



Since 1983

Dr. Vishwanath Karad

**MIT WORLD PEACE  
UNIVERSITY** | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

# FACULTY PUBLICATION

## RESEARCH PAPERS

August-2026



## TITLE:

Predictive Modeling and Patient Stratification

## AUTHOR :

Dhawale K.; Bhagat D.; Dubey P.

## JOURNAL NAME:

Precision Medicine: Improving Healthcare with Data Science and Machine Learning

## DETAILS:

Published on May 2026



## ABSTRACT:

Precision healthcare has ushered in a new era of medicine where preventative measures and therapies are tailored to each patient's unique genetic, environmental, and lifestyle characteristics. Interdisciplinary cooperation, which integrates the knowledge of genetics, AI, bioinformatics, clinical research, and social sciences, is essential to this revolution. This chapter explores how big data analytics, predictive modeling, and personalized biotechnologies might work together to revolutionize patient care, highlighting the synergy between these disparate domains. It also discusses the particular difficulties of putting precision healthcare into practice, such as moral conundrums, data security, and fair access. This chapter provides a forward-looking view of the potential of interdisciplinary approaches to transform healthcare into a truly patient-centered model through intriguing case studies and upcoming trends.

Link: <https://doi.org/10.2174/9798898814779126010010>





## TITLE:

Edge-RAG over Bluetooth Mesh: A Multi-User Retrieval-Augmented LLM with Offline Connectivity for Mobile Chatbots

## AUTHOR :

Nikam A.; Palwe S.; Bartakke S.; Shinde O.;  
Yadav A.

## JOURNAL NAME:

Procedia Computer Science (Vol.-283)

## DETAILS:

Published on 13 August 2025



## ABSTRACT:

Large Language Models (LLMs) have significantly advanced natural language processing; however, their reliance on stable internet connections and high-performance computing resources limits deployment on mobile and low-power platforms. This paper presents Edge-RAG over Bluetooth Mesh, a retrieval-augmented generation framework designed to operate fully offline on mobile devices. Inference tasks are handled by a designated host device, while queries and outputs are exchanged through a modified Bridgefy mesh layer, which was originally created for peer-to-peer communication but adapted here for user-to-LLM interaction. The system incorporates a three-stage RAG training pipeline with FAISS-based dense retrieval to ensure factual grounding and adaptability across domains. Experimental evaluation demonstrates Recall@5 of 0.89, MRR of 0.84, and BERTScore of 0.86, while maintaining end-to-end latency below 2 seconds at five mesh hops. Compared with BM25 and cloud-based inference, the proposed approach achieves competitive accuracy while eliminating reliance on external infrastructure. The contributions of this work lie in (i) extending LLM accessibility to offline, resource-constrained environments, (ii) introducing a privacy-preserving mesh-based interaction layer, and (iii) demonstrating resilience under mobility and multi-user conditions. These findings highlight the feasibility of deploying edge-native LLMs for disaster recovery, secure organizational use, and rural connectivity scenarios.

Link: <https://doi.org/10.1016/j.procs.2026.06.269>



### TITLE:

Computational and Experimental Evaluation  
of Average Radial Velocities and Variations  
inside Curved Converging-Diverging  
Diffusers for Small Wind Turbines

### AUTHOR :

Shastri D.S.; Kaware K.R.; Sulakhe V.N.;  
Kale S.A.

### JOURNAL NAME:

Journal of Engineering Science and  
Technology Review (Vol.-19, Issue-3)

### DETAILS:

Published on June 2026



### ABSTRACT:

Enhancing the power production of small wind turbines (SWT) operating at low wind locations is a significant research focus in the area of distributed energy applications. The power production of a SWT can be significantly improved by placing them inside a curved converging-diverging (CCD) diffuser. The performance of CCD diffusers considerably depends on the four major diffuser dimensions including inlet & exit diameters and converging & diverging section lengths. In this paper nine CCD diffuser models are designed using Design of Experiments (DOE) for four variables at three levels. The vertical flange height is kept fixed. Computational Fluid Dynamics (CFD) of these nine CCD diffuser models was carried out using k-SST turbulence model in ANSYS Fluent 2022 R1. The evaluation was carried out based on the average radial plane velocities and radial plane velocity variations using regression analysis. The optimized diffuser dimensions were determined using desirability analysis. The optimized diffuser was tested using CFD and wind tunnel experimentation and showed good agreement between the results. The optimized diffuser dimensions were found to be  $D_i = 155$  mm,  $L_c = 20$  mm,  $L_d = 86$  mm and  $D_e = 190$  mm, giving a composite desirability of 0.8268. The optimized diffuser was tested using CFD and wind tunnel experimentation, showing agreement within 3.30% for average radial plane velocity and 3.49% for radial plane velocity variation between the two methods.

Link:

<https://www.scopus.com/pages/publications/105046315300?origin=resultslist>



## TITLE:

Governance and Data Management in  
Federated Learning

## AUTHOR :

Sharma S.; Gupta R.; Kumar J.

## JOURNAL NAME:

A Review Series: Federated Learning in  
Financial Services: A Path to Secure AI

## DETAILS:

Published on 2026



## ABSTRACT:

Federated Learning (FL) shifts machine learning from centralized data aggregation to distributed training on local devices or servers, preserving privacy by keeping raw data decentralized. Federated governance emerges as a hybrid data governance model tailored to FL, blending centralized policy enforcement with local team autonomy to enable secure, compliant model training. This chapter studies the use of federated governance, a hybrid approach that strikes a compromise between local domain team's autonomous execution and centralized policy-setting. It focuses at important elements like: Governed FL Frameworks: The incorporation of technological connections (such as Eclipse Dataspace Components) to enforce use guidelines and data sovereignty when training models in delicate industries like healthcare. Organizational Archetypes: Mapping organizational preparedness according to data ownership, infrastructure, and market position using decision frameworks. Data Quality Governance: Mechanisms to guarantee that heterogeneous, non-Iid (non-independent and identically distributed) data across several participants satisfies quality requirements to avoid global model deterioration are known as data quality governance. Policy-as-Code: The transition to automated, codified governance in which training pipelines directly incorporate rules for data access, masking (such as PII protection), and compliance. Security and Trust: Secure aggregation and differential privacy increase security and trust by reducing risks including model inversion, poisoning, and data reconstruction. The transition toward Data Mesh architectures in 2025, where domain teams control data products, is highlighted in the chapter's conclusion. This will change governance from static compliance to a strategic facilitator for collaborative AI.

Link:

<https://www.taylorfrancis.com/chapters/mono/10.1201/9781003710059-4/governance-data-management-federated-learning-suvarna-sharma-rashmi-gupta-jeetendra-kumar>



### 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. **Conclusion:** Berberis aristata can be thought as a possible therapeutic plant having anticancer efficacy against oral squamous cell carcinoma.

Link: <https://www.ijper.org/article/60/3s/s1194>



### **TITLE:**

Flute Design and Analysis for Enhanced Structural Integrity and Sustainability in Cardboard Packaging

### **AUTHOR :**

Bodke S.; Jamadar N.; Wagle C.; Burande C.; Swamy G.S.C.; Kolhe A.M.

### **JOURNAL NAME:**

World Sustainability Series

### **DETAILS:**

Published on 12 July 2026



### **ABSTRACT:**

The research paper explores the complex world of improving the performance of cardboard, with a special implication given to sustainability through examining the different flute designs. The waveform shapes of the corrugated cardboard are known as flutes that affect greatly the strength and the durability of corrugated cardboard. The objective of this study is to fully learn about the geometric, structural, and mechanical properties of flutes in order to promote the overall performance of cardboard. This research will help to increase the strength and sustainability of the cardboard. The purpose behind this is to design flutes to achieve maximum performance and structural integrity in packaging designs and the investigations are done using the analytical method and Finite Element Analysis (FEA). In this, various patterns of flutes are simulated using, U-shaped, V-shaped, semi-circular shaped, box-shaped, trapezoidal and UV-shaped flutes to evaluate their effects on the structural integrity of cardboard. The study goes further to correlate and compare analytical and FEA results to find out their accuracy and implications on flute selection. Finally, the paper will conclude the most appropriate pattern of flute to be used to improve the performance of cardboard to lead to the creation of more sustainable packing solutions.

Link: [https://doi.org/10.1007/978-3-032-26150-2\\_14](https://doi.org/10.1007/978-3-032-26150-2_14)





## TITLE:

Climate Justice in the Age of AI: Power, Data, and the Marginalisation of Vulnerable Communities

## AUTHOR :

Bharadwaj S.; Gangurde R.D.; Mishra A.M.

## JOURNAL NAME:

Responsible AI for Climate Action: Governance, Justice, and Sustainable Transitions

## DETAILS:

Published on June 2026



## ABSTRACT:

This chapter examines the evolving intersection between artificial intelligence and climate justice, with particular attention to how data-driven systems reshape governance, decision-making, and distributive outcomes. It critically analyses the ways in which algorithmic infrastructures, while promising efficiency and predictive capacity, risk reproducing structural inequalities embedded within historical and socio-economic contexts. The discussion foregrounds issues such as data asymmetries, digital exclusion, and the marginalisation of vulnerable communities across diverse governance settings. By interrogating the ethical and institutional dimensions of AI deployment in climate governance, the chapter highlights tensions between technological innovation and normative commitments to equity and justice. It further explores emerging regulatory frameworks and the need for inclusive, accountable, and context-sensitive approaches that centre human rights and participatory governance in the age of intelligent systems.

Link: <https://doi.org/10.4018/979-8-2600-2020-3.ch010>



## 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 TiO<sub>2</sub>-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  $\Omega$ .cm<sup>2</sup>) 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<sup>+</sup> 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>





## TITLE:

The Dynamics of Power and Policy in Education and Global Communication From a Sociolinguistic Perspective

## AUTHOR :

Bharadwaj S.; Gangurde R.D.; Mishra A.M.

## JOURNAL NAME:

Theories, Issues, and Contemporary Applications of Sociolinguistics

## DETAILS:

Published on August 2026



## ABSTRACT:

This chapter per the authors examines the dynamics of power and policy in education and global communication through a sociolinguistic perspective, focusing on how language operates as a site of authority, inclusion, and exclusion. Drawing on the theoretical contributions of Pierre Bourdieu, Basil Bernstein, and Norman Fairclough, it analyses how educational policies shape linguistic hierarchies and reproduce social inequalities, particularly in multilingual and postcolonial contexts. The chapter further explores the impact of globalization, digital platforms, and artificial intelligence on communication practices, highlighting the emergence of new forms of linguistic governance and algorithmic mediation. It critically evaluates the implications of these transformations for language rights, pedagogical inclusion, and access to knowledge in higher education. By integrating sociolinguistic theory with contemporary policy analysis, the chapter argues for more inclusive and equitable language frameworks that recognize linguistic diversity as a critical resource in global communication.

Link: <https://doi.org/10.4018/979-8-3373-9028-4.ch001>



## TITLE:

Experimental Comparison of R600a Domestic Refrigerator with Fin and Metal Foam Evaporator Under Tropical Conditions

## AUTHOR :

Dhavale A.A.; Lele M.M.

## JOURNAL NAME:

Heat Transfer Engineering

## DETAILS:

Published on 28 July 2026



## ABSTRACT:

Conventional fin-and-tube evaporators in domestic refrigeration systems exhibit reduced performance under elevated ambient conditions, particularly in tropical climates. This study experimentally evaluates a 190 L domestic refrigerator modified with an externally wrapped copper metal foam coated evaporator operating with isobutane refrigerant, which has a low global warming potential. A dual-evaporator configuration enabled side-by-side comparison with a fin-tube evaporator under identical ambient temperatures of 30 °C–40 °C and cabinet temperatures of 0 °C–15 °C. Key performance indicators included the coefficient of performance, evaporator cooling capacity, compressor power input, and volumetric refrigeration capacity. Integration of open-cell copper foam with 90% and 30 pores per inch improved phase-change heat transfer and refrigerant distribution, resulting in a 25%–31% increase in coefficient of performance, a 14%–18% rise in cooling capacity, a 10%–19% enhancement in volumetric refrigeration capacity, and up to 12% reduction in compressor power compared with the conventional system. These improvements are attributed to intensified nucleate boiling, enhanced thermal conductivity, and uniform superheat development. The enhancement strategy allows drop-in retrofitting without changes to system layout, refrigerant charge, or control logic, offering a scalable approach for improving efficiency in tropical climates.

Link: <https://doi.org/10.1080/01457632.2026.2705647>



## TITLE:

A comprehensive review on hydrogen blending with fossil fuels and biofuels for internal combustion engine automotive applications

## AUTHOR :

Potdar V.G.; Kulkarni K.G.; Chakrabarti S.S.

## JOURNAL NAME:

Journal of Thermal Analysis and Calorimetry

## DETAILS:

Published on August 2026



## ABSTRACT:

There is a growing need for the reducing carbon emissions from road transport, coupled with stricter emission standards. This has increased the pace of research to identify viable alternative fuels for ICEs. In order to reduce carbon emissions, the combination of H<sub>2</sub> with fossil fuels and biofuels has evolved as an effective alternative. Detailed analysis of H<sub>2</sub> blending with diesel, gasoline, biodiesel, CNG, and tri-fuels for automotive ICE is provided based on systematic investigation of 95 peer-reviewed articles published from 2020 to 2025. An extensive review of the literature analyses demonstrates that an increase in H<sub>2</sub> fraction in the total energy supplied by the fuel mixture from 10 to 40% can contribute to noticeable improvements in terms of efficiency and emission performance of engines. Efficiency gain is in the range of 3–10%, whereas emission reductions of CO, HC, and smoke vary from 20 to 50%, 25 to 60%, and 30 to 60% correspondingly. On the other hand, higher combustion temperatures caused by enrichment of the H<sub>2</sub> content lead to increased generation of NO<sub>x</sub> with emission increase ranging from 10 to 30%, necessitating effective mitigation strategies such as exhaust gas recirculation, lean-burn operation, water injection, and optimized combustion phasing, which can lower NO<sub>x</sub> by 20–45%. In addition, modern techniques of artificial intelligence and machine learning, such as ANN, XGBoost, and LSTM, have proved quite helpful in predicting engine performance and emissions, with R<sup>2</sup> values > 0.96 reported in numerous studies. Some of the critical issues that remain unsolved are the lack of representative transient and on-road engine tests, insufficient understanding of the long-term durability of materials in contact with H<sub>2</sub>, and the requirement for uniform combustion emissions control strategies.

Link: <https://doi.org/10.1007/s10973-026-16006-0>



## TITLE:

Machinability and Thermal Behaviour of CuO Nanoparticle-Reinforced Minimum Quantity Lubrication During Precision Hard Turning of Oil-Hardened AISI 4340 Steel

## AUTHOR :

Gunjal S.U.; Sanap S.B.

## JOURNAL NAME:

Journal of The Institution of Engineers  
(India): Series D

## DETAILS:

Published on August 2026



## ABSTRACT:

A combined experimental and computational investigation was performed to evaluate the machinability and thermal performance of oil-hardened AISI 4340 steel (52–55 HRC) during precision hard turning under CuO nanoparticle-enhanced, soybean oil-based minimum quantity lubrication (MQL). A Taguchi L27 (33) orthogonal array comprising 27 machining trials was used to examine the effects of cutting speed, feed rate, and nanofluid concentration on tangential cutting force, surface roughness, flank wear, and tool–chip interface temperature, with depth of cut held constant at 0.3 mm. Cutting-zone temperature was independently characterised through 12 in-situ infrared measurements, a MATLAB artificial neural network (ANN), Minitab quadratic response-surface regression, and Deform-3D finite element simulation. Analysis of variance (ANOVA) confirmed feed rate as the statistically dominant factor for force and roughness ( $p < 0.001$ ), while cutting speed and feed jointly governed flank wear, with nanoparticle concentration a significant secondary factor in all three responses. SEM–EDS analysis of six representative post-trial inserts identified adhesive, abrasive, diffusion-controlled, and oxidative wear mechanisms, with EDS evidence of oxygen- and carbon-enriched tribofilm formation under CuO-MQL conditions. Multi-objective SLSQP optimisation, validated through three replicate confirmation trials (deviation  $\leq 5.3\%$ ), identified  $V_c = 250$  m/min,  $f = 0.1$  mm/rev, and  $C = 3.0$  wt% as the optimum condition, delivering experimentally confirmed reductions of 74% in cutting force, 38.6% in surface roughness, and 24.1% in flank wear, together with a 25–35% reduction in cutting-zone temperature, relative to dry machining. The ANN model predicted interface temperature within a maximum error of 13.8% (RMSE = 4.8 °C), outperforming the polynomial regression model (RMSE = 14.2 °C). CuO-assisted MQL also reduced lubricant consumption by more than 95% relative to conventional flood cooling (50–150 mL/h versus 1–10 L/min).

Link: <https://doi.org/10.1007/s40033-026-01067-0>



## **TITLE:**

Blue Finance for Small Island Economies:  
Innovative Mechanisms for Ocean- Based  
Sustainable Development

## **AUTHOR :**

Patil A.A.

## **JOURNAL NAME:**

Blue Economy Innovation for Sustainable  
Tourism and Climate Resilience

## **DETAILS:**

Published on August 2026



## **ABSTRACT:**

Small Island Developing States (SIDS) face unprecedented challenges in achieving sustainable development while confronting climate change and economic vulnerability. Blue finance emerges as a transformative approach that leverages ocean- based economic activities to generate sustainable revenue streams while promoting environmental conservation. This perspective paper examines innovative blue finance mechanisms tailored for SIDS. Through a comprehensive review of existing literature and case studies, we identify key blue finance instruments. The analysis reveals that while blue finance offers significant opportunities for SIDS to diversify their economies and enhance resilience, successful implementation requires addressing critical challenges including limited institutional capacity, regulatory frameworks, and technical expertise. We propose a framework for integrating blue finance into national sustainable development strategies, emphasizing the importance of international cooperation, capacity building, and innovative partnerships.

Link: <https://doi.org/10.4018/979-8-2600-3305-0.ch012>



## **TITLE:**

Quantum Dot-Based Materials for High-Performance Batteries and Supercapacitors

## **AUTHOR :**

Kate R.; Lonkar G.; Periasamy P.; Kale B.;  
Chavali M.

## **JOURNAL NAME:**

Materials Horizons: From Nature to  
Nanomaterials

## **DETAILS:**

Published on 10 July 2026



## **ABSTRACT:**

Quantum Dots (QDs)—semiconductor nanoparticles, have garnered significant interest in energy storage applications due to their unique properties, such as high surface-to-volume ratio, tunable electronic characteristics, and quantum size effect. These features make QDs a promising solution for addressing the growing need for energy conversion and storage, especially in light of global challenges such as climate change and the depletion of fossil fuels. This chapter explores recent advancements in applying QDs for lithium-ion, sodium-ion, potassium-ion, and Li sulfur batteries, highlighting their role in improving charge storage capacity, cycling stability, and rate performance. The application of QDs in Supercapacitors (SCs) and other battery chemistries is also explored. This chapter focuses on presenting and discussing recent advances and progress in application of QDs and related composite materials for energy storage technologies.

Link: [https://doi.org/10.1007/978-981-92-0172-3\\_12](https://doi.org/10.1007/978-981-92-0172-3_12)



## TITLE:

Turning the Sulfur Dial: Strategic Oxidation-State Manipulation in Modern Drug Discovery

## AUTHOR :

Md. Arshad A.S.; Singh R.; Wiemer A.J.

## JOURNAL NAME:

Journal of Medicinal Chemistry (Vol.-69, Issue-15)

## DETAILS:

Published on 28 July 2026



## ABSTRACT:

Sulfur occupies a distinct niche in the toolkit of a medicinal chemist. Unlike oxygen, sulfur is rationalized by ionic-resonance, negative hyperconjugation into low-lying  $\sigma^*$  orbitals, and high polarizability of its 3p valence shell, accommodates the oxidation states from  $-2$  to  $+6$ , adopting a diverse range of molecular geometries. Such properties position sulfur as a tunable element that contributes to drug molecules beyond passive lipophilic bulk. The proportion of sulfur-containing motifs among newly FDA-approved small-molecule drugs has increased from approximately 11% in 2020 to about 20% in 2024. Here, we argue that oxidation state switching at a single sulfur atom should be treated as a first-line lead optimization strategy. We map how different oxidation states impact geometry, polarity, and stability and how their interconversion enables rapid tuning of both target engagement and ADMET properties. We analyze synthetic innovations like SuFEx click chemistry, DABSO-mediated sulfonylation, etc., which make these motifs experimentally accessible. We propose a decision-making framework positioning sulfur oxidation state as a dynamic design variable in medicinal chemistry.

Link: <https://doi.org/10.1021/acs.jmedchem.6c01226>



### TITLE:

Sunlight-Active Mesoporous Zn-TiO<sub>2</sub> Quasi-Spheres For Enhanced Decolorization Of Distillery Spent Wash

### AUTHOR :

Bhosale A.S.; Mali N.P.; Dhotre S.B.; Takle S.P.; Ware A.S.; Bankar D.B.; Mene R.U.; Bhujbal N.N.

### JOURNAL NAME:

Rasayan Journal of Chemistry (Vol.-19, Issue-5)

### DETAILS:

Published on January 2026



### ABSTRACT:

Sugarcane-based distillery spent wash is a notoriously challenging malodorous effluent, characterised by its acidic pH, intense dark brown colour, and high organic load. These features seriously harm the aquatic ecosystem and environmental sustainability. In this paper, Zn-TiO<sub>2</sub> nanocatalysts with 1-5 wt.% Zn were synthesized by using the hydrothermal method. A systematic study of the structural features, optical response and photocatalytic properties of TiO<sub>2</sub> was conducted to evaluate the influence of Zn doping. Characterisation of the catalysts was carried out using X-ray diffraction, FESEM, TEM, Raman analysis, UV-DRS, and BET techniques. Zn-doped TiO<sub>2</sub> exhibited a quasi-spherical morphology with particle size ranging from 10 to 25 nm. Doping results in a shift of Raman peaks toward lower wavenumbers and causes the band gap energy to decline from 3.03 eV to 2.8 eV. Photocatalytic performance under solar light was investigated by monitoring decolourisation efficiency and the extent of COD and TOC reduction of the spent wash. Among all doped samples, the 3% Zn-TiO<sub>2</sub> sample exhibits higher photocatalytic activity (84%) compared to undoped TiO<sub>2</sub> (64%) under the same conditions. These findings demonstrate the potential of Zn-TiO<sub>2</sub> as an efficient photocatalyst for sustainable wastewater treatment.

Link: <https://rasayanjournal.co.in/abstract.php?id=4887>



## TITLE:

A Review Series: Federated Learning in Financial Services: A Path to Secure AI

## AUTHOR :

Sharma S.; Kumar J.; Gupta R.; Balas V.E.;  
Dhiman G.

## JOURNAL NAME:

A Review Series: Federated Learning in Financial Services: A Path to Secure AI

## DETAILS:

Published on 2026



## ABSTRACT:

As financial institutions increasingly rely on AI and ML for data-driven decision-making, concerns about data privacy, security, and regulatory compliance are growing. Federated learning (FL) emerges as a key solution, enabling collaborative AI model training across multiple organizations without sharing raw data. This book explores advancements in FL technology in the financial industry, specifically in the context of privacy-preserving AI. It also examines the significant shift from traditional centralized machine-learning approaches to decentralized learning techniques. Structured into four comprehensive sections, the book offers an in-depth examination of the subject. The first section provides an overview and introduction to FL, and reviews the increasing challenges of data privacy and regulatory constraints in the financial industry, highlighting how federated learning enables secure AI-driven financial services. The second section explores federated architectures, secure multi-party computation, differential privacy, and homomorphic encryption. The third section highlights practical applications of AI and federated learning in areas such as risk management, fraud detection, credit scoring, and customer personalization, demonstrating how FL enhances security, scalability, and operational efficiency in financial systems. Financial applications where federated learning enhances security, scalability, and efficiency are also addressed. The fourth section discusses emerging trends in federated learning, including blockchain-based federated learning, zero-trust architectures, and its integration with decentralized finance (DeFi). The book concludes by examining practical implementations and regulatory considerations, ensuring compliance with data protection laws such as GDPR and CCPA.

Link:

<https://www.scopus.com/pages/publications/105047761694>



## TITLE:

DACAS: Dual Attentive Consensus Mechanism-Enabled Authentication Security Scheme for Secure Healthcare Data Storage

## AUTHOR :

Cholke A.D.; Rajput S.D.; Mulani U.M.;  
Deshpande A.V.; Kakad S.; Dongre S.P.

