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RESEARCH PAPERS

January-2026



TITLE:

TomatoRipen-MMT: transformer-based RGB and NIR spectral fusion for tomato maturity grading

AUTHOR :

Dubey, P.; Waghodekar, P.; Lahane, P.S.;
Bhagat, D.; Dubey, P.; Zakariah, M.

JOURNAL NAME:

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

DETAILS:

Published on 18 December 2025



ABSTRACT:

Computer vision and multispectral imaging have increasingly become essential tools in modern precision agriculture. Accurate ripeness assessment is critical for yield optimization, reducing post-harvest losses, and enabling automated harvesting systems. However, traditional RGB-based approaches struggle to differentiate subtle maturity changes, and existing solutions often fail under varying lighting, occlusion, or cultivar-specific conditions. To address these challenges, this study focuses on the integration of complementary spectral cues for reliable tomato ripeness evaluation. The work utilizes a curated RGB-NIR tomato dataset comprising 224 hyperspectral samples, processed into aligned multimodal image pairs with balanced ripeness categories. The proposed TomatoRipen-MMT model employs a multimodal Transformer framework with dual encoders, cross-spectral attention, and a joint decoder to fuse spatial and biochemical cues. The novelty of the methodology lies in the dynamic cross-attention mechanism, which learns inter-modal dependencies between RGB and NIR signals for enhanced ripeness interpretation. Performance metrics including accuracy, precision, recall, F1-score, mIoU, and AUC were used to comprehensively evaluate the system. Experimental results demonstrate that TomatoRipen-MMT significantly outperforms all baseline RGB-only, NIR-only, and fusion methods, achieving 94.8% classification accuracy and 82.6% mIoU. These findings establish the effectiveness of multimodal Transformers for robust, high-precision fruit maturity assessment in controlled and greenhouse environments.

Link: <https://doi.org/10.1038/s41598-025-32522-9>



TITLE:

Coconut milk as a plant-based dairy alternative: developmental trends and assessing carbon footprint impact

AUTHOR :

Darsana, K.; Bashir, O.; Morya, S.; Pawase, P.A.; Mondal, I.H.; Amin, T.; Mugabi, R.

JOURNAL NAME:

Discover Food (Vol.-6, Issue-1)

DETAILS:

Published on 11 January 2026



ABSTRACT:

Coconut milk, derived from the fruit of the coconut palm (*Cocos nucifera*), is a widely used and adaptable plant-based substitute for conventional dairy milk. It originates from the white pulp of fully-grown mature coconuts. The extraction of coconut milk entails a series of procedures, which encompass harvesting, husking, and processing the coconut flesh. This study investigates the production of coconut milk, evaluating its nutraceutical quality, environmental impact, and sustainability compared to conventional dairy and other plant-based milks. Through compositional analysis, coconut milk was found to be a good source of medium-chain triglycerides, vitamins, and minerals. Life cycle assessment revealed that the carbon footprint of coconut milk production is lower than that of dairy milk but higher than some other plant-based milk like almond or soy milk. Innovative processing methods were explored to improve the efficiency and quality of coconut milk extraction. Approaches to enhance the long-term sustainability of coconut milk manufacturing by reducing energy and water usage were also evaluated. It is essential to investigate more energy-efficient methodologies to mitigate the environmental consequences. This thorough analysis offers valuable insights into the diverse aspects of coconut milk, presenting a comprehensive perspective on its possible industrial uses.

Link: <https://doi.org/10.1007/s44187-025-00707-w>



TITLE:

Comprehensive study and analysis of machine learning and deep learning methods used for heart disease prediction

AUTHOR :

Mande, S.S.; Wategaonkar, D.

JOURNAL NAME:

Biomedical Signal Processing and Control
(Vol.-116)

DETAILS:

Published on January 2026



ABSTRACT:

Heart disease is a major life-threatening health condition, and the leading cause of death globally. Timely and appropriate detection is essential for effective management and improved patient outcomes. In recent decades, have seen the development of machine learning (ML) and Deep learning (DL) methods in the healthcare industry. This review presents an analysis of 45 research studies based on ML, DL, and ensemble methods, with the significance on the approaches, strengths, challenges, and performance achievements. This comprehensive analysis explores diverse classifiers and their efficacy in heart disease prediction based on the dataset, performance metrics, methodology, and preprocessing techniques. The analysis shows that the deep learning models, specifically the CNN and ANN achieve more accurate outcome than the other detection methods, due to their ability in learning intricate or complex patterns from the data. This systematic review identifies the research gaps and offering valuable insight for developing the robust predictive framework in the future.

Link: <https://doi.org/10.1016/j.bspc.2026.109467>



TITLE:

Anti-osteoporosis Potential of *Ananas comosus*: An Herbal Phyto-Shield for the Silent Thief

AUTHOR :

Mahadik, S.; Shastri, A.; Chavan, D.M.J.

JOURNAL NAME:

Journal of Pharmaceutical Innovation (Vol.-21, Issue-2)

DETAILS:

Published on January 2026



ABSTRACT:

Osteoporosis is a skeletal disorder marked by decreased bone mass and microarchitectural deterioration, which increases fracture risk and reduces quality of life, especially in elderly people. *Ananas comosus* (pineapple), a tropical plant rich in bioactive compounds, has promising therapeutic potential but remains underexplored for treating osteoporosis. Current pharmacological treatments, although effective, often come with significant side effects and high costs, highlighting the need for safer, more affordable alternatives. Therefore, this study aims to assess the osteoprotective effects of a hydroalcoholic extract of *Ananas comosus* fruit in a dexamethasone-induced osteoporosis model using female Wistar rats. Osteoporosis was induced via intramuscular administration of dexamethasone (7 mg/kg/week for four weeks). Rats were subsequently treated with hydroalcoholic extract of fruits of *A. comosus* at 200, 400, and 800 mg/kg/day for 15 days. Sodium alendronate (0.2 mg/animal/day) served as the standard comparator. Bone morphometry, bone mineral density (BMD), ash value, serum alkaline phosphatase (ALP), and biomechanical strength were assessed. Dexamethasone significantly impaired bone health by reducing femur length, thickness, weight, BMD, and ash content, while increasing serum ALP levels ($P < 0.001$). Treatment with *A. comosus* extract, especially at 800 mg/kg, led to significant improvements in bone morphometric indices ($P < 0.05$), restored BMD ($P < 0.01$), increased ash content ($P < 0.01$), and decreased ALP levels ($P < 0.01$). Biomechanical strength was notably improved in the extract-treated groups, nearly matching the effectiveness of sodium alendronate. *A. comosus* extract demonstrated dose-dependent anti-osteoporotic effects, which may be attributed to its flavonoids, phenolics, and other phytoconstituents with anti-inflammatory, antioxidant, and osteogenic properties. These findings support its potential as a safe, plant-based therapeutic candidate for glucocorticoid-induced osteoporosis.

Link: <https://doi.org/10.1007/s12247-025-10356-2>



TITLE:

Effectiveness of SWRCM composite strips for masonry walls with openings under in-plane cyclic loading: An experimental study

AUTHOR :

Tripathy, D.; Singhal, V.

JOURNAL NAME:

Engineering Failure Analysis (vol.-186)

DETAILS:

Published on December 2025



ABSTRACT:

Nine half-scale unreinforced masonry (URM) walls were subjected to quasi-static cyclic lateral loading to examine failure and the contribution of steel wire-reinforced cementitious composite (SWRCM) strips. The test matrix included four unstrengthened reference specimens—one solid wall and three with different opening configurations—and five walls retrofitted using SWRCM. Among the strengthened series, one solid wall was fully strengthened on both faces, while the others were retrofitted with strategically placed vertical and horizontal SWRCM strips. In the unstrengthened group, damage was concentrated around openings, where stress localization led to progressive cracking and, especially in walls with door-openings, complete separation of a masonry pier was noticed along with a strength reduction exceeding 25%. In contrast, the retrofitted walls exhibited delayed crack development, uniform damage distribution, and substantially improved seismic performance. Strengthened specimens displayed marked improvements: lateral strength and energy dissipation increased by factors of 2.0–2.6 and 13.7–23.3, respectively. Most importantly, the walls with discrete SWRCM strips performed comparably to the fully jacketed wall, highlighting the effectiveness of the strip-based approach in limiting brittle failures, reducing stiffness degradation, and controlling deformation around openings. Strain gauge measurements further indicated that existing design strain limits are adequate for solid walls and those with small openings, but may require revision when applied to walls with larger openings, where failure patterns are more severe.

Link: <https://doi.org/10.1016/j.engfailanal.2025.110507>



TITLE:

Enhanced ASD detection using 3D facial landmark localization with convolutional shape appearance model and graph-randomized XGBoost

AUTHOR :

Attar, N.; Paygude, S.

JOURNAL NAME:

Sadhana - Academy Proceedings in Engineering Sciences (Vol.-51, Issue-1)

DETAILS:

Published on January 2026



ABSTRACT:

Autism spectrum disease (ASD) is a neurological disease that affects social interaction, communication and behaviour, thus early diagnosis is essential for treatment. Existing detection methods, such as 2D face scans and eye tracking data, are ineffective in capturing difficult facial features and minor asymmetries. Hence, this study presents a novel Convolutional Shape Appearance Model with Randomized Trees-based XGBoost to increase the accuracy and reliability of ASD detection using 3D facial landmark localization. Existing methods fail to capture small facial asymmetries and detailed landmarks essential for accurate diagnosis from 3D facial images, which limits the accuracy of diagnosing ASD-related behaviours. To address this, a novel convolutional neural network (CNN) with an active shape appearance model (ASAM) is introduced, which combines the strengths of CNNs in automatically learning intricate facial features from 3D images and ASAM's ability to capture variations in facial shapes and textures, thereby enhancing the feature extraction process and accurate localization of facial landmarks. Furthermore, existing detection methods struggle to integrate and analyse facial asymmetry and the complex interactions between multiple facial features simultaneously, leading to reduced accuracy in detecting ASD. Thus, a Euclidian graph with a Randomized Trees-based XGBoost approach is utilized, which captures spatial relationships between facial landmarks and models complex feature interactions, thereby enhancing the accuracy and reliability of ASD detection. The findings demonstrate that the suggested model offers excellent levels of accuracy, precision, recall, detection accuracy, sensitivity and specificity when compared to other existing models.

