAL NAME:

Upskilling for the Age of AI Automation

DETAILS:

Published on May 2026

ABSTRACT:

AI is changing the global economy by altering job types and the skills that people need. This topic explores how AI and new ideas are changing our world and provides advice on preparing for these changes. The rapid growth of AI technology has already changed jobs, created new opportunities, and presented challenges for skill development. Tools like machine learning, natural language processing, and automation are changing how we work and creating a need for new skills. This needs ongoing support and skill development. Good planning and ongoing learning are essential for keeping up with changes caused by AI. The talk discusses ways to improve AI skills, develop a lifelong learning habit, and adapt to new challenges. It highlights the role of strong education systems, job training programs, and development activities in preparing people for future jobs. Essential skills and good behavior are highlighted as key to financial success. There's a need for teachers, lawmakers, and business leaders to work together to create strong learning environments. The text explains how people and organizations adapt to these changes by focusing on continuous learning and skill development. It highlights the importance of education, business support, and government actions in helping people learn for a long time and preparing them for future job needs. The goal is to show how AI has improved workforce insights, helping people and organizations understand and use data and tools to succeed. It highlights the importance of basic AI knowledge for enhancing skills, solving problems, organizing tasks, and working together. People and groups can remain effective and adaptable by preparing for changes and improving AI skills. The writing survey examines how AI and machines are improving, how they are used in businesses today, and what we expect for the future. It examines research papers, industry reports, and books to explore how AI affects understanding and social progress. The text examines how people who work with information can improve, identifies essential skills, and suggests how to develop those skills actively.

Link: https://doi.org/10.2174/9798898812614126010004

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Evaluation of Berberis aristata Extract and Berberine for Anti-Oral Cancer Potential

AUTHOR :

Vichare, V; Rokade, M; Ithape, V; Tambe, V; Shashikant, D; Vishnu, C

JOURNAL NAME:

Indian Journal Of Pharmaceutical Education And Research (Vol.-60, Issue-3)

DETAILS:

Published on 2 June 2026

ABSTRACT:

Background: Traditional ayurveda medication Berberis aristata possesses a wide range of biological activities, including antipyretic, anti-inflammatory, anti-diabetic, and anticancer, etc. Protoberberine, berberine, and bis-isoquinoline are the three primary alkaloids discovered in Berberis aristata, however, berberine is generally considered to be the main one. Extract of Berberis aristata has been shown to have the ability to stop the spread of cancer cells. Aim: To evaluate the ability of Berberis aristata to combat the human oral cancer cell line (SCC-29B). Materials and Methods: A methanolic extract of Berberis aristata stem was prepared. The alkaloidal fraction was separated from the extract. Through preparative TLC, berberine was isolated. UV, HPLC, HPTLC, and LCMS/MS were used to characterise the extract, alkaloidal fraction, and isolated berberine in order to validate its presence. The SRB assay method was used to evaluate the anticancer potential of extract and berberine against human oral cancer cell line SCC-29B. Statistical analysis was done. Docking studies were conducted to understand binding affinity of berberine with different targets of oral cancer. Berberine showed comparable binding affinity to Adriamycin with tested targets. Results: Berberis aristata stem extract was found to significantly control % cell growth of SCC-29B cell line. It may be deduced that Berberis aristata stem extract has the potential to have anticancer properties against oral squamous cell carcinoma.

Link: https://doi.org/10.5530/ijper.20265938

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Gold Nanoparticles: Innovative Supramolecular Platforms for Targeted Drug Delivery and Bioorthogonal Catalysis

AUTHOR :

Pawar, A; Zade, A; Shastri, A; Ingole, R; Kharde, S; Rajguru, J

JOURNAL NAME:

Indian Journal Of Pharmaceutical Education And Research (Vol.-60, Issue-3)

DETAILS:

Published on 2 June 2026

ABSTRACT:

Gold Nanoparticles (AuNPs) have gained significant attention across multiple fields, including drug delivery, therapy, sensing, material science and catalysis, due to their tunable properties. These nanoparticles exhibit high stability, water solubility, biocompatibility and chemical versatility, primarily attributed to the Self-Assembled Monolayers (SAMs) of organic ligands on their metal cores. Key features such as size, shape and surface functionality play a critical role in determining their interactions with biological systems, influencing uptake, distribution, cytotoxicity and biomolecular interactions. The aim of this review is to provide an in-depth analysis of the application of AuNPs in drug delivery and therapy, highlighting their role in drug conjugation, controlled release and targeted therapeutic interventions. Additionally, the review aims to explore the expanding domain of bioorthogonal catalysis and its relevance to drug delivery systems. This study focuses on reviewing various research articles and case studies that discuss the principles of supramolecular chemistry related to AuNPs. Specifically, it examines methods of drug conjugation, the process of self-assembly in supramolecular drug delivery systems and the application of transition metal catalysts in bioorthogonal catalysis. Key breakthroughs in the field, including advancements made by researchers like Meggers and Bradley, are analyzed to illustrate the cutting-edge developments in the use of AuNPs. The analysis reveals that AuNPs can significantly enhance drug delivery by enabling precise targeting and controlled release. Their interaction with complementary molecules allows for tailored therapeutic interventions. In bioorthogonal catalysis, AuNPs demonstrate the ability to perform targeted conversions and synthetic reactions, with key achievements in intracellular catalytic processes.