## JOURNAL NAME:

Concurrency and Computation: Practice and Experience (Vol.-38, Issue-17)

## DETAILS:

Published on August 2026



## ABSTRACT:

The efficient and secure management of healthcare records is crucial, as it contains sensitive medical information. Any modifications or tampering in the medical information can result in dreadful conditions due to the wrong diagnosis. Existing methods deployed for maintaining secure storage faced complexities due to larger key lengths, resource requirements, and interoperability issues across a broader deployment. Therefore, to address these limitations, the Dual Attentive Consensus mechanism-enabled Authentication Security (DACAS) scheme is proposed in this research. Specifically, the Dual Attentive Consensus mechanism (DAC) handles the block creations and blockchain transactions to elevate the security against malicious validator nodes and balances the efficiency of the system. Moreover, the proposed method utilizes the dual verification mechanism that involves the Advanced Encryption Standard (AES) algorithm for encrypting the user credentials and the Elliptic Curve Digital Signature Algorithm (ECDSA) for signature generation, bolstering data integrity and authenticity. Additionally, the Ring Learning with Errors (RLWE) Homomorphic algorithm is employed to encode the patient data before storing it in the cloud via blockchain. The method generates the ciphertext without altering the original contents and improves the data integrity by providing strict privacy compliance. Extensive experiments demonstrate that the proposed DACAS scheme exhibits higher security, outperforming the existing BDSS and AES-IDEA methods with a time delay of 1.48 ms, GUR of 0.902, gas usage of 13414.78, and verification time of 2.54 ms for evaluation over a data volume of 100 KB/patient and network size of 250 nodes. Further, the experimental results show that the DACAS scheme significantly lowers the processing cost of both encryption and decryption, while elevating the security level of data storage.

Link: <https://doi.org/10.1002/cpe.70907>



## TITLE:

Dynamic entropy-based lightweight security architecture integrating ECC signcryption and zero trust for interoperable healthcare systems

## AUTHOR :

Pharande R.S.; Tiwari B.; Bhoite S.

## JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-29, Issue-8)

## DETAILS:

Published on August 2026



## ABSTRACT:

Interoperable healthcare IT systems are leveraged upon 5G enabled interacted IoMT devices and database servers, yet most existing security frameworks still rely on static keys that cannot cope with array of cyber threats, vulnerabilities, and attack vectors. To address this gap, we presented an environment-aware security framework that fused together with ECC-based mutual authentication and signcryption mechanism. The proposed approach uses environmental values such temperature as a natural, dynamic source of entropy to introduce randomness in the security process, especially in driving session oriented cryptographic keys, allowing each transmission to be securely binds with the device's operating context. In the proposed work, signcryption process binds the encryption and signing into a single step, that reduces the packet size and computational cost of resource limited sensing and gateway devices. On the other side, a Zero Trust Data Gateway unsigncrypts, verifies, and forwards messages to a patient-centric ZTA module for granting or rejecting permission based on received request within specific context. The experiment show that proposed approach achieves faster execution, lower overhead, and stronger replay resistance than traditional RSA or Elliptic Curve Cryptography-Elliptic Curve Digital Signature Algorithm (ECC-ECDSA) alternatives. Overall, proposed work concludes a practical path toward secure, context-aware communication in next-generation healthcare environments.

Link: <https://doi.org/10.47974/JDMSC-2745>





## TITLE:

Multi-Robot Communication and Surveillance System Using Raspberry Pi and MQTT

## AUTHOR :

Thombare M.; Jadhav P.

## JOURNAL NAME:

GSEACT 2026 - 2026 IEEE Global Symposium on Emerging and Communication Technologies

## DETAILS:

Published on June 2026



## ABSTRACT:

This paper presents an IoT-based multi-robot hazard detection and surveillance system built on Raspberry Pi 4 single-board computers and the MQTT publish-subscribe messaging protocol. Three autonomous robotic units collaborate to monitor environmental hazards, elect a coordinating leader upon detection, and execute a synchronized response that includes audible alerting, photographic documentation, GPS geo-tagging, and SMTP email notification. Each robot integrates an MQ-2 combustible gas sensor, an inductive metal detector module, a NEO-6M GPS receiver, and a Pi Camera v2. Interrobot coordination is achieved through a Mosquito MQTT broker using a First-Come-First-Serve leader election algorithm that assigns incident command to whichever robot first exceeds a detection threshold. Non-leader robots acknowledge the event and autonomously navigate toward the reported coordinates to establish a multi-point monitoring perimeter. Experimental evaluation in a controlled  $5 \sim m \times 5 \sim m$  environment conducted over 30 repeated trials confirms hazard detection response times below 2 seconds, QoS 1 MQTT latency of 41 ms mean, gas detection accuracy of 97%, metal detection accuracy of 99%, and uninterrupted operation over a 72-hour continuous reliability trial. The proposed decentralized architecture demonstrably outperforms conventional single-robot and centralized multirobot platforms in coverage, fault tolerance, scalability, and alert richness, while the per-robot bill of materials of approximately INR 7,755 makes it economically viable for industrial safety, military surveillance, and disaster response deployments.

Link: <https://ieeexplore.ieee.org/document/11619947>



## TITLE:

Crop Recommendation System for Konkan Region of Maharashtra using Interpretable Machine-Learning with XAI

## AUTHOR :

Vadke J.; Bhoite S.

## JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026 (Vol.-12, Issue-1)

## DETAILS:

Published on 2026



## ABSTRACT:

Machine Learning has proved beneficial in many domains positively impacting various aspects of our daily lives. Agriculture in India is a major occupation and nations economy is deeply affected by agriculture. This study suggests a Crop Recommendation System for the Konkan region of Maharashtra utilizing Machine Learning combined with Explainable Artificial Intelligence (XAI) in light of growing agricultural uncertainties and the urgent need for sustainable farming techniques. The Konkan region, a crucial agricultural zone in Maharashtra, is the direction of the dataset, which includes important agronomic metrics such as soil nutrients (nitrogen, potassium and phosphorus), pH level, temperature, humidity, and rainfall. The prediction performance of a number of supervised machine learning models, such as Random Forest, KNN, Support Vector Machine (SVM), Decision Tree and XGBoost, in suggesting the best crops based on these characteristics was assessed. SHAP (SHapley Additive exPlanations) values were used to illustrate feature contributions and model decisions in order to improve interpretability and confidence among local farmers and policymakers. LIME is used to explain the reason for suggestion of a specific crop for a given land. In addition to promoting openness, the incorporation of XAI enables stakeholders to make knowledgeable agronomic choices. By enhancing crop output, soil health, and financial returns, this technology can make a substantial contribution to precision agriculture in Maharashtra.

Link:

<https://www.scopus.com/pages/publications/105047270414>



## TITLE:

Electrolyser and anaerobic digestion driven CO<sub>2</sub> hydrogenation routes towards sustainable dimethyl ether production: A review of carbon capture technologies, advanced reactor technologies, and sustainability assessment

## AUTHOR :

Lad A.A.; Patrikar A.Y.; Joshi R.R.

## JOURNAL NAME:

Next Energy (Vol.-13)

## DETAILS:

Published on October 2026



## ABSTRACT:

Power-to-X (PtX) technology-based fuels can reduce greenhouse-gas (GHG) emissions by using captured carbon dioxide (CO<sub>2</sub>) and can therefore support climate-change mitigation goals. PtX products include methane, methanol (MeOH), Fischer-Tropsch fuels, ammonia, and dimethyl ether (DME). DME is a potentially sustainable energy carrier that can substitute for diesel and liquefied petroleum gas (LPG), and it can be blended with LPG as a cleaner alternative fuel. Although previous studies have reported advances in catalyst developments, individual production routes, and PtX products, however, limited attention has been provided to a systems-level comparison of two feasible renewable DME production routes. This review compares water-splitting electrolysis and anaerobic-digestion routes and evaluates carbon-capture technologies, catalysts and reactor performance, process intensification, energy requirements, carbon utilization, and scale-up limitations within a systems framework. Techno-economic analysis (TEA) and life-cycle assessment (LCA) indicates the environmental and economic performance of each route is conditional rather than inherent. The electrolyser-driven route can achieve a low life-cycle carbon footprint when hydrogen is produced using low-carbon based electricity source along with CO<sub>2</sub> capture, followed by compression, are supplied by low-emission energy. The anaerobic-digestion-driven route can provide significant GHG reductions and may achieve a net-negative result under specific waste-management scenarios. However, its performance strongly depends on feedstock source, avoided-emission credits, process-energy demand, biogas purification, reforming, and digestate management. Consequently, neither of the specific routes should be classified as universally net-zero nor carbon-negative without clearly defining their LCA boundaries and assumptions.

Link:

<https://www.sciencedirect.com/science/article/pii/S2949821X26003923>



### TITLE:

Managing Millions, Market, Meeting Masters and Moksha: Exploring the Digital Confluence of Spiritual Touris and Internationalisation of Maha Kum

### AUTHOR :

Kaur S.; Ramachandaran S.D.; Dhar B.K.

### JOURNAL NAME:

Spiritual Tourism and Landscape: Indigenous Technique and Holistic Insights

### DETAILS:

Published on 2026



### ABSTRACT:

The Kumbh Mela celebrates the rejuvenation of body, mind and soul through the healing energies of nature. It serves as a psychological healing and inner peace. Apart from the significance of the cosmic alignment, the Kumbh festival encompasses economic, cultural, spiritual and global aspirations. International pilgrims, celebrities, scholars, politicians, YouTube influencers and foreign devotees not only witness the peace, faith and spiritual essence of the Maha Kumbh but also actively participate in the rituals. In the social media era, dozens of content creators presenting podcasts and sharing videos and reels created a snowball effect on millions of Gen Z, adding a celebrity effect in international and local marketing. The 'Maha' Kumbh is the first mega-spiritual gathering event since the advent of social media. The chapter aims to highlight the significance of the Maha during the 2025 Kumbh Mela. The chapter attempts to discover the motivational and spiritual factors that are captivating the economic growth and global participation of Maha Kumbh in terms of proposing 4 M9 of it, i.e., Managing Millions (M), Market (M), Meeting Masters (M) and Moksha (M). The chapter combines three theories to understand the 'biggest spiritual gathering' event in human history: the push and pull theory, the digital and media influence theory and the self-identity theory. The chapter's findings ensure that it is not just a gathering of millions but a catalyst for global peace, seeking transformational experiences, peace and well-being.

Link:

<https://www.scopus.com/pages/publications/105046612282?origin=resultslist>





## TITLE:

Privacy-Preserving Federated Learning for Heart Disease Prediction—A Review of Security Architectures and Techniques

## AUTHOR :

Choudhari A.; Bhalekar M.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 30 July 2026



## ABSTRACT:

Heart disease remains the leading cause of mortality worldwide, necessitating collaborative research across healthcare institutions to develop accurate prediction models. Traditional centralized machine learning approaches face significant barriers due to patient privacy concerns, regulatory constraints, and institutional reluctance to share sensitive medical data. Federated learning emerges as a promising solution that enables collaborative model training while maintaining data locality and privacy protection. This paper presents a comprehensive review of privacy-preserving federated learning techniques specifically applied to heart disease prediction, examining security architectures and their effectiveness in healthcare environments. We systematically analyze differential privacy, homomorphic encryption, and secure multi-party computation approaches, evaluating their security guarantees, computational overhead, and clinical utility preservation. Our comparative analysis reveals that differential privacy provides the most practical solution for large-scale healthcare collaborations, achieving 85–95% of centralized learning accuracy while maintaining formal privacy guarantees. The review identifies significant implementation challenges including regulatory compliance complexities, technical deployment barriers, and inter-institutional coordination requirements. We highlight critical research gaps in scalability, real-world deployment strategies, and integration with existing healthcare infrastructure. Our findings provide actionable guidance for healthcare institutions considering federated learning adoption while identifying essential directions for future research in privacy-preserving collaborative healthcare analytics.

Link:

<https://www.scopus.com/pages/publications/105047085039?origin=resultslist>





## TITLE:

HomeBudget++: AI-Driven Smart Home Budgeting to Predict, Optimize, and Enhance the Personal Finances

## AUTHOR :

Yarde P.; Kumbhar V.; Suryavanshi M.;  
Namjoshi V.; Shivnechari A.; Shendage J.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on July 2026



## ABSTRACT:

With the contemporary world becoming very fast, it is becoming hard to manage household finances in a proper way, considering the growing living costs and the erratic economic changes. HomeBudget++ is an AI-powered application to resolve those issues because it uses advanced algorithms to forecast, optimize, and improve home budgeting. The rationale behind the study can be explained by the increasing demand in the automated and personalized financial tools that will enable the users run the control over their finances and plan their future costs in a more effective manner. The issue of inaccurate budgeting and financial mismanagement, especially among people and families, is resolved through offering foresight and individualized budgeting recommendations. The methodology, based on Long Short-Term Memory (LSTM) networks to predict the future spending trends, Genetic Algorithms (GA) to optimize the spending schedule, and examine the spending pattern and potential cost-cutting spots, and improved financial distribution, helps to understand the past and the future of the spending process. According to the outcomes of the system, there are considerable changes in user predictability and control of their budgets, as the number of overspending and the rate of savings increase. This practice is useful to individuals, families, and communities since it enhances financial stability and enables users to make informed decisions. Uniqueness of the HomeBudget++ is that it combines LSTM and GA, which provides real-time data analysis of financial data and predicts through AI (Artificial Intelligence), unlike traditional budgeting tools.

Link:

<https://www.scopus.com/pages/publications/105047313561>





## TITLE:

Status of Endemic Flora of the Himalayan Hotspot

## AUTHOR :

Pramanik S.; Sarkar K.; Kundu A.; Paul B.;  
Halder S.; Joardar N.

## JOURNAL NAME:

Topics in Biodiversity and Conservation  
(Vol.-21)

## DETAILS:

Published on June 2026



## ABSTRACT:

The Himalayan region is a vital biodiversity hotspot renowned for its diverse ecosystems and endemic flora. This chapter examines the current status of indigenous plant species in this critical area, highlighting their ecological significance and the severe threats they face. With habitats ranging from subtropical woods to alpine meadows, the Himalayas support unique species like *Trillium govanianum* and *Taxus wallichiana*, crucial for ecological balance and human needs. However, these plants are increasingly endangered due to rapid urbanisation, infrastructure expansion, unsustainable agriculture, and climate change. The chapter discusses how habitat loss, over-exploitation, invasive species, and illegal trade affect plant diversity. It also reviews local, national, and international conservation strategies emphasising the urgent need to sustain these valuable species properly. The chapter underlines the critical need for effective, comprehensive action in preserving the Himalayan flora by looking deeper into the challenges as well as the ongoing measures of conservation.

Link:

<https://www.scopus.com/pages/publications/105047595974>



### TITLE:

Music and Aroma Therapy for Female Health: Principles, Methods, and Applications

### AUTHOR :

Jadhav A.; Pandey V.

### JOURNAL NAME:

Holistic Approaches for Women's Sustainable Health: Volume 1: Foundations, Innovations, Challenges, and Management

### DETAILS:

Published on July 2026



### ABSTRACT:

This chapter examines the complementary therapeutic roles of essential oils and music therapy in enhancing psychological and physiological health. Essential oils, derived from various plant parts, modulate the hypothalamic–limbic axis, elevating relaxing hormones, while reducing stress-related neurotransmitters. These actions alleviate neuropsychological disturbances and sleep disorders, particularly in menopausal women. Through olfactory stimulation, aromatic compounds influence emotional regulation, while their antiseptic and permeation properties enhance circulation, relieve spasms, promote wound healing, and improve bone health due to their nutrient content. Music therapy, a practice rooted in antiquity, exerts significant psychophysiological benefits by modulating mood, cognition, and immune responses. It enhances neurotransmitter activity particularly, serotonin and dopamine thereby, alleviating anxiety, depression, and stress-related dysfunctions. Music-induced immunomodulation strengthens host defenses, while its regulatory effects on cardiovascular and endocrine systems mitigate the neurotoxic and immunosuppressive consequences of chronic stress. Together, essential oils and music therapy represent holistic, nonpharmacological approaches for restoring emotional balance and promoting overall well-being.

Link:

<https://www.scopus.com/pages/publications/105045944948?origin=resultslist>



## TITLE:

Securing decentralized finance: a bibliometric and thematic review of cybersecurity in DeFi ecosystem

## AUTHOR :

Kumar R.; Kishor K.; Sengupta R.; Patil A.A.

## JOURNAL NAME:

SN Business and Economics (Vol.-6, Issue-9)

## DETAILS:

Published on 2026



## ABSTRACT:

Decentralized finance (DeFi) has expanded rapidly, yet its cybersecurity foundations remain fragmented and poorly understood, creating systemic risks for users, institutions, and financial infrastructures. This study maps the structure, evolution, and intellectual trajectory of cybersecurity research in DeFi, identifying the most influential documents, authors, journals, and contributing countries, as well as tracing the development of scholarly discourse across academic and grey literature. This research undertakes an extensive bibliometric and content analysis that explores the nexus between DeFi and cybersecurity, utilizing a dataset of 99 peer-reviewed articles cataloged in Scopus as of July 2025. By implementing PRISMA protocols alongside analytical instruments such as VOSviewer and Gephi, this investigation delineates publication trends, citation counts, keyword co-occurrence frequency key contributors, and the geographic distribution of research efforts. The analysis of keyword co-occurrence and bibliographic coupling elucidates six thematic clusters, which encompass blockchain-enabled infrastructure, AI-driven threat detection, cyber resilience, regulatory frameworks, institutional risk management, and FinTech pedagogy. The findings reveal a pronounced escalation in academic output following 2023, indicative of an increased institutional focus on vulnerabilities associated with DeFi. Nevertheless, the citation dispersion and thematic fragmentation suggest limited theoretical integration across domains. Key work focuses on blockchain governance, explainable AI, digital identity, and macro-financial risks, while cyber insurance, regulatory interoperability and educational frameworks in DeFi remain underdeveloped.

Link:

<https://www.scopus.com/pages/publications/105047875757>





## TITLE:

Hybrid Deep Learning Method for DeepFake Detection Integrating CNN, Transformer, Bi-LSTM and Grad-CAM Explainability

## AUTHOR :

Wagh A.; Rane R.

## JOURNAL NAME:

Proceedings of the 5th International Conference on Computer Networks, Big Data and IoT, ICCBI 2026

## DETAILS:

Published on June 2026



## ABSTRACT:

The creation of Deepfakes with the help of AI models such as GAN and Auto-encoders is a threat to privacy and security. Detection methods using classical techniques were proven to be inadequate when dealing with Sophisticated Deepfakes. This paper seeks to give descriptions on several detection methodologies and their disadvantages, especially lacking any form of spatial temporal analysis of several databases such as Faceforensic++ and Celeb-DF. This paper seeks to analyze the different methodologies used in the field of Deepfakes detection while discovering some research gaps in the field and suggesting a new methodology using CNN, transformers, Bi-LSTMs with the inclusion of explainable artificial intelligence such as Grad-CAM. The proposed technique will result in efficient Deepfakes detection methods having an accuracy of 98.71%, 99.12%, 98.32%, and 98% for Celeb-DF, Faceforensic++, Custom Image Dataset, and DAFDV respectively.

Link:

<https://www.scopus.com/pages/publications/105047057476>



### TITLE:

A Deep Learning-Enabled Privacy-Preserving Framework for Secure Medical Image Storage in Cloud Systems Using Advanced Convolutional Architectures

### AUTHOR :

Bhondve P.S.; Dixit B.A.

### JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-5s)

### DETAILS:

Published on July 2026



### ABSTRACT:

With the rapid adoption of cloud computing for healthcare data storage, ensuring the privacy and security of sensitive medical images has become a critical challenge. Recent advancements in deep learning, particularly convolutional neural networks (CNNs), offer new possibilities for enhancing encryption and data protection without compromising image quality or diagnostic value. This research aims to develop a state-of-the-art, CNN-based privacy-preserving framework that leverages feature extraction and adaptive encryption methods to securely manage medical imaging data in cloud environments, aligning with emerging trends in AI-driven healthcare security and regulatory compliance. With the increasing reliance on cloud-based platforms for storing and sharing medical imaging data, privacy and security concerns have become paramount. Medical images such as CT scans, MRI, and X-rays contain sensitive patient information that must be protected from unauthorized access while ensuring usability for clinical diagnosis. This research proposes a Deep Learning-Enabled Privacy-Preserving Framework that integrates advanced convolutional neural network (CNN) architectures with adaptive encryption techniques to enhance the confidentiality of medical images stored in cloud environments. The framework extracts essential features from images while applying encryption algorithms that maintain data integrity and diagnostic value. Experimental results on diverse medical image datasets demonstrate the efficiency, robustness, and scalability of the proposed approach, making it suitable for modern healthcare applications where secure, cloud-based data management is essential.

Link:

<https://www.scopus.com/pages/publications/105046679134>



## TITLE:

A Data-Driven Approach for Microbial Contamination Prediction in Indian Rivers using BOD with Interpretable Machine Learning

## AUTHOR :

Tendulkar H.; Bhoite S.

## JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026 (Vol.-1)

## DETAILS:

Published on 2026



## ABSTRACT:

Water quality research is essential to the sustainability of the environment and the safety of people, especially in countries like India where surface water bodies are under increasing stress from human interference. This study analyzes the relationship between physicochemical parameters such as pH, temperature, (DO) dissolved oxygen, (BOD) biochemical oxygen demand, and microbial contamination (as measured by Total Coliform counts) and electrical conductivity, in India's major rivers and states. The study examines regional variation in important water quality indicators and pinpoints regions of concern where water is most susceptible to contamination using a dataset that includes 534 observations from 18 Indian states. According to the findings, states like Maharashtra, Bihar, Uttar Pradesh, and Karnataka have higher monitoring data frequencies, which may reflect increased industrialization, urbanization, and awareness of water quality problems. States like Delhi, Chhattisgarh, and Kerala, on the other hand, have many fewer reported observations, which may indicate either underreporting or a lack of monitoring infrastructure. Low DO values were seen in regions with high BOD and Total Coliform levels, suggesting oxygen depletion brought on by microbial and organic pollution. The findings highlight the immediate need for real-time data gathering systems, a standardized national framework for water monitoring, and legislative actions to address disparate regional capacity. This study highlights how important it is to combine microbiological evaluations with physicochemical studies to provide a complete picture of water quality.

Link:

<https://www.scopus.com/pages/publications/105047246830>



## TITLE:

Smart Traffic Light with Real-Time Ambulance Detection

## AUTHOR :

Kuveskar M.; Joshi S.; Walujkar R.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2026



## ABSTRACT:

One of the main challenges in metropolitan cities is proper traffic management and emergency response, this paper presents Smart Traffic Light with Real-time Ambulance Detection, which aims to decrease traffic in urban areas and ensure a green corridor for emergency vehicles. The system integrates an ESP-32 as the main controller. LED lights (red, yellow, green) are used to simulate a traffic signal. RF modules (transmitter and receiver) are added in the system to detect the presence of an ambulance. Sensors, such as microphones, are used to detect siren sounds. A TinyML model is deployed on ESP-32 to perform ML-based sound recognition. Additionally, an LED display is added to provide visual alerts to other vehicles to increase awareness about nearby ambulance. When both, RF signal as well as siren sound are detected, a green corridor is created for the emergency vehicle automatically. The system offers a solution for a reduction in response time for critical situations and ensures minimal congestion in urban cities, especially in cases where it is easily preventable. This project provides a scalable foundation for development of real-world intelligent transport systems with the help of modern technologies like ML.

Link: <https://www.springerprofessional.de/en/smart-traffic-light-with-real-time-ambulance-detection/53086304>



### 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 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. The versatile properties of AuNPs, particularly their ability to participate in supramolecular self-assembly and bioorthogonal catalysis, position them as promising tools for advancing drug delivery and therapeutic applications.

Link:

<https://www.scopus.com/pages/publications/105046237988?origin=resultslist>



## TITLE:

A Comparative Study of Alternative Building Blocks in the Indian Context

## AUTHOR :

Minde P.; Sonawane S.; Dhopeswar Y.

## JOURNAL NAME:

Lecture Notes in Civil Engineering

## DETAILS:

Published on January 2026



## ABSTRACT:

The rapid growth of the construction industry has significantly increased the generation of construction and demolition waste (CDW), presenting an urgent environmental challenge. Concrete blocks have long been a popular choice due to their strength; however, issues like cracking raise serious concerns about their structural integrity and long-term performance. This study aims to provide practical insights and solutions for construction professionals, policymakers, and industry stakeholders to promote more resilient and sustainable construction practices. A comprehensive survey conducted in Pune, Akola, and Nashik identified three major causes of cracking in autoclaved aerated concrete (AAC) block walls: inherent cracking within AAC walls, degradation of structural integrity over time, and inadequate thermal insulation. While red brick remains a favored material due to its durability, load-bearing capacity, fire resistance, and contribution to energy efficiency, new alternatives are emerging to meet modern sustainability and performance standards. Among these, Porothers bricks or blocks stand out as a highly innovative solution. These clay-based bricks are approximately 60% lighter than traditional materials, offering substantial cost savings by reducing the structural load. Engineered to enhance energy efficiency and sustainability, Porothers bricks also facilitate easier installation and improved overall building performance, positioning them as a promising alternative for the future of eco-friendly construction.

Link:

<https://www.scopus.com/pages/publications/105046148916>



## 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 A.K.

## JOURNAL NAME:

Frontiers in Artificial Intelligence (Vol.-9)

## 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:  $98.44\% \pm 0.56\%$ ) with optimized hyperparameters including a learning rate of 0.01, a hidden dimension of 128, and an epoch size of 150. This performance significantly outperforms existing methods such as Random Forest (87.3%), SVM (82.8%), and standard DNNs (90.7%), confirming the model's potential for non-invasive, real-time stress monitoring via wearable technologies and mobile health platforms.

Link:

<https://www.scopus.com/pages/publications/105046762021>



### **TITLE:**

Durability Analysis of Fiber-Reinforced Concrete with Diverse Curing Compounds

### **AUTHOR :**

Bhagwat A.; Patil J.