Link: <https://doi.org/10.1007/s12046-025-03024-1>



TITLE:

NiMn₂O₄-based electrode materials for electrochemical supercapacitors: A comprehensive insight

AUTHOR :

Tanwade, S.; Kate, R.; Mane, R.; Deokate, R.

JOURNAL NAME:

Journal of Power Sources (Vol.-667)

DETAILS:

Published on January 2026



ABSTRACT:

It is crucial to develop advanced energy production and storage technologies to cater the ever-growing worldwide energy demand and address the depletion of existing fuel resources. Although, non-conventional energy sources have significant potential to partially address the looming global energy crisis, their intermittent nature limits potential utilization compared to conventional coal and petroleum-based energy sources. There is a need to develop durable, chemically stable, mechanically robust, eco-friendly and cost-efficient energy storage technologies for commercial usages. As a result, numerous studies have focused on establishing novel electrode materials for developing high-performance supercapacitors. Among these, spinel NiMn₂O₄ (NMO) has attracted significant attention in recent years due to its outstanding merits which are not limited to low cost, environmental abundance, and ease of synthesis. This review provides a comprehensive summary and detailed discussion of the progress made in synthesis methods and structural control of NMO-based electrode materials. In particular, it highlights recent advances in existing strategies, including electrode synthesis with diverse nanostructures and morphologies, as well as the development of composite, heterojunction, and hybrid nanostructures. In addition, this review proposes potential challenges to guide ongoing research on the NMO-based materials. The current limitations and future perspectives of the NMO-based supercapacitors (SCs) for the practical implementation are also emphasized.

Link: <https://doi.org/10.1016/j.jpowsour.2026.239267>



TITLE:

Rootless survivors in plants

AUTHOR :

Kondhare, K.R.; Lavhale, S.G.; Giri, A.P.

JOURNAL NAME:

Plant Science (Vol.-364)

DETAILS:

Published on December 2025



ABSTRACT:

Cattle health and productivity are fundamental to the livelihoods of agriculturalists and the overall agricultural economy. Traditional cattle health monitoring methods are often time-consuming and lack the capacity for real-time assessment of cattle health, resulting in reduced milk productivity and economic losses. To address these challenges, we propose the implementation of an Internet of Things (IoT) technology-based, low-cost, real-time cattle health monitoring system. The system comprises wearable sensors for continuous monitoring of vital parameters such as body temperature, heart rate, and activity level. These sensor values are relayed wirelessly to a cloud server, where data is processed and analyzed to identify anomalies indicative of potential health-related problems. This information is presented to the farmer through a user-friendly mobile application, which displays real-time alerts and suggests preventive or remedial actions. The system facilitates early disease detection, leading to improved cattle health, enhanced milk production, and enhanced farm profitability. The system emphasizes cost-effectiveness by utilizing readily available hardware, thereby increasing accessibility for smallholder farmers. The system offers a long-term solution for cattle health management. This paper aims to demonstrate the transformative potential of integrating low-cost IoT technologies with livestock farming to establish precision agriculture and enhance the prosperity of rural farming communities

Link: <https://doi.org/10.1016/j.plantsci.2025.112951>



TITLE:

Design, synthesis, and biological evaluation of 2-amino-1,3,4-thiadiazoles as new potential EGFR inhibitors for treatment of cancer

AUTHOR :

Thorat, S.M.; Koul, S.; Kote, S.; Bhat, R.G.

JOURNAL NAME:

Bioorganic and Medicinal Chemistry (Vol.-134)

DETAILS:

Published on December 2025



ABSTRACT:

1,3,4-Thiadiazoles are known to exhibit a wide array of biological activities such as diuretic, antifungal, anticonvulsant and anticancer properties. Since 1,3,4-thiadiazoles are structurally considered as bio-isosteres of pyrimidine, this structural framework along with its capability to bind to various biological targets has led to the development of many FDA approved drugs. The current work focuses on the identification of an initial hit from an existing library of thiadiazoles and its optimization to a potential lead molecule. The compounds were evaluated for in-vitro cytotoxicity in four human cancer cell lines namely HepG2, MCF7, HCT116 and A549 as well as in Vero cell lines. Four compounds 11h–11k showed potency comparable with or better than the positive control Erlotinib and exemplary selectivity towards normal cells. These compounds were then screened to assess their inhibitory potential in wild type and mutated EGFR (T790M). Compound 11j was found to be potent in these assays. Further computational approach driven SAR around this compound led to the identification of a more potent compound 14h that showed sub-micromolar potency in wild type EGFR with much improved potency against T790M. Apoptotic effect of 14h was investigated using annexin V-FITC/PI dual staining assay in which 14h was found to trigger apoptotic pathways effectively with a significantly higher proportion of cells undergoing both early and late apoptotic events, underscoring its potential as a therapeutic agent targeting programmed cell death. Western blot analysis of 14h indicates that it primarily impairs EGFR phosphorylation, supporting its potential as a targeted modulator of EGFR signalling.

Link: <https://doi.org/10.1016/j.bmc.2025.118527>





TITLE:

GTSRB Shield: A Novel Machine Learning Approach to Anomaly Detection in German Traffic Signs Recognition Benchmark (GTSRB) Dataset

AUTHOR :

Patil, K.; Akbar Badusha, A.; Jadhav, S.;
Gunale, K.

JOURNAL NAME:

SAE Technical Papers

DETAILS:

Published on January 2026



ABSTRACT:

The escalating dependence of Autonomous Vehicles on Intelligent Transportation Systems (ITS) has highlighted the imperative for comprehensive security protocols to safeguard such vehicles against cyber threats. Intrusion Detection Systems (IDS's) are pivotal in ensuring the protection of these systems by detecting and alleviating unauthorized access and nefarious activities. The German Traffic Sign Recognition Benchmark (GTSRB) database, which encompasses an extensive compilation of traffic sign imagery, functions as a vital asset for the advancement of machine learning-based IDS. This research elucidates an intrusion detection system (IDS) that employs machine learning algorithms to scrutinize the GTSRB database. The proposed IDS emphasize the preprocessing of the GTSRB dataset to extricate pertinent features that can be employed for the training of machine learning models. Research also focuses on model development with machine learning algorithms to classify traffic signs and discern anomalies suggestive of potential intrusions. The efficacy of the models is evaluated utilizing accuracy thereby ensuring that the IDS can consistently differentiate between benign and malicious activities. This inquiry contributes to the domain of intelligent transportation systems by establishing a resilient framework in autonomous vehicles for intrusion detection, thus bolstering the security of automated traffic management systems against prospective cyber threats. The results underscore the criticality of incorporating machine learning methodologies in real-time systems to proactively mitigate security vulnerabilities and preserve the integrity of traffic data.

Link: <https://doi.org/10.4271/2026-26-0611>



TITLE:

Anti-osteoarthritic effects of stem bark extract of *Anogeissus latifolia*: a comprehensive in-vivo study

AUTHOR :

C.B.; Shinde, S.R.; R.S.; Baheti, A.M.;
Nagar, S.; Bhatt, S.; Pawar, A.T.

JOURNAL NAME:

Inflammopharmacology

DETAILS:

Published on January 2026



ABSTRACT:

Background *Anogeissus latifolia* Roxb. (Family: Combretaceae) is an Indian medicinal plant. The bark of the plant is used traditionally in the Ayurvedic system of medicine for the treatment of pain, inflammation, and arthritis. The objective of this study was to investigate the protective effects of ethanol extract of the stem bark of *Anogeissus latifolia* Roxb. (EAL) in osteoarthritis-induced rats, to verify its use in traditional medicine and contribute to the understanding of its ethnopharmacological importance. **Methods** Osteoarthritis was induced by injecting 3 mg of monosodium iodoacetate (MIA) into the knee joint under anesthesia. The anti-osteoarthritic activity of EAL was investigated at 100, 200 and 400 mg/kg oral doses for 28 days by estimating joint swelling, the weight-bearing capacity of joints, locomotor activity, and serum levels of inflammatory markers such as IL-6, IL-1 β , TNF- α , MMP-1 and MMP-13. Histopathology and radiological examinations of the knee joints were performed. **Results** Treatment with EAL resulted in a marginal, statistically nonsignificant reduction in arthritis-induced joint swelling. The weight-bearing capacity of joints and locomotor activity were improved significantly by the EAL. There was a significant decrease in serum IL-6, IL-1 β , TNF- α , MMP-1 and MMP-13 levels in EAL-treated rats. Arthritis-induced pathological changes in the knee joints were reversed by the EAL. **Conclusions** The ethanolic stem bark extract of *Anogeissus latifolia* exhibited anti-osteoarthritic activity in the MIA-induced rat model, potentially mediated through modulation of inflammatory mediators and cytokines.

Link: <https://doi.org/10.1007/s10787-026-02112-w>



TITLE:

Anticancer Potential Of Ultrasonicated Nanoemulsion Of Nigella Sativa Oil With Physicochemical Characterization And Cytotoxicity Evaluation In MCF-7 Breast Cancer Cells

AUTHOR :

Podutwar, A.; Jagdale, S.

JOURNAL NAME:

International Journal of Applied Pharmaceutics (Vol.-18, Issue-1)

DETAILS:

Published on January 2026



ABSTRACT:

Objective: The objective of this study was to develop an ultrasonicated nanoemulsion of Nigella sativa (NS) oil and evaluate its anticancer potential through physicochemical characterization and cytotoxicity assessment in MCF-7 breast cancer (BC) cells.

Methods: The nanoemulsion was made utilizing Tween (Tw) 80 and investigated by particle size (PS), zeta potential (ZP), and thermodynamic stability. These parameters were evaluated by assessing physicochemical properties, antioxidant capacity through the DPPH assay, and cytotoxic potential by means of the MTT assay on MCF-7 BC cells.