Link: https://doi.org/10.5530/ijper.20261157

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Energy, exergy, and environmental (3E) analysis of transcritical CO2 refrigeration cycle with an expander, an internal heat exchanger, and a mechanical sub-cooler

AUTHOR :

Sah, RP; Maji, A; Sapre, MS; Raj, P; Siddiqui, MAH; Sur, A

JOURNAL NAME:

Results In Engineering (vol.-31)

DETAILS:

Published on June 2026

ABSTRACT:

The present study investigates energy, exergy, and environmental performances of the transcritical CO2 refrigeration cycle. In this study, a mathematical model is developed in MATLAB and interfaced with REFPROP to call refrigerant properties. The cycle is studied with various configurations using an internal heat exchanger, expander, and mechanical sub-cooler. A parametric study is conducted to examine the effects of gas cooler pressure, evaporator temperature, and gas cooler exit temperature on the COP and exergy efficiency of the systems, with comparisons made to the basic cycle. The study resulted in the finding that the cycle with an expander achieves the highest COP of 3.21 with 32.83% increase over the basic cycle and an exergy efficiency of 22.7% under their respective optimal gas cooler pressure. The IHX cycle suffers the maximum exergy destruction, in which the gas cooler of the cycle has the maximum irreversibility. In addition, the TEWI analysis was also performed, and the study showed that the expander cycle reduced 23.74% annual CO2 emissions, compared to the basic cycle under their respective optimal gas cooler pressure, as the energy recovered from the expander has been used to reduce the compressor power. Moreover, Correlations for the optimal heat-rejection pressure have been developed for each configuration,whichavoids repeated simulations/experiments to predict the optimal pressure of the specific cycle, assisting the researchers in system performance optimization and system design.

Link: https://doi.org/10.1016/j.rineng.2026.111477

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Investigating the role of rare earth ion as dopant and Co-dopant in Cuo NPs for high frequency applications (vol 37, 442, 2026)

AUTHOR :

Khan, A; Kumar, T; Muthukrishnan, M; Thiagamani, SMK; Alzahrani, KA; Ayyar, M; Topare, N; Hashem, M; Abou El-Reash, YG; Koheil, H; Keshta, BE

JOURNAL NAME:

Journal Of Materials Science-Materials In Electronics (Vol.-37, Issue-18)

DETAILS:

Published on 24 June 2026

ABSTRACT:

The necessity for improved dielectric materials has grown due to the swift advancement of 5G networks and high-frequency communication technologies (mmWave, IoT, and satellite communications). Dielectric materials with high dielectric permittivity, low dielectric loss, and excellent thermal stability are necessary for modern communication devices. To address these issues, this research focuses on creating innovative dielectrics with better permittivity, enhanced thermal stability, and environmentally benign synthesis. Advancing such materials are critical for developing sustainable and energy-efficient technologies in telecommunications, power electronics, and electric cars. In this study, Copper oxide nanoparticles (CuO NPs) were produced in an ecologically acceptable manner, and their dielectric characteristics were thoroughly investigated. Rare earth elements (Samarium and Cesium) were added to improve these qualities by doping and co-doping process. The structural properties of the prepared nanoparticles were investigated using X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR). Scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX) were used to study their morphology. Additionally, thermogravimetric analysis (TGA) and differential thermal analysis (DTA) were used to determine their thermal stability. Dielectric studies in the 50 Hz—1 MHz range and at 40, 80 and 120 °C found that Sm-Ce co-doped CuO had the maximum dielectric permittivity of 789 at 50 Hz and 120 °C, as well as the lowest dielectric loss of 0.99 (< 1). Low dielectric loss obtained in this present study is one of the major advantages for using CuO as dielectric material, which exhibit high dielectric loss due to its semiconducting nature.