### **JOURNAL NAME:**

Lecture Notes in Civil Engineering

### **DETAILS:**

Published on 2 January 2026



### **ABSTRACT:**

Concrete durability is a vital aspect of infrastructure performance, influencing its structural integrity and service life. Two key indicators of durability are electrical resistivity, which signifies pore connectivity and moisture retention, and chloride penetration, which can trigger reinforcement corrosion. This study examines the impact of fiber reinforcement and curing agents on enhancing concrete durability. To evaluate performance, electrical resistivity testing and the Rapid Chloride Penetration Test (RCPT) were conducted. A detailed literature review guided the selection of fiber types, proportions, and curing agents. Concrete specimens incorporating 0.66% volume fractions of steel fibers, polypropylene fibers, and a hybrid combination of both underwent treatment with different curing agents. Their durability was assessed by measuring electrical resistivity and chloride penetration levels. The results indicate that fiber-reinforced concrete significantly enhances durability by reducing electrical resistivity and chloride ingress compared to conventional concrete. The presence of fibers improves the concrete matrix, limiting pore connectivity and restricting chloride diffusion. Furthermore, optimized curing methods further contribute to performance enhancement. These findings underscore the potential of fiber reinforcement and effective curing techniques in developing resilient and long-lasting concrete structures. By incorporating these advancements, engineers and researchers can improve infrastructure durability, ultimately reducing maintenance costs and extending the lifespan of concrete structures. This study provides valuable insights for future research and practical applications in construction.

Link: [https://doi.org/10.1007/978-981-95-3204-9\\_4](https://doi.org/10.1007/978-981-95-3204-9_4)



### **TITLE:**

Landslide Monitoring Using Internet of Things

### **AUTHOR :**

Gholap V.M.; Ambavkar A.D.; Satpute S.;  
Patil A.; Baldota A.S.; Gutte V.

### **JOURNAL NAME:**

Lecture Notes in Networks and Systems

### **DETAILS:**

Published on 2 August 2026



### **ABSTRACT:**

Landslides are a significant danger to communities in hilly and mountainous areas, particularly during heavy rain. This work presents a low-cost, real-time landslide monitoring and early warning system using the Internet of Things (IoT). The system employs soil moisture sensors, vibration sensors, and environmental sensors to monitor slope conditions continuously. An ESP32 microcontroller collects sensor readings and sends them to a cloud platform for visualization and remote access. When the system detects unusual moisture levels or ground movement patterns, it triggers local alarms and sends alerts to registered users through cloud services. The proposed IoT design shows reliable sensing, data transmission, and alerting abilities suitable for use in rural or remote areas. This prototype offers an affordable way to improve landslide readiness and community safety. Because of its low maintenance requirements, the system is suitable for long-term use in isolated areas. Its modular design makes it simple to upgrade or replace sensors. Through a mobile dashboard, community volunteers can also keep an eye on readings, assisting local authorities in taking prompt action and minimizing damage prior to a landslide..

Link: [https://doi.org/10.1007/978-3-032-31523-6\\_23](https://doi.org/10.1007/978-3-032-31523-6_23)



## TITLE:

When Feet Become Wings: An Introduction  
and an Invitation

## AUTHOR :

Giri A.K.

## JOURNAL NAME:

Chitta Ranjan Das and Our Creative  
Planetary Futures: When Feet Become  
Wings

## DETAILS:

Published on 28 May 2026



## ABSTRACT:

Orgies are no compensation for not living your life as a complete human being in a genuine relationship with all people. [...] An individual is responsible not only to themselves or to the very small personal world of their possessions, including what they customarily call their family. They are also responsible to their society, to the present state of their world and to everything the latter connotes.

Link: [https://doi.org/10.1007/978-981-95-6244-2\\_1](https://doi.org/10.1007/978-981-95-6244-2_1)



### TITLE:

Effects of waste marble as partial replacement of cement and fine aggregate on the mechanical, durability and microscopic properties of concrete

### AUTHOR :

Sathe S.; Sonawane M.; Yeole M.; Shekokar S.; Gunaware P.D.

### JOURNAL NAME:

Magazine of Concrete Research

### DETAILS:

Published on August 2026



### ABSTRACT:

Cement production significantly contributes to greenhouse gas emissions and global warming, underscoring the need for sustainable alternatives in the construction industry. One promising approach is the reuse of industrial by-products in concrete. The marble industry generates substantial amounts of waste, which, if disposed of improperly, can cause land contamination and ecological issues. In this study, the potential of marble powder (MP) as a partial cement substitute and marble fine aggregate (MFA) as a partial replacement for natural fine aggregate in M30 grade concrete was examined. Experimental mixes were prepared with incremental replacements of MP (5–15%) and MFA (5–15%), as well as combined substitutions, maintaining a water/cement ratio of 0.39. The mixes were evaluated for mechanical strength, durability and microstructural properties. The results showed that MP primarily functions as an inert filler, improving pore structure at lower replacement levels. At 28 days, the optimum performance was achieved with 10% MP, 10% MFA and a hybrid mix of 10% MP + 10% MFA, showing compressive strength gains of approximately 11%, 13% and 16%, respectively, compared with the control concrete. Microstructural analysis confirmed enhanced pore refinement owing to the filler effect of the MP. Overall, controlled use of MP and MFA improves concrete performance and supports sustainable and cost-effective construction.

.Link: <https://doi.org/10.1680/jmacr.25.00443>



### TITLE:

AQbD-guided development of a robust and green SI-RP-HPLC method for impurity profiling of an efonidipine hydrochloride ethanolate and chlorthalidone combination, with LC-MS and NMR-based identification of degradation product in efonidipine

### AUTHOR :

Bang P.S.; Choudhari V.P.; Gharge V.S.

### JOURNAL NAME:

Journal of Chromatography A (Vol.-1785)

### DETAILS:

Published on September 2026



### ABSTRACT:

Efonidipine Hydrochloride Ethanolate (EHE) and Chlorthalidone (CTD) are co-formulated for the management of hypertension owing to their complementary pharmacological actions. Ensuring accurate impurity profiling in such combination formulations is vital for maintaining drug stability, safety and regulatory compliance. However, conventional analytical techniques often face challenges related to sustainability and robustness. Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) remains a key analytical approach for impurity determination, yet the integration of Quality by Design (QbD) principles into its development is still evolving. The present study focuses on developing a novel, sustainable RP-HPLC method for impurity profiling of EHE and CTD tablets using a QbD approach and green chemistry. Chromatographic separation was achieved on a Zorbax SB C8 column (150 mm × 4.6 mm, 5 μm). Critical method parameters such as mobile phase composition and pH were systematically optimized through QbD to enhance method robustness. A photolytic degradation product of EHE was identified as Efonidipine Related Compound A, and a plausible photolytic degradation pathway was proposed. A photolytic degradation product was identified in the LC-MS and its structure was confirmed through NMR spectroscopy. The developed green method exhibited excellent resolution, precision and reproducibility across multiple batches, allowing for effective separation and quantification of impurities. This green QbD-optimized, environmentally sustainable RP-HPLC method provides a reliable and scalable solution for impurity profiling in complex pharmaceutical formulations, aligning with modern quality control and regulatory expectations.

Link: <https://doi.org/10.1016/j.chroma.2026.467321>



### TITLE:

Smart parking management system: a seamless parking solution using YOLO and QR code payment technology

### AUTHOR :

Kumar S.; Rani R.; Pippal S.K.

### JOURNAL NAME:

IAES International Journal of Artificial Intelligence (Vol.-15, Issue-4)

### DETAILS:

Published on August 2026



### ABSTRACT:

The inefficiencies of traditional parking systems, including manual entry and reliance on sensors, as well as slow payment lines, contribute to congestion and a lower level of user satisfaction. This paper suggests a smart parking management system (SPMS) based on the license plate recognition (LPR) technology using you only look once version 5 (YOLOv5) model in combination with a QR code based payment system, to automate the parking system. It's able to detect vehicle license plates in real-time, which means that data doesn't have to be entered manually, and it also avoids the need for physical sensors, which cuts down on infrastructure costs. With a centralized database, the efficient tracking of vehicles is achieved, and QR-based payment will facilitate contactless payments at exit. Experimental evaluation shows that the proposed system out performs than the other systems, with an accuracy of 98.09% and recall of 98.25% in case of LPR. This system drastically decreases processing time, congestion and improves overall user experience. SPMS is more efficient, scalable, and reliable than traditional and existing smart parking systems. The results show that the proposed method is a cost-effective and practical solution for solving the modern parking management problem.

Link: <http://doi.org/10.11591/ijai.v15.i4.pp3614-3624>





## TITLE:

Graph-Neurosymbolic Neural Networks for Trustworthy Clinical Decision Support

## AUTHOR :

Akande O.N.; Mishra A.; Adeniyi A.E.;  
Mughal Q.U.A.; Orifama D.G.

## JOURNAL NAME:

Proceedings of Machine Learning Research  
(Vol.-319)

## DETAILS:

Published on January 2026



## ABSTRACT:

The increasing adoption of artificial intelligence in clinical decision support systems has been constrained by persistent concerns regarding safety, interpretability, and regulatory trustworthiness. While graph neural networks (GNNs) have shown strong predictive performance by modeling complex relationships in electronic health records, they largely operate as unconstrained statistical models that may produce clinically unsafe or logically inconsistent recommendations. This study proposes a novel Graph-Neurosymbolic Framework for Trustworthy Clinical Decision Support that tightly integrates graph-based neural learning with formal symbolic medical reasoning. In the proposed framework, patients and clinical entities are represented as a heterogeneous clinical graph, while domain knowledge encoded as first-order logic and Horn-clause rules explicitly constrains graph construction, neural message passing, and inference. The novelty of this study lies in embedding symbolic governance directly into the learning process rather than applying post-hoc rule checking or explainability. This design enables formal safety enforcement, logical consistency, and the generation of rule-driven counterfactual explanations that are clinically plausible and auditable. The framework is evaluated using two large publicly available electronic health record datasets, MIMIC-IV and eICU-CRD, representing both single-center and multi-institutional clinical settings. Experimental results demonstrate that the proposed graph-neurosymbolic approach achieves competitive predictive performance while substantially reducing clinical rule violations compared to neural-only baselines. In addition, the framework produces high-fidelity and rule-consistent explanations and exhibits improved robustness under distribution shift across institutions.

Link:

<https://www.scopus.com/pages/publications/105045848104>



### **TITLE:**

A comprehensive review on secure image watermarking using cryptography and DL

### **AUTHOR :**

Shinde V.R.; Pande H.

### **JOURNAL NAME:**

Imaging Science Journal

### **DETAILS:**

Published on 14 August 2026



### **ABSTRACT:**

The widespread distribution of digital images through cloud platforms, social media, and intelligent systems has intensified concerns regarding copyright protection, ownership verification, and content integrity. Traditional digital image watermarking techniques often exhibit limited robustness against geometric and signal-processing attacks and remain vulnerable to unauthorized watermark manipulation. Recent research has, therefore, explored hybrid approaches that integrate cryptographic techniques with Deep Learning (DL) to improve watermark security, robustness, and imperceptibility. This paper presents a comprehensive review of recent cryptography- and DL-based image watermarking methods, focusing on security enhancement strategies, robustness mechanisms, and commonly adopted performance metrics. It further examines challenges related to computational complexity, scalability, interpretability, real-time processing, and resource-constrained deployment, particularly in edge computing and Internet of Things (IoT) environments. Finally, key research gaps, open challenges, and future directions are identified to support the development of secure, robust, intelligent, and adaptive image watermarking systems.

Link: <https://doi.org/10.1080/13682199.2026.2716280>



## TITLE:

An Interpretable Machine Learning Approach to Fake News Detection and Domain-Wise Classification

## AUTHOR :

Keer K.; Bokhare A.; Pabalkar V.;  
Chitranshi J.; Vanikar J.C.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

The spread of fake news is a serious danger to democratic discourse, public health, and public trust. Four machine learning models Logistic Regression, Naive Bayes, Random Forest, and XG-Boost are compared in this study for the purpose of classifying news as either real or fake. Utilizing TF-IDF and unique linguistic metrics, extensive preprocessing and feature engineering were carried out. The top-performing model was described using LIME for interpretability after models were evaluated using F1-score, ROC-AUC, and confusion matrices. In order to further categorize fake news, the system was expanded to include five macro categories namely, social issues, politics, health, crime, and finance. Our findings show encouraging interpretability, performance, and real-world deployment potential.

Link: [https://doi.org/10.1007/978-3-032-27705-3\\_35](https://doi.org/10.1007/978-3-032-27705-3_35)



### TITLE:

Exploring the determinants of responsible investing: revisiting the role of emotional intelligence in investment behaviour

### AUTHOR :

Raut R.; Rao S.; Kumar C.; Deshpande A.;  
Kaul N.

### JOURNAL NAME:

Frontiers in Behavioral Economics (Vol.-5)

### DETAILS:

Published on 24 June 2026



### ABSTRACT:

**Purpose** – In an era marked by heightened market volatility and growing investor responsibility, understanding the psychological determinants of sound investment behaviour has become increasingly important. This study examines how emotional intelligence (EI) shapes investment performance (IP), with overconfidence bias (OB) and self-regulation (SR) acting as mediators and financial literacy (FL) serving as a moderator. **Design** – A quantitative, cross-sectional research design was employed. A structured questionnaire was administered to 448 active investors in India, predominantly working professionals aged 30–60 years who actively managed their own investment portfolios. Participants were selected through purposive sampling. The proposed conceptual model was tested using confirmatory factor analysis and structural equation modelling (SEM) in AMOS 26. Common method bias was assessed using Harman's single-factor test (which showed that a single factor accounted for 45.86% of the variance), and convergent and discriminant validity were established ( $CR > 0.87$ ;  $AVE > 0.57$ ). **Findings** – The structural model demonstrated a satisfactory fit ( $CFI = 0.970$ ;  $RMSEA = 0.055$ ). EI exerted a significant positive association with IP ( $\beta = 0.465$ ,  $p < 0.001$ ) and a strong negative association with OB ( $\beta = -0.871$ ,  $p < 0.001$ ), while OB negatively influenced IP ( $\beta = -0.194$ ,  $p < 0.01$ ). Both OB and SR significantly mediated the relationship between EI and IP, and FL significantly moderated this relationship ( $\beta = 0.128$ ,  $p < 0.001$ ), strengthening it under conditions of high financial literacy. **Practical implications** – The findings suggest that integrating EI training into financial literacy programmes can enhance investor decision-making, improve advisory effectiveness, and improve long-term portfolio outcomes.

Link: <https://doi.org/10.3389/frbhe.2026.1826273>



### **TITLE:**

Introduction to Federated Learning in Financial Services

### **AUTHOR :**

Jabde M.; Patil C.H.; Upasani M.; Wagh A.

### **JOURNAL NAME:**

A Review Series: Federated Learning in Financial Services: A Path to Secure AI

### **DETAILS:**

Published on 2026



### **ABSTRACT:**

The quick digital transformation of financial support services has led to widespread acceptance of artificial intelligence (AI) methodologies and machine learning (ML) techniques for tasks such as CIBIL/credit scoring, fraud recognition and detection, risk management, and personalized banking. However, the sensitive landscape of financial data, combined with stringent regulatory and confidentiality requirements, significantly limits the applicability of conventional centralized learning approaches. Federated Learning (FL) has arisen as a distributed machine learning methodologies that allows multiple financial institutions to combinedly train models without sharing raw data, thus preserving data privacy, data sovereignty, and regulatory compliance. This book chapter provides a comprehensive examination of federated learning in the context of financial services. It introduces the fundamental concepts, architectures, and operational workflows of federated learning, followed by an in-depth discussion of why federated learning is particularly important for the financial sector. The chapter analyses key challenges faced by financial institutions, including data silos, cybersecurity risks, regulatory constraints, fairness concerns, and the need for cross-institutional collaboration. Furthermore, the chapter presents a detailed exploration of major financial applications of federated learning, including credit scoring, fraud detection, counter-terrorist financing, anti-money laundering, risk management, stress testing, personalised banking, algorithmic trading, regulatory technology, and integration with blockchain-based financial systems. By synthesising theoretical foundations with practical use cases, this chapter demonstrates how federated learning serves as a foundational technology for secure, scalable, and responsible artificial intelligence in modern financial ecosystems.

Link:

<https://www.scopus.com/pages/publications/105047762517>



## TITLE:

Reboarding realities: training comprehensiveness as a moderator between change fatigue, mental health, and intention to leave in reboarding mothers

## AUTHOR :

Shetye S.K.; Srivastava A.P.

## JOURNAL NAME:

European Journal of Training and Development

## DETAILS:

Published on 19 August 2026



## ABSTRACT:

**Purpose** – Drawing upon the Job Demands–Resources (JD-R) Model, the study examines the direct and mediated linkages between change fatigue (CF), mental health (MH) and intention to leave (ITL) in the context of “reboarding mothers” – mothers returning to work after maternity leave or a prolonged child-rearing absence. This study aims to further examine whether training comprehensiveness (TC) functions as a moderating resource in the relationships among CF, MH and ITL. **Design/methodology/approach** – Using convenience and quota sampling methods, data from 313 reboarding mothers were collected and analysed by applying the partial least squares-structural equation modelling method to identify the linkages between the studied variables using SmartPLS-4 software. **Findings** – The findings indicate that CF is positively related to ITL and negatively related to MH among reboarding mothers. MH was also found to be negatively associated with ITL. Further, analysis revealed that MH partially mediated the relationship between CF and ITL. In addition, training comprehensiveness moderated the indirect relationship, suggesting that mothers who perceived their reboarding training to be more comprehensive experienced weaker adverse effects of CF on MH and subsequent intentions to leave. **Practical implications** – The findings highlight the importance of comprehensive reboarding training as a workplace resource that may support mothers’ workforce reintegration. The study offers practical insights for organisations seeking to strengthen reboarding initiatives by enhancing role clarity, workplace adaptation and employee support during the transition back to work. **Originality/value** – The study extends the application of the JD-R model, wherein CF is related to job demand and training comprehensiveness as job resources. These linkages provide sensitisation about the transition challenges that reboarding mothers face; at the same time, the study offers mitigation strategies through comprehensive training.

Link: <https://doi.org/10.1108/EJTD-04-2025-0069>



### TITLE:

Facial Emotion Detection using Optimized  
CNN and ResNet with PSO

### AUTHOR :

Dangi D.; Kumar J.; Gupta R.; Sharma S.

### JOURNAL NAME:

Procedia Computer Science (Vol.-283)

### DETAILS:

Published on 13 August 2026



### ABSTRACT:

Emotion detection through facial expressions is integral to various fields, spanning healthcare, human psychology, and computer-human interfaces. This paper presents a thorough investigation into automated emotion recognition from facial imagery. In the proposed work novel framework is proposed, employing computer vision and machine learning techniques for emotion feature extraction and expression classification. Two publicly available datasets, FER 2013 and RAF-DB have been used. After data pre-processing, data augmentation has been performed. For classification purposes, CNN, PSO+CNN, ResNet50V2, and PSO+ResNet50 V2 models have been used. Results indicate the efficacy of the approach in accurately identifying emotions, including happiness, sadness, and others, with accuracies of 68.67% using PSO + Convolutional Neural Networks (CNN) and 74.71% using PSO + Residual Networks (ResNet). Emotion detection from facial expressions holds promise for enhancing human-computer interaction and understanding human behaviour, with implications across diverse domains.

.Link: <https://doi.org/10.1016/j.procs.2026.06.165>





## TITLE:

Image Classification through Deep Learning Models using Machine Learning Techniques

## AUTHOR :

Pawar S.; Kuveskar M.; Kale R.

## JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026 (Vol.-1)

## DETAILS:

Published on 2026



## ABSTRACT:

Large-scale image dataset processing for classification has remained a significant computational burden on the general-purpose Artificial Neural Networks (ANNs) and Classical Machine Learning (ML), resulting in lower computational efficiency and not very high levels of accuracy. In order to overcome these limitations, in this paper, we propose a deep learning framework well optimized for learning image-classification-specific tasks. The paper introduces the basics of neural networks and the importance of different CNN architectures in image classification in the beginning. It makes the following essential improvements to traditional CNN models for improved feature extraction, noise reduction, and tuning of parameters. A custom deep learning network architecture is designed and tuned towards high performance and scalability. Comprehensive experiments also show that the proposed model outperforms a number of state-of-the-art CNN models in classification accuracy with various iterations. Furthermore, the effect of architecture and parameter tuning on performance is deeply investigated. Results demonstrate the efficiency and effectiveness of our proposed model in solving complex image classification problems.

Link:

<https://www.scopus.com/pages/publications/105047252706?origin=resultslist>





## TITLE:

Deep ResNet-Based Classification of Handwritten Devanagari Characters: A Comprehensive Evaluation on DEVA-C-SET Dataset

## AUTHOR :

Garud A.; Mali S.M.; Patil C.H.; Nagane A.S.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

Recognizing handwritten characters in Indic scripts is a big problem for optical character recognition since scripts like Devanagari are quite complicated, and people write in different ways. This work does a full evaluation of a ResNet-based deep learning architecture for finding Devanagari letters. It uses the DEVA-C-SET dataset, which has 44,000 photographs of handwritten characters in 44 classes that were made using digital canvas methods. Our suggested ResNet architecture works very well on the test dataset, with an F1-score of 99.87%, an accuracy of 99.87%, a precision of 99.88%, and a recall of 99.87%. The study looks at performance per class in great detail, checks the confusion matrix, and compares it to other methods that are already in use. The results show that using high-quality digitally acquired datasets with residual network designs works well for identifying Indic scripts. This sets a new standard for systems that classify Devanagari characters.

Link: [https://doi.org/10.1007/978-3-032-19160-1\\_13](https://doi.org/10.1007/978-3-032-19160-1_13)



## TITLE:

Impact of Artificial Intelligence Assisted Drug Therapy Optimization on Drug Related Problems Amongst Older Adult Patients: A Systematic Review

## AUTHOR :

Syed J.; Thomas C.; Kaur B.; Pereira P.; Jayaram T.C.; Undela K.; Madhan R.; Math P.K.T.; Patil V.; Avarebeel S.; Ramesh K.; Chalasan S.H.

## JOURNAL NAME:

International Journal of Pharmaceutical Investigation (Vol.-16, Issue-1)

## DETAILS:

Published on November 2025



## ABSTRACT:

Drug-Related Problems (DRPs) are common among hospitalized older adult patients and can lead longer hospital stays, worsening clinical conditions, increased healthcare costs, and even death. Artificial Intelligence (AI)-assisted interventions may aid in the optimization of medications and prevention of DRPs in this population. This review elucidates the impact of AI-assisted interventions on drug therapy optimization and identifies and prevents DRPs in hospitalized older adult patients. A comprehensive literature search was conducted in PubMed, Scopus, and Google Scholar for studies published between January 2012 to December 2022, pertaining to AI in drug therapy optimization in older adult care. The quality of the included studies was also assessed. A total of 567 relevant studies were identified, with 194 records excluded as duplicates. Following screening and eligibility determination, 13 studies were included in the review (five randomized controlled trials, two non-randomized trials, and six cohort studies). The quality ratings ranged from 79 to 100%. The studies examined clinical decision support systems and their impact on outcomes such as potentially inappropriate medications, medication appropriateness, adverse drug events, and AI recommendation acceptance rates ranging from 18 to 54%. Overall, AI tools aided in the improvement of prescribing practices; however, definitive effects on key outcomes were lacking. Alert fatigue and disobeying AI advice were significant barriers. AI interventions have the potential to improve medication safety and optimize treatment regimens for older adult patients in hospitals. However, more research is necessary to determine the true clinical significance of the CDSS and other technological interventions, especially in terms of critical clinical outcomes, such as adverse drug reaction identification and prevention, healthcare utilization, patient morbidity, and mortality.

Link: <https://www.jpionline.org/article/16/1/30>



### TITLE:

Midline versus bilateral miniscrews with clear aligners for intrusion of maxillary anteriors: A finite element model analysis

### AUTHOR :

Lolge S.; Kharche A.; Deshmukh S.; Gautam R.; Mastud C.; Dhattrak P.

### JOURNAL NAME:

APOS Trends in Orthodontics (Vol.-16, Issue-3)

### DETAILS:

Published on 10 August 2026



### ABSTRACT:

**Objectives:** This study compares stress distribution on maxillary dentition, periodontal ligament (PDL), alveolar bone, and aligners using a midline versus bilateral miniscrews to intrude maxillary anteriors for deep bite correction with clear aligner therapy. **Material and Methods:** A 3D computer-aided design (CAD) model of the maxilla and maxillary dentition with aligner was created using computer-aided three-dimensional interactive application version 5 release 7 (CATIA V5R7). Two models with different miniscrew configurations were made (M1 = single midline miniscrew and M2 = two miniscrews bilaterally). This assembly was subjected to 50 g, 100 g, 150 g, 200 g, and 300 g loads using elastics. M1 was subjected to loading on one implant, and M2, the loads were equally divided on two implants bilaterally. Stress distribution and displacement on the assembly (aligner, maxillary dentition, PDL, and alveolar bone) were evaluated and compared. **Results:** The equivalent von Mises stress proportionally increased in both models (M1 and M2) with an increase in loading force. The stresses and displacement with the M1 model were almost twice as compared to M2 for the same loading force, with M2 showing stress on the canine. M2 provides better control over proclination with the same magnitude of load. **Conclusion:** Using miniscrews along with clear aligners resulted in variable stress distribution patterns, with the M2 configuration showing even distribution of stresses. Greater displacement with M1 in the sagittal direction resulted in labial flaring. M1 can be used in cases with retroclined incisors, while M2 can be used in cases requiring canine intrusion.