Results: The finalized batch had a feasible droplet size of 47.09 nm, acceptable stability, and a proficient release profile of the drug in a long-term model (93.74% cumulative release). While nanoemulsion resulted in comparatively lower antioxidant activity than pure NS oil due to encapsulation and demonstrated a significantly lower IC₅₀ (1.435±0.148 µl/ml) than paclitaxel (5.317±0.112 µl/ml), and showed enhanced cellular uptake, as confirmed through FITC fluorescence imaging.

Conclusion: The finalized NS oil nanoemulsion demonstrated potent in vitro cytotoxicity against MCF-7 cells. However, further ex-vivo and in vivo investigations are required to confirm its suitability for topical BC therapy.

Link: <https://doi.org/10.22159/ijap.2026v18i1.56446>





TITLE:

Medifolio: An Intelligent Medical Portfolio System for Healthcare Management and Consultation

AUTHOR :

Barve, S.; Ranwadkar, S.; Gogate, P.;
Vaidya, H.; Kamble, A.

JOURNAL NAME:

Communications in Computer and
Information Science (Vol.- 2732 CCIS)

DETAILS:

Published on 10 January 2026



ABSTRACT:

Medifolio is a comprehensive medical portfolio system designed to assist doctors and other healthcare professionals in managing their data more centrally and effectively. Its adaptable architecture ensures seamless access to patient records, medical histories, and consultation data across web and other platforms. Built with React.js and Python's Flask microframework, Medifolio leverages advanced technologies such as image recognition for medical classification and Web Real Time Communication (WebRTC) for real-time doctor-patient communication. Unlike traditional Electronic Health Record (EHR) systems, it functions as an intelligent repository, prioritizing ease of access and decision support for healthcare providers.

It supports a responsible approach to digital health assistance by providing insights on preventative healthcare without resorting to automated prescriptions. Future advancements include deeper Natural Language Processing (NLP) Driven analytics, better accessibility, and increased compatibility with current medical infrastructures. Medifolio seeks to revolutionize medical information management in contemporary healthcare by providing physicians with a cohesive, effective, and intelligent solution.

Link: https://doi.org/10.1007/978-3-032-08638-9_13



TITLE:

An Efficient Algorithm for Path Matrix
Computation and Improved Path Energy
Bounds

AUTHOR :

P Narke, A.; P Malavadkar, P.

JOURNAL NAME:

Lecture Notes in Computer Science (Vol.-
16423 LNCS)

DETAILS:

Published on 6 January 2026



ABSTRACT:

The path matrix and path energy of a graph provide valuable insights into structural properties related to vertex-disjoint paths. In this paper, we present a new algorithm for computing the all-pairs path matrix of undirected graphs. The method employs Gomory-Hu trees with fast unit-capacity max-flow computations, achieving a time complexity of . We further establish new bounds for the path energy in terms of the maximum degree and the Frobenius norm, which improve upon the existing bound and give sharper estimates for all non-complete graphs. In addition, we demonstrate a connection between classical graph energy and path energy, thereby contributing to the broader framework of spectral graph theory.

Link: https://doi.org/10.1007/978-3-032-15621-1_2





TITLE:

SEHO Music: A Privacy-Centric, Self-hosted Music Streaming Platform

AUTHOR :

Sonawane, S.; Kulkarni, A.; Mudgale, P.;
Kale, P.

JOURNAL NAME:

Lecture Notes in Networks and
Systems(Vol.- 1682 LNNS)

DETAILS:

Published on 8 January 2026



ABSTRACT:

SEHO Music is an innovative self-hosted music streaming platform developed with a focus on privacy, control, and user empowerment. The platform allows users to store, manage and stream their personal music collections from any location, offering a decentralized alternative to conventional streaming services. Built using advanced cloud technologies, SEHO Music harnesses the power of a Raspberry Pi-based server to provide a secure, customizable, and scalable solution for music lovers who value data privacy and ownership. This paper explores the technical architecture, design choices, and user experience enhancements that make SEHO Music a superior and future-proof platform in the growing landscape of multimedia streaming services.

Link: https://doi.org/10.1007/978-3-032-08240-4_30



TITLE:

Financial Inclusion and Gender Inequality in
India: Bridging Gaps through Policy
Interventions

AUTHOR :

Singh, R.; Sentikumla; Singh, V.P.; Goel, R.;
Singh, B.P.; Sahoo, R.N.

JOURNAL NAME:

Gender, Power, and Economic Inequality in
the Global South: An Intersectional
Approach

DETAILS:

Published on 7 January 2026



ABSTRACT:

India has achieved significant advancement in financial inclusion during the last decade through its digital platforms and Jan Dhan Yojana initiative. The problem of gender inequality continues to impede financial system access because of social traditions, cultural norms, and economic limitations faced by women. Many efforts have failed to close the financial access disparity between men and women, which hinders women's economic opportunity and intensifies systematic social imbalances. The analysis in this chapter focuses on the financial inclusion versus gender inequality relationship in India as well as the policy solutions needed to create a bridge between these two elements. The assessment looks at current policies and programs for financial inclusion of women and provides improvements for better execution of initiatives. The research study employs both quantitative and qualitative analytical methods. National financial inclusion statistics demonstrate gender inequalities yet actual studies about government initiatives like Pradhan Mantri Jan Dhan Yojana and Micro Units Development and Refinance Agency show how they enable women to access monetary services. Research findings demonstrate that Indian policy programs intensified general financial inclusion but failed to solve distinctive obstacles which affect women. Women who live in rural regions alongside lower-income social classes experience the most extensive exclusion from financial services. Digital literacy programs together with initiatives for credit access and local community learning programs will diminish the inequality women face in accessing financial services. The chapter determines that fully bridging the gender gap in financial access requires specific policy changes from the government along with active community engagement programs. Gender-sensitive approaches should be implemented with current policies to achieve fair financial accessibility, which will create opportunities for women's empowerment and support India's socioeconomic growth.

Link: <https://doi.org/10.4324/9781003587309-8>





TITLE:

Predictive analytics in agriculture: Machine learning for crop yield estimation

AUTHOR :

Dingorkar, S.; Kosamkar, P.; Bajoria, A.;
Shah, Y.; Dahiya, A.; Bohara, M.

JOURNAL NAME:

Transforming Agriculture with Emerging
Technologies for a Sustainable Future (Book
Chapter)

DETAILS:

Published on 6 January 2026



ABSTRACT:

In order to forecast agricultural yields and suggest suitable crops, this chapter examines the use of machine learning techniques, including Random Forest (RF), Decision Trees, Support Vector Machines, and K-Nearest Neighbors (KNN). Predicting crop yields accurately is essential for enhancing food security and streamlining farming methods. The study shows that by utilizing crop traits, soil composition, and meteorological data, these systems improve predictions. Key findings show that KNN performs best in crop recommendation tasks with 98.18% accuracy, while the RF model obtains 96.67% accuracy. These findings demonstrate how machine learning may be used to address issues in sustainable agriculture.

Link: <https://doi.org/10.1201/9781003494782-12>



TITLE:

Decoding Explainable AI: A Critical Review
of Emerging Techniques, Key Challenges,
and Future Pathways

AUTHOR :

Hande, Y.; Lokhande, J.; Gunjal, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 1517 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The high-speed growth and development of artificial intelligence (AI) have profoundly influenced numerous industries. However, the increasing complexity and lack of transparency in many AI models, often termed “black-box” systems, have raised significant concerns regarding their trustworthiness and accountability. In response, the field of Explainable AI (XAI) has emerged as an important area of research, focusing on enhancing the transparency and interpretability of AI systems for human users. Ethical considerations surrounding XAI are also addressed, with attention to issues such as bias, fairness, and accountability. The evolution of XAI, its core principles, and the most recent techniques in the field is a vital area of growth. Exploring the key concepts and methods, including both model-agnostic and model-specific approaches, strategies for evaluating feature importance, and techniques for causal inference is covered in most sections of the paper. Also highlighting XAI’s applications across various domains such as healthcare, finance, autonomous systems, and natural language processing is done. In each sector, it discusses the specific challenges and potential advantages of implementing XAI, demonstrating how it can improve decision-making processes and foster greater trust in AI systems.

Link: https://doi.org/10.1007/978-981-96-8895-1_23



TITLE:

Ensuring VIP Security: A Comprehensive
Study of Radar Jammer Mitigation
Techniques

AUTHOR :

Pujeri, U.; Lokhande, J.; Phatak, M.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 1517 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The efficacy of jamming technology is a countermeasure against emerging threats targeting high-profile individuals (VIPs). By examining a diverse array of jamming techniques, their technical capabilities, and operational considerations, this study seeks to contribute to the development of more robust VIP protection strategies. The research will explore the potential of jamming to mitigate threats posed by radio frequency-based devices, while also addressing the challenges, limitations, and ethical implications associated with its deployment. Specifically, the study will delve into the effectiveness of jamming techniques in disrupting various types of communication signals, including those used by drones, remote-controlled vehicles, and electronic surveillance equipment. Additionally, it will analyze the potential for jamming to interfere with legitimate communications, the ethical considerations surrounding its use, and the risks associated with escalating conflicts. Ultimately, this work aims to inform the development of comprehensive security protocols that integrate jamming technology effectively, providing VIPs with enhanced protection against contemporary threats in a rapidly evolving technological landscape.

Link: https://doi.org/10.1007/978-981-96-8895-1_24





TITLE:

Innovations, Materials, and Future Trends in
Fuel Tank Engineering: A Detailed Survey

AUTHOR :

Narwade, G.; Lokhande, J.; Shah, V.; Pise,
N.; Mali, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 510 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

Fuel tanks are essential components in transportation and industrial systems, serving a critical role in the storage and delivery of fuel. As the demand for cleaner energy increases, traditional fuel storage systems are being challenged by advanced alternatives, including hydrogen-based solutions. This survey offers a comprehensive overview of current fuel tank technologies, including hydrogen storage systems, performance analyses, safety considerations, and innovations in materials and design. The paper synthesizes insights from various studies to present a clear picture of the evolution in fuel tank technologies, key challenges, and emerging trends. Future directions and research areas are highlighted, providing guidance for the development of safer, more efficient fuel storage solutions. Fuel tank technology is a crucial aspect of numerous industries, ranging from automotive to aerospace and energy storage. As the global demand for energy efficiency and alternative fuels like hydrogen grows, fuel tank designs must evolve to meet new performance, safety, and environmental standards. This paper provides an extensive review of existing fuel tank technologies, emphasizing material advancements, manufacturing techniques, and future challenges. Additionally, we discuss the growing trend towards lighter, more durable materials such as composites and their implications for performance and sustainability. The review identifies key research areas and technological innovations, offering insights into the future direction of fuel storage solutions.