Link: https://doi.org/10.1007/s10854-026-17259-z

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

Zepto's Initial Public Offering: On Crossroads

AUTHOR :

Mali, V; Kulkarni, M

JOURNAL NAME:

Asian Journal Of Management Cases

DETAILS:

Published on 29 June 2026

ABSTRACT:

The case examines the dilemma surrounding Zepto's anticipated 2026 initial public offering. Zepto was founded by Aadit and Kaivalya Vohra, both Stanford University dropouts. It disrupted the quick commerce landscape and leveraged it. Initially, they offered micro-transaction services and 10-minute grocery delivery, which was unrealistic at the time, particularly with COVID-19 looming large; however, they identified the urgent need for faster grocery delivery during the pandemic. With their technology background, they brought a tech-driven model and established 'dark stores' to ensure faster delivery. The model boasted a strong logistics system and a fleet of delivery partners, supported by its app, to deliver groceries in under 10 minutes. This led consumers to embrace the option of faster grocery delivery at their convenience, helping Zepto emerge as a strong player by 2023. Zepto was then set on being an entirely Indian company after raising $350 million from Motilal Oswal Private Wealth. The case discusses the convergence of financial strategies and the decision to go public. The case is based on qualitative data and relies solely on secondary sources, including financial performance data published by the company on reputable business reporting sites like Inc42 and Entrackr, press releases and official statements, media interviews with the founders, and industry analysis of the quick commerce industry.

Link: https://doi.org/10.1177/09728201261451624

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Morphological and Contour-Based Handwritten English Word Segmentation on IAM Dataset

AUTHOR :

Pawar, BS; Patil, CH; Jabde, MK; Mali, S

JOURNAL NAME:

Soft Computing And Its Engineering Applications, Icsoftcomp 2025, Pt Ii

DETAILS:

Published on April 2026

ABSTRACT:

Handwritten text recognition is a crucial task in document digitization, requiring accurate preprocessing and segmentation for effective Optical Character Recognition (OCR). This study focuses on developing an efficient preprocessing pipeline to enhance handwritten text quality and improve word segmentation accuracy using the IAM dataset. The proposed rule-based approach integrates standard image processing steps-grayscale conversion, Otsu's adaptive thresholding, and morphological operations in a novel sequential framework that strengthens word separation and suppresses background noise. A contour-based segmentation technique is then applied to accurately detect and isolate words. Experimental results demonstrate that the preprocessing pipeline significantly improves text clarity and segmentation accuracy, making it suitable for further OCR applications. The average result of segmentation achieved is 96.15% on English handwritten text, excluding the cursive style of handwriting. This work contributes to the advancement of handwritten text recognition by providing a robust preprocessing framework for complex handwritten documents. A comparative analysis highlights the trade-offs between traditional projection-based methods, deep learning approaches, and the proposed morphological segmentation. This study contributes to the field by offering an optimized preprocessing pipeline that improves word segmentation accuracy, ultimately aiding in better recognition performance for handwriting analysis systems. The proposed method provides a practical solution for automated handwritten document processing, making it valuable for applications such as digital archiving, transcription, and OCR preprocessing.

Link: https://doi.org/10.1007/978-3-032-22062-2_38

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

h-extra r-component connectivity of k-ary n-cubes

AUTHOR :

Jagadale, U; Shinde, A; Malavadkar, P

JOURNAL NAME:

Discrete Mathematics Algorithms And Applications (Vol.-18, Issue-6)

DETAILS:

Published on June 2025

ABSTRACT:

The k-ary n-cube, denoted by Qnk, is one of the important interconnection networks for parallel and distributed computing systems. In this paper, we examine its fault-tolerant properties in the context of h-extra r-component connectivity. Let G be a connected graph. For integers h >= 0 and r >= 2, an h-extra r-component cut is a subset F of V (G) such that G - F results in a disconnected graph with at least r components and each component contains more than h vertices. The h-extra r-component connectivity of G, denoted by c kappa rh(G), is the minimum size of an h-extra r-component cut of G. We investigate the h-extra r-component connectivity of k-ary n-cubes for h = 1 and r = 3, and determine that c kappa 31(Q nk) = 8n - 8, for k >= 4 and n >= 3. Furthermore, we derive an upper bound on the 1-extra (r + 1)-component connectivity of k-ary n-cubes for k >= 4 and 1 <= r <= n - 1 as c kappa r+11(Q nk) <=-r2 + (4n - 3)r + 2.