Link:

<https://www.scopus.com/pages/publications/105047710564>





## TITLE:

Optischedule Algorithm for Automatic Time Table Generator- Nexus of Metaheuristic Optimization Approaches with Heuristic Search Techniques

## AUTHOR :

Deshmukh R.; Jadhav B.; Deshpande R.A.;  
Kuwar K.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

Creating a schedule takes a lot of effort and time for educators. An intelligent scheduling appliance would reduce this load by streamlining the process and saving valuable time. By creating schedules automatically, our proposed system aims to eliminate the challenges associated with traditional setup and management. To do this, we plan to employ complex algorithms such as resource scheduling, genetics, and heuristics. These algorithms incorporate several methods to increase the efficiency of the timetable creation process. The number of subjects, professors, workload, semester, and topic priorities will all be entered into the system. The system will create workable schedules for the working days of the week using these inputs, making the best use of all available resources while adhering to predetermined limitations.

Link: [https://doi.org/10.1007/978-3-032-27157-0\\_1](https://doi.org/10.1007/978-3-032-27157-0_1)



## TITLE:

Twitter Sentiment Mining for  
Cryptocurrencies with Deep Learning  
Approach

## AUTHOR :

Garala J.; Kulkarni S.

## JOURNAL NAME:

17th International Conference on Advances  
in Computing, Control, and  
Telecommunication Technologies, ACT  
2026

## DETAILS:

Published on 2026



## ABSTRACT:

Due to their volatility in price, the cryptocurrencies are used widely in different financial and business undertakings. Advancement in the processing of natural language and giant data analytics has caused the inception of automated systems that assess sentiments in online communities, which have now been crucial in facilitating publication of opinions by individuals in this forum. Twitter, one of the most popular social media there are, has several tweets about cryptocurrencies. With this information, we can predict the shift of bitcoin prices by utilizing deep learning (DL). Studying the sentiment of Twitter, the researchers aim to come to know more and analyze factors that are driving volatile price of cryptocurrencies. The central issue in this article is the lack of the standard model that may be referred to for the analysis of textual emotions, although textual emotions are among the reasons behind the increase and decrease in the price of cryptocurrencies. The aim of this article is to classify the sentiments for an expression into three classes. neutral, negative, and positive. The techniques that have been used include Word embedding Fast-Text model, Long-short-term memory networks (LSTMs), re-current neural networks (RNNs), gated recurrent units (GRUs), one-dimensional convolutional neural networks (CONV1D), a bi-LSTM+CONV1D, Recurrent-Convolutional Neural Networks (Three different datasets from Kaggle which contain different tweets on cryptocurrencies have been used in this research. The Long Short-Term Memory (LSTM) generated the best results in comparison with other similar techniques and outperformed other approaches in determining the sentiment conveyed within the text of the cryptocurrencies.

Link:

<https://www.scopus.com/pages/publications/105047285036?origin=resultslist>





## TITLE:

Advancing Decision-Making in Cricket: A Review of AI - Driven Decision Review System(DRS)

## AUTHOR :

Shah M.; Bobde S.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

Artificial Intelligence (AI) is a game-changer in cricket as it helps umpires and makes the decisions more accurate, especially through the Decision Review System (DRS). This paper narrates the progress of AI techniques in cricket, beginning with conventional machine learning models like Support Vector Machines (SVM) and Random Forests and culminating in modern deep learning models such as Convolutional Neural Networks (CNN), Long Short-Term Memory (LSTM), and hybrid models. These methodologies had excellent results in certain fields like no-ball detection, boundary detection, and umpire signals recognition. Nevertheless, they still have some problems, for example, they need to understand both spatial and temporal support, the dataset is scarce, and the computational requirement is high. As a solution to such a problem, a hybrid deep learning architecture integrating ResNet, CNN, and LSTM is proposed. This system is intended to speed up the event detection process as well as make it more accurate in cricket scenarios like LBW, run-outs, wickets, and wides. This paper also identifies some areas that can be turned into research topics such as the need for more diversified data collection, better efficiency of models, utilization of multiple camera inputs, and implementation of explainable AI for improved transparency. In summary, AI technology can be a great help to umpires in that it makes the decisions fairer, more consistent, and reliable

Link: [https://link.springer.com/chapter/10.1007/978-3-032-27163-1\\_37](https://link.springer.com/chapter/10.1007/978-3-032-27163-1_37)





## TITLE:

Constructing Economic Resilience Policies,  
Institutions, and Strategic Foresight: Trade-  
Offs Constraints and Innovations

## AUTHOR :

Sengupta R.

## JOURNAL NAME:

Policies and Interventions to Enhance  
Economic Resilience

## DETAILS:

Published on 2 June 2026



## ABSTRACT:

Economic resilience has emerged as a defining characteristic of nations capable of navigating turbulent global conditions without suffering permanent damage to their growth trajectories. This chapter examines the practices that distinguish resilient economies from those that succumb to protracted downturns following adverse shocks. Rather than treating resilience as an inherent quality, the analysis frames it as the outcome of deliberate policy choices, institutional arrangements, and strategic foresight. Drawing on comparative evidence across diverse economic contexts, the chapter identifies patterns in how governments, firms, and communities construct adaptive capacity before crises occur and mobilize resources during periods of acute stress. The discussion moves beyond prescriptive frameworks to acknowledge the contested nature of resilience-building, where trade-offs between efficiency and redundancy, growth and stability, often defy simple resolution.

Link: <https://doi.org/10.4018/979-8-3373-5218-3.ch002>



## TITLE:

Navigating the utility of generative artificial intelligence in healthcare delivery

## AUTHOR :

Kulkarni M.; Sheth M.; Chaudhary P.

## JOURNAL NAME:

Natural Language Processing for Healthcare:  
The Rise of Intelligent Assistants

## DETAILS:

Published on 2026



## ABSTRACT:

The healthcare sector is seeking to adopt new technology-based solutions to continually evolve and combat rising healthcare expenses and a shortage of qualified healthcare professionals. A particular category of AI that ChatGPT has popularized is generative AI. Generative AI is a complex technology that uses deep learning models to generate human-like content, such as images and sentences, in response to diverse and intricate prompts, which can include various languages, instructions, and questions. In keeping with our definition, it is essential to note that Generative AI goes beyond the human-like interactions in Conversational AI by having the unique capacity to deliver a response and develop the content in that response. To this effect, Artificial Intelligence (AI) and associated technologies are seen as a great transforming force. These technologies may transform many facets of patient care and operational procedures within providers, payers, and pharmaceutical organizations. Newer forms of artificial intelligence, particularly generative AI, are gaining importance in healthcare due to their potential applications and promise of improving patient care. Specifically, generative AI has shown promise in aiding diagnosis through decision support systems, medical report production, and synthetic image synthesis, while predictive text generation has proven helpful for documentation purposes. Synthetic text generation, just-in-time feedback, and conversation systems were beneficial in clinical management. Although generative AI has the potential to revolutionize healthcare, it is crucial to carefully weigh the risks, advantages, and safety measures to protect patients and allay ethical and privacy concerns. The chapter will focus on understanding the usefulness of generative AI in healthcare provision.

Link: <https://doi.org/10.1016/B978-0-443-45252-9.00015-3>



### **TITLE:**

Sustainability of Fished Populations  
Challenges, Strategies and Future Directions:  
A Review

### **AUTHOR :**

Kulkarni P.; Kulkarni A.; Alware S.T.;  
Pandey A.; Kalita T.

### **JOURNAL NAME:**

Agricultural Science Digest (Vol.-46, Issue-4)

### **DETAILS:**

Published on 28 February 2026



### **ABSTRACT:**

This review paper summarizes recent research on global fisheries, highlighting ecological, economic and social obstacles. Ecologically, overfishing, habitat degradation and climate change threaten the health of marine ecosystems, necessitating ecosystem-based management approaches and conservation measures. Economically, declining fish stocks and market dynamics pose challenges to the livelihoods of fishing communities, highlighting the importance of sustainable fishing practices and alternative earning options. Strategies such as ecosystem-based management, science-based decision-making and innovative technologies are identified as crucial for achieving sustainability. Effective fisheries management also requires legislative actions targeted at stopping illegal fishing and fostering global collaboration. The assessment recommends cooperative efforts in the future between communities, governments and stakeholders to maintain the long-term viability of fishing populations through the application of adaptive management techniques. By adopting these strategies and establishing resilience, it is aimed to preserve marine biodiversity, secure food sources and support the well-being of present and future generations.

Link: <https://doi.org/10.18805/ag.d-6301>



## TITLE:

Detecting Human Activity in Thermal Low-Light Videos using Score-Level Fusion of EfficientNet and MobileNet

## AUTHOR :

Pawar P.P.; Phadke A.C.

## JOURNAL NAME:

Recent Advances in Electrical and Electronic Engineering (Vol.-19)

## DETAILS:

Published on 10 April 2026



## ABSTRACT:

Introduction: Human Activity Recognition (HAR) in low-light environments is indispensable for healthcare, surveillance, and assisted living, as visibility is limited. The accuracy remains a challenge in Thermal imaging enables activity detection in such conditions. This work introduces a lightweight score-level fusion framework via the Weighted Quadratic Average Method (WQAM) in combining MobileNetV2 and EfficientNetB0 to boost recognition performance on thermal video data. Methods: A dataset of 1,000 low-light thermal recordings covering four events, such as walking, running, duck walking, and crawling, was collected using a FLIR C5 imager. Frame extraction and normalization were involved in preprocessing. To improve classification reliability while maintaining efficiency, MobileNetV2 and EfficientNetB0 were trained individually, and WQAM is used to fuse their outputs. Results: MobileNetV2 achieved 87% accuracy, and EfficientNetB0 reached 90%. The proposed fusion model outperform both individual models and state-of-the-art methods significantly and improves performance, achieving 96% accuracy. The approach also demonstrated a reduced processing time for real time applications. Discussion: The complementary features of MobileNetV2 and EfficientNetB0 are leveraged in WQAM-based fusion effectively, providing computational efficiency and superior recognition accuracy. For real-world applications where accuracy and speed are equally critical, this framework provide suitable balance. Conclusion: The proposed WQAM fusion framework surpasses baseline models and existing methods, achieved 96% accuracy on low-light thermal HAR. This fusion provides a practical solution for deployment in surveillance, healthcare, and assisted living environments with robustness, efficiency, and scalability.

Link:

<http://dx.doi.org/10.2174/0123520965432576260111035558>



### TITLE:

Evaluation of Logistic Regression and Decision Tree Classifiers to Detect Smurf Attacks on a Network Interface

### AUTHOR :

Abubakar A.A.; Mishra A.; Abubakar U.B.

### JOURNAL NAME:

A Review Series: Federated Learning in Financial Services: A Path to Secure AI

### DETAILS:

Published on 2026



### ABSTRACT:

Reliable cyber-attack detection is important to safeguard systems and networks. A Smurf attack is a resource consumption attack using Internet Control Message Protocol (ICMP) to overwhelm a network with ping traffic which consumes available bandwidth. The research provides a solution using machine learning classifiers (logistic regression and decision tree) algorithms to classify malicious packets from a generated dataset, the researchers used the dataset KDD99Cup, which is a rich pcap (packet capture) dataset that contains malicious smurf packets. The experiment was carried out using python programming language and results show that logistic regression outperformed the decision tree with accuracy in classification of 92%, with the decision tree having 86%. The results archived using the classifiers show the need for more cyber security firms to adopt the implementation of ML algorithms for better detection rates.

Link:

<https://www.scopus.com/pages/publications/105047760552?origin=resultslist>





## TITLE:

Optimization Methods in Mobile  
Communication Systems: A Machine-  
Generated Literature Overview

## AUTHOR :

Pande M.; Kulkarni A.J.; Shastri A.S.

## JOURNAL NAME:

Optimization Methods in Mobile  
Communication Systems: A Machine-  
Generated Literature Overview

## DETAILS:

Published on 2025



## ABSTRACT:

This book presents the result of an innovative challenge, to create a systematic literature overview driven by machine-generated content. This machine-generated volume, with chapter introductions by the human expert, of summaries of the existing studies furthers our understanding of the optimization methods in mobile communication systems. The book provides a machine generated comprehensive yet classified review of the optimization methods, techniques and approaches associated with different mobile communications and systems including wavelet-based CR-OFDM systems, MIMO slot antenna with low mutual coupling for 5G networks, etc. It also covers mainly the techniques for performance analysis of MIMO systems such as the hybrid filtering technique for MIMO-OFDM systems and artificial intelligence solutions beyond 5G radio access networks. Questions and related keywords were prepared for the machine to query, discover, collate and structure by Artificial Intelligence (AI) clustering. The AI-based approach seemed especially suitable to provide an innovative perspective as the topics are indeed both complex, interdisciplinary and multidisciplinary. Springer Nature has published much on these topics in its journals over the years, so the challenge was for the machine to identify the most relevant content and present it in a structured way that the reader would find useful. The automatically generated literature summaries in this book are intended as a springboard to further discoverability. They are particularly useful to readers with limited time, looking to learn more about the subject quickly and especially if they are new to the topics. Springer Nature seeks to support anyone who needs a fast and effective start in their content discovery journey, from the undergraduate student exploring interdisciplinary content to Master- or PhD-thesis developing research questions, to the practitioner seeking support materials, this book can serve as an inspiration, to name a few examples.

Link: <https://link.springer.com/book/10.1007/978-981-95-1810-4>



## **TITLE:**

Anomaly Detection in Cryptocurrency Prices

## **AUTHOR :**

Pawar A.; Choudhari S.; Naik S.; Khande R.

## **JOURNAL NAME:**

Springer Proceedings in Mathematics and  
Statistics

## **DETAILS:**

Published on 14 October 2025



## **ABSTRACT:**

This Paper focuses on creating and utilizing ML algorithms that can detect anomalies in the pricing of key cryptocurrencies, including Bitcoin, Ethereum, Avalanche, Tether, and Litecoin. The volatility of the cryptocurrency market highlights the significance of identifying abnormal price movements that might indicate market scams or other discrepancies. Through this research, we employ Random Forest, Isolation Forest, and XGBoost models, all offering distinct advantages: Random Forest merges different educational approaches, Isolation Forest is skilled at pinpointing anomalies, and XGBoost applies enhancement techniques. By utilizing these models, we enhance the detection of abnormal trading behaviors, promoting a more secure and open environment in the cryptocurrency market. Additionally, we present the findings of the anomaly detection through PowerBI and Python tools to clearly communicate insights to stakeholders. The outcomes show the effectiveness of these machine learning approaches in detecting anomalies, aiding both investors and regulatory bodies in making well-informed decisions about the direction of the cryptocurrency market.

Link: [https://doi.org/10.1007/978-981-95-3841-6\\_15](https://doi.org/10.1007/978-981-95-3841-6_15)



## TITLE:

HPLC Analysis of Saptarangi plus Kadha  
and Saptarangi Tablet

## AUTHOR :

Bharswde J.; Choudhari V.; More C.;  
Kuchekar A.; Gadhave R.; Choudhari G.

## JOURNAL NAME:

Research Journal of Pharmacy and  
Technology (Vol.-19, Issue-6)

## DETAILS:

Published on 5 June 2026



## ABSTRACT:

RP-HPLC isocratic method was developed for mangiferin (MAN) in polyherbal liquid, Saptarangi plus Kadha and herbal tablet, Saptarangi tablet (vati) formulation using JASCO (LC4000) System, 4010 diode array detector, YMC-Pack Pro C-18, (250 mm × 4.6 mm, 3 μm) column, software (Crome-Nav 2), data integration at 254 nm was achieved. Water: ACN (30:70 v/v), mobile phase, pH adjusted to 3 with orthophosphoric acid at flow rate of was 1 ml/min was used. The analysis was completed within 6 minutes. Hence, consequently speed and economy has been achieved in analysis. System suitability parameters for analytes were well within the limit. The method was validated as per ICH guidelines and was found to be simple, linear, specific, accurate and robust. The linearity was observed over the concentration range of 10-50 μg/ml at 254 nm with R<sup>2</sup> 0.995 for MAN. The method precision (inter-day and intra-day) was determined using six-independent test solutions and % RSD was found <2. Assay method was evaluated with the recovery of the standards. The results of recovery found close to 100 % confirms accuracy of the method. The result of precision and recovery shows that the methods is precise and accurate. The values of LOD and LOQ were calculated and method were found to be sensitive. RT of standard in chromatograms of extracts and herbal preparations matches perfectly. The values of purity front and purity tail were found greater than 0.99 for MAN which indicate peak is pure. Hence, a method is specific. The effect of different variations on peak areas was evaluated by calculating %RSD for each condition which indicate low value for %RSD (less than 2) and hence, method is robust.

Link: <https://doi.org/10.52711/0974-360X.2026.00347>



## TITLE:

Anti-hemorrhoidal Efficacy of  
Hydroethanolic Extract of *Tagetes erecta*  
Flower-Based Ointment in Croton Oil-  
Induced Hemorrhoids: Role of VEGF and  
COX-2 Inhibition

## AUTHOR :

Kore P.; Deshmukh A.; Desai U.; Pujari R.;  
More A.; Nipate S.; Chaudhari S.; Kuchekar  
M.; Harde M.; Shingan A.

## JOURNAL NAME:

Revista Brasileira de Farmacognosia (Vol.-  
36, Issue-1)

## DETAILS:

Published on 29 July 2026



## ABSTRACT:

Hemorrhoids are characterized by inflammation, vascular dilation, and abnormal angiogenesis, and currently available therapies often provide only limited and temporary relief. The present study aimed to evaluate the anti-hemorrhoidal potential of *Tagetes erecta* L., Asteraceae (African marigold), through molecular docking, topical formulation development, in vivo efficacy studies, and mechanistic investigation focusing on inflammatory mediators and vascular endothelial growth factor expression. A total of 142 phytoconstituents reported from *T. erecta* were screened through molecular docking against vascular endothelial growth factor receptor 2 and cyclooxygenase-2. To conduct an in-depth interaction analysis of vascular endothelial growth factor receptor 2 and cyclooxygenase-2, the 10 top compounds with the lowest binding energies were chosen. A hydroethanolic extract of the plant was incorporated into ointment formulations and evaluated for rectal permeation using Franz diffusion cells. Hemorrhoids were experimentally induced in rats using a croton oil preparation. Following treatment with the formulated ointments for 5 days, rectoanal coefficient and severity score were assessed. Serum levels of pro-inflammatory markers including tumor necrosis factor- $\alpha$ , interleukin-6, prostaglandin E2, and cyclooxygenase-2, along with the anti-inflammatory cytokine interleukin-10, were determined. Immunohistochemistry was performed to evaluate vascular endothelial growth factor expression, and histopathological analysis was conducted to examine tissue morphology. The 20% *T. erecta* ointment showed favorable rectal permeation and significantly reduced rectoanal coefficient and severity scores. Treatment normalized inflammatory cytokine levels in a dose-dependent manner, reduced vascular endothelial growth factor expression, and improved tissue architecture. *Tagetes erecta* ointment demonstrated significant anti-hemorrhoidal activity.

Link: <https://link.springer.com/article/10.1007/s43450-026-00763-y>



## TITLE:

Investigating the Methods of Preparation and Application of Solid Lipid Nanoparticles – A Review

## AUTHOR :

Pradhan S.J.; Phatak M.M.; Kuchekar A.;  
Gawade A.

## JOURNAL NAME:

International Journal of Pharmaceutical Sciences and Nanotechnology (Vol.-29, Issue-3)

## DETAILS:

Published on June 2026



## ABSTRACT:

Over the past years, solid lipid nanoparticle delivery systems have become popular. An attractive colloidal carrier system with several applications and unique qualities, SLN seems to be. It has gained popularity due to its tolerance, increased potency, and lower levels of toxicity as well as the miracles it has achieved in treating various diseases including cancer and TB. SLN-incorporated medications are patient-compliant, easy to produce, and offer several benefits. It is cost-effective and provides administration through several routes. Solid lipid nanoparticles overcome the drawbacks of colloidal carriers and are attracting much attention from formulators. There are several methods for producing lipid nanoparticles, high and low-temperature homogenization, solvent injection, ultrasonication, and spray-drying processes have all become more popular. Because of their comprehensive positive benefits, including skin hydration, occlusion, increased bioavailability, and skin targeting, SLNs have significant potential in the pharmaceutical and cosmetics industries. This article discusses the prospective contributions of SLNs to the delivery system to attract readers' interest in SLNs. Easy production, biocompatibility, scale-up feasibility, non-irritating, increased drug loading capacity, and stability are the main characteristics of SLN that make them a viable drug delivery technology.

Link: <https://doi.org/10.37285/ijpsn.2026.19.3.11>





## TITLE:

Foresight: Advanced Algorithms for  
Detecting Plastic Money Fraud

## AUTHOR :

Kakandwar M.; Kulkarni S.

## JOURNAL NAME:

17th International Conference on Advances  
in Computing, Control, and  
Telecommunication Technologies, ACT  
2026

## DETAILS:

Published on 2026



## ABSTRACT:

The widespread adoption of plastic money, such as credit and debit cards, for online payments has made financial systems increasingly vulnerable to fraud attempts by cybercriminals. Safeguarding financial security requires effective detection and mitigation of such fraudulent transactions. Machine learning offers a powerful solution for this challenge by identifying suspicious patterns within transaction data. This paper investigates the use of various machine learning models—including Convolutional Neural Networks (CNN), Random Forest, Naïve Bayes, and Artificial Neural Networks (ANN)—to categorize transactions as either fraudulent or genuine. Furthermore, the study explores enhanced accuracy and detection capabilities achieved by combining two models in a hybrid approach. This strategy enables financial institutions to proactively detect and address fraudulent activities, strengthening overall system security. The findings highlight the significant potential of machine learning in advancing fraud detection, ultimately fostering a safer and more dependable digital financial environment.

Link:

<https://www.scopus.com/pages/publications/105047258958?origin=resultslist>



## TITLE:

Effect on heat transfer performance of automobile radiator using hybrid nanofluids and phase change materials: an exhaustive review

## AUTHOR :

Nagawade S.S.; Deshmukh V.N.

## JOURNAL NAME:

Journal of Thermal Analysis and Calorimetry (Vol.-151, Issue-17)

## DETAILS:

Published on 30 July 2026



## ABSTRACT:

Nanofluids have demonstrated a remarkable ability to enhance the heat transfer performance of radiators, achieving an impressive average improvement of 20–28% compared to conventional coolants. This review examines the use of nanofluids in automotive radiators, focusing on key factors such as preparation methods, stability, and the mechanisms that enhance heat transfer. It discusses studies on both single and hybrid nanofluids, detailing their effects on radiator performance and the advantages of combining them with phase change materials. This report includes numerical simulation studies, turbulence modeling, and validation techniques used to predict heat transfer and pressure drop. The optimal operating parameters for nanofluids in radiators include a volume concentration ranging from 0.01 to 2, with particle shapes such as spherical, cylindrical, and platelet. The recommended volumetric flow rate is between 2 and 10 LPM, and the inlet fluid temperature should be maintained between 60 and 90 °C. Under these conditions, the OHTC increases by 15 to 50%. The review highlights the substantial impact of nanofluids and other miscellaneous techniques including incorporation with geometry modifications, turbulence promoters, and PCM in the cooling performance of radiators. In this review, researchers can find the challenges of practical implementation and the recommendations for future developments in this area.

Link: <https://doi.org/10.1007/s10973-026-15882-w>



### TITLE:

CKSO-BiLSTM: energy management strategy of hybrid electric vehicles using optimised torque controller

### AUTHOR :

Kulkarni H.H.; Deore M.P.; Lokhande N.; Jape V.S.; Soman A.R.; Kodgirwar V.P.

### JOURNAL NAME:

International Journal of Power Electronics  
(vol.-22, Issue-4)

### DETAILS:

Published on 2026



### ABSTRACT:

Optimal voltage vectors are selected to reduce the torque ripples and current harmonics and the control performance is improved. Multi-layer features and attention mechanisms are integrated to control the torque in the bidirectional long short-term memory (BiLSTM) model. The dynamic performance of the motor is enhanced by calculating the torque and load variations. Function dimensionality is increased by the proposed optimisation to solve the design problems and derive the finite solutions. The proposed collaborative knowledge sharing optimisation (CKSO) is used for the power consumption of the motor and finds the optimal torque for the motor operation. The proposed method CKSO-BiLSTM outperformed the results of dq current, mechanical power, RPM, speed and torque values are 230.32 A, 19.04, 64.12, 26.67 m/s and 24.82 N-m. These outperformed results prove the effectiveness of the model and accurate control of torque.

Link:

<https://www.scopus.com/pages/publications/105046006731?origin=resultslist>



## TITLE:

Enhanced dielectric response and optical tunability in  $\text{NH}_4\text{I}$ -doped  $\text{ZrO}_2/\text{PVA}$  nanocomposites for advanced electronic applications

## AUTHOR :

Patil A.M.; Naik J.; Bhajantri R.F.