Link: https://doi.org/10.1007/978-981-96-9275-0_1



TITLE:

Object Tracking System Using Edge Computing

AUTHOR :

Lahane, P.S.; Bedekar, A.; Phursule, A.;
Gandhi, S.; Ubale, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 535 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

Object tracking is essential for identifying and following moving objects across a sequence of frames in video streams. However, traditional object tracking devices often lack the ability to autonomously track objects, relying instead on manual control of static cameras via software applications. This research presents an object tracking system designed to automatically detect and follow moving targets. The system utilizes advanced algorithms to continuously monitor and track objects in real time, eliminating the need for manual intervention. The primary objective of the study is to evaluate the accuracy and effectiveness of the implemented algorithm in consistently tracking moving objects. Experimental results demonstrate the system's ability to autonomously follow detected targets, validating the accuracy of the tracking mechanism and its potential for applications in automated surveillance and other related fields.

Link: https://doi.org/10.1007/978-981-96-9191-3_9



TITLE:

A Deep Learning-Based Assistant for the
Visually Impaired

AUTHOR :

Kadam, S.; Gohokar, V.; Kute, R.;
Paranjape, B.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 525 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The most recent survey estimates that approximately 1.5 million visually impaired individuals live in India and struggle to carry out daily tasks. According to the most recent statistics, this population totals about 170 million around the globe and is growing at a 10% annual rate. Visually disabled people have a difficult time navigating new environments and knowing where a staircase is poses a significant challenge. Identifying the stairs is difficult due to various types of staircases, various viewing angles, and poor lighting conditions. Classifying them as up or down is even more difficult. For vision impaired people, however, finding out downstairs is even more crucial. The stair recognition algorithm should also be quick and accurate. This paper proposes a deep learning-based system for helping staircase detection and classify them as going up or down. A custom-made stairs dataset is used to test different models and the best model found is the fine-tuned VGG-19 deep learning model.

Link: https://doi.org/10.1007/978-981-96-9048-0_43



TITLE:

Fish Disease Detection and Recognition
Using ResNet50

AUTHOR :

Jain, L.B.; Shinde, S.S.; Lele, J.A.; Kukade,
S.; Phadke, A.C.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 518 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

Fish diseases pose a significant threat to the aquaculture industry, leading to substantial economic losses and reduced productivity. Current detection methods, relying heavily on visual inspection, are time-consuming and require expert knowledge. This paper proposes an automated fish disease detection system using deep learning, specifically the ResNet50 architecture. Utilizing a dataset of 1750 high-quality fish skin images spanning seven disease categories, the model achieved 96.7% accuracy and an F1 score of 96.7%. This system offers a scalable, efficient, and highly accurate tool for monitoring fish health, reducing reliance on manual diagnosis. Future work aims to integrate IoT frameworks for real-time surveillance and expand dataset diversity to enhance model generalization.

Link: https://doi.org/10.1007/978-981-96-8898-2_9





TITLE:

Real-Time Deepfake Audio Detection Using
Lightweight CNNs

AUTHOR :

Karale, A.; Talele, P.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
758 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

With the rapid advancement of deepfake audio technology, producing artificial voices that sound remarkably realistic is now simpler than ever. As this becomes available In addition to opening up new creative possibilities, it also poses grave security, disinformation, and fraud concerns. Although many of the deepfake audio detection tools available today are accurate, their application in real-time situations is limited by their high processing overhead. In this work, we introduce a Convolutional Neural Network (CNN)-based lightweight deepfake audio detection model. Our model can detect AI-generated speech accurately and with minimal processing demands by utilizing Mel-Spectrogram features and an effective CNN architecture. The model works well with high accuracy and low latency, according to tests on standard datasets, which makes it appropriate for real-world uses like media verification and voice authentication. Looking ahead, we aim to improve the model's ability to withstand adversarial attacks and adapt to new types of deepfake generation techniques. In the future, we would like to improve the model's robustness against hostile attacks and make it more flexible to accommodate new deepfake generation techniques.

Link: https://doi.org/10.1007/978-3-032-13419-6_5



TITLE:

Toward Hybrid Security Models in IoT:
Exploring Elliptic Curve Cryptography and
LSTM-Based Threat Detection Approaches

AUTHOR :

Savale, V.; Rao, M.

JOURNAL NAME:

Smart Innovation, Systems and Technologies
(Vol.-447 SIST)

DETAILS:

Published on 2 January 2026



ABSTRACT:

This article is a review on the current developments in IoT security using cryptographic techniques and machine learning: 50 documents published between 2022 and 2024; It states that an IoT network gets larger. Therefore, such a property of networks makes them more vulnerable and, thus, demands scalable security solutions that are efficient and robust in providing security. Some hybrid cryptographic and machine learning approaches such as elliptic curve cryptography combined with anomaly detection have been found promising in improving the real-time detection of threats. It is in this respect that efficiency, scalability, and interpretability are yet to be defined. In this review, the need for standardized testing frameworks, privacy-preserving approaches, and adaptive models to accommodate different IoT contexts is indicated. The gaps include a lack of real-world use cases and associated benchmarking metrics for malware detection in addition to modeling trade-offs between security and computational efficiency. Future work focuses on developing scalable, interpretable, and privacy-preserving models that translate from theory into practice and further develop hybrid cryptographic and machine learning techniques for IoT security.

Link: https://doi.org/10.1007/978-981-96-7545-6_30



TITLE:

Interpretable Landslide Hazard Analysis in the Western Ghats of Maharashtra, India: A Hybrid Machine Learning and Statistical Approach

AUTHOR :

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

JOURNAL NAME:

Geological Journal

DETAILS:

Published on January 2026



ABSTRACT:

Landslide hazard mapping is critical for disaster risk reduction and resilient planning in vulnerable regions. Whilst the existing methods for Landslide hazard mapping (LHM) provide good predictability, they still lack in analysing the impact of parameters on the hazard risk. Although Explainable AI (XAI) application enhances this capability, its use in LHM analysis is still limited. This study presents an interpretable framework for evaluating landslide hazards in Raigad district, Maharashtra, that integrates machine learning models, Random Forest (RF) and Support Vector Machine (SVM) with statistical techniques, Frequency Ratio (FR) and Shannon Entropy (SE). Sixteen conditioning factors, selected through multicollinearity screening and feature-selection methods and spatially validated inventory of 174 datasets of landslides and non-landslides each, were used for analysis. Model performance was assessed using evaluation metrics. The RF model achieved the highest AUC-ROC of 0.90, followed by SVM (0.81), SE (0.80), and FR (0.79). To identify critical parameters affecting landslide vulnerability, XAI methods such as SHapley Additive exPlanations (SHAP) and partial dependence plot analysis were applied. Slope angle emerged as the most dominant predictor of landslide risk. The generated hazard maps can offer more useful insights into the categorisation of land based on the degree of landslide risk. These maps can be used in development planning to help with infrastructure design, land-use zoning, and prioritisation of high-risk locations for mitigation.

Link: <https://doi.org/10.1002/gj.70175>



TITLE:

Biogas innovation for a circular economy:
overcoming challenges and enhancing
efficiency

AUTHOR :

Srivastava, A.; Khan, M.I.; Nayak, C.;
Burande, C.G.; Meena, P.K.; Wagle, C.S.;
Marghade, D.

JOURNAL NAME:

Chemical Engineering Communications

DETAILS:

Published on 10 January 2026



ABSTRACT:

Anaerobic digestion (AD) offers an effective solution for waste management and carbon emission reduction, generating biogas—a viable alternative to nonrenewable energy sources—due to its high heat capacity and fuel efficiency. However, its full potential remains underutilized due to operational challenges, policy constraints, and societal acceptance issues. This paper explores the key challenges in biogas production and examines innovations that support a circular economy. One major hurdle is the resistance of lignocellulosic components in biowaste, limiting efficient AD. Various pretreatment techniques are assessed to enhance the digestibility of these materials. Additionally, microalgal culture is discussed as a promising approach for clean energy production through waste treatment and biogas enhancement. Impurities in biogas often limit its usability, necessitating advanced upgrading techniques, such as nanocellulose membranes, for efficient gas purification. While biogas offers a sustainable alternative to fossil fuels, widespread adoption faces technological and policy barriers. This review analyzes the technological aspects of biogas generation and its role in achieving the United Nations' Sustainable Development Goals, addressing key challenges, potential solutions, and the broader sustainability impact of biogas technology.

Link: <https://doi.org/10.1080/00986445.2025.2611393>



TITLE:

Deep eutectic solvents as emerging carriers for antihyperlipidemic drugs: current trends and future perspectives

AUTHOR :

Gaikwad, S.; Marne, A.; Gawade, A.;
Kuchekar, A.

JOURNAL NAME:

Pharmaceutical Development and
Technology

DETAILS:

Published on 4 January 2026



ABSTRACT:

The therapeutic effectiveness of the most antihyperlipidemic drugs, particularly Biopharmaceutics Classification system Class II drugs like statins, is severely limited by their low aqueous solubility and resulting low and variable oral bioavailability (e.g. ~5% for simvastatin). Deep Eutectic solvents and Therapeutic Deep Eutectic System are explored in this review as an environmentally friendly and innovative next-generation platform designed to overcome these fundamental biopharmaceutical limitations. These systems function as good solubilizers, improving the dissolution rate and the thermodynamic stability of antihyperlipidemic drugs significantly. This directly enhances the drug absorption kinetics, resulting in more predictable and enhanced oral bioavailability. Commercialization of DESs still faces major challenges. Large-scale-up is difficult because their high viscosity reduces mixing and mass transfer efficiency. Also, a complete evaluation of their cytotoxicity, biodegradability, and long-term thermal stability is still needed to ensure their safe and sustainable use as effective pharmaceutical excipients.