Link: https://doi.org/10.1142/S1793830925500946

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।। विश्वशान्तिर्ध्रुवं ध्रुवा ।।

TITLE:

NeuroBridge-AI: A Hybrid Biophysical and Machine Learning Framework for Multi-Scale Neural Simulation

AUTHOR :

Dahiwal, P; Sambare, GB; Vayadande, K; Nooji, P; Khade, A; Prakasha, KK; Bhat, A; Sharma, DA; Ingle, P; Avhad, JB

JOURNAL NAME:

Ieee Access (Vol.-14)

DETAILS:

Published on 6 June 2026

ABSTRACT:

Understanding how neural networks develop emergent behavior remains one of the main challenges in computational neuroscience. Models that balance the dynamics of microscopic ion-channels with macroscopic behavioral responses are important, but most strategies have lost cellular details in favor of network scale. OpenWorm c302 (302 neurons, 7000 synapses) and implementation of ModelDB (ModelDB 266796), a model of the human hippocampal circuit with healthy and epileptic variants, provide complementary advantages: connectome topology and complete neuronal physiology, respectively. This study offers a hybrid structure, which combines the hippocampal ModelDB-based biophysics with the network topology of c302, to allow real-time voltage propagation, synaptic co-ordination and temporal synchronization via Python-based cross-framework communication. Electro-physiological properties and locomotor emergent behaviors are reproduced in the hybrid simulation. The benchmark tests indicate a great correspondence with experimental results: AVA inter-neuron peak firing rate of 34 Hz (target 32-35 Hz), VB motor neuron synchrony index of 0.87 (target >= 0.85) and 96% correspondence in the sequences of body-wall muscle activation. The hybrid system maintains fine-grained neuronal fidelity and has realistic coordination on a network scale compared to stand-alone simulations of c302 or ModelDB. The condition of adaptation modulation of the synaptic weights and ion-channel conductance produces stable and non-saturating oscillatory dynamics. The hybrid system establishes a two way communication between the hippocampal and C. elegans neural models to study how biophysical and whole-network dynamics can interact to produce emergent behavior. The model combines a comprehensive model of neuronal dynamics with fully connected brain regions, which has led to research on how localized neurons processes can lead to complex organisms.

Link: https://doi.org/10.1109/ACCESS.2026.3700047

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Microstructural And Tribological Analysis Of T4-Treated A16061-Zrb2 Composites Fabricated By Stir Casting

AUTHOR :

Morampudi, P; Somayajula, VSP; Panthangi, RK; Harak, SS; Kajal, G; Srikar, G; Kolhe, AM

JOURNAL NAME:

Archives Of Metallurgy And Materials (vol.-71, Issue-1)

DETAILS:

Published on March 2026

ABSTRACT:

Aluminum Metal Matrix Composites (AMMCs) are well known for their superior mechanical properties and wear resistance, which makes them suitable for use in automobiles and the aerospace industry. Wear behavior, tensile strength and micro-Vickers hardness of Al 6061 reinforced with ZrB2, produced by the stir casting process, were studied in this research. To further improve its characteristics, the composite was subjected to T4 heat treatment, consisting of solutionizing, quenching, and natural aging. Experimental findings indicated noticeable improvements in tensile strength, hardness as well as wear resistance with higher ZrB2 content. The increased hardness is due to strong interfacial bonding between Al 6061 matrix and ZrB2 particles and precipitation hardening effect due to T4 treatment. Additionally, the homogeneous dispersion of ZrB2 particles efficiently resisted material loss during wear. The results indicate thatAl6061/ZrB2 composites, especially T4-treated ones, highly suitable for applications requiring superior surface hardness and durability.

Link:
https://journals.pan.pl/dlibra/publication/157767/edition/138588/content

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॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

TITLE:

Triton X-100 Surfactant Effects on Friction and Wear of Short Carbon Fiber-Epoxy Composite

AUTHOR :

Salunkhe, A; Ghadge, R; Kumar, P

JOURNAL NAME:

Polymer Composites

DETAILS:

Published on 7 July 2026

ABSTRACT:

Interfacial debonding accelerates wear in short carbon fiber-epoxy composites (V-f = 40 +/- 2). Triton X-100 surfactant (1, 2, and 3 wt.%) was applied to modulate friction and wear performance, with modified composites designated as CE-1S, CE-2S, and CE-3S. Pin-on-disc tests (ASTM G99) against EN31 steel (58-60 HRC) were conducted at 15-25 N and 1.05-1.57 m/s. Gravimetric analysis recorded 0.85% mass gain at 1 wt.% concentration, consistent with near-saturation adsorption behavior. At this optimal concentration (CE-1S), steady-state COF decreased from 0.45 to 0.29, representing a 35.56% reduction relative to the untreated baseline ($p < 0.05$). The specific wear rate for CE-1S decreased by 27.4% (to 8.68 & times; 10(-5) mm(3)/N m) at 1.57 m/s and by 64.3% ($p = 0.0012$) at 1.05 m/s. Surfactant concentrations above 1 wt.% were associated with excess deposition that progressively degraded tribological performance. SEM observations were consistent with a reduction in fiber pull-out from 64 +/- 9 to 22 +/- 4