## JOURNAL NAME:

Next Materials (Vol.-13)

## DETAILS:

Published on October 2026



## ABSTRACT:

$\text{NH}_4\text{I}$  doped  $\text{ZrO}_2/\text{PVA}$  multifunctional polymer nanocomposite films were successfully fabricated using a simple and cost-effective solution casting method with double distilled water as a solvent. The influence of  $\text{NH}_4\text{I}$  incorporation on the structural, optical, surface morphological, dielectric, and electrical properties of the composite films was systematically investigated. FTIR analysis confirmed the interaction between  $\text{NH}_4\text{I}$ ,  $\text{ZrO}_2$  nanoparticles, and the PVA polymer matrix, indicating the modification of polymer chain interactions and ionic environments. UV-Visible spectroscopy revealed that  $\text{NH}_4\text{I}$  doping significantly influenced the optical properties by reducing the direct optical band gap from 5.08 eV to 4.95 eV, while the minimum indirect band gap was observed at 4.65 eV. The correlation between optical band gap and refractive indices was evaluated using the Reddy and Singh-Kumar relationships, demonstrating the tunability of optical parameters through ionic doping. Atomic force microscopy analysis confirmed a homogeneous surface morphology with increased surface roughness, indicating effective incorporation of  $\text{NH}_4\text{I}$  within the composite matrix. The dielectric studies revealed higher permittivity at lower frequencies, followed by a gradual decrease with increasing frequency due to Maxwell-Wagner interfacial polarization arising from conductor-insulator interactions. The dielectric constant increased with  $\text{NH}_4\text{I}$  addition up to 10 wt% loading, attributed to enhanced dipolar polarization and ionic contribution within the polymer matrix. Furthermore, the AC conductivity exhibited a continuous increase with increasing  $\text{NH}_4\text{I}$  concentration over the entire frequency range, confirming improved charge transport facilitated by mobile ionic species. The obtained results demonstrate that  $\text{NH}_4\text{I}$  incorporation provides an effective strategy for tailoring the optical and dielectric properties of  $\text{ZrO}_2/\text{PVA}$  nanocomposites.

Link: <https://doi.org/10.1016/j.nxmte.2026.103009>



### **TITLE:**

ResNet-20: A Deep Learning Approach for Accurate Classification and Identification of Legume Leaf Diseases

### **AUTHOR :**

Patil B.D.; Parmar G.; Shinde-Pawar M.;  
Shahane D.; Patil A.A.; Dhotare V.

### **JOURNAL NAME:**

Indian Journal of Agricultural Research  
(vol.-60, Issue-7)

### **DETAILS:**

Published on June 2026



### **ABSTRACT:**

Background: The necessity for effective and precise disease detection techniques is highlighted by the rising demand for legumes. Convolutional neural networks (CNNs), a type of deep learning, provide a potent way to diagnose plant diseases. CNNs make it possible to accurately identify illnesses in real time by quickly evaluating enormous amounts of plant pictures. By giving farmers proactive tools for monitoring crop health, cutting losses and enhancing food quality, automated detection systems can improve agricultural practices. Methods: To categorize bean leaves, this study suggests a deep learning-based method utilizing the ResNet-20 model. To increase model generalization and lessen overfitting, data augmentation techniques such as scaling, rotation and flipping were employed. The model was trained on a dataset of labelled images and its performance was assessed using categorization metrics, confusion matrix, ROC curve and Matthews Correlation Coefficient. Result: The ResNet-20 model's test accuracy was 76.15. Additional performance indicators such as metrics demonstrated the model's reliable classification abilities. The ROC curve further illustrated the model's exceptional ability to differentiate between healthy and unhealthy leaves.

Link: <https://doi.org/10.18805/IJARE.A-6507>



### TITLE:

BrainMorphNet (BMN): Multistage Hierarchical Attention Framework for Robust Brain Tumor Detection in MRI

### AUTHOR :

Jadhav V.J.; Kale N.; Javale D.P.; Gore R.

### JOURNAL NAME:

Automation and Remote Control (Vol.-87, Issue-3)

### DETAILS:

Published on 21 August 2026



### ABSTRACT:

Abstract: The development of effective treatments and the improvement of patient survival rates depend heavily on the timely and precise diagnosis of brain tumors. Nevertheless, the current deep-learning methods have trouble generalizing, are prone to overfitting with small datasets, and are imprecise in identifying the subtle boundaries of tumors, all of which could limit their application in clinical settings. To tackle these concerns, this paper has introduced an innovative BrainMorphNet (BMN) structure which can automatically detect and categorize brain tumors on MRI images completely, hence overcoming these problems. The first step of the approach is the application of data-specific preprocessing to clear the images of artifacts and improve their quality. Afterwards, the multilevel feature extraction generates the global and local structures of the tumor regions simultaneously. Lastly, the framework applies adaptive attention mechanisms to spatial and contextual features and thus improve them. There is a very strong multiclass separation between gliomas, meningiomas, pituitary tumors, and nontumor cases, and the whole setup is such that cancers can be diagnosed at a particular place. Our rigorous testing on the Brain Tumor MRI and Figshare datasets gave a model accuracy of 0.993, precision of 0.985, and F1 score of 0.988. The system is a very effective and time-saving tool for brain tumor analysis automation, and it is a significant step towards more intelligent medical imaging and diagnostic systems. These impressive numbers show that BMN has good generalization and clinical reliability.

Link: <https://doi.org/10.1134/S0005117925601423>



## **TITLE:**

SDN in Cloud Computing

## **AUTHOR :**

Tandon A.; Nagare K.; Patel S.

## **JOURNAL NAME:**

Studies in Big Data (Vol.-195)

## **DETAILS:**

Published on 18 July 2026



## **ABSTRACT:**

Achieving a fair and sustainable future requires meeting Sustainable Development Goal 9 (SDG 9) through developing clean and efficient operations that assist organizations with enhancing their existing infrastructure, as well as stimulating innovation in the process. Each country will have to re-examine its own development plans based on numerous changes (digitalization, climate change, and a complicated global supply chain) that have occurred recently. This chapter illustrates the way various nations (both developed and developing) are addressing the effects of these changes at an international level. We will present an analysis of what works and what does not work through actual cases from the field. We have also created an Integrated SDG 9 Impact Model that provides a standard framework to discuss key themes relating to SDG 9 such as: innovation; resilient infrastructure; digital inclusion; and long-term sustainability. Finally, we will provide current data to identify the required investments and provide examples of successful implementation so that individuals including: investors; corporate leaders; and public policy can take action to solve the problems identified herein. The overarching goal of this chapter is to increase economic development through worldwide community development, environmental stewardship, and sustainable economic growth.

Link: [https://doi.org/10.1007/978-3-032-22249-7\\_12](https://doi.org/10.1007/978-3-032-22249-7_12)





## TITLE:

An intelligent computer vision-based deep learning framework for automated detection, localization, and classification of fruit diseases in precision agriculture systems

## AUTHOR :

Dahiwal P.; Wahul R.; Sonawane V.;  
Khonde S.; Khedkar S.; Pole G.; Raskar S.;  
Bodkhe B.K.

## JOURNAL NAME:

Signal, Image and Video Processing (Vol.-  
20, Issue-10)

## DETAILS:

Published on 10 August 2026



## ABSTRACT:

Fruit diseases are one of the biggest problems for farmers around the world, costing them between 20 and 40% of their crops each year. Conventional disease scouting methods, relying on manual visual inspection by field agronomists, are inherently subjective, time-intensive, and incapable of scaling to large commercial plantations where early-stage infections must be identified before irreversible spread. The emergence of deep learning-powered computer vision presents a transformative opportunity to automate, standardize, and accelerate disease detection in precision agriculture systems. Despite significant recent progress, automated fruit disease detection remains hindered by several critical challenges. This research proposes the Deep Learning Fruit Disease Detection and Classification framework (DL-FDD), a novel dual-head architecture integrating a modified EfficientNetB4 backbone with a Feature Pyramid Network (FPN) neck, Squeeze-Excitation (SE) attention gates, and an Adaptive Multi-Strategy Augmentation (AMSA) pipeline. The framework simultaneously performs 18-class disease classification and precise lesion localization using a joint classification-regression head trained with a hybrid categorical cross-entropy and GIoU loss function. The DL-FDD framework achieves an overall disease detection accuracy of 94.7% and a mean Average Precision (mAP) of 94.3% at IoU@0.50 on a curated dataset of 87,000 annotated fruit images spanning six major crop categories. Inference latency averages 18.7 ms per image at  $224 \times 224$  resolution, enabling real-time deployment. The framework outperforms ResNet-50 by 5.4%, VGG-16 by 7.6%, and EfficientNetB4 standard by 4.4% across comparable benchmarks. The DL-FDD framework establishes a new performance benchmark for automated fruit disease detection, providing a scalable, interpretable, and computationally efficient solution suitable for real-world precision agriculture deployment. The integration of GAN-based augmentation and attention mechanisms substantially mitigates class imbalance and localization ambiguity, advancing the state-of-the-art toward practical agronomic adoption.

Link: <https://doi.org/10.1007/s11760-026-05626-6>



### TITLE:

Extraction of Biomedical Entities from Text Data using Named Entity Recognition

### AUTHOR :

Dhawas P.; Moriwal R.; Budhe P.P.; Apune S.S.; Sharma K.D.; Kukade A.

### JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026 (Vol.-1)

### DETAILS:

Published on 2026



### ABSTRACT:

The biomedical field is witnessing an unprecedented growth in unstructured textual data from scientific literature, clinical notes, and electronic health records. Effective extraction of biomedical entities from such data is vital for knowledge discovery, drug-disease relation mapping, and decision support systems. This work presents a deep learning-based Named Entity Recognition (NER) framework for automatic identification of biomedical entities like diseases, drugs, and chemicals. Taking advantage of BioBERT—a domain-specific pre-trained language representation model fine-tuned for biomedical text—we fine-tune the model with the BC5CDR dataset to improve its capacity to identify and classify named entities at high precision. The method catches contextual relations and domain-specific meanings, surpassing conventional NER strategies. Our experiments demonstrate substantial improvement in entity recognition accuracy, which testifies to the robustness of the model for real-world biomedical text mining tasks. This research illustrates the promise of transformer-based models for pushing biomedical natural language processing applications and enabling structured data extraction for downstream biomedical analytics.

Link:

<https://www.scopus.com/pages/publications/105047281465?origin=resultslist>



## TITLE:

Fabrication and characterization of rice husk ash reinforced aluminum matrix composite

## AUTHOR :

Seshappa A.; Bhavsingh B.; Swetha S.;  
Jomde A.; Reddy M.H.; Shamkuwar S.;  
Chakravarthy A.; Ahasan Md.

## JOURNAL NAME:

Journal of the Mechanical Behavior of  
Materials (Vol.-35, Issue-1)

## DETAILS:

Published on 6 August 2026



## ABSTRACT:

Aluminum matrix composites (AMCs) have advantageous properties like minimum weight, an outstanding strength-to-weight ratio, and excellent thermal insulation, as well as robust durability to wear, rendering the material appropriate for rigorous usage in the construction, transportation, and aeronautical industries. A significant difficulty, subsequently, is the identification of reinforced materials offering that remains simultaneously economically viable and environmentally sustainable. Rice Husk Ash (RHA), a by-product of paddy processing sometimes seen as trash, presents a viable option. Integrating RHA into AMCs decreases ecological impact while offering a cost-effective alternative to traditional strengthening. This research included the fabrication of aluminum hybrids reinforced with 3 %, 6 %, and 9 % rice husk ash (RHA) by mass through stir casting. Mechanical assessments comprising tensile, compressive, impact, and hardness tests demonstrated a constant improvement in properties with increased RHA concentration. In comparison to unreinforced aluminum, tensile strength increased by 11.42 %, 17.02 %, and 47.12 %, and compressive strength augmented by 18.02 %, 26.98 %, and 41.12 % for the corresponding RHA additions. The hardness also impression strength engagement is significantly enhanced, by extreme improvements of 56.21 %, also 69.99 % at 9 % reinforcement. The results substantiate that RHA may significantly enhance the mechanical properties of AMCs while concurrently promoting globular low-cost initiatives through transmuting agricultural excess interested in high-value complex materials aimed at various operational engineering practices.

Link: <http://dx.doi.org/10.1515/jmbm-2025-0111>



## TITLE:

Forecasting Influencing Parameter for CO<sub>2</sub> and CH<sub>4</sub> Emission from Agriculture Using Lasso and Ridge Regression

## AUTHOR :

Kosamkar P.; Kulkarni V.

## JOURNAL NAME:

Earth and Environmental Sciences Library

## DETAILS:

Published on 13 January 2026



## ABSTRACT:

**Purpose:** Agriculture sector produces a notable amount of greenhouse gas emission (GHG), which contributes significantly to climate variation and global warming. To deal with the consequences of climate variation on agriculture, vigilant management of resources such as soil, water, and management practices will be required. This study aims to find the influencing soil and climatic parameters for CO<sub>2</sub> and CH<sub>4</sub> emission from the agriculture sector with two different cultivation patterns. The study also aims to understand that weather the agroclimatic zone plays a role in the emission of CO<sub>2</sub> and CH<sub>4</sub>.

**Design/Methodology/Approach:** Implemented lasso and ridge regression for forecasting the CO<sub>2</sub> and CH<sub>4</sub> emission from different cultivation farm with regularization which avoids the problem of multicollinearity. We used IoT sensors MQ-4 and MQ-135 for measuring the CO<sub>2</sub> and CH<sub>4</sub> emission, Agrinex solution for NPK and pH values and Google weather app for climate parameters. The Raspberry Pi will read the data from sensors and send it to ThingSpeak cloud server for storing.

**Findings:** For predicting CO<sub>2</sub> and CH<sub>4</sub> emission the RMSE value for lasso and ridge are 0.031695, 0.034699, 0.00521 and 0.000528 respectively. Lasso has the lowest RMSE value as compared to ridge which indicates a good prediction model. We compare the emission for different cultivation pattern CO<sub>2</sub> and CH<sub>4</sub>. The CO<sub>2</sub> and CH<sub>4</sub> emission from farm land and protected farm land is 45.9204 (PPM) and 37.5767 (PPM), 202.1688 (PPM) and 182.8158 (PPM) respectively. The result shows that agro-climatic zone affect the emission of CO<sub>2</sub> and CH<sub>4</sub>. Nitrogen, Moisture, Pressure, Humidity and Temperature are most influencing parameter for CO<sub>2</sub> and CH<sub>4</sub> emission in farm land and protected farm land.

**Research Limitations/ Implications:** N<sub>2</sub>O emission from the agriculture is not considered in the study.

**Originality/Value:** When the dataset contains multicollinearity (two or more variables are closely correlated), the ordinary least square (OLS) approach of linear regression is ineffective. However, there might be a lot of variation.

Link: [https://doi.org/10.1007/978-3-032-11426-6\\_21](https://doi.org/10.1007/978-3-032-11426-6_21)



### **TITLE:**

Advancements and challenges in bird migration models: a comprehensive survey

### **AUTHOR :**

Musale P.P.; Sonawani S.S.

### **JOURNAL NAME:**

International Journal of Global Environmental Issues (Vol.-25, Issue-1)

### **DETAILS:**

Published on 29 July 2026



### **ABSTRACT:**

Bird migration is a critical natural process that supports ecosystem stability and species conservation. This study explores the use of machine learning and deep learning models to predict bird migration patterns, focusing on their application in conservation efforts, habitat preservation, and climate change adaptation. With India's diverse ecosystems providing critical habitats for numerous bird species, predicting migration patterns is key to effective wildlife management. A review of over 50 studies on bird migration prediction highlights methodological approaches, challenges, and observation results, emphasising the need for reliable forecasting models. These models can help reduce risks such as bird strikes in urban development and inform climate change policies. The findings demonstrate the potential of predictive technologies to support global efforts in conserving migratory species and understanding ecosystem dynamics.

Link: <https://doi.org/10.1504/IJGENVI.2026.155260>



## TITLE:

An Explainable AI-Driven Framework for  
Integrating Diverse Health Data to Enhance  
Predictive Accuracy and Clinical  
Interpretability

## AUTHOR :

Lahane A.S.; Dixit B.A.

## JOURNAL NAME:

Journal of Intelligent Decision Making and  
Information Science

## DETAILS:

Published on August 2026



## ABSTRACT:

The potential benefits of artificial intelligence (AI) in healthcare cannot be overstated, and there is a lot of potential to ensure that patients can receive optimal care through early disease detection, personalized treatment options, and more. Nonetheless, the used advanced AI models have remained largely hindered by their black-box nature, which is why they are usually called the black-box problem. Such a lack of transparency undermines trust amongst clinicians and regulatory agencies so as to restrict the effective utilization of such powerful tools practically. Explainable Artificial Intelligence (XAI) appears as a decisive way out in such an essential challenge. Increasing clarity and explanation of complex machine learning models have the direct benefits of fostering more trust, as well as enhancing diagnostic accuracy and the successful overall results of patients. The effectiveness with which XAI can provide transparent and decipherable information toward AI-derived predictions is not only a technical contribution, but a necessary match with demands of ethical and clinical concerns in an area where decisions have significant implications. This means that the XAI capacity will become a rising need in a regulatory and ethical Trias handled and measured in an environment where the outcomes of decisions have great implications on the outcomes of patients. This report is an account of a framework through XAI to incorporate various health data sources such as electronic health records, medical imaging, laboratory reports, and wearable sensor information, which can be integrated in the context of achieving higher predictive performance in disease prediction and treatment stratification, as well as decision-making transparency.

Link: <https://doi.org/10.59543/jidmis.v3.1902>



## TITLE:

Fraud Detection and Anti-Money  
Laundering (AML)

## AUTHOR :

Kotalwar A.; Waghodekar P.; Sonar R.;  
Dange V.; Nagargoje P.

## JOURNAL NAME:

A Review Series: Federated Learning in  
Financial Services: A Path to Secure AI

## DETAILS:

Published on 2026



## ABSTRACT:

The acceleration of the development of digital financial ecosystems has increased the complexity, scope, and speed of fraudulent acts and money-laundering endeavors. The conventional centralized machine learning models of detecting fraud and Anti-Money Laundering (AML) have fundamental constraints, such as limited data sharing, privacy laws, institutional data siloing, and real-time cross-institutional anomalies. This chapter discusses the role played by Federated Learning (FL) and distributed anomaly-detection systems in offering a paradigm shift to collaborative and privacy-protective intelligence to prevent financial crimes. We provide a summary of a state of the art of real-time fraud detection systems that are based on federated methods, with emphasis on the importance of decentralized model training, secure aggregation, and non-IID adaptive optimization in enhancing detection accuracy. Moreover, we discuss a distributed anomaly-detection plan that would be able to capture developing fraud patterns and inter-channel transactional deviations on non-homogeneous data sources. Lastly, we talk of FL integration with AML practices and in particular, monitoring of suspicious activities that are improvement of network-based risk scoring, and reduction of false positives through sharing of cross-institution patterns without disclosing sensitive data. With the aid of systematic analysis and research-specific synthesis, this chapter proves the idea that federated architectures are the scalable, regulation-compliant, and extremely robust future of fraud detection and AML operations.

Link:

<https://www.scopus.com/pages/publications/105047763672?origin=resultslist>



## TITLE:

Four Quadrants (Passion, Mission, Vision, and Profession) of IKIGAI-Based Smart Model for Career Guidance Using AI

## AUTHOR :

Kumbhar V.; Yarde P.; Chitre D.; Phalle T.;  
Chavan S.; Namjoshi V.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

The modern world has made career guidance more complicated due to rapid technological transformation, unstable labour markets, and increasing disjuncture between personal desires and professional achievements. Currently, AI-based career guidance systems are skill-focused, academic achievement-focused, or employability-focused, but often fail to consider purpose-based aspects of career satisfaction that can be valuable in the long term. In order to fill this gap, this work suggests applying the IKIGAI-based Smart Career Guidance Model that combines Artificial Intelligence (AI) and four interdependent quadrants- Passion, mission, vision, and profession- to provide complete and meaningful career guidance. The suggested model will operationalize the IKIGAI constructs based on structured psychometric data and unstructured textual responses, processed by a hybrid AI framework that integrates machine learning classifiers, feature extraction based on NLP, and an intelligent recommender system. This model is tested against a sample of student and early-career profiles gathered by means of validated measures. The results of the experiment show that the proposed approach performs better than standard skill-based models with an improvement of 12–18% in the accuracy of the recommendations, an increased F1-score by 15%, and a score of user alignment by 20%. The analysis of user satisfaction also shows a statistically significant increase ( $p < 0.05$ ) in the perceived relevance and clarity of recommendations. Theoretically, this study is important in formalizing IKIGAI as a measurable framework in AI-based career guidance. Practically, it can provide a scalable, clear, and person-centred framework to help individuals, institutions, and policymakers facilitate purpose-oriented, socially oriented career development in the AI era.

Link: [https://doi.org/10.1007/978-3-032-28591-1\\_46](https://doi.org/10.1007/978-3-032-28591-1_46)



## TITLE:

Enhancing Road Safety: YOLOv8 and Fuzzy Decision-Making for Accident Detection from Video Datasets

## AUTHOR :

Zope R.; Bhoite S.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 21 July 2026



## ABSTRACT:

This study presents an innovative approach for road accident detection on highways by integrating YOLOv8, a state-of-the-art object detection model, with fuzzy decision-making mechanisms. Highway accidents pose significant challenges due to their high frequency and severe consequences, necessitating efficient and real-time detection systems. YOLOv8, known for its superior accuracy and speed in object detection, is employed to identify potential accidents from live highway surveillance footage. To enhance the robustness of the detection process, fuzzy logic is incorporated into the YOLOv8 layers. This integration aims to handle the inherent uncertainties and ambiguities in visual data, improving the model's ability to discern accident scenarios from normal traffic conditions. The proposed system leverages the convolutional layers of YOLOv8 to extract high-level features from the input images, while the fuzzy decision-making module processes these features to evaluate the likelihood of an accident. This is achieved by defining fuzzy rules and membership functions that classify different accident indicators, such as abrupt vehicle stops, collisions, and erratic movements. The fuzzy inference system then combines these indicators to produce a confidence score for accident detection. Experimental results demonstrate that the fusion of YOLOv8 with fuzzy decision-making significantly enhances detection accuracy, reducing false positives and false negatives compared to traditional methods. This hybrid approach not only ensures real-time processing capabilities but also offers a scalable solution adaptable to various highway environments. The findings suggest that the proposed system holds substantial promise for improving traffic safety and enabling prompt emergency response through reliable accident detection.

Link: [https://doi.org/10.1007/978-981-95-3163-9\\_3](https://doi.org/10.1007/978-981-95-3163-9_3)



## TITLE:

Attention-Guided Brain Tumor Segmentation Using Multimodal MRI

## AUTHOR :

Ashtagi R.; Patil M.; Uke N.; Bidwe R.;  
Betgeri S.S.; Bidwe O.S.

## JOURNAL NAME:

Natural Resources for Human Health

## DETAILS:

Published on September 2026



## ABSTRACT:

The segmentation of brain tumors in multimodal magnetic resonance imaging (MRI) is an important task in the clinical diagnosis, treatment planning and disease monitoring processes. The accurate delineation is however difficult because of the heterogeneity of tumors, irregularity of their borders and the different intensity distributions on various imaging modalities. In this work an Attention-Guided Brain Tumor Segmentation framework is presented, that relies on complementary information extracted from T1, T1ce, T2 and FLAIR MRI sequences for accurate tumour localization and segmentation. The architecture proposed combines various modalities, and uses attention guided encoder to enhance the representation of discriminative features and to remove irrelevant background information. Data quality is enhanced and the model generalizes better with a comprehensive preprocessing pipeline, which involves skull stripping, intensity normalization, image resizing and data augmentation. The experimental results demonstrate that the proposed attention-guided model offers more accurate segmentation, preservation of boundaries and robustness compared with the traditional deep learning model. Besides, whole tumor segmentation, segmentation of tumor core and enhancing tumor regions are realized with good results by combining multimodal MRI features. In summary, the proposed method is clinically applicable and is a reliable, effective method for automatic brain tumor segmentation, which aids in the better diagnosis and treatment planning.

Link:

<https://www.scopus.com/pages/publications/105048188906?origin=resultslist>



## TITLE:

IT Index Predictive Modelling A Deep Study  
With SARIMAX and Market Indicators

## AUTHOR :

Birari A.; Salunkhe H.; Yawalkar P.;  
Jamadar J.

## JOURNAL NAME:

Recent Trends in AI and Data Science

## DETAILS:

Published on July 2026



## ABSTRACT:

This chapter mainly investigates closing prices in the IT Index based on time series analysis and the Seasonal Auto Regressive Integrated Moving Average with eXogenous regressors (SARIMAX) model. This paper aims to advance the model's predictive accuracy by incorporating variables like moving averages, disparities in the everyday price, the Relative Strength Index (RSI), and the Average True Range (ATR). The closing prices of the IT Index were obtained for 5 years (from 2017 to 2023), and using feature engineering, the data were tested using ARIMA and SARIMAX models. The results indicate that the transformation between the highest and lowest prices and the 14-day moving average significantly influences the final cost of the IT Index. SARIMAX is a beneficial tool for financial analysis and decision-making. It might integrate external variables and provide findings that closely resemble the realistic data.

Link: <https://doi.org/10.1201/9781003635178-2>





## TITLE:

Chitta Ranjan Das and Our Creative  
Planetary Futures: When Feet Become  
Wings

## AUTHOR:

Giri A.K.