Link: <https://doi.org/10.1080/10837450.2025.2611902>



TITLE:

Machine Learning-Based Intrusion Detection System

AUTHOR :

Ashtagi, R.; Chopade, P.; Chivate, A.;
Chitpur, S.; Dashedwar, I.; Jadhav, D.

JOURNAL NAME:

Lecture Notes in Networks and
Systems(Vol.- 1478 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

In the current digital landscape, the risk to the integrity of data and networks is ever-present, making cybersecurity indispensable. This research proposes a system that detects Intrusion using Machine Learning (IDS) to ensure network security. The goal is to have a system that detects Intrusion (IDS) that can reliably detect invasive behavior in network traffic. This dataset is ready to be analysed with a one-hot encoder, normalization, and data preprocessor. An IDS uses binary classification to distinguish between an intrusion and normal activity and multiclass classifications. Machine learning techniques are evaluated including SVM (Support Vector Machine), KNN (K Nearest Neighbors), Multi-Layer Perceptron and Discriminant Analysis. According to the results, technology effectively detects intrusions and significantly reduces false positives. The study underlines the importance of machine learning in enhancing cybersecurity, leading to an active approach to protect data and the virtual space.

Link: https://doi.org/10.1007/978-981-95-1320-8_9





TITLE:

Malicious URL Detection Using Machine Learning

AUTHOR :

Betgeri, S.; Ashtagi, R.; Kaulwar, M.;
Kawtikwar, Y.; Khadse, S.; Khandare, A.

JOURNAL NAME:

Lecture Notes in Networks and
Systems(Vol.- 1478 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The digital landscape has experienced significant advancements in recent years, particularly in the realm of the Internet, which has become increasingly integral to our daily activities. Consequently, the threat of cyber-attacks is rapidly escalating, as malicious actors employ sophisticated tactics to exploit vulnerabilities. Among the most critical dangers are malicious URLs, which are crafted to surreptitiously extract sensitive information, often by deceiving unsuspecting users. This can lead to compromised systems and enormous financial losses, amounting to billions of dollars yearly. Consequently, the imperative to safeguard websites has never been higher. This study evaluates the literature on machine learning models with a focus on malicious URL identification techniques, examining the limitations of previous research as well as detection techniques, feature types, and datasets.

Link: https://doi.org/10.1007/978-981-95-1320-8_8



TITLE:

Assessing the Efficacy of VGG16 with CNN
in Non-clinical ASD Prediction

AUTHOR :

Bidwe, R.V.; Ashtagi, R.; Mishra, S.; Bajaj,
S.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.- 1565 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

In this study, we introduce a new technique based on image processing to predict “autism spectrum disorder” (ASD) images using a combination of transfer learning and VGG16 Convolutional Neural Network (CNN) architecture. Using an extensive dataset of 2540 training pics, 100 validation, and 300 test images, the model showed an accuracy of 71.33%, which is quite impressive. The proposed approach, by leveraging pre-trained weights on a large image dataset and fine-tuning ASD-specific data, holds great promise for effectively screening people with ASD. Conclusions The results indicate that deep learning methods could help to enhance the accuracy of ASD diagnosis and interventions, inherently improve early diagnosis and specialized therapy interventions for patients with ASD. In general, this research sets the stage for better and more individualized treatments for people with ASD. It also sets the ground for future research focusing on increasing the accuracy and robustness of machine learning models that could be used in ASD prediction and management.

Link: https://doi.org/10.1007/978-981-95-0375-9_13



TITLE:

A Ranked Set Generalized Procedure for
Computing Mean Using Searls Technique:
Applications to Real Data

AUTHOR :

Singh, A.; Singh, B.; Shukla, S.

JOURNAL NAME:

Proceedings of the National Academy of
Sciences India Section A - Physical Sciences

DETAILS:

Published on 17 January 2026



ABSTRACT:

The Searls technique has been used in this article to build a generalized class of estimators for estimating a finite population mean under a ranked set sampling strategy. To the first order of approximation, the equations for bias and mean square error (MSE) of the proposed class of estimators have been derived. Many specific estimators from the suggested class are displayed. Using the MSE, percentage relative efficiency criterion, the suggested class of estimators has been compared to the corresponding generalized class and to its other existing estimators. It has been established under what circumstances the suggested class performs better. Ranked set sampling is better substitute of simple random sampling, is also proved. Two real-world studies using real-world data on cost-effective gasoline sample, and sleeping patterns of elderly people have been used in efficiency comparisons, in empirical study. The simulation studies have also been carried for the same.

Link: <https://doi.org/10.1007/s40010-025-00976-1>



TITLE:

Redox-Active Bis-Catecholaldimine Cu(II)-Salen Complex with Hydroxyl Functionality as Cathode Material in Li-Ion Battery

AUTHOR :

Sharma, V.; Singh, A.D.; Majumder, M.;
Sengupta, S.; Metre, R.K.

JOURNAL NAME:

ChemPlusChem (Vol.-91, Issue-1)

DETAILS:

Published on 15 January 2026



ABSTRACT:

In this paper, we report the synthesis, structure, and application of bis-catecholaldimine-based CuII-Salen complex as a cathode material in lithium-ion battery. [Cu(LH2)] (1) complex was prepared using the ligand 6,6'-{[Ethane-1,2-diylbis(azanylidene)]bis(methanylidene)}-bis(3,5-di-tert-butyl-1,2-dihydroxybenzene) (LH4). The complex 1 was characterized structurally by single-crystal X-ray diffraction technique. It was also further characterized by various techniques such as high-resolution mass spectrometry, Fourier Transform Infrared, thermogravimetric analysis, and elemental carbon, hydrogen, nitrogen (CHN) analysis. Complex 1 is a mononuclear complex that crystallizes in the triclinic P-1 Space group with a Cu⁺² ion present in a slightly distorted square planar geometry. Complex 1 [Cu(LH2)] was further employed as a cathode material for a secondary lithium-ion battery, which shows superior cyclic and rate capability performance. The [Cu(LH2)] (1) electrode shows an average capacity of 73.5 mAh/g at 50 mA/g after rate capability test, as compared to the 21.8 mAh/g specific capacity for the LH4 electrode. To understand the redox chemistry of the Cu-complex, a series of Density functional theory (DFT) computations were carried out for the complex 1 and its corresponding one- and two-electron reduced species.

Link: <https://doi.org/10.1002/cplu.202500571>



TITLE:

Strengthening 5th Series Aluminum Alloy
with Silicon Carbide: A Stir Casting
Approach

AUTHOR :

Dhavale, S.A.; Barve, S.B.

JOURNAL NAME:

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

DETAILS:

Published on 8 November 13 January 2026



ABSTRACT:

This study investigated the enhancement of mechanical properties in AA5086 aluminum alloy through the incorporation of silicon carbide (SiC) particles using a stir casting process, targeting marine applications. The composite's tensile strength, microhardness, and ductility were evaluated by varying the SiC content from 0 to 6%. Results revealed a significant increase in tensile strength by 20.49%, reaching 196.23 N/mm² at 6% SiC incorporation. Microhardness improved to 120.97 VHN, although a minor reduction in ductility was observed (elongation at fracture reducing from 26.4 to 24.0%). These findings highlight the potential of aluminum alloy composites as lightweight, high-strength materials, presenting a viable alternative to stainless steel for underwater structures where overall weight is a critical consideration.

Link: <https://doi.org/10.1007/s40033-025-00975-x>



TITLE:

Correction: Exploring Predictive Risk Factors for Myocardial Injury in Children Treated with Anthracyclines: A Pilot Study (Cardiovascular Toxicology, (2025), 25, 12, (1861-1880), 10.1007/s12012-025-10065-9)

AUTHOR :

Lee, T.; Douglass, D.; Stine, K.; Phanavanh, B.; George, N.; Vijay, V.; Fuscoe, J.C.; Desai, V.G.

JOURNAL NAME:

Cardiovascular Toxicology (Vol.-26, Issue-1)

DETAILS:

Published on 12 January 2026



ABSTRACT:

Exploring Predictive Risk Factors for Myocardial Injury in Children Treated with Anthracyclines: A Pilot Study. Cardiovasc Toxicol.

(Abstract not available)

Link: <https://doi.org/10.1007/s12012-025-10075-7>



TITLE:

Adverse Drug Reactions Reporting among
Pharmacy Students: Impact of an
Educational Intervention

AUTHOR :

P.p, S.A.; Mateti, U.V.; U.p, N.; Kolar, R.;
B.c, V.; Chand, S.

JOURNAL NAME:

Current Drug Therapy

DETAILS:

Published on 13 January 2026



ABSTRACT:

Introduction: This study aimed to assess the influence of education on pharmacy students' knowledge, attitudes, and practices regarding ADR reporting.

Methods: A pre- and post-intervention assessment, without a control group, was undertaken at a pharmacy educational institution, involving 573 participants enrolled in B. Pharm and Pharm. D programs. The effect of the educational intervention was assessed using a validated KAP (Knowledge, Attitude, and Practice) questionnaire, and the findings were analyzed.

Results: Following the educational intervention, students' knowledge, attitude, and practice scores improved significantly; knowledge increased from 40.52 ± 22.448 to 93.75 ± 9.933 , attitude from 71.62 ± 21.894 to 97.70 ± 6.499 , and practice from 23.58 ± 21.005 to 88.94 ± 14.669 . The improvement in knowledge, attitude, and practice was notably higher among B. Pharm students compared to Pharm. D students, with a p-value of <0.001 .

Conclusion: This study suggests that educational interventions using written materials and oral presentations may effectively improve pharmacy students' knowledge, attitudes, and practices regarding ADR reporting in the short term.

Link:

<http://dx.doi.org/10.2174/0115748855400747251124062058>





TITLE:

Customer Retention Prediction

AUTHOR :

Langote, V.; Kulkarni, S.; Ghorpade, A.;
Songirkar, A.; Chincholkar, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(1651 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

Identifying customer retention is essential for decreasing lost revenues as well as maintaining an established base of loyal customers. By reviewing historical data that includes customer demographics, purchasing habits and behaviours, businesses will be able to determine which customers are going to discontinue using their services or products. In generating models that can identify customers at risk, this process includes machine learning models such as decision trees, logistic regression and neural networks. It is important that predictive retention can work provided the right algorithms are selected, and reliable data is sourced. Continual updates and improved models will enhance accuracy, giving firms the opportunity to keep up with changes in how consumers behave. The models will also give businesses the ability to produce more targeted retention marketing plans since they will not only identify at-risk customers but also give clear data on what they are doing to create customer churn.