Link: https://doi.org/10.1002/pc.71399

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TITLE:

Integration of Mechanical Systems and IoT for Smart and Climate-Resilient Irrigation in Agriculture

AUTHOR :

Maharana, HK; Kulkarni, MV; Nayak, RC; Roul, MK; Sarangi, SK; Vijaybhai, SB

JOURNAL NAME:

Agricultural-Centric Computation, Ica 2025

DETAILS:

Published on 1 April 2026

ABSTRACT:

Irrigation is a crucial component of agriculture, and technology-driven irrigation systems can significantly enhance farmers ' active participation and productivity. This study presents two distinct IoT-enabled irrigation methods. The two new irrigation methods in small-scale farming that are introduced in this research are a solar-powered irrigation system and an IoT-based irrigation method with the use of a compound gear train mechanism. The latter is specifically designed to provide operational effectiveness during low sunlight hours, thus providing a steady supply of water. The speedy innovation of Internet of Things (IoT) technology has dramatically evolved farming activities, providing innovative solutions for improving crop production and making better use of resources. The current study ventures into the collaboration of IoT and climate-resilient technologies with a view to revolutionizing the agricultural irrigation sector through the harnessing of renewable energy. ESP8266 is at the heart of our concept, renowned for its easy-touse interface as well as support for Wi-Fi, allowing a smart irrigation system to be implemented. The main objective of the current research is to design and develop a state-of-the-art circuit using the ESP8266 microcontroller to sense key environmental parameters such as Relative Humidity (RH), Dry Bulb Temperature, and Soil Moisture content. The system enables programmable control to keep the soil moisture content at its optimal level, i.e., for a saturation level of 80%. In addition, we suggest the incorporation of current solar water pumping and storage models in our IoT-based irrigation system to create a climate-resilient irrigation system. This is highly efficient for cultivating fruits and vegetables using drip and sprinkler irrigation methods. Under conditions of low sunlight, the gear train-driven irrigation system provides continuous water supply, making irrigation more reliable.

Link: https://doi.org/10.1007/978-3-032-17083-5_13

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TITLE:

A Cognitive Fuzzy-Analytic Hierarchy Process and Semantic Reasoning Framework for Human-like Intelligence in HR Performance Evaluation

AUTHOR :

Kulkarni, O; Gonge, S; Kandi, VSP; Srilatha, D; Banchhor, C; Pande, SD; Ghuge, CA; Dhabliya, D

JOURNAL NAME:

Journal Of Communications Software And Systems (Vol.-22, Issue-2)

DETAILS:

Published on January 2026

ABSTRACT:

This paper outlines a cognitive reasoning platform which integrates semantic reasoning with fuzzy logic, and the Analytic Hierarchy Process, (AHP) for producing intelligence comparable to human intelligence for making the intricate decisions. By simulating human cognitive processes, it interprets relational hierarchies and synthesizes imprecise assessments into structured metrics, generating autonomous decisions by processing a variety of inputs. Context-aware adaptation that imitates human cognition and the close linkage of computational rigor and semantic reasoning are two important developments. 89% of experimental outcomes match expert evaluations, outperforming conventional techniques. It uses Human Resources (HR) evaluation as the main application context, even though the cognitive reasoning platform is architecturally broad and appropriate for a variety of domains needing structured judgments, such as healthcare triage, project risk analysis, and academic performance review. This explains why HR examples are used frequently in the manuscript as both an instructive use case and a validation area.

Link: https://doi.org/10.24138/jcomss-2025-0106

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TITLE:

Targeting the GLP-1 receptor pathways for dual manageme nt of obesity and depression

AUTHOR :

Keswani, R; Bhatt, S

JOURNAL NAME:

Drug Discovery Today (Vol.-31, Issue-4)

DETAILS:

Published on July 2026

ABSTRACT:

Glucagon-like peptide-1 (GLP-1) receptor agonists (GLP-1RAs), initially developed for the treatment of diabetes mellitus, are now widely used in obesity management. Obesity and depression are interconnected and share common biological pathways, including inflammation, oxidative stress, neurotransmitter imbalance, mitochondrial dysfunction, adipocytokine alterations, as well as gut-brain and HPA-axis dysregulation. These mechanisms are mediated by the signaling pathways that involve the GLP-1 receptor and provide a therapeutic target in comorbid disorders. GLP-1RAs have an impact on glycemic levels, weight reduction, insulin sensitivity, appetite and satiety control. Recent studies also highlight their neuroprotective effects, including modulation of dopaminergic pathways, enhanced hippocampal neurogenesis and neuroinflammation reduction. Hence, this review focuses on the therapeutic potential of using GLP-1 receptor pathways in the dual treatment of obesity and depression.