## JOURNAL NAME:

Chitta Ranjan Das and Our Creative  
Planetary Futures: When Feet Become  
Wings

## DETAILS:

Published on 2026



## ABSTRACT:

This book explores the profound legacy of Chitta Ranjan Das (1923–2011), a pioneering Indian thinker, educator, and writer who left an indelible mark on philosophy, literature, and education. As the founder of Jeevana Vidyalaya (School of Life) in 1950s Odisha and a devoted nurturer of integral education movement in Odisha, Das redefined education through integral learning, deeply influenced by the visionary ideals of Tagore, Gandhi, Kristen Kold, Sri Aurobindo and the Mother. This volume brings together a diverse group of international scholars to engage with Das's ideas, placing his work within the broader context of global intellectual discourse. His contributions—ranging from philosophy and culture to literature—continue to inspire fresh perspectives on education and social transformation. Das's translation efforts introduced Odia readers to world literature, including works by Tolstoy, Gandhi, Sri Aurobindo, and Boris Pasternak, bridging cultures and ideas across linguistic boundaries. In an era of increasing interest in diverse global philosophies, this book offers a timely and essential exploration of Das's work, linking his thoughts to the contemporary movement of planetary thinking. With its transdisciplinary approach—interweaving literature, philosophy, and history—this volume is a must-read for scholars, educators, and anyone interested in the evolution of thought beyond conventional borders.

Link: <https://link.springer.com/book/10.1007/978-981-95-6244-2>



### TITLE:

Cipher cell-based information-theoretic encryption over 6G channels

### AUTHOR :

Bhatt D.P.; Vats P.; Tharewal S.; Goje S.P.;  
Popli R.K.; Sharma S.

### JOURNAL NAME:

Journal of Discrete Mathematical Sciences  
and Cryptography (Vol.-29, Issue-8)

### DETAILS:

Published on August 2026



### ABSTRACT:

Sixth-generation networks demand robust security under extreme data rates, massive connectivity, and ultra-low latency. Conventional cryptographic methods based on computational assumptions may be insufficient in such environments. This study proposes a cipher-cell-based information-theoretic encryption model that partitions data into elementary units and applies entropy-enhancing transformations to ensure secrecy independent of attacker capability. Analysis shows near-uniform entropy, minimal information leakage, and low overhead, making the approach suitable for secure, ultra-reliable communication in future high-speed 6G systems.

Link: <https://doi.org/10.47974/JDMSC-2749>



## TITLE:

Spatially Explicit and Temporally Validated  
Graph Convolutional Network Framework  
for Landslide Susceptibility Mapping in  
Basaltic Terrain

## AUTHOR :

Pawar N.S.; Sharma K.V.; Gogate N.

## JOURNAL NAME:

Geological Journal

## DETAILS:

Published on 22 August 2026



## ABSTRACT:

Landslide susceptibility mapping (LSM) is important in rapidly developing, landslide-prone basaltic terrains of the Western Ghats, India. Although temporal validation has gained attention in LSM, comprehensive comparisons of graph-based deep learning and conventional machine learning models incorporating temporal and spatial validation, uncertainty quantification and reliability assessment remain limited. In this study, a spatially explicit and temporally validated framework is implemented to evaluate a graph convolutional network (GCN) against deep neural network (DNN), one-dimensional convolutional neural network (1D CNN), random forest (RF), extreme gradient boosting (XGB) and light gradient boosting machine (LGBM) to better capture spatial relationships in the basaltic terrain of Raigad district. A dataset of 1840 samples (920 landslide and 920 non-landslide) was prepared, with 1412 samples used for model development and 428 samples (214 landslide and 214 non-landslide) from 2022 to 2025 reserved for testing. Model performance was assessed using multiple evaluation metrics supported by Taylor diagram analysis, stratified and spatial block cross validation and bootstrap-based uncertainty analysis. GCN achieved the highest performance (AUCROC = 0.989; accuracy = 0.9239), followed by XGB (0.974), RF (0.970), LGBM (0.969), 1D CNN (0.886) and DNN (0.865). Permutation importance analysis identified distance to roads, slope, NDVI, relative relief and annual rainfall as dominant factors. The proposed framework enhances the reliability and spatial generalization of landslide susceptibility assessment, providing a robust basis for risk-informed planning in data-scarce mountainous regions.

Link: <https://doi.org/10.1002/gj.70470>





## TITLE:

Diabetes Prediction using Diabetic Biomarkers: A Literature Survey

## AUTHOR :

Poojary P.; Chanchlani A.

## JOURNAL NAME:

17th International Conference on Advances  
in Computing, Control, and  
Telecommunication Technologies, ACT  
2026

## DETAILS:

Published on 2026



## ABSTRACT:

Diabetes is a growing global health concern requiring early detection and continuous monitoring. In this work, we address key research gaps identified from the review of existing studies, including the lack of real-time biomarker integration, transparency in prediction, and personalized recommendations. We propose a multi-source diabetes prediction system that processes data from clinical reports, wearable devices, manual inputs, and electronic health records. The system utilizes NLP techniques for biomarker extraction and employs a machine learning model to classify patients as diabetic, pre-diabetic, or non-diabetic. An Explainable AI (XAI) layer is integrated to interpret model decisions and highlight key biomarkers contributing to the prediction. Additionally, the system provides personalized health recommendations based on the analysis. This approach aims to deliver an accurate, real-time, and patient-centric solution for effective diabetes prediction and management.

Link:

<https://www.scopus.com/pages/publications/105047287791?origin=resultslist>



**TITLE:**

Foam-Core Sandwich Structures with Kevlar  
Face Sheets

**AUTHOR :**

Patankar I.; Vaidya K.S.; Kandasubramanian  
B.

**JOURNAL NAME:**

Polymer-Plastics Technology and Materials

**DETAILS:**

Published on 21 August 2026



**ABSTRACT:**

Kevlar foam-core sandwich structures have attracted considerable attention as lightweight multifunctional composites for aerospace, defense, transportation, and protective applications owing to their exceptional combination of high specific strength, impact resistance, and energy-absorption capability. However, the available literature remains dispersed across material systems, core architectures, and loading conditions, limiting a comprehensive understanding of the underlying structure–property relationships. This review critically examines recent advances in Kevlar and aramid-based foam-core sandwich structures, focusing on the influence of face-sheet architecture, cellular core design, and interfacial engineering on mechanical performance and failure behavior. The analysis reveals that Kevlar-rich face sheets enhance damage tolerance through fiber stretching, fibrillation, crack bridging, and progressive energy dissipation, while hybrid carbon/Kevlar configurations provide an effective balance between stiffness and toughness. Foam-core density, morphology, and topology are shown to govern collapse stability, shear transfer, and energy absorption, whereas advanced interfacial strategies, including nanomodification, surface functionalization, and fiber-bridging mechanisms, significantly improve delamination resistance and residual strength. A mechanistic synthesis of experimental and numerical studies is presented to establish links between constituent architecture and structural response under static, impact, and crash loading conditions.

Link: <https://doi.org/10.1080/25740881.2026.2720659>



## TITLE:

A deep learning approach to mild cognitive impairment detection from electroencephalogram signals; [Uma abordagem de deep learning para detecção de comprometimento cognitivo leve a partir de sinais de eletroencefalograma]

## AUTHOR :

Ohal H.S.; Mantri S.

## JOURNAL NAME:

Dementia e Neuropsychologia

## DETAILS:

Published on 24 August 2026



## ABSTRACT:

Mild cognitive impairment (MCI) is an important condition that may progress to Alzheimer disease (AD) or other types of dementia. If MCI can be detected early, timely interventions may be implemented. Traditional diagnostic methods rely on neuropsychological tests and imaging studies but have limitations in terms of efficiency and accessibility. Therefore, electroencephalogram (EEG)-based deep learning approaches represent promising developments that may offer new frameworks for the early diagnosis of MCI. Objective: This study aimed to develop a long short-term memory (LSTM)-based architecture for classifying MCI using EEG signals. The temporal characteristics of EEG signals may reveal meaningful information that improves classification performance. Methods: A publicly available EEG dataset comprising 27 subjects (11 MCI; 16 normal) was used. Raw EEG signals were preprocessed using band-pass filtering, Independent Component Analysis, and segmentation. The 64-node LSTM model was trained using processed EEG segments for binary classification. The model was evaluated using standard performance metrics. Results: The proposed LSTM-based model achieved an accuracy of 98.14% for MCI versus normal classification, outperforming conventional algorithms such as K-Nearest Neighbors (KNN) and Support Vector Machine (SVM). The model also demonstrated high precision (99.21%), recall (98.69%), and F1-score (98.95%). The confusion matrix showed 4,774 normal and 3,257 MCI segments correctly classified, with very few misclassifications, highlighting its strong discriminative capability. Conclusion: This study highlights the potential of LSTM networks for early MCI detection. The findings suggest that deep learning-driven EEG analysis may be a valuable tool for noninvasive and scalable cognitive health assessments.

Link: <https://doi.org/10.1590/1980-5764-DN-2025-0364>





## TITLE:

Exploring MSME Loan Defaults: The Role of Borrower and Loan Characteristics from a Micro-level Perspective

## AUTHOR :

Saha A.; Rooj D.; Sengupta R.

## JOURNAL NAME:

Arthaniti: Journal of Economic Theory and Practice

## DETAILS:

Published on 27 May 2025



## ABSTRACT:

This study utilises a novel data set from a commercial bank in India to explore the associations between borrower, loan and macroeconomic characteristics and the likelihood of default in micro, small and medium enterprises (MSMEs). We analyse how borrower attributes, such as gender, age and religion, and loan characteristics, such as relationship lending, interest rates, guarantees and collateral, relate to default probabilities. The results indicate that MSME loans in urban and metropolitan areas are associated with a higher probability of default. Both cash credit and term loans covered under the credit guarantee fund exhibit a greater likelihood of default. The analysis also suggests an inverse association between default probability and macroeconomic stability, measured by state-wise gross domestic product. Moreover, differences emerge in the factors linked to default across cash credit and term loans. Interest subsidies appear to be associated with a lower default probability for term loans, whereas larger term loans tend to have a higher likelihood of default. These findings highlight the importance of refining lending practices and optimising credit guarantee mechanisms to foster the sustainable growth of MSMEs.

Link:

<https://www.scopus.com/pages/publications/105047126169?origin=resultslist>



## TITLE:

An Explainable NLP Benchmarking Framework for Multilingual Health Misinformation Detection Using Transformer-Based Models

## AUTHOR :

Shewale V.; Tiple B.

## JOURNAL NAME:

Proceedings of the 3rd International Conference on Innovations in Cybersecurity and Data Science, ICICDS 2026

## DETAILS:

Published on 2026



## ABSTRACT:

Health misinformation spreading across online platforms and social media poses significant risks to public health, particularly in low-resource environments and multilingual settings. Automatic detection of misinformation remains a challenging task due to semantic ambiguity, class imbalance, linguistic diversity, and lack of model transparency. To address these challenges, this study proposes an explainable Natural Language Processing (NLP) framework for monolingual and multilingual health misinformation detection by integrating traditional Machine Learning (ML) models, deep neural networks, and transformer-based architectures. In this study, a unified corpus is constructed by combining three publicly available benchmark datasets (CoAID, ReCOVery, and Monkeypox). Furthermore, the multilingual generalization is evaluated using publicly available dataset containing Chinese, Arabic, Bulgarian and English text samples. The experiments were conducted using Term Frequency-Inverse Document Frequency (TF-IDF) features with traditional machine learning models, where Random Forest achieved an accuracy of 97.1%. Multilingual evaluation achieved 82.1% accuracy, highlighting cross-lingual generalization challenges. The Local Interpretable Model-agnostic Explanations (LIME) are used to enhance transformer's model transparency through token-level interpretability. The results demonstrate that the proposed framework can support automated health misinformation monitoring systems to improve the reliability of online health information ecosystems.

Link:

<https://www.scopus.com/pages/publications/105046076453?origin=resultslist>



## TITLE:

Oral Administration of Different Forms of  
Exogenous Tau Protein Induces Multi-Organ  
Defects Across Developmental Stages in  
*Drosophila melanogaster*

## AUTHOR :

Sahu S.; Chidamabaram H.;  
Ananthanarayanan V.; Qureshi T.; Desale S.;  
Chandrashekar M.; Santhoshkumar R.;  
Mishra M.; Chinnathambi S.

## JOURNAL NAME:

Neurotoxicity Research (vol.-44, Issue-4)

## DETAILS:

Published on 13 August 2026



## ABSTRACT:

Tau is a crucial protein involved in many neurodegenerative diseases, including Alzheimer's disease. Natively, Tau is an unfolded protein found predominantly in axons that play a vital role in maintaining and stabilizing microtubules. Under pathological circumstances, Tau disengages from microtubules and forms insoluble intracellular filaments on its own, building neurofibrillary tangles in the brains of Alzheimer's patients. Although Tau exists in aggregates found in the brain and gut of Alzheimer's patients, the function of Tau in the brain is well studied, while the role of Tau in the gut needs further investigation. We have investigated the effects of Tau monomer, oligomer, and aggregates at 10  $\mu$ M concentration via feeding them to the third instar larvae. To evaluate the genotoxicity, we did 4', 6-diamidino-2-phenylindole staining, while dichloro-dihydro-fluorescein diacetate staining was performed to assess cytotoxicity. Furthermore, we performed a TUNEL assay to detect apoptotic cells. Additionally, we carry out an NBT assay for biochemical estimation of reactive oxygen species by extracting hemolymph. Phenotypes were examined in different stages, i.e., larvae, pupae, and adult flies. Histological studies were performed on eye, gut tissue and reproductive organs of *D. melanogaster* to check the cytoskeletal alterations. The current study finds that the administration of monomer, oligomer, and aggregate forms causes genotoxicity, cytotoxicity, and cytoskeletal defects in *D. melanogaster*.

Link: <https://link.springer.com/article/10.1007/s12640-026-00818-x>



## TITLE:

“Adoption pathways for green hydrogen in developing economies: A review- driven hybrid modelling framework with policy insights from India”

## AUTHOR :

Seth D.; Rehman M.A.A.

## JOURNAL NAME:

Renewable and Sustainable Energy Reviews

## DETAILS:

Published on August 2026



## ABSTRACT:

Green Hydrogen (GH) is increasingly recognised as a cornerstone of the future energy economy, essential for sustainable transitions and long-term decarbonisation. It directly supports SDG-7 (Affordable and Clean Energy), SDG-9 (Industry, Innovation, and Infrastructure), and SDG-13 (Climate Action). Yet adoption pathways remain fragmented, with policy frameworks often emphasising production expansion while underplaying infrastructure, regulation, and institutional coherence. This study addresses the gap by combining a systematic review of global and national literature with expert consultations and policy document analysis to identify key determinants of GH adoption. A hybrid methodological framework—integrating Graph Theoretic Analysis(GTA), Analytic Hierarchy Process(AHP), and Structural Equation Modelling(SEM)—is applied to prioritise determinants, quantify interdependencies, and validate causal linkages. Findings reveal that storage, transport infrastructure along with other enabling factors (finance, regulation, governance) exert greater influence on adoption rather than production and usage. This imbalance highlights the risks of production-centric policies, including those embedded in India's National Green Hydrogen Mission (NGHM). While India provides the empirical foundation, the framework offers generalizable insights for other developing and emerging economies, where modular infrastructure, blended finance, phased regulatory pathways, and institutional capacity-building are essential to overcome fragmented systems and accelerate GH adoption.

Link:

<https://www.sciencedirect.com/science/article/abs/pii/S1364032126006179>



## TITLE:

Trump 2.0 and global stock dynamics: a decomposed view of US trade partners' market connectedness

## AUTHOR :

Verma S.; Yadav M.P.; Gaikwad S.B.

## JOURNAL NAME:

Journal of Economic Studies

## DETAILS:

Published on 13 August 2026



## ABSTRACT:

**Purpose** – We aim to elucidate the decomposed connectedness among the financial markets of the top five US trade partners, i.e. Mexico, Canada, China, Taiwan and Germany. It also intends to explore the opportunity for risk mitigation through diversification for a cross-country portfolio. **Design/methodology/approach** – The novel R2 decomposed connectedness model has been employed to delve into the contemporaneous and lagged connectedness among the stock markets of the examined economies. The daily observation from November 6, 2024, to October 1, 2025, has been used for the empirical investigation. **Findings** – The study reveals that the total connectedness between the markets is dynamic over time and responsive to trade uncertainties originating from Trump 2.0, and that contemporaneous effects were found to be more dominant than lagged effects. In addition, study results reveal that Germany is the main net transmitter of shock, whereas Taiwan is the main net receiver of shock. The study also indicates the Mexican market may be considered in the portfolio to mitigate the risks due to the least recipient/transmission of the shock among the examined markets. **Practical implications** – The study results have several noteworthy practical implications for financial decision-making. It is valuable for investors as they can incorporate connectedness dynamics revealed by the study for identifying a suitable market for asset allocation. **Originality/value** – It provides a decomposed assessment of financial market connectedness of the key trade partners of the United States in the context of Trump 2.0, employing a novel decomposed connectedness model.

Link: <https://doi.org/10.1108/JES-01-2026-0045>



### **TITLE:**

Exploration of extremophilic microorganisms for production and applications of exopolysaccharides

### **AUTHOR :**

Kanekar P.; Kulkarni S.; Joshi A.; Kanekar S.; Kadam V.; Thakkar I.; Patel A.; Kale P.; Garge P.; Tewari-Raje R.

### **JOURNAL NAME:**

Advances in Applied Microbiology

### **DETAILS:**

Published on August 2026



### **ABSTRACT:**

Extremophilic microorganisms live in extreme environmental conditions such as high or low temperature, high or low pH, high concentration of salt and accordingly are classified as thermophilic, psychrophilic, alkaliphilic, acidophilic and halophilic respectively. They adapt themselves to the extreme conditions by producing novel biomolecules like heat shock proteins, cold active enzymes, compatible solutes and exopolysaccharides. Extremophilic microorganisms maintain their cellular integrity with the help of exopolysaccharide (EPS) which constitutes slime or a hydrated matrix that keeps the cells embedded. EPS are composed of carbohydrates and some amino acids. Thermophilic microorganisms namely *Thermus*, *Geobacillus*, *Bacillus*, *Thermococcus* and halophilic microorganisms namely *Halomonas*, *Halobacillus*, *Haloferax* and *Halococcus* are reported and well-studied for production of EPS. The EPSs exhibit emulsifying, viscofying and antioxidant properties that find applications in food industry, oil recovery and anticancer agents.

Link: <https://doi.org/10.1016/bs.aambs.2026.07.003>





## TITLE:

FIND: An Internet wide Deepfake Detection Tool

## AUTHOR :

Jadhav P.; George R.; Kulkarni S.

## JOURNAL NAME:

17th International Conference on Advances  
in Computing, Control, and  
Telecommunication Technologies, ACT  
2026 (vol.-1)

## DETAILS:

Published on 2026



## ABSTRACT:

The proliferation of deepfakes necessitates robust, multi-faceted detection mechanisms. This work introduces a synergistic framework that integrates two specialized pipelines to address the challenges of both video and image forgery detection [1]. For video deepfake detection (temporal analysis), a resource-efficient architecture combines a classical ResNet feature extractor with a Quantum Long Short Term Memory (QLSTM) network [1]. This quantum-enhanced model demonstrates up to a 99.16% reduction in recurrent layer parameters compared to classical LSTM, achieving performance superior to or comparable with its classical counterpart [1]. For image deepfake detection (frequency/spatial analysis), we adopt the WMamba module, which excels at exploiting subtle forgery artifacts by applying Dynamic Contour Convolution (DCConv) to hierarchical Wavelet representations [1]. WMamba achieves state-of-the-art (SOTA) performance in cross-dataset evaluation [1]. This dual approach confirms that specialized, multi-modal strategies are critical for resilient, computationally viable deepfake detection systems.

Link:

<https://www.scopus.com/pages/publications/105047258383?origin=resultslist>



## TITLE:

Deciphering antidiabetic mechanisms of a polyherbal blend via network pharmacology and multi-layer computational modeling

## AUTHOR :

Murudkar P.H.; Parekar P.J.; Baheti A.M.;  
Nagar S.; Pawar A.T.

## JOURNAL NAME:

Pharmacological Research - Natural  
Products (vol.-12)

## DETAILS:

Published on August 2026



## ABSTRACT:

Background: Diabetes mellitus is a complex metabolic disorder characterized by significant hyperglycemia and insulin resistance, driven by interconnected pathological processes such as oxidative stress and  $\beta$ -cell dysfunction. This multifactorial nature limits the success of single-target therapies, underscores the need for systems-based approaches. The study aimed to investigate the multi-target effects of a standardized polyherbal formulation, using network pharmacology, molecular docking, ADMET prediction, molecular dynamics simulation and MM-GBSA binding energy analysis. Methods: Eight medicinal plants traditionally used for diabetes management were extracted and combined. HR-LCMS profiling identified 73 phytoconstituents. Potential diabetes-associated targets were predicted using BindingDB and SwissTargetPrediction, with cross-validation using GeneCards and Open Targets. A compound-target network was constructed and analysed using clustering, KEGG and GO enrichment. Docking of all phytoconstituents against ten diabetes-related proteins was performed using AutoDock Vina. Five protein-ligand complexes were further evaluated using molecular dynamics simulations in Desmond, followed by MM-GBSA binding energy calculations. Results: From the network analysis, 54 phytocompounds associated with diabetes-related targets were identified in a network containing 201 nodes and 449 interactions. The enrichment analysis revealed the presence of metabolic pathways, including the insulin pathway, the PI3K-AKT signaling pathway, glucose metabolism and oxidative stress pathway. In docking studies, it was observed that hesperidin and apigenin have the potential to bind favorably to the insulin receptor, GLP-1 receptor, GFAT, glucokinase, and  $\alpha$ -glucosidase. Molecular dynamics simulation showed that the selected complexes maintained their structural stability over 100 ns.

Link: <https://doi.org/10.1016/j.prenap.2026.100841>



## TITLE:

Hybrid quantum classical pipeline for  
proactive ransomware detection using CNN-  
PCA-VQC ensemble

## AUTHOR :

Ovhal S.S.; Satpute S.S.; Motade S.N.;  
Mainkar P.

## JOURNAL NAME:

Journal of Integrated Science and  
Technology (vol.-14, Issue-8)

## DETAILS:

Published on 30 June 2026



## ABSTRACT:

Ransomware, existing as a pervasive global threat, inflicts harm beyond the detection capabilities of conventional systems. Existing solutions are inherently reactive, as they typically identify malicious intent only after encryption has begun. The proposed work would put forth a combination of machine learning platforms which has the ability to detect the presence of ransomware 30-70 seconds prior to encryption. This is made up of four parts: (i) a 1D CNN Encoder which takes time-based sequences of API Calls (120 steps with 10 feature channels) which produces an embedding vector with a dimension of 64. (ii) PCA reduction with 16 principal components on top of the CNN encoder's output. (iii) Parameterized VQC with angle encoding utilized for translation of dataset into quantum states and application of shallow VQC layers specifically for classification and (iv) Classical processing component which is a classifier named XGBoost; its results are compiled using a combination result set with a weight ratio set at 60:40. The accuracy of the ensemble module was 94.75% in testing using a synthetic dataset that included both benign and ransomware samples. This represents a 0.5% relative improvement over the classical XGBoost baseline. It passed both individual component tests and fusion tests with relevance at the 0.5% level. Its feasibility under NISQ hardware constraints is rigorously evaluated, with statistical significance at the 0.5% level.

Link: <https://doi.org/10.62110/sciencein.jist.2026.v14.1616>



## TITLE:

Sustainable concrete incorporating bagasse ash and plastic waste as fine aggregate

## AUTHOR:

Sathe S.; Biswas A.; Shekokar S.;  
Mangulkar M.

## JOURNAL NAME:

Proceedings of the Institution of Civil  
Engineers: Engineering Sustainability

## DETAILS:

Published on 3 August 2026



## ABSTRACT:

The construction industry is increasingly adopting sustainable materials to reduce environmental impacts while maintaining structural performance. This study investigates the combined use of sugarcane bagasse ash (BA) and polyethylene terephthalate (PET) aggregates in M30-grade concrete. BA replaced cement at 0%–15%, while PET replaced natural sand at 0%–20%. The control mix achieved a compressive strength of 37.25 MPa, while the 5%BA + 10%PET mix attained 36.46 MPa ( $\approx 2\%$  reduction). At 20% PET replacement, compressive strength decreased to 33.81 MPa ( $\approx 9\%$  reduction). Similar trends were observed for split tensile strength (3.45–3.27 MPa) and flexural strength (3.79–3.62 MPa). The optimum mix (BA10–PET10) exhibited a modulus of elasticity of 28 525 MPa and UPV of 4.05 km/s, indicating good-quality concrete. Durability improved significantly, with rapid chloride permeability test values decreasing from 3150 to 2045 Coulombs and water penetration reducing from 22 to 15 mm. Sorptivity decreased from 0.0060 to 0.0041 mm/min<sup>0.5</sup>, while effective porosity reduced from 15.2% to 12.3%. Abrasion resistance improved by 18.8%, and marine-exposure strength loss decreased from 22.95% to 19.02%. Furthermore, BA and PET reduced cost by 10% and carbon dioxide emissions by 30.6%. Overall, mixes containing 10%–15% BA and 5%–10% PET achieved the best balance of performance, durability and sustainability.

Link: <https://doi.org/10.1680/jensu.26.00096>



### TITLE:

Uncovering the Chitosan–Melatonin Axis in Sugarcane: First Report of Enhanced Tryptophan Decarboxylase and Tryptamine 5-Hydroxylase Activities

### AUTHOR:

Ithape D.; Shinde N.; Dalvi S.; Joshi A.;  
Kutty N.N.

### JOURNAL NAME:

Physiologia Plantarum (Vol.-178, Issue-4)

### DETAILS:

Published on 20 August 2026



### ABSTRACT:

Globally, chitosan and phyto-melatonin have been explored as versatile bio-stimulants for the induction of tolerance to multiple stresses and enhancing crop productivity sustainably. Its role has also been reported in eliciting and enhancing the different secondary metabolites in plants. Sugarcane is an efficient bioenergy crop for the production of sugar and different industrial products, as well as biofuel. The present study evaluates the effect of gamma-irradiated chitosan on improvements in key parameters, viz., germination and physiological and biochemical traits in the sugarcane variety Co 86032 associated with enhanced melatonin biosynthesis at the settling stage. Concomitant with the accumulation of stress-associated metabolites, application of 100 ppm gamma-irradiated chitosan significantly enhanced phyto-melatonin accumulation (2.3 ppm), primarily through the enhanced key enzyme activities in phyto-melatonin biosynthesis, viz., tryptophan decarboxylase (63.25%) and tryptamine 5-hydroxylase (36.54%), which further activated the metabolite cascade, resulting in significant enhancements of total auxin content (45.17%), germination percentage, leaf area, vigor index-I, and vigor index-II. Photosynthetic pigments also show marked improvements in chlorophyll a, chlorophyll b, total chlorophyll, and carotenoids. Furthermore, there were enhanced enzymatic antioxidants, viz., peroxidase, ascorbate peroxidase, chitinase, and non-enzymatic antioxidants, viz., reducing sugars, total sugars and phenolics. Collectively, these findings suggest that gamma-irradiated chitosan is a novel biostimulator that enhances endogenous phyto-melatonin and auxins levels, seedlings vigor, physiological efficiency, and stress tolerance in sugarcane.

Link: <https://doi.org/10.1111/ppl.71068>



### TITLE:

Wavelet Feature-Based Face Detection and Recognition with Dimensionality Reduction and k-NN Classifier

### AUTHOR :

Raut P.T.; Patil S.B.

### JOURNAL NAME:

Procedia Computer Science (Vol.-283)

### DETAILS:

Published on 13 August 2026



### ABSTRACT:

In computer vision and detection of patterns, human face recognition becomes a particularly crucial field of study. This area includes a number of regulations, including pattern matching, recognition, neural networks, and image processing. The ability of a face recognition system to perform depends on how well its features are extracted using various classification approaches. Extracting the essential facial expression components from a human face photograph is among the main responsibilities for face acknowledgement. Humans naturally communicate through their facial expressions, which are also crucial for picture processing and pattern detection. Using PCA, LDA, and Wavelet with k-Nearest Neighbor classification, this paper performed several experiments to identify facial traits and determine the correct face using the face image datasets. The proposed approach is evaluated on two benchmark face datasets, Yale and Face94. Experimental results demonstrate recognition accuracies of 87.5% on the Yale dataset and 92.5% on the Face94 dataset, showing modest performance in contrast to existing methods. These results demonstrate that the hybrid architecture offers robustness against changes in illumination, face expression, and occlusion while striking a balance between accuracy and computing efficiency.

Link: <https://doi.org/10.1016/j.procs.2026.06.200>



## TITLE:

Peripheral blood cell counts as correlates of insulin sensitivity in children and youth with type 1 diabetes: A retrospective study from western India

## AUTHOR :

Khandagale S.; Bhor S.; Oza C.; Mondkar S.; Kamble V.; Agnihotri A.; Singh A.; Haque I.; Pachpor T.; Khadilkar A.; Khare S.

## JOURNAL NAME:

Endocrine (Vol.-91, Issue-1)

## DETAILS:

Published on 10 August 2026



## ABSTRACT:

**Background:** Type 1 diabetes mellitus (T1DM) is an insulin dependent diabetes treated with exogenous insulin therapy. A subset of individuals with T1DM develops reduced insulin sensitivity, a phenomenon often referred to as ‘double diabetes’, which is associated with an increased risk of complications. The pathophysiology of double diabetes in T1DM is not well understood. We hypothesize that changes in peripheral blood in T1DM may act as cellular correlates and provide insights into the development of double diabetes. **Methodology:** A retrospective study (N = 343) was performed at a tertiary care centre in western India. An estimated insulin sensitivity (eIS) score was calculated using the Coronary Artery Calcification in T1DM (CACTI) equation. A partial correlation, univariate, and multiple regression were performed to study the association of eIS with the components of hemogram (lymphocytes, neutrophils, monocytes, eosinophils, platelets, erythrocytes, and hemoglobin). Additionally, stratified multiple regression analyses were performed to assess the association of eIS with age, sex, and Body Mass Index (BMI). **Results:** Peripheral blood cell counts were associated with eIS in children and youth with T1DM. Across BMI, age, and sex strata, eosinophils consistently showed modest-to-moderate positive associations with eIS, whereas monocytes, neutrophils, lymphocytes, and platelets showed negative associations that varied by subgroup. In overall cohort, neutrophils and lymphocytes demonstrated statistically significant but minimal negative associations. **Discussion:** The development of double diabetes may occur independent of obesity and the cellular patterns observed paralleled those reported in non-obese populations.

Link: <https://doi.org/10.1007/s12020-026-04721-5>



### TITLE:

Experimental study of a pin-fin hybrid collector-evaporator in a solar heat pump

### AUTHOR :

Patil R.A.; Deshmukh V.

### JOURNAL NAME:

Applied Thermal Engineering (Vol.-304)

### DETAILS:

Published on July 2026



### ABSTRACT:

Conventional flat-plate collector-evaporators in direct-expansion solar heat pump systems suffer from high thermal losses that limit performance under varying outdoor conditions. This study experimentally investigates a glazed pin-fin hybrid collector-evaporator integrated into a direct-expansion solar heat pump water heater using R-134a. A glazed pin-fin hybrid collector-evaporator with a 0.46 m<sup>2</sup> aperture (0.72 m<sup>2</sup> effective) area with 45 staggered copper pin fins was tested in Pune, India (3–5 January 2025) across three heating cycles (50 °C, 60 °C, and 70 °C Outlet), under solar irradiance of 600–830 W/m<sup>2</sup>, ambient temperatures of 21–30 °C, and wind speeds of 1.8–3.8 m/s. The characteristic curve yielded a collector optical efficiency of 83.12% and a heat-removal-loss coefficient of 2.296 W/m<sup>2</sup>K for a compact 0.46 m<sup>2</sup> aperture, compared with 1.65–5.6 m<sup>2</sup> in prior studies. The effective overall heat-loss coefficient ranged from 3.68 to 5.54 W/m<sup>2</sup>K under a sub-ambient evaporation regime. Effective collector efficiency, based on combined solar and ambient heat input, ranged from 84.5% to 87.5%, while the system coefficient of performance ranged from 1.50 to 3.70 over outlet temperatures of 50 to 70 °C. The levelized cost of heating averaged ₹4.66/kWh, and the total equivalent warming impact ranged from 17.21 to 21.10 t CO<sub>2e</sub> over a 15-year lifetime. Response surface methodology identified 750 W/m<sup>2</sup>, 23.25 °C, and 0.0132 kg/s as optimal operating conditions, yielding a predicted coefficient of performance of 3.92 and an effective collector efficiency of 87.38%. An outlet water temperature of 50–60 °C provides the most favourable balance between thermal performance, cost, and environmental impact.

Link: <https://doi.org/10.1016/j.applthermaleng.2026.132577>



### TITLE:

A new way to harvest energy for sustainable development towards green technology

### AUTHOR :

Nayak R.C.; Vijaybhai S.B.; Kulkarni M.V.;  
Khan N.H.; Ghutke P.C.; Kumar S.; Jalgar  
S.R.

### JOURNAL NAME:

AIP Conference Proceedings (vol.-3284,  
Issue-1)

### DETAILS:

Published on 30 July 2026



### ABSTRACT:

Energy is necessary for industry, homes, and transportation. Both non-renewable and renewable energy sources are available. Air pollution is caused by non-renewable energy sources, whereas renewable energy sources are environmentally beneficial. Including sun, wind, and energy transformed from one form to another, non-conventional means of power generation are more advantageous to society. India ranks fourth globally in the field of renewable energy sources. Our Prime Minister recently announced plans to build a renewable energy source plant to produce electricity and to encourage further study into the free energy concept. In an effort to encourage more entrepreneurs to enter the renewable energy sector, he also broadcasted plans to offer inducement from the center for both the free energy concept and the renewable energy sector. Many nations these days use technology to produce energy. We have created a model in this work that generates power by converting pressure energy. Vehicles and human motion both contribute to the development of pressure energy. By providing a certain track and mechanism, this pressure energy is transformed into electrical energy. This work presents the specifics of the planned system and its operation. With its lever and gear mechanism, our technology offers a novel approach to the sustainable growth of green energy produce. The main factor contributing to this system's stability is its natural walking track, which harvests energy without causing any physical strain on the body.

Link: <https://doi.org/10.1063/5.0328658>



## TITLE:

Machine Learning-Driven Sidechain  
Architecture for Scalable and Secure IoT  
Networks

## AUTHOR :

Vairagade R.; Wankhade S.; Hande Y.;  
Borade S.; Shinde V.; Kalyankar M.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

The sudden growth of the Internet of Things (IoT) has allowed connecting billions of devices in various areas: healthcare, smart cities, transportation, energy systems, etc. Although such growth is highly beneficial, it also presents some issues that pose great challenges such as security, scalability, latency and energy efficiency [5, 17, 34]. The main causes of these problems are centralized architectures, the heterogeneity of the devices as well as the insufficient computational capacity of IoT nodes. One of the solutions that may be proposed to increase the IoT security is blockchain systems that can offer decentralization, transparency, and resistant to tampering data processing [34]. However, classical blockchain systems are associated with high computational load, network saturation, and inadequate scalability causing them to be inappropriate in resource limited IoT systems. To overcome these limitations, this paper has offered a machine learning- based blockchain sidechain [8, 11]. Design that can be specific to an IoT type of network. The suggested model uses a modified genetic algorithm to optimize the generation of sidechains and enhance scalability [15, 31, 49]. An enhanced version of Delegated Practical Byzantine Fault Tolerance Delegated Proof of Stake (DPBFT DPoS) system is proposed to decrease both latency and energy spent on transmitting transaction [44, 49]. Secondly, multilayer perceptron and support machine learning models are also incorporated to increase intrusion detection and trust scores.

Link: [https://doi.org/10.1007/978-3-032-26905-8\\_27](https://doi.org/10.1007/978-3-032-26905-8_27)



## TITLE:

Energy-Aware Cluster-Optimized Intelligent  
Routing Protocol for WSN-based IoT  
Networks

## AUTHOR :

Kumbhar P.Y.; Naik A.A.

## JOURNAL NAME:

SSRG International Journal of Electronics  
and Communication Engineering (vol.-13,  
Issue-7)

## DETAILS:

Published on 29 July 2026



## ABSTRACT:

Wireless Sensor Networks (WSNs) use resource-constrained sensor nodes to continuously monitor ambient conditions and serve as data sinks for various Internet of Things (IoT) applications. However, maximizing Energy Efficiency (EE) while maintaining reliable data delivery remains a significant challenge. Existing clustering and routing algorithms struggle with issues such as uneven energy consumption, premature node failures, and poor network performance. Additionally, many existing metaheuristic schemes are not adaptable to dynamic network environments, which leads to ineffective energy management. To address the above issues and enhance the energy efficiency of IoT-based WSN, this research introduced a novel Energy-Aware Cluster-Optimized Intelligent Routing (EACO-IR) protocol. The EACO-IR protocol performs in three stages: stable cluster formation, Cluster Head (CH) selection, and energy-aware route finding. At first, stable clusters are formed using the Hybrid Fuzzy–Density Adaptive Kronecker Clustering (HF-DAC) algorithm. Subsequently, CHs are optimally selected using the Mutation-Enhanced Armadillo–Devil Optimization (MEADO) based on a multi-objective function for the Base Station (BS). Finally, the Multi-level Energy-Aware Attention Transformer-Based Reinforcement Learning is introduced to create intra and inter-cluster data travel ways to minimize communication overhead from SNs to the BS. Experimental results show that the proposed protocol yields an average throughput of 4 Mbps, an average Packet Delivery Ratio (PDR) of 98.71%, and an end-to-end latency of 0.06 seconds, outperforming current state-of-the-art clustering and routing algorithms. Ultimately, this framework establishes a highly adaptable template for deploying self-optimizing, long-lasting IoT architectures capable of supporting real-time data streaming without premature network degradation.

Link: <https://doi.org/10.14445/23488549/IJECE-V13I7P113>





## TITLE:

Architecting a Trust-Centric AI-Blockchain  
System for Intelligent and Secure Real Estate  
Asset Tokenization

## AUTHOR :

Warke Y.P.; Sugave S.R.

## JOURNAL NAME:

Journal of Intelligent Decision Making and  
Information Science (Vol.-3, Issue 8s)

## DETAILS:

Published on August 2026



## ABSTRACT:

The exploratory data analysis results provide important insights into the dataset characteristics that guide the design of the proposed AI-enabled blockchain framework. The class distribution graph shows a strong imbalance, with approximately 86.2% genuine samples and 13.8% forged samples, reflecting real-world conditions where fraudulent cases are relatively rare. This imbalance necessitates the use of robust machine learning strategies, such as class-weighted learning and advanced evaluation metrics beyond simple accuracy, to ensure reliable detection of forged instances. The file size distribution further indicates that most samples are lightweight, with an average size of 42.6 KB and a long-tailed distribution extending up to 295 KB, supporting the adoption of a hybrid on-chain/off-chain storage strategy to optimize blockchain storage costs and network performance. Dimensionality reduction and visualization results obtained using PCA and t-SNE highlight the complexity of the classification problem addressed in the proposed work. The PCA projection reveals partial overlap between genuine and forged samples, indicating that linear feature separation is insufficient for accurate classification. Similarly, the t-SNE visualization shows localized clustering of forged samples but noticeable overlap with genuine data, confirming the presence of non-linear relationships in the feature space. These observations justify the integration of deep learning models and ensemble classifiers within the AI layer to capture complex patterns and improve generalization. The image resolution distribution further demonstrates that most images fall within a consistent resolution range of approximately 300–700 pixels (width) and 200–550 pixels (height), ensuring stable model training while still requiring standardized preprocessing to handle resolution variability across training, validation, and test splits. Based on these data characteristics, the proposed AI-enabled blockchain framework is designed to deliver measurable improvements in performance, security, and efficiency.

Link: <https://doi.org/10.59543/jidmis.v3.2086>





## TITLE:

Adaptive multimodal transformer for wildfire spread prediction using feature-weighted attention

## AUTHOR :

Dubey P.; Keswani G.; Mishra A.; Nayak M.; Mahmood M.R.; Dubey P.

## JOURNAL NAME:

Bulletin of Electrical Engineering and Informatics (Vol.-15, Issue-4)

## DETAILS:

Published on August 2026



## ABSTRACT:

Hazard modelling technology has evolved quickly in recent years to predict wildfires, which are an important class of natural disaster for accurate forecasting and proactive control. The combination of remote sensing and machine learning has been playing an important role in this area. Yet traditional models fail to accommodate the sophisticated spatiotemporal dynamics in fire-affected areas and tend to be agnostic toward individual predictors. This study utilizes a multimodal dataset comprising normalized difference vegetation index (NDVI), wind vectors, surface temperature, humidity, land cover, and elevation from sources such as moderate resolution imaging spectroradiometer (MODIS), Sentinel-2, ERA5, and shuttle radar topography mission (SRTM). These inputs were normalized within spatial grids, and temporally-aligned for day-ahead prediction. We introduce an adaptive multimodal transformer (AMT) with a feature weighting module (FWM) to adaptively emphasize informative features. The transformer architecture allows for long-range spatial learning, and the FWM strengthens contextual sensitivity. The novelty of this approach lies in its interpretable feature reweighting mechanism for dynamic environmental conditions. Model performance was evaluated using F1-score, intersection over union (IoU), mean absolute error (MAE), and mean average precision (MAP). Results show that the proposed model outperforms the MA-Net baseline, achieving a 5% improvement in F1-score and a 14.7% reduction in MAE, demonstrating superior accuracy, generalization, and interpretability.

Link: <https://doi.org/10.11591/eei.v15i4.11326>





## TITLE:

Macroeconomic Policies for Resilience to  
Global Financial Crisis

## AUTHOR :

Patil A.A.; Yadav R.; Sengupta R.

## JOURNAL NAME:

Policies and Interventions to Enhance  
Economic Resilience

## DETAILS:

Published on June 2026



## ABSTRACT:

Global financial crises pose significant threats to economic stability, disrupting growth trajectories and imposing substantial social costs. This chapter examines the role of macroeconomic policies in enhancing economic resilience to financial shocks, drawing on theoretical frameworks and empirical evidence from major crises over the past three decades. We analyze how fiscal policy, monetary policy, exchange rate regimes, and capital account management contribute to crisis prevention and mitigation. The analysis reveals that policy flexibility, adequate fiscal space, credible monetary frameworks, and prudential regulatory measures are essential components of resilient macroeconomic architecture. We argue that building resilience requires ex-ante policy choices that balance stability with growth objectives, while maintaining the capacity for countercyclical responses during crisis episodes. The chapter concludes with policy recommendations for emerging and advanced economies seeking to strengthen their resilience to future financial disruptions.

Link: <https://doi.org/10.4018/979-8-3373-5218-3.ch006>





## TITLE:

Generative Artificial Intelligence-Enabled Decision Support Systems and Organizational Performance: A Moderated Mediation Model of Human-AI Collaboration Quality

## AUTHOR :

Patil J.; Langote M.S.; Majalekar S.; Chavan R.V.; Chordiya P.B.; Chude N.A.; Kulkarni S.

## JOURNAL NAME:

Journal of Intelligent Decision Making and Information Science (Vol.-3, Issue-7s)

## DETAILS:

Published on August 2026



## ABSTRACT:

Background: Organizations are rapidly adopting generative artificial intelligence (GenAI) within decision support systems (DSS) to accelerate and improve managerial decision-making, yet empirical evidence on how GenAI-enabled DSS translate into measurable organizational performance gains remains fragmented and inconsistent across industries. Research gap: Prior information systems (IS) research has examined GenAI adoption, decision support effectiveness, and organizational performance largely in isolation, with limited integrated testing of the mechanisms (mediators) and boundary conditions (moderators) that explain when and how GenAI-enabled DSS improve performance outcomes. In particular, the role of human-AI collaboration quality as a moderating condition, rather than as an outcome, has received little empirical attention. Purpose: This study develops and empirically tests a moderated mediation model in which decision support system effectiveness mediates the relationships between three antecedents (generative AI capability, data and information quality, and organizational AI readiness) and organizational performance, with human-AI collaboration quality moderating the mediated path. Method: Grounded in Dynamic Capability Theory and the DeLone and McLean IS Success Model, the study proposes a quantitative, cross-sectional survey design targeting managers and decision-makers in medium and large organizations, with data to be analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings: Using an illustrative simulated dataset constructed to demonstrate the analytical procedure, all measurement and structural model criteria (reliability, convergent and discriminant validity, path significance, moderated mediation) are shown to meet accepted thresholds, and the hypothesized relationships receive support.

Link: <https://doi.org/10.59543/jidmis.v3.1660>



## TITLE:

Beyond Authentication: A Three-Pillar  
Evidentiary Framework for Deepfake  
Evidence in Court of law

## AUTHOR :

Inamdar P.; Inamdar A.; Bedekar M.

## JOURNAL NAME:

Journal of Intelligent Decision Making and  
Information Science (Vol.-3, Issue-7s)

## DETAILS:

Published on August 2026



## ABSTRACT:

As Artificial Intelligence—generated deepfakes become forensically indistinguishable from authentic media, existing rules of evidence including the United States Federal Rules of Evidence 1975, the United Kingdom's Police and Criminal Evidence Act 1984, and India's Bharatiya Sakshya Adhiniyam, 2023 are proving inadequate to ensure the reliability of audiovisual evidence in criminal proceedings. This article conducts a comparative doctrinal analysis of evidentiary authentication frameworks across these three jurisdictions, demonstrating that current standards were designed for an era in which media manipulation left detectable forensic artefacts. We identify a dual epistemic threat: the risk of admitting fabricated deepfake evidence (the "fabrication threat") and the risk of excluding authentic evidence through spurious deepfake claims (the "liar's dividend"). To address this doctrinal gap, we propose a three-pillar jurisprudential model comprising (i) a structured burden-shifting authentication protocol, (ii) judicial notice of AI generative capability, and (iii) a provenance-first evidentiary doctrine grounded in cryptographic content credentials. The model is evaluated against the constitutional and procedural constraints of each jurisdiction, with particular attention to the Indian evidentiary landscape under the newly enacted Bharatiya Sakshya Adhiniyam. We conclude with concrete legislative and procedural reform recommendations for courts operating in the post-authentication era.

Link: <https://doi.org/10.59543/jidmis.v3.1771>





## TITLE:

Evaluating Predictive Models for Precision  
in Insurance Pricing

## AUTHOR :

Bafna R.; Joshi D.

## JOURNAL NAME:

17th International Conference on Advances  
in Computing, Control, and  
Telecommunication Technologies, ACT  
2026 (Vol.-1)

## DETAILS:

Published on 2026



## ABSTRACT:

In the insurance and healthcare sectors, accurately forecasting medical insurance premiums is essential. This study compares a number of regression models, to estimate insurance costs based on demographic and lifestyle data. We applied feature scaling to improve model consistency. Grid search was used to adjust the Light GBM hyperparameters, and Light GBM was used as the meta-learner in the stacking ensemble. Each model was evaluated using the coefficient of determination. The Stacking Regressor demonstrated the efficiency of model ensembling by outperforming all other models with the highest coefficient of determination score. This Comparative approach highlights ensemble and hybrid approaches for accurate cost forecasting in insurance applications and clarifies the predictive capabilities of different algorithms.

Link:

<https://www.scopus.com/pages/publications/105047279597?origin=resultslist>





## TITLE:

Smart, Immersive & Connected—Emerging  
VR, AR, and IOT Trends in Brand  
Experience of Indian K–12 International  
Schools

## AUTHOR:

Wairagade A.; Mukherjee A.

## JOURNAL NAME:

Lecture Notes in Networks and Systems

## DETAILS:

Published on 2 July 2026



## ABSTRACT:

This study discusses how the new technologies—Virtual Reality (VR), Augmented Reality (AR) and Internet of Things (IoT)—is changing brand experience in K–12 international schools in India. Despite being used to a large extent for up-skilling learning, their potential influence on institutional brand, parent confidence and advocacy has not been explored extensively in the research. With 50 stakeholders (principals, teachers, marketing managers, IT staff and parents), the study’s qualitative exploratory design explores how immersive and connected technologies shape perceptions of modernity, transparency and credibility. Findings demonstrate VR/AR augment experiential touchpoints, while IoT reinforces safety and communication resulting in a higher brand experience, which cultivates trust and encourages parent advocacy. It’s all in how prepared schools are—in physical infrastructure, teacher training, budget and digital literacy. The research provides a conceptual model for technology adoption brand experience trust advocacy and implications and insights for how schools may wish to differentiate themselves.

Link: [https://doi.org/10.1007/978-3-032-27705-3\\_11](https://doi.org/10.1007/978-3-032-27705-3_11)



### TITLE:

Green Synthesis of Silver Nanoparticles by Using Red Geranium Flower (*Pelargonium graveolens*) for Efficient Photocatalytic Dye Degradation

### AUTHOR :

Bag P.P.; Lepcha U.C.; Pathak A.; Sherpa U.D.; Hazra G.; Thapa D.K.; Bag A.

### JOURNAL NAME:

ChemistrySelect (Vol.-11, Issue-31)

### DETAILS:

Published on 12 August 2026



### ABSTRACT:

The development of sustainable and environmentally benign strategies for nanoparticle synthesis and wastewater remediation remains a significant challenge. In this study, silver nanoparticles (g-AgNPs) were green synthesized using the aqueous extract of *Pelargonium graveolens* (red geranium) flowers, which served as both reducing and stabilizing agents, eliminating the need for hazardous chemicals. The synthesized nanoparticles were characterized by UV-vis spectroscopy, PXRD, FTIR, SEM, and EDX analyses. A characteristic surface plasmon resonance band at 424 nm confirmed nanoparticle formation; PXRD revealed a crystalline structure with an average crystallite size of  $\sim 14$  nm. SEM analysis showed predominantly spherical nanoparticles with an average particle size of  $15.28 \pm 2.45$  nm. The g-AgNPs exhibited excellent visible-light photocatalytic activity, achieving 94% degradation of methylene blue (MB) following pseudo-first-order kinetics with an apparent rate constant of  $0.0094 \text{ min}^{-1}$ . The catalyst retained 95.7% of its degradation efficiency after repeated reuse, demonstrating good stability. Control experiments confirmed that both visible light and g-AgNPs were essential for efficient dye degradation. DFT calculations revealed strong MB adsorption on the Ag surface with an adsorption free energy of  $-96.54 \text{ kcal mol}^{-1}$ , facilitating charge transfer and enhancing photocatalytic performance. These findings demonstrate the potential of plant-mediated AgNPs for sustainable environmental remediation.

Link: <https://doi.org/10.1002/slct.74099>



## TITLE:

Targeting Histone Deacetylase 2 in  
Alzheimer's Disease: From Molecular  
Insights to Epigenetic Therapeutic  
Opportunities

## AUTHOR :

Anand A.; Sania A.; Singh S.K.; Bajad N.

## JOURNAL NAME:

Molecular Neurobiology (Vol.-63, Issue-1)

## DETAILS:

Published on 27 July 2026



## ABSTRACT:

Alzheimer's disease (AD) is a neurodegenerative disorder that leads to cognitive impairment, memory loss, and nerve cell dysfunction. Despite substantial research efforts, effective AD therapies remain limited. Histone deacetylase 2 (HDAC2) is a principal epigenetic regulator that is essential for controlling gene expression and neuronal connectivity. Recently, HDAC2 has attracted significant attention as a potential therapeutic target in AD owing to its involvement in key disease hallmarks, including neuroinflammation, A $\beta$  accumulation, and abnormal tau phosphorylation. We have outlined and discussed the molecular insights into HDAC2 in AD and its recently emerged inhibitors. Inhibiting HDAC2 has demonstrated potential in lowering neuroinflammatory signalling and reestablishing synaptic and neuroprotective gene expression patterns in preclinical AD models. Current preclinical evidence indicates that HDAC2 may play a significant role in AD development and may represent a target for therapeutic intervention. Recent progress in HDAC2 inhibitor development offers a rationale for this approach, although further mechanistic and clinical investigations are required. Resolving the precise roles of HDAC2 dysregulation in AD and determining the utility of combination strategies remain important priorities. Whether HDAC2-targeted inhibitors can yield disease-modifying benefits in AD remains to be demonstrated in clinical studies.

Link: <https://doi.org/10.1007/s12035-026-06078-2>





## TITLE:

Critical review of Botnet sophistication and detection inefficiencies in IoT and mobile networks

## AUTHOR :

Sonune H.; Kulkarni N.

## JOURNAL NAME:

Discover Internet of Things (Vol.-6, Issue-1)

## DETAILS:

Published on 12 June 2026



## ABSTRACT:

Botnets are continuing to be a significant contributor to large-scale cyberattack, and their detection in IoT and mobile ecosystems is progressively challenging because of limited resources, encrypted messaging, command and control strategy development, and concept drift. The review will cover botnet detection techniques on IoT and mobile networks using machine learning, deep learning, SDN-enabled, hybrid, and explainable-AI techniques. Instead of this, we take into account the deployment factors, such as the latency, memory footprint, scalability, and robustness to evasion and obfuscation, which are supported by the evidence presented in the literature. Our recurrent constraints are summarized; among them are the use of legacy or non-representative data, costly feature pipelines, lack of real-time scalability, and lack of interpretability to be used operationally. On the findings of these, we define research directions to adaptive, drift-resilient, privacy-preserving, and explainable pipelines to detection which can be applied to heterogeneous, resource-constrained environments. It is important to note that all the performance numbers mentioned are reported in the original research and cannot be considered the outcome of one common testbed.

Link: <https://doi.org/10.1007/s43926-026-00398-4>



## TITLE:

Adsorption of fluoride from groundwater using iron-rich laterite soil: Batch parametric study, isotherm, kinetics, and thermodynamics

## AUTHOR :

Mishra L.; Saxena A.; Anand P.; Bhowmik P.N.; Ateş B.

## JOURNAL NAME:

Desalination and Water Treatment

## DETAILS:

Published on August 2026



## ABSTRACT:

Fluoride concentrations in groundwater above the WHO drinking-water guideline of 1.5 mg/L cause irreversible dental and skeletal fluorosis, affecting an estimated 66 million people in India. Low-cost defluoridation materials are urgently needed where membrane-based technologies are economically unviable. In this study, raw iron-rich laterite from Mancheswar, Odisha, is evaluated as a low-cost, zero-preparation fluoride adsorbent. SEM-EDS, XRD, FTIR and BET (24.6 m<sup>2</sup>/g) characterisation revealed a porous surface dominated by hematite, goethite, kaolinite and quartz, bearing Fe-OH and Al-OH surface hydroxyls. Batch experiments examined particle size (75–425 µm), dose (0.5–10 g/L), Co (0.5–10 mg/L), pH (2–9), contact time (5–180 min) and temperature (293–313 K). At pH 6.5–7, a 2 g/L dose and 100 min, the 75 µm fraction reduced 10 mg/L fluoride to 0.7 mg/L (93% removal). Equilibrium data fitted the Freundlich isotherm best ( $R^2 \approx 0.99$ ), indicating a heterogeneous surface; the Langmuir model, which does not best describe the data, gave a Langmuir-derived monolayer capacity of 0.201 mg/g (300 µm fraction), reported for comparison only. Pseudo-second-order kinetics ( $R^2 = 0.9999$ ) describe the uptake rate, and thermodynamic analysis shows the adsorption to be spontaneous, endothermic and entropy-driven ( $\Delta G^\circ = -6.85$  to  $-8.62$  kJ/mol;  $\Delta H^\circ = +19.03 \pm 1.7$  kJ/mol;  $\Delta S^\circ = +88.3 \pm 5.6$  J/(mol·K), 95% confidence interval from a three-temperature regression), confirmed by XPS surface speciation.

Link: <https://doi.org/10.1016/j.dwt.2026.101903>



## TITLE:

Real-Time Sign Language Recognition  
Using CNN and MediaPipe with Enhanced  
Background Adaptation and Contextual  
Translation

## AUTHOR :

Naik V.; Palwe S.; Jain M.; Murkute S.;  
Londhe O.

## JOURNAL NAME:

International Journal of Computing and  
Digital Systems (Vol.-19, Issue-1)

## DETAILS:

Published on 2026



## ABSTRACT:

Real-time sign language recognition remains difficult to deploy in practice because most vision-based systems lose accuracy once the background becomes cluttered or lighting conditions change, and because many existing solutions rely on costly, specialized hardware such as data gloves or depth sensors. This paper addresses that problem with a real-time sign language recognition system built for the Deaf and Hard-of-Hearing (DHH) community that operates on a standard webcam. The proposed framework combines a Convolutional Neural Network (CNN) classifier with Google's MediaPipe hand-landmark extraction: rather than classifying raw video frames, the system renders MediaPipe's 21-point hand landmarks onto a normalized background before classification, which reduces the CNN's sensitivity to environmental clutter and illumination changes while lowering computational overhead relative to pure-CNN, raw-frame approaches. The proposed model was trained and evaluated using a dataset consisting of hand gesture images captured under both controlled and real-world environmental conditions. The overall framework integrates image preprocessing, landmark extraction, CNN-based feature learning, and contextual language processing to achieve robust and efficient recognition in real-time applications. An adaptive background-processing stage and a lightweight NLP-based contextual translation module further improve robustness and convert recognized letter sequences into coherent words and sentences, with speech output for natural interaction. On the evaluation dataset, the system achieves 97–99% accuracy under controlled conditions and 89% under uncontrolled, real-world conditions, with end-to-end latency under 100 milliseconds. The experimental results demonstrate that the proposed framework maintains high recognition accuracy while requiring only a standard webcam, making it suitable for deployment in educational institutions, public service environments, and everyday communication scenarios.

Link:

<https://www.scopus.com/pages/publications/105046438642?origin=resultslist>



### TITLE:

In-Silico Molecular Docking Studies of Crinum Solapurense: For Cox-Inhibition

### AUTHOR :

Dhange A.A.; Gajeli G.B.; Ghurghure S.M.;  
Moharir S.M.; Bobade C.D.

### JOURNAL NAME:

Current Trends in Biotechnology and  
Pharmacy (Vol.-20, Issue-3)

### DETAILS:

Published on July 2026



### ABSTRACT:

In the present study, an aim was to identify a drug-like candidate for the plant Crinum Solapurense (Amaryllidaceae). The Lycorine, an alkaloid that could be a potential candidate which can interact and inhibit the cyclooxygenase-2 (COX-2) generated protein 5KIR and relieve pain and inflammation. Total 18 compounds were analyzed through Autodock vina. The docking value was observed in the range of -9.4 to -10.3 kcal·mol<sup>-1</sup>. No other article and review have been reported for the molecular docking study for the plant Crinum Solapurense. Moreover, there have been some articles of plants belonging to the family Amaryllidaceae.

Link: <https://doi.org/10.5530/ctbp.2026.3.24>



## TITLE:

Ensemble machine learning models for high-resolution landslide risk assessment in India's Western Ghats

## AUTHOR :

Pawar N.S.; Sharma K.V.

## JOURNAL NAME:

Physics and Chemistry of the Earth (vol.-144)

## DETAILS:

Published on August 2026



## ABSTRACT:

Landslides pose significant risks to lives, infrastructure, and economic stability in India's Western Ghats. This study evaluates six widely used machine learning models, namely Random Forest (RF), eXtreme Gradient Boosting (XGB), Support Vector Machine (SVM), k-Nearest Neighbors (KNN), Artificial Neural Network (ANN), and Logistic Regression (LR) to improve landslide susceptibility mapping (LSM) in the Raigad district of the Western Ghats and examine the influence of spatial resolution on conditioning factor importance. Seventeen factors representing topographic, hydrological, geological, and anthropogenic influences were derived from the ALOS PALSAR DEM, Sentinel-2 imagery, Indian Meteorological Department (IMD) rainfall data, and the Bhukosh portal. Feature selection was performed using multicollinearity analysis, Spearman's correlation, and the Boruta algorithm. The models were trained using validated 178 landslide locations identified from Bhukosh, the NASA catalog, and field surveys, together with an equal number of non-landslide locations to create a balanced dataset of 356 samples. LSM were generated and model performance and robustness were evaluated using conventional and spatial cross-validation and assessed using area under the receiver operating characteristic curve (AUCROC), predictive and calibration metrics. RF achieved the highest predictive performance (AUCROC = 0.91; accuracy = 82.82%), followed closely by XGB (AUCROC = 0.90; accuracy = 82.71%). Sensitivity analysis across multiple spatial resolutions shows that topographic variables consistently exhibited the highest influence on landslide occurrence.

Link: <https://doi.org/10.1016/j.pce.2026.104685>



### TITLE:

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

### AUTHOR :

Bapat M.; Mali S.M.; Patil C.

### JOURNAL NAME:

Tehnicki Glasnik (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://www.scopus.com/pages/publications/105046842601?origin=resultslist>



## TITLE:

Fiscal deficit and monetary dynamics in India: unravelling the asymmetric nexus

## AUTHOR :

Pandey P.; Sharma V.; Khan W.; Kumar P.;  
Chandniwala V.J.

## JOURNAL NAME:

SN Business and Economics (Vol.-6, Issue-9)

## DETAILS:

Published on 10 August 2026



## ABSTRACT:

The present study empirically investigates the effectiveness of the Fiscal Theory of Price Level (FTPL) in India by exploring both linear and nonlinear relationships through annual time-series data spanning from 1972 to 2021. The empirical analysis examines key macroeconomic variables including the consumer price index, interest rate, fiscal deficit, money supply, financial innovation, and exchange rate volatility, employing Autoregressive Distributed Lag (ARDL), Nonlinear ARDL (NARDL), and Multiple Threshold ARDL (MTNARDL) models. The findings reveal a long-run cointegrated relationship between fiscal deficit and monetary variables, though with distinct transmission mechanisms. While linear ARDL estimates suggest a uniform positive impact, NARDL results indicate directional asymmetry: fiscal expansion exerts a stronger inflationary impact (0.670) compared to fiscal contraction (0.508). The MTNARDL model further refines these findings by identifying magnitude asymmetry, revealing that inflation is significantly more responsive to lower quantile fiscal shocks (0.807) than to extreme high-deficit shocks (0.116). Regarding interest rates, the MTNARDL model uncovers a structural sign reversal: while moderate deficits positively drive rates (0.113), extreme fiscal adjustments exhibit an inverse relationship (-0.175). These findings provide empirical support for the FTPL but highlight that linear models underestimate the complex, non-monotonic reaction of monetary variables.

Link: <https://doi.org/10.1007/s43546-026-01279-2>





## TITLE:

AI-Powered Visual Monitoring of Owl Species for Biodiversity Sustainability using Deep Learning Models

## AUTHOR :

Shetkar A.; Koparde P.; Sonawani S.

## JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026 (Vol.-1)

## DETAILS:

Published on 2026



## ABSTRACT:

Biodiversity preservation is critical to sustaining ecosystems, with owls serving as key ecological indicators and natural pest controllers. This study proposes an AI-powered visual monitoring system to automate the classification of 14 owl species native to Pune, India. Leveraging convolutional neural networks—EfficientNet-B3, Res-Net50, and VGG16—the system applies transfer learning and data augmentation to address challenges of limited training data and nocturnal imaging. The dataset, sourced from the Macaulay Library via eBird, contains 3,500 curated images captured under varied lighting conditions. Experimental results show EfficientNet-B3 achieving the highest test accuracy of 96.96%, offering a scalable solution for real-time, non-invasive biodiversity surveillance. The framework demonstrates the viability of deep learning in ecological conservation and supports circular economy goals through data-driven environmental intelligence.

Link:

<https://www.scopus.com/pages/publications/105047285595?origin=resultslist>



## TITLE:

Intelligent Sensing and Predictive Analytics  
for Hydroponic System Optimization

## AUTHOR :

Kulkarni P.; Gohokar V.; Kute R.

## JOURNAL NAME:

Studies in Computational Intelligence

## DETAILS:

Published on 4 June 2026



## ABSTRACT:

The integration of predictive analytics in urban agriculture is creating a transformation. This study explores the role of IoT-enabled sensors and machine learning-based models for forecasting future environmental conditions and plant growth. Real-time sensor data is collected from temperature, humidity, pH, light intensity, Electrical Conductivity (EC), Total Dissolved Solids (TDS), water level, and CO2 sensors. The collected sensor data is investigated using time series analysis to detect trends, seasonal variations, and anomalies, providing constructive insights for system optimization. Time series analysis and regression models are employed to predict system behavior, allowing proactive adjustments to nutrient levels, irrigation cycles, and climate control. Furthermore, early detection of potential system failures or suboptimal conditions is achieved through anomaly detection techniques, enabling timely interventions and reducing crop loss. This research demonstrates how predictive analytics can optimize hydroponic farming, enhancing yield, efficiency, sustainability, and scalability in precision agriculture.

Link: [https://doi.org/10.1007/978-3-032-19543-2\\_11](https://doi.org/10.1007/978-3-032-19543-2_11)



### TITLE:

Adaptive multimodal liveness detection framework for biometric authentication against spoofing and deepfake attacks

### AUTHOR :

Kotalwar A.; Joshi R.R.

### JOURNAL NAME:

Discover Artificial Intelligence (Vol.-6, Issue-1)

### DETAILS:

Published on 11 August 2026



### ABSTRACT:

With the explosive growth of generative AI technologies, the threat posed by spoofing attacks and deepfake attacks on biometric authentication systems continues to grow. Traditional biometric systems rely on visual presentation and are subject to various types of presentation attacks such as replay attacks, printed photographs, and synthetic deepfake identities. This paper presents an Adaptive Multimodal Liveness Detection Framework (AMLF) to increase the strength of biometric identity systems and reduce their vulnerability to both spoofing and deepfake attacks. The framework also aims to reduce the computational costs of performing liveness detection on resource-constrained edge devices. The proposed framework uses three techniques for liveness detection across multiple biometric modalities (face, fingerprint, and iris): spatial texture analysis, temporal biometric signals, and frequency-domain artifacts. A lightweight, deep neural network architecture is used for the multimodal liveness detection process on edge devices and enables real-time liveness detection. A series of experiments conducted on publicly available datasets (FaceForensics++, CASIA-Iris-V4, MSU-MFSD, and FVC2006) demonstrate that the proposed AMLF considerably increases the accuracy of detecting spoofing attacks over existing approaches based on deep learning methods while significantly reducing the computational costs associated with these methods.

Link: <https://doi.org/10.1007/s44163-026-01911-y>





## TITLE:

Portfolio Optimization of Indian Stock Market using Reinforcement Learning and Explainable AI

## AUTHOR :

Chorasiya R.; Kinger S.

## JOURNAL NAME:

17th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2026

## DETAILS:

Published on 2026



## ABSTRACT:

This paper gives a hybrid AI system to optimize risk-adjusted portfolio for the Indian stock market with Deep Reinforcement Learning (DRL) methods and eXplainable AI (XAI). The structure relies on an individual NSE dataset with 1900+ stock symbols and DRL models, such as Proximal Policy Optimization (PPO), Advantage Actor-Critic (A2C), Soft Actor-Critic (SAC) and Deep Deterministic Policy Gradient (DDPG). It has a dynamic reallocation policy and constraints to reduce interest exposure to high-performing stocks and over-concentration. Compared to the prior performance, risk-adjusted performance is evaluated, using Sharpe Ratio, Sortino Ratio, Annualized Volatility and Maximum Drawdown in the model. Evaluation metrics indicate PPO was superior in comparison to the other models, with a Sharpe Ratio of 1.3972 and Cumulative Return of 34.04%. The framework demonstrates how DRL and XAI are effective in building transparent and robust investment portfolios, specific to emerging markets such as India are concerned.

Link:<https://www.scopus.com/pages/publications/105047240882?origin=resultslist>





## TITLE:

CrossChain-VaxTrace: A Sustainable and Interoperable Blockchain Architecture Integrating Federated Graph Neural Networks and Edge Artificial Intelligence for Green Vaccine Supply Chain Optimisation

## AUTHOR :

Boyra R.; Bose R.; Khan A.A.; Roy S.; Sutradhar S.; Prasad R.K.; Prashar D.; Jha S.

## JOURNAL NAME:

IET Collaborative Intelligent Manufacturing (Vol.-8, Issue-1)

## DETAILS:

Published on 21 August 2026



## ABSTRACT:

The vaccine supply chain around the world is under severe pressure due to cold-chain integrity failures, end-to-end traceability fragmentation, multi-organisational data sovereignty wars and the huge environmental footprint of energy-intensive consensus mechanisms. To overcome these challenges, this paper proposes a new integrated architecture, CrossChain-VaxTrace, which synergistically integrates cross-chain blockchain interoperability, federated graph neural networks (FGNNs) and edge artificial intelligence (AI) to tackle these challenges. The inter-chain blockchain layer uses a Proof-of-Authority (PoA) hub-and-spoke network, whereby data can flow freely across heterogeneous supply chain networks, maintaining organisational data sovereignty and with 67% less energy usage than conventional Proof-of-Work systems. The FGNN architecture facilitates privacy-preserving distributed learning on dynamic supply chain graph structures, which can support demand forecasting over a 15–30-day horizon and multi-objective route optimisation, achieving a balance among cost, time, emissions and quality, without concentrating sensitive pharmaceutical data in the hands of rival organisations. Edge AI nodes installed at strategic checkpoints on NVIDIA Jetson devices support real-time temperature alerts and anomaly detection, sub-second (285 ms average) latency, automatic cold-chain violation notifications and blockchain-verified immutable audit trails. The green computing approach is sustainability-focused and entails the addition of solar-powered edge nodes (45% renewable energy contribution), PoA consensus and federated learning to reduce computational redundancy and carbon footprint. Experimental validation of a 50-entity, 5-organisation simulated network over 180 days shows: 99.2% accuracy in end-to-end traceability; 43% reduction in vaccine spoilage; 1100 transactions per second throughput and 285 ms latency; 98/100 data privacy score; and broad cross-chain interoperability across heterogeneous stakeholder systems—establishing CrossChain-VaxTrace as a comprehensive, secure and environmentally sustainable framework for pharmaceutical logistics.

Link: <https://doi.org/10.1049/cim2.70074>



**TITLE:**

Development of artificial skin using  
composites

**AUTHOR :**

Jadhav S.; Girase V.; Dhattrak P.

**JOURNAL NAME:**

Advanced Composites (Vol.-22)

**DETAILS:**

Published on 2026



**ABSTRACT:**

The development of artificial skin has long been a goal in biomedical engineering, with possible uses in wound healing, prostheses, and tissue engineering. The skin is an intricate organ that plays a critical role in sustaining vital host physiological functions. Researchers have investigated the use of numerous materials and methods to develop skin substitutes that can replicate the intricate structure and functions of human skin. This chapter reviews the applications of artificial skin and the techniques employed in its development. The current level of research into composites used to build artificial skin is also discussed. While synthetic polymers offer greater control over chemical composition and mechanical qualities, natural biopolymers exhibit superior cell responsiveness. The continued exploration of new biomaterial combinations and advanced fabrication techniques will undoubtedly lead to the development of even more effective and versatile artificial skin substitutes that can address the complex challenges of skin regeneration and replacement.

Link: <https://doi.org/10.1515/9783111386027-014>



## TITLE:

AQbD-guided development of a robust and green SI-RP-HPLC method for impurity profiling of an efonidipine hydrochloride ethanolate and chlorthalidone combination, with LC-MS and NMR-based identification of degradation product in efonidipine

## AUTHOR :

Bang, PS; Choudhari, VP; Gharge, VS

## JOURNAL NAME:

Journal Of Chromatography A

## DETAILS:

Published on 27 September 2026



## ABSTRACT:

Efonidipine Hydrochloride Ethanolate (EHE) and Chlorthalidone (CTD) are co-formulated for the management of hypertension owing to their complementary pharmacological actions. Ensuring accurate impurity profiling in such combination formulations is vital for maintaining drug stability, safety and regulatory compliance. However, conventional analytical techniques often face challenges related to sustainability and robustness. Reverse Phase High-Performance Liquid Chromatography (RP-HPLC) remains a key analytical approach for impurity determination, yet the integration of Quality by Design (QbD) principles into its development is still evolving. The present study focuses on developing a novel, sustainable RP-HPLC method for impurity profiling of EHE and CTD tablets using a QbD approach and green chemistry. Chromatographic separation was achieved on a Zorbax SB C8 column (150 mm & times; 4.6 mm, 5 & micro;m). Critical method parameters such as mobile phase composition and pH were systematically optimized through QbD to enhance method robustness. A photolytic degradation product of EHE was identified as Efonidipine Related Compound A, and a plausible photolytic degradation pathway was proposed. A photolytic degradation product was identified in the LC-MS and its structure was confirmed through NMR spectroscopy. The developed green method exhibited excellent resolution, precision and reproducibility across multiple batches, allowing for effective separation and quantification of impurities. This green QbD optimized, environmentally sustainable RP-HPLC method provides a reliable and scalable solution for impurity profiling in complex pharmaceutical formulations, aligning with modern quality control and regulatory expectations.

Link: <https://doi.org/10.1016/j.chroma.2026.467321>

(WOS)



## TITLE:

Enhanced dielectric response and optical tunability in NH<sub>4</sub>I-doped ZrO<sub>2</sub>/ PVA nanocomposites for advanced electronic applications

## AUTHOR :

Patil, AM; Naik, J; Bhajantri, RF

## JOURNAL NAME:

NEXT MATERIALS

## DETAILS:

Published on October 2026



## ABSTRACT:

NH<sub>4</sub>I doped ZrO<sub>2</sub>/PVA multifunctional polymer nanocomposite films were successfully fabricated using a simple and cost-effective solution casting method with double distilled water as a solvent. The influence of NH<sub>4</sub>I incorporation on the structural, optical, surface morphological, dielectric, and electrical properties of the composite films was systematically investigated. FTIR analysis confirmed the interaction between NH<sub>4</sub>I, ZrO<sub>2</sub> nanoparticles, and the PVA polymer matrix, indicating the modification of polymer chain interactions and ionic environments. UV-Visible spectroscopy revealed that NH<sub>4</sub>I doping significantly influenced the optical properties by reducing the direct optical band gap from 5.08 eV to 4.95 eV, while the minimum indirect band gap was observed at 4.65 eV. The correlation between optical band gap and refractive indices was evaluated using the Reddy and Singh-Kumar relationships, demonstrating the tunability of optical parameters through ionic doping. Atomic force microscopy analysis confirmed a homogeneous surface morphology with increased surface roughness, indicating effective incorporation of NH<sub>4</sub>I within the composite matrix. The dielectric studies revealed higher permittivity at lower frequencies, followed by a gradual decrease with increasing frequency due to Maxwell-Wagner interfacial polarization arising from conductor-insulator interactions. The dielectric constant increased with NH<sub>4</sub>I addition up to 10 wt% loading, attributed to enhanced dipolar polarization and ionic contribution within the polymer matrix. Furthermore, the AC conductivity exhibited a continuous increase with increasing NH<sub>4</sub>I concentration over the entire frequency range, confirming improved charge transport facilitated by mobile ionic species.

Link: <https://doi.org/10.1016/j.nxmate.2026.103009>  
(WOS)



*Published on August 2026*

*Since 1983*



**MIT-WPU**

॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

**FACULTY PUBLICATION**

RESEARCH PAPERS