Link: https://doi.org/10.1007/978-3-032-06688-6_23



TITLE:

ML-Driven Analysis of NavIC-Based
Tracking for Route Optimization in Urban
Air Mobility

AUTHOR :

Modcoicar, V.P.; Baraskar, T.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(1609 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The idea behind the necessity of switching from the widely used Global Positioning System (GPS) to NavIC (Navigation with Indian Constellation) is presented in this paper. The development of new navigation systems for Urban Air Mobility (UAM) applications is crucial for enabling reliable and efficient aerial transportation solutions. The AeroTrail project aims to build Unmanned Aerial Vehicles (UAVs) for tasks such as surveillance and communication relays in urban environments. This paper contributes to the AeroTrail project by investigating the feasibility and benefits of integrating NavIC for enhanced UAV navigation in urban environments. Furthermore, it focuses on the critical aspect of route planning by evaluating the effectiveness of various machine learning classification techniques to predict optimal and sustainable flight routes based on unique operational factors, particularly the correlation between flight characteristics and CO₂ emissions. This research aims to identify the most suitable prediction models that can ultimately inform an automated route planning mechanism aligned with both efficiency and environmental considerations.

Link: https://doi.org/10.1007/978-3-032-04312-2_26





TITLE:

Advancing air quality prediction with hyperparameter optimization and innovative feature analysis using deep learning models in Phoenix, Arizona, USA

AUTHOR :

Kumar, V.; Agrawal, A.; Kedam, N.;
Alsulamy, S.; Singh, A.

JOURNAL NAME:

Theoretical and Applied Climatology (Vol.-
157, Issue-1)

DETAILS:

Published on 7 January 2026



ABSTRACT:

This study applies advanced machine learning techniques to forecast the Air Quality Index (AQI) in Phoenix, Arizona, USA, utilizing a comprehensive dataset spanning 24 years. The methodology centers on deploying the Random Forest (RF) and MLP models with Hyperparameter Optimization and advanced feature engineering to enhance predictive performance. A key innovation is the systematic use of lagged and rolling statistical features to capture the dynamic nature of air quality fluctuations. Lag features, representing AQI values from the previous 1 to 7 days, and rolling statistics, including 3-day and 7-day rolling means and standard deviations, were instrumental in capturing short-term trends and temporal dependencies in AQI. These features reflect the influence of local emission patterns and meteorological conditions, with analysis highlighting the strong predictive power of short-term features like the 3-day rolling mean. Feature importance analysis and dimensionality reduction addressed multicollinearity, enhancing model efficiency and reliability. The optimized MLP model outperformed RF, achieving an MSE of 0.04 on unseen data. This study provides practical tools for real-time AQI forecasting, enhancing environmental learning, and supporting public health and urban planning. It highlights the importance of lagged and rolling features, establishing a robust framework and benchmark for future air quality predictive modeling.

Link: <https://doi.org/10.1007/s00704-025-05992-0>



TITLE:

Catboost and Random Forest for stage-to-discharge prediction in a Monsoon-dominated river system

AUTHOR :

Khambenour, R.; Shaikh, A.F.; Bhirud, Y.L.;
Patil, U.S.; Shelar, V.V.

JOURNAL NAME:

Disaster Advances (Vol.-19, Issue-1)

DETAILS:

Published on January 2026



ABSTRACT:

Accurate river flow forecasting is critical for effective water resource management, flood mitigation and disaster preparation, particularly in monsoon-driven river systems. This study explores the use of machine learning models Random Forest and CatBoost for predicting daily river discharge based solely on historical water level data. The Narmada River basin, a major monsoon-influenced system in central India, serves as the case study. Lagged water level features were incorporated to capture temporal dependencies and model performance was evaluated using statistical metrics including MAE, RMSE, R^2 , NRMSE and RMSPE. Both models demonstrated strong predictive capabilities across training, validation and testing phases, with CatBoost consistently outperforming Random Forest in relative error metrics.

Time-series and scatter plot analyses further confirmed CatBoost's superior ability to capture dynamic flow variations, especially under peak conditions. The findings highlight the robustness and reliability of data-driven approaches for stage-to-discharge conversion, offering a viable alternative as traditional hydrological modeling faces limitations due to sparse or dynamic input data. This study reinforces the potential of machine learning techniques to enhance operational forecasting and water management strategies in regions with pronounced seasonal variability and limited auxiliary data.

Link: <https://doi.org/10.25303/191da063073>



TITLE:

A Machine Learning Approach to Predict,
Optimize, and Build Fantasy Cricket Teams
Using Evolutionary Algorithm

AUTHOR :

Singh, U.; Singh, A.; Jadhav, P.; Gyale, S.;
Iyer, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems
(Vol.-1617 LNNS)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The idea of the selection of the correct players plays a crucial role in the team formation of any sport like it does for Cricket. Enforcing a point system, player points were predicted using historic match data. Different machine learning approaches were integrated and compared to form a model ensemble. Subsequently, using genetic algorithm (GA), these points were used to embody the model fantasy team. Our findings show that various approaches yield different results, and hence, an amalgamation of such approaches can be utilized. The top players from each team could be recognized with as many as three being accurately identified out of five. Additionally, accuracy above 61.2% was secured in the formation of the fantasy team. The paper thus entails such decisive information to all the key stakeholders. Using this approach, one can thus predict, optimize, and in turn build their fantasy team with the least losses.

Link: https://doi.org/10.1007/978-3-032-04539-3_7



TITLE:

Multicriteria Decision Making in Sustainable
GRI-G4 Disclosure Framework

AUTHOR :

Kumar, M.; Bairagi, P.; Mishra, P.C.

JOURNAL NAME:

Studies in Computational Intelligence (Vol.-
1226)

DETAILS:

Published on 2 January 2026



ABSTRACT:

This chapter aims to evaluate the standards and capacity of corporate sustainability reporting techniques used by Indian businesses following the Global Reporting Initiative (GRI-G4) guidelines. The report adheres to disclosure criteria that include economic, environmental, social, and governance aspects, which form the basis for ranking corporations based on their reporting performance. The study also explores the progress in sustainability reporting among GRI-compliant businesses in India using a multicriteria decision-making (MCDM) technique. To assess the quantity and quality of sustainability disclosures within the GRI-G4 framework, a content analysis method is employed. Corporate sustainability reporting (CSR) levels are measured using a binary coding scheme, with “1” indicating disclosure and “0” indicating non-disclosure. The quality of sustainability disclosures is rated on a four-point scale from “0” to “3.” Criteria weights are determined using the MCDM technique, including entropy, and rankings are established using the TOPSIS technique (Technique for Order of Preference to Ideal Solution). This evaluation benefits various stakeholders, such as potential investors, asset managers, rating agencies, non-governmental organizations (NGOs), policymakers like the Securities and Exchange Board of India (SEBI) and the Ministry of Corporate Affairs, customers, academics, and students, by supporting informed decision making.

Link: https://doi.org/10.1007/978-981-95-0599-9_7



TITLE:

A Comprehensive Review on Active Noise
Reduction Methods for Aircraft
Aerodynamics System

AUTHOR :

Solanki, M.; Dusane, A.

JOURNAL NAME:

Journal of Vibration Engineering and
Technologies (vol.-14, Issue-1)

DETAILS:

Published on 7 January 2026



ABSTRACT:

To provide a comprehensive and future-focused synthesis of aerodynamic noise reduction techniques by introducing a novel classification framework that bridges traditional active control systems with emerging machine learning-based predictive approaches. The review aims to deliver actionable insights for advancing intelligent and energy-efficient aeroacoustic control solutions. A systematic evaluation and categorization of active noise control strategies, including plasma actuators, smart materials, and adaptive algorithms such as reinforcement learning, neural networks, and filtered-xLMS systems. Comparative analysis is performed using quantitative performance metrics including decibel (dB) reduction, computational complexity, feasibility, and implementation readiness. The review highlights the strengths, limitations, and performance trade-offs of both conventional and AI-driven noise reduction technologies. New hybrid and adaptive approaches demonstrate promising improvements in noise attenuation, operational efficiency, and system intelligence, positioning them as viable candidates for next-generation aeroacoustic control. This study establishes a forward-looking roadmap for innovative noise control research by integrating advanced data-driven methods with established active control techniques. The structured comparative framework and identification of hybrid strategies make the review a unique and valuable contribution toward the development of sustainable, adaptive, and practical aerodynamic noise mitigation systems.

Link: <https://doi.org/10.1007/s42417-025-02249-y>



TITLE:

Fuzzy Based Support Vector RideNN for Parkinson's Disease Detection Using Voice Signal and Hand Drawing Spiral Image

AUTHOR :

Ghate, P.D.; Phadke, A.C.

JOURNAL NAME:

SN Computer Science (Vol.-7, Issue-1)

DETAILS:

Published on 7 January 2026



ABSTRACT:

Parkinson's disease is a neurodegenerative condition that affects people worldwide. In general, neurologists monitor the changes in handwritten drawings and voice speech signals to detect Parkinson's disease. The common techniques utilized for the detection of Parkinson's disease are limited and expensive. A novel Fuzzy Support Vector-Rider optimization algorithm-based Neural Network (FSV-RideNN) approach is employed for the detection of Parkinson's disease by utilizing voice signals and spiral images. The input hand-drawing spiral image is initially pre-processed by utilizing a Gaussian filter, and the resultant pre-processed images are augmented. Subsequently, features are extracted from the augmented image. Similarly, the pre-processing of input voice signals is executed by utilizing a Non-Local Mean (NLM) filter. Later, the signal-based features are extracted from the pre-processed signal. Thereafter, the proposed method detects Parkinson's disease using FSV-RideNN from the extracted signal-based and image-based features. Furthermore, the detection performance of FSV-RideNN is assessed by correlating it with the detection performance of baseline approaches, and FSV-RideNN attained superior performance with a Negative Predictive Value (NPV) of 92.05%, accuracy of 88.48%, Positive Predictive Value (PPV) of 91.56%, True Negative Rate (TNR) of 90.57%, and True Positive Rate (TPR) of 89.68% respectively.

Link: <https://doi.org/10.1007/s42979-025-04614-w>



TITLE:

Unlocking AI-driven innovations in textile design for a circular economy

AUTHOR :

Chaudhary, G.; Ghag, N.

JOURNAL NAME:

Design Journal

DETAILS:

Published on 6 January 2026



ABSTRACT:

Purpose: This study explores how AI can support sustainable and efficient textile design, identify AI-based factors, analyse their interdependencies, and categorize them into cause-and-effect groups using a structured decision-making approach.

Design/methodology/approach: The study adopted a three-step process: (1) conducting a systematic literature review to identify AI applications in textile design, (2) applying the Fuzzy Delphi Method (FDM) to screen and cross-validate key factors based on expert opinions, and (3) using the Decision Making Trail and Evaluation Laboratory (DEMATEL) approach to analyse the cause-and-effect relationships between the screened factors.

Findings: The study found that AI-enabled generative Design for Material Efficiency and Predictive Colour and Trend Forecasting for Design Planning are primary causal factors influencing other AI-driven innovations, while AI-Powered Fit Prediction and Customization Algorithms and AI-Based Circular Design Recommendations are ranked as effect factors (i.e., they are more dependent on the impact of other factors). The results demonstrate the interdependent role of AI technologies in textile design and their influence on sustainability and efficiency in operations.

Originality and implications: The study provides new insight by mapping the influence of textile design AI technologies in a systematic way using an integrated FDM-DEMATEL framework, and the findings offer useful guidelines for designers, producers, and policymakers to set priorities for AI-based innovations and to make strategic investments into AI applications for increasing efficiency, circularity, and sustainability in the textile sector.

Link: <https://doi.org/10.1080/14606925.2025.2611242>



TITLE:

Graphs Derived from Coatoms of Lattices

AUTHOR :

Shroff, R.C.; Kshirsagar, P.S.

JOURNAL NAME:

Trends in Mathematics (Vol.-Part F 1273)

DETAILS:

Published on 2 January 2026



ABSTRACT:

The concept of graphs derived from coatoms of lattices is introduced. Two proper elements of a lattice are adjacent if their join is a coatom of a lattice. Some fundamental properties of these graphs such as cut vertex, diameter, planarity, and girth are studied. A condition is obtained under which these graphs are complete bipartite graphs. Some characterizations of such graphs are studied.

Link: https://doi.org/10.1007/978-3-032-04418-1_3



TITLE:

Recovery of Nutrients and Metals from
Sewage

AUTHOR :

Rathod, P.B.; Singh, M.P.; Dhayagude, A.C.

JOURNAL NAME:

Environmental Science and Engineering
(Part F 1205)

DETAILS:

Published on 3 January 2026



ABSTRACT:

Sewage treatment and the removal of nutrients and metals from sewage are increasingly in demand as part of sustainable resource management. Innovative technologies are being developed to extract nutrients such as potassium, nitrogen, phosphorus, and metals like zinc, iron, and copper from sewage. These processes help mitigate environmental pollution and create opportunities for using the recovered materials in agriculture and industry. This chapter aims to compile information on the processes involved in recovering nutrients and metals from sewage, as well as to explore the superiority and drawback of these procedure. Additionally, the chapter will discuss the future needs for further development in sewage treatment processes.

Link: https://doi.org/10.1007/978-3-032-07597-0_7



TITLE:

Homogenization technique-based prediction of elastic properties in pistachio shell powder-acrylic butadiene styrene (ABS) polymeric composites

AUTHOR :

Rathod, P.; Washimkar, D.; Anerao, P.; Pawar, A.; Yelamasetti, B.; Patil, N.; Sharma, S.; Shelare, S.; Ramaswamy, K.

JOURNAL NAME:

Polymers and Polymer Composites (Vol.-34)

DETAILS:

Published on 5 January 2026



ABSTRACT:

The superior mechanical and physical properties of composite materials have attracted a lot of attention, surpassing those of their individual components. Recent studies have focused on creating eco-sustainable composites by adding natural reinforcing fillers, like agricultural waste, to polymer matrices. This study examines the elastic properties of a new composite material made of acrylic butadiene styrene (ABS) as the matrix and pistachio shell powder as reinforcement. The effective elastic characteristics of the material were predicted using a homogenization technique. Different volume fractions of pistachio shell powder (0, 1, 3, 5, 10, and 15%) were used in Finite Element Analysis (FEA). The results were compared with those of traditional micromechanical models, such as Hobbs' model and the Rule of Mixtures (ROM). According to the numerical analysis, while Poisson's ratio was mostly same, Young's Modulus and shear modulus significantly increased as the filler amount increased. Young's Modulus rises by 19.77% with 15% reinforcement, according to FEA data, which was in good agreement with Hobbs' expectations. At increasing volume fractions, the ROM model over stated stiffness, whereas FEA gave a more accurate approximation. The study highlights that pistachio shell powder can be used as an efficient reinforcement for ABS composites, showing enhanced mechanical qualities while using less material. By offering a validated numerical framework for forecasting the elastic behavior of bio composite materials, this study aids in their optimization for structural applications.

.Link: <https://doi.org/10.1177/09673911251410749>





TITLE:

Gamification in the Metaverse: Enhancing Consumer Experience and Loyalty

AUTHOR :

Gaurav, K.; Sharma, D.; Vats, S.

JOURNAL NAME:

Palgrave Studies of Marketing in Emerging Economies (Vol.-Part F 1270)

DETAILS:

Published on 2 January 2026



ABSTRACT:

Metaverse has revolutionized digital interactions by blending virtual and physical realities to create immersive user experiences across varied domains. The integration of immersive worlds for real-time communication, socialization, work, shopping, and play incorporates myriad cutting-edge technologies such as virtual reality, augmented reality, blockchain, and artificial intelligence. Gamification indeed became one highly inventive as well as an engaging scalable method to offer incomparable customer experiences and build upon brand loyalty: it is the use of different game design elements—like leaderboards, badges, points, storylines, and challenges, by design, not unknowingly, in a non-game context to improve user engagement and consumer experience across the domains. The chapter thus investigates the psychological and behavioral implications of gamification with a view that are likely to engage real-world consequences toward improving consumer experience and stimulating brand loyalty in the context of the metaverse. The interplay between social interaction and virtual rewards are highlighted as major drivers to positively influence consumer engagement, thus serving as the prime considerations in the design of gamified experiences. Therefore, this chapter consolidates theoretical findings to provide ground for a more coherent intellectual discourse linking gamification-metaverse relationship formation through a systematic framework grounded on understanding its disruptive power in creating powerful consumer-brand relationships. Furthermore, the chapter describes how gamification in the metaverse engages customers and builds brand loyalty in immersive virtual environments while also discussing the critical topics as ethical considerations.

Link: https://doi.org/10.1007/978-3-032-02365-0_7



TITLE:

Enhancement in Performance Metrics for
Mobile Ad Hoc Networks (MANETs) Using
Hybrid Ant Lion Optimization (HALO)
Algorithm

AUTHOR :

More, A.P.; Kale, R.S.; Rizvi, M.A.

JOURNAL NAME:

Journal of Electrical and Computer
Engineering (Vol.-2026, Issue-1)

DETAILS:

Published on 4 January 2026



ABSTRACT:

Mobile ad hoc networks (MANETs) are constantly confronted with issues including variable quality of service (QoS) metrics, route optimization, and flexible topology. Here, a novel hybrid ant lion optimization (HALO) algorithm is proposed that integrates the cooperative foraging behavior of ant colonies from ant colony optimization and the hunting strategies of lion prides from Lion optimization algorithm along with ad hoc on-demand multipath distance vector (AOMDV) protocol. This bio-inspired algorithm dynamically adapts routing paths to optimize QoS metrics, including throughput, delay, packet delivery ratio, energy efficiency, and routing overhead. Simulation experiments conducted using network simulator-3 (NS-3) demonstrates HALO's effectiveness in optimizing paths and enhancing performance metrics across various network scenarios. According to results, the suggested HALO algorithm works better than the conventional methods like lion optimization algorithm (LOA) and ant colony optimization (ACO) with ad hoc on-demand distance vector (AODV) and AOMDV protocols. Simulation demonstrates that the suggested approach improves throughput by 30%–35%, PDR is increased by approximately 30%, E2E delay is reduced by 100 to 125 msec, energy consumption is reduced by 75 to 85 mJ, and routing overhead is reduced by 10% compared to the traditional routing protocols.

Link: <https://doi.org/10.1155/jece/9947624>



TITLE:

Cardiovascular Medications and Dementia Risk in Older Adults: A Literature Review and Disproportionality Analysis Using OpenVigil FAERS Data

AUTHOR :

Syed, J.; Potdar, A.; Chalasani, S.H.

JOURNAL NAME:

Journal of Geriatric Psychiatry and Neurology

DETAILS:

Published on 3 January 2026



ABSTRACT:

Background Cardiovascular medications are commonly prescribed to older adults; however, their potential association with cognitive decline remains poorly understood. Objective This study aimed to systematically evaluate the relationship between cardiovascular drugs and the risk of dementia. Methods (1) A retrospective disproportionality analysis of the FDA Adverse Event Reporting System data, accessed via OpenVigil 2.1, which examined 97 cardiovascular drugs across 14 therapeutic categories in patients aged ≥ 60 years, and (2) a literature review of case-reports of drug-induced cognitive impairment. Results Of the 97 drugs analyzed, disproportionate reporting signals (indicating more frequent reporting than expected by chance) were identified for 38 (39.2%) across four types of dementia: dementia (13.4%), Alzheimer's disease (16.5%), vascular dementia (18.6%), and dementia with Lewy-bodies (6.2%). ACE inhibitors exhibited the highest signal rate (75.0%). Thirteen case-reports were identified, primarily involving statins (53.8%). Discontinuation of the drug resulted in cognitive improvement in 12/13 cases. Conclusions This study identifies disproportionate dementia-related adverse event reporting for nearly 40% of cardiovascular drugs examined, with ACE inhibitors and ARBs showing the highest signal rates. However, these findings are preliminary and require validation through future pharmacoepidemiological studies.

Link: <https://doi.org/10.1177/08919887251415199>



TITLE:

Consequences and Functional Alterations of
Endocrine Disruptors on Women's Health

AUTHOR :

Mishra, D.; Singh, R.; U.p, N.; Pradhan, R.;
Chand, S.

JOURNAL NAME:

Current Women's Health Reviews (vol.-22,
Issue-2)

DETAILS:

Published on 23 May 2025



ABSTRACT:

Endocrine-disrupting chemicals (EDCs) are anthropogenic compounds that have garnered significant research consideration due to their harmful effects on human health. These compounds disrupt normal physiological homeostasis by interfering with processes such as hormone synthesis, transport, metabolism, and excretion. Even at low concentrations, EDCs can contribute to severe health issues, including life-threatening cancers and metabolic disorders in humans and animals. Consequently, monitoring EDCs in human populations is a critical area of focus. Preclinical and in vitro studies have established the impact of EDCs on hormonal pathways, particularly in male and female gonadal development. Furthermore, biomonitoring studies have detected EDCs in various biological matrices, including those of fetuses, children, and pregnant women. Exposure to EDCs has been associated with complications in the female reproductive system, like premature ovarian failure, precocious puberty, and polycystic ovary syndrome. This review provides a comprehensive summary of the associations between EDC exposure and female reproductive dysfunction, emphasizing potential mechanisms underlying these effects.

Link:

<http://dx.doi.org/10.2174/0115734048361078250515192658>



TITLE:

Therapeutic Potential of Methanolic Extract of Areca catechu Nut in Treating Nicotine Use Disorder: evidence from preclinical mouse behavioral models

AUTHOR :

Vibhute, D.D.; Dorik, P.; Jadhav, A.; Pandey, V.

JOURNAL NAME:

Journal of Pharmacopuncture (Vol.-28, Issue-4)

DETAILS:

Published on 31 December 2025



ABSTRACT:

Objectives: Arecoline, the main bioactive compound in Areca catechu nut, interacts with nicotinic acetylcholine receptors ($\alpha 4\beta 2$ and $\alpha 7$), suggesting potential in reducing nicotine cravings and withdrawal symptoms. This study evaluates the therapeutic potential of methanolic Areca catechu nut extract (MAN) against nicotine dependence and withdrawal in C57BL/6J mice.

Methods: A modified runway model assessed nicotine-seeking behavior. Antidopaminergic effects and locomotor activity were measured via the haloperidol-induced catalepsy model and actophotometer. Behavioral models were used to evaluate MAN's effects on nicotine withdrawal symptoms anxiety (elevated plus maze, open field, marble burying), depression (forced swim, tail suspension), social interaction, anhedonia (sucrose preference), memory (elevated plus maze), and hyperalgesia (hot plate assay).

Results: MAN (25 and 50 mg/kg, p.o.) showed antidopaminergic activity, reduced nicotine craving, and alleviated withdrawal symptoms (anxiety, depression, anhedonia, memory impairment, hyperalgesia) by enhancing serotonergic neurotransmission.

Conclusion: MAN shows potential as a therapeutic candidate for nicotine use disorder.

Link: <https://doi.org/10.3831/kpi.2025.28.4.335>



TITLE:

Designing Intelligent Mentoring Systems For
Art Learners

AUTHOR :

Suma, N.G.; Deepti; Khurana, S.; Katyal, A.;
Parida, T.; Lahane, P.S.

JOURNAL NAME:

ShodhKosh: Journal of Visual and
Performing Arts (Vol.-6, Issue-2s)

DETAILS:

Published on 16 December 2025



ABSTRACT:

The use of Artificial Intelligence (AI) in art education has spawned Intelligent Mentoring Systems (IMS) that enable art learners to have personalized learning experiences. These systems are a combination of adaptive learning algorithms, visual analysis and affective computing to offer custom guidance, feedback and skill development paths. The proposed research paper discusses the development of an Intelligent Mentoring System based on AI and multimodal data (sketches, digital paintings, and written reflections) to evaluate artistic development and prescribe specific learning intervention in art learners. The system uses a hybrid approach that involves the use of Convolutional Neural Networks (CNNs) to analyze visual artwork and Natural Language Processing (NLP) in analyzing learner feedback and descriptions. Reinforcement learning is a dynamically adaptive framework that uses mentoring policies according to individual learning paths and maximizes engagement and creative development. Moreover, the explainable AI (XAI) components provide the evaluation transparency so that learners can get the feedback reasons and art improvement indicators. The architecture upholds a human-in-the-loop paradigm, in which skilled artists work alongside AI advisors to improve criteria of evaluation, to be both aesthetic and delicate, as well as technical. The study focuses on the pedagogical and psychological dimensions of mentorship instead of considering the affective state recognition, which helps to modify emotional support in the creative process. This smart mentoring system seeks to balance the traditional forms of art mentorship and AI-customization with the view of promoting independent creativity, self-reflection, and long-term artistic development among learners within the formal and informal learning settings.

Link: <https://doi.org/10.29121/shodhkosh.v6.i2s.2025.6748>





TITLE:

Towards the Efficient and Privacy-Aware
Diagnosis of Bladder Inflammations

AUTHOR :

Ashtagi, R.; Bidwe, R.V.; Jaybhaye, S.; Uke,
N.J.; Jain, J.; Jaju, U.; Agarwal, K.;
Kalamkar, A.

JOURNAL NAME:

Engineering, Technology and Applied
Science Research (Vol.-15, Issue-6)

DETAILS:

Published on 8 December 2025



ABSTRACT:

Conventional centralized machine learning solutions for medical diagnosis face significant limitations, such as data privacy concerns, communication overhead, and poor scalability across healthcare institutions, restricting real-time and secure diagnostic capabilities for diseases such as acute bladder inflammation. To address these challenges, this work proposes a highly accurate and privacy-preserving model that ensures scalability and efficiency while reducing training time. A Federated Logistic Regression (FLR) approach uses data from multiple clinical institutions to collaboratively train a global model without exchanging raw patient data. The FedAvg algorithm is employed to aggregate locally trained models into a centralized global model, evaluated on a dataset of urinary tract inflammations. Experimental findings reveal that the federated architecture achieves diagnostic accuracy comparable to centralized frameworks while requiring significantly fewer training iterations, resulting in a $\sim 20\times$ improvement in convergence efficiency without compromising patient privacy. The FLR model demonstrates a secure, realistic, and computationally feasible solution for the diagnosis of acute bladder inflammation, underscoring the transformative potential of federated learning to advance privacy-preserving medical diagnostic systems within distributed healthcare settings.

Link: <https://doi.org/10.48084/etasr.12519>



TITLE:

Development of the ColorEmoNet Dataset and of a Machine Learning Approach for Emotion Recognition Using Color Theory

AUTHOR :

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

JOURNAL NAME:

Engineering, Technology and Applied Science Research (Vol.-15, Issue-6)

DETAILS:

Published on December 2025



ABSTRACT:

Color theory is a way of understanding how colors influence human perception and emotions. Color theory and Machine Learning (ML) can be combined to deeply understand the psychological impact of colors on human emotion. This study aims to expand our understanding of the color-emotion relationships. To establish a relationship, ML algorithms, such as Support Vector Machines (SVM), Convolutional Neural Network (CNN), and Recurrent Neural Network (RNN), were employed to classify the emotional feedback induced by colors in images using the ColorEmoNet dataset. The proposed approach achieved an accuracy of 76% using SVM, 86.49% using CNN, and 68% using RNN, demonstrating the effectiveness of color-based features for emotion recognition. The results of this study can contribute to developing innovative emotion recognition systems that enhance emotional understanding in practical applications.

Link: <https://doi.org/10.48084/etasr.12009>



TITLE:

Deep Learning-Based Classification of Indian Road Vehicles Using a Custom Dataset and Pretrained Models

AUTHOR :

Paranjape, B.; Naik, A.

JOURNAL NAME:

Engineering, Technology and Applied Science Research (Vol.-15, Issue-6)

DETAILS:

Published on December 2025



ABSTRACT:

Vehicle classification is a vital component of intelligent transportation systems, enabling applications such as traffic monitoring, automated parking, vehicle restrictions, autonomous driving, toll collection, and expressway traffic analysis. On Indian roads, a diverse range of uniquely designed vehicles—such as trucks, rickshaws, and certain bike types—poses distinct classification challenges. Traditional image processing and pattern recognition approaches, relying on handcrafted features and limited datasets, often struggled under real-world conditions affected by lighting, weather, and environmental variability. Deep learning methods have overcome many of these limitations, yet a region-specific benchmark dataset for Indian vehicles has been lacking. To address this gap, a custom dataset, the Bharatiya Vehicle Dataset (BhVD), was developed, containing four prominent vehicle categories: cars, bikes, trucks, and rickshaws. In this work, thirteen pretrained Keras models, originally trained on ImageNet, were fine-tuned and evaluated on the BhVD and two other Indian traffic datasets. The models were compared across accuracy, inference speed, and real-time applicability. The InceptionResNetV2 model achieved the highest accuracy of 94.34% on the BhVD, whereas MobileNet proved the fastest, with an inference time of 60 ms. The results demonstrate the effectiveness of transfer learning for region-specific vehicle classification and provide insights into selecting models that balance speed and accuracy for real-world deployment in Indian traffic environments.

Link: <https://doi.org/10.48084/etasr.12979>



TITLE:

The price of love: The feminist heroine of the Bollywood romantic comedy

AUTHOR:

Sathe, N.R.

JOURNAL NAME:

Routledge Handbook of South Asian
Cinemas

DETAILS:

Published on 2025



ABSTRACT:

In this chapter, I focus on two recent Bollywood romantic comedies – *Tu Jhooti Main Makkar* (“You’re a Liar I’m a Cheat,” Luv Ranjan) and *Rocky Aur Rani Ki Prem Kahaani* (“The love story of Rocky