Link: https://doi.org/10.1016/j.drudis.2026.104727

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TITLE:

Association of Brain-Derived Neurotrophic Factor with Neurite Outgrowth in HT-22 Hippocampal Neurons Stimulated by Medicinal Mushrooms Hericium erinaceus and Lignosus rhinocerotis (Agaricomycetes)

AUTHOR :

Kuang, TA; David, P; Kushairi, N; Nallathamby, N; Phan, CW; Sinniah, A; Sabaratnam, V; Pandy, V; Naidu, M

JOURNAL NAME:

International Journal Of Medicinal Mushrooms (Vol.-28, Issue-6)

DETAILS:

Published on January 2026

ABSTRACT:

Neurite outgrowth, also known as neuritogenesis, is among the crucial factors contributing to the overall neuroplasticity and maintenance of a healthy nervous system. The neurite outgrowth activities of two medicinal mushrooms, i.e. Hericium erinaceus and Lignosus rhinocerotis, have been previously demonstrated in multiple in vitro models showcasing their nerve growth factor (NGF)-promoting activities. In this study, the neuritogenic effects of hot aqueous extracts from H. erinaceus (HE) fruiting bodies and the sclerotium of L. rhinocerotis (LR) were investigated in the HT-22 mouse hippocampal neuronal cell line with potential association to the brain-derived neurotrophic factor (BDNF) expression. Findings show that HE and LR up to 400 & micro;g/mL were non-toxic to HT-22 cells, as measured in the MTT viability assay. In neurite outgrowth assays, HEaq at 25 & micro;g/mL significantly ($P < 0.05$) increased the number of neurite-bearing cells. Meanwhile, LRaq at as low as 6.25 and 12.5 & micro;g/mL remarkably ($P < 0.01$; $P < 0.001$) improved the neurite outgrowth activities. Both HEaq and LRaq significantly ($P < 0.0001$) upregulated the mRNA expressions of BDNF, the neurotrophic factor responsible for hippocampal neuroplasticity. Immunofluorescence studies have further shown the protein expression of BDNF and neurofilament. These findings suggest that the aqueous extracts of HE and LR could play a vital role in enhancing neuroplasticity and maintaining a healthy nervous system, paving the way for their potential application in neurodegenerative disease management and cognitive health.

Link:
https://doi.org/10.1615/IntJMedMushrooms.2026063851

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TITLE:

Empirical Analysis of The Impact of Cryptocurrency Development on Investors' Decision-Making and The Economy

AUTHOR :

Padhye, P; Gupta, SK; Mishra, U; Burande, A; Parashar, N

JOURNAL NAME:

Journal Of Information & Knowledge Management

DETAILS:

Published on July 2026

ABSTRACT:

Global recognition of the developing cryptocurrency market is growing. Policymakers, institutional investors and individual investors are now all very interested in it. In contrast to more conventional methods, the new encrypted blockchain technology gives individual investors modern investment alternatives. The unstable market, on the other hand, causes instability and uncertainty for market participants, leaving a research void for academics to look into what causes these challenges. The purpose of this research is to look into how the growth of cryptocurrencies has affected investor decision-making and the economy. The study employed a method that was quantitative and used a Likert-scale instrument to collect data via an online questionnaire. With the assistance of the software programs SPSS and AMOS, the data were interpreted and evaluated using an SEM analysis. The research exposed was satisfactorily addressed, and the findings supported earlier literary works. The result shows that social influence, perceived risk and profitability impact the crypto decision-making process except for subjective norms. Also, the findings revealed that transaction cost, transparency, employment rate and inflation protection impact the growth of the Indian economy. The study's primary conclusions are related to issues with data gathering and methodology. Since the survey could not be conducted over a longer period due to schedule constraints, a longitudinal study that included more consumer variables in the analysis would be of interest. Future researchers should concentrate on market factors and how they affect various cryptocurrencies as well. To sum up, a study with a wider scope might yield more important findings.

Link: https://doi.org/10.1142/S021964922650036X

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TITLE:

A hybrid MCDM-GRU framework for Indian road accident risk prediction with real-time web deployment

AUTHOR :

Yeole, MM; Kudoli, A; Patil, R; Sonawane, M

JOURNAL NAME:

Innovative Infrastructure Solutions (Vol.-11, Issue-8)

DETAILS:

Published on 20 July 2026

ABSTRACT:

As the number of road accidents in India is on the rise, intelligent mechanisms that can forecast the risk of accidents and help in making decisions based on the data are urgent. This study hypothesises a hybrid approach that integrates Multi-Criteria Decision-Making (MCDM) with TOPSIS method and a Gated Recurrent Unit (GRU)-based deep learning model on time-series prediction of the risk of road accidents. The system receives traffic accident data via a user-friendly web interface created with Streamlit, data is preprocessed by the system, risk scores are calculated with MCDM, and predictions of future risk scores of accidents are made with GRU. The model is trained and tested using real-world traffic data of the Indian traffic and it shows efficient learning with low RMSE and consistent predictive results. The web implementation also renders it more usable and understandable to the policymakers and traffic departments. The experimentation has shown that our method is a sound one and the tool can be scaled by applying it to smart city environments. The proposed hybrid model combines TOPSIS-based MCDM and GRU deep learning to predict road accident risks using time-series Indian traffic data. A Streamlit web interface enables near real-time CSV uploads, risk score visualization, and forecasting, improving accessibility for policymakers and smart city planners. The model achieved a low RMSE (0.0917) and outperformed baseline methods, validating its capability for accurate, interpretable, and scalable accident risk forecasting. The proposed hybrid framework improves prediction accuracy by approximately 7.4% compared to the baseline GRU model while maintaining computational efficiency.

Link: https://doi.org/10.1007/s41062-026-02811-x

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TITLE:

AE-HGNN: attention-enhanced hypergraph neural networks for interpretable stress prediction through higher-order dependency modeling

AUTHOR :

Garg, B; Kasar, M; Mane, R; Donelli, M; Jain, A; Dubey, AK

JOURNAL NAME:

Frontiers In Artificial Intelligence

DETAILS:

Published on 7 July 2026

ABSTRACT:

Stress is a significant contributor to the deterioration of mental and physical health, including conditions such as anxiety, depression, and cardiovascular issues. Traditional machine learning techniques like SVM, Decision Trees, and DNNs have been used for stress prediction using physiological and behavioral data, but they struggle to capture complex, high-order interactions among stress indicators and require extensive preprocessing of noisy signals. To address these limitations, a novel Stress Prediction System based on Attention Enhanced Hypergraph Neural Networks (AE-HGNN) is proposed that models higher-order relationships among environmental and behavioral factors such as humidity, temperature, and step count. The proposed attention mechanism adds attention weights to each factor; unlike conventional graph-based models limited to pairwise relationships, the attention enhanced hypergraph neural network leverages hyperedges to represent multi-node dependencies, significantly improving classification performance and robustness. The primary contributions of this work involve the design of an Attention Enhanced-HGNN architecture for stress classification that models higher-order dependencies by assigning attention weights to each factor. The proposed model achieves a test accuracy of 99.75% (5-fold cross-validated mean: 98.44% +/- 0.56%) with optimized hyperparameters including a learning rate of 0.01, a hidden dimension of 128, and an epoch size of 150.

Link: https://doi.org/10.3389/frai.2026.1844784

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TITLE:

Study of Gender-Specific Emotion Expressivity in Speech Using MFCC and CNN

AUTHOR :

Bapat, M; Mali, SM; Patil, C

JOURNAL NAME:

Tehnicki Glasnik-Technical Journal (Vol.-20, Issue-3)

DETAILS:

Published on July 2026

ABSTRACT:

Analysis of sentiment is a pivotal component of natural language processing and has recently observed noteworthy evolutions. Still, the impact of gender on expressivity of the emotion remains an undiscovered area. The proposed work utilizes a broad range of over 12000 audio data samples from four different benchmarked datasets RAVDESS, CREMA-D, TESS, and SAVEE. Convolutional Neural Network (CNN) is used to identify and detect patterns and biases according to gender. The study found mixed-gender emotion accuracy at 84.26%, female emotion accuracy at 89.40%, and male emotion accuracy at 82.70%. The proposed work aims to demonstrate that the female voice is more expressive of emotion than the male voice by examining the difference in sentiment expression between genders. This research will enhance the insights of sentiment analysis and can be useful to contrivance industries ranging from customer service to human-system interaction.

Link: https://hrcak.srce.hr/348858

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TITLE:

Enhanced corrosion resistance and antibacterial performance of Ti-6Al-7Nb via silver-modified micro arc oxidation

AUTHOR :

Pesode, P

JOURNAL NAME:

Surface Engineering

DETAILS:

Published on 16 July 2026

ABSTRACT:

Titanium alloys are extensively utilised in orthopaedic and dental implants; however, concerns related to corrosion-induced ion release and implant-associated infections necessitate advanced surface engineering strategies. In this investigation, micro-arc oxidation (MAO) was employed to fabricate bioactive oxide coatings on Ti6Al7Nb alloy, followed by addition of silver nanoparticles (AgNPs) to impart antibacterial functionality. The performance of MAO-coated Ti6Al7Nb was systematically compared with Ti6Al4V ELI under identical processing conditions. Surface characterization revealed a porous TiO2-based coating composed of anatase and rutile phases with uniformly incorporated Ca and P. Electrochemical impedance spectroscopy demonstrated a bilayer coating structure, having porous outside layer and a dense inside barrier layer responsible for superior corrosion resistance. The inner layer resistance of Ti-6Al-7Nb (97,980 Omega.cm2) exceeded that of Ti-6Al-4V ELI, indicating enhanced electrochemical stability, likely associated with the presence of niobium oxide. Biocompatibility assessment using MTT assay showed that MAO-coated Ti-6Al-7Nb achieved the highest average cell viability (94.53%), significantly exceeding the ISO 10993-5 threshold of 70% and outperforming uncoated counterparts. Incorporation of AgNPs resulted in stronger antibacterial performance verses S. aureus and E. coli, having a maximum inhibition zone of 16.5 millimetre at 1.5 g/L silver nanoparticles concentration. The antibacterial effect was concentration-dependent and attributed to membrane disruption and sustained Ag+ ion release. Overall, the combined improvements in corrosion resistance, cytocompatibility, and antibacterial performance demonstrate that AgNP-incorporated MAO-coated Ti6Al7Nb is a highly promising candidate for next-generation implants requiring long-term stability and infection resistance.

Link: https://doi.org/10.1177/02670844261469662

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TITLE:

Molecular Docking-Based Approach to Elucidate the Efficacy and Toxicity of a Synthetic Biopolymer 1-(Carboxyamino) ethyl carbamic Acid for Use as a Coating Material on Cardiac Stents

AUTHOR :

Chopade, J; Hujare, D

JOURNAL NAME:

Oriental Journal Of Chemistry (Vol.-42, Issue-3)

DETAILS:

Published on June 2026

ABSTRACT:

The current study explores the potential of a novel synthetic biopolymer, 1-(carboxyamino) ethyl carbamic acid (CECA), which possesses hydrophilic and bioadhesive properties favorable for vascular environments. Molecular docking and computational analysis provide early-stage insights into potential bioactivity and safety of novel compounds. This work focuses on CECA's interaction with cardiovascular-relevant targets and its predicted safety profile. This study aims to investigate the efficacy and potential toxicity of a synthetic biopolymer derived 1-(carboxyamino) ethyl carbamic acid as a coating material for cardiac stents using a molecular docking-based in silico approach. The synthesized polymer's molecular interactions with key cardiovascular proteins, Results suggest favorable binding affinities toward endothelial healing proteins and minimal interaction with RBC and toxicity targets, indicating promising biocompatibility. The findings support the potential of this polymer as a non-toxic, bio functional stent coating for improved cardiovascular implant performance.

Link: https://dx.doi.org/10.13005/ojc/420309

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TITLE:

An advanced wide-and-deep learning framework for soybean price forecasting using market, weather, trade, and supply data☆

AUTHOR :

Ghonge, VD; Kulkarni, Y

JOURNAL NAME:

Methodsx (Vol.-17)

DETAILS:

Published on July 2026

ABSTRACT:

Precise prediction of agricultural commodity prices is key to assisting farmers, traders, policymakers and supply chain stakeholders to alleviate the uncertainty, and enable them to make sound decisions. The fluctuation in the price of soybean is very unpredictable because of the interplay of market forces, weather unpredictability, trade, output and farming methods. This paper suggests a multi-source machine learning model that is capable of forecasting the accurate price of soy beans using past market prices, arrivals, trade as well as weather forecasting, crop supply and area under cultivation. The dataset of a complete prediction of the prices of soybean between Jan 2015 to March 2026 was built by using the data provided in AGMARKNET, NCDEX, government trade portals, meteorological agencies and state agricultural databases. Exploratory data analysis was done to learn price distributions and regional differences, then systematic data preprocessing, normalization and feature engineering such as rainfall deviation, price range and arrivals per cultivation area was done. Several machine learning and deep learning models were implemented, such as Random Forest, Gradient Boosting, XGBoost, ensemble methods, dense neural network, attention-based models, and a proposed Wide and Deep Network (AgroWDN) was tested. RMSE, MAE, MSE and R2 measures were used to evaluate model performance on training, validation and test datasets. Experimental outcomes depict that AgroWDN model is, by all means, more efficient than the traditional machine learning and deep learning methods, making the least prediction errors and R2 at 98.97; it implies a high predictive performance. These results prove that the method of multi-source data fusion and hybrid deep learning structures are effective in price prediction in agriculture. The suggested framework provides a scalable and useful solution to the profitable prediction of soybean prices and may be applied to other crops and markets.

Link: https://doi.org/10.1016/j.mex.2026.104030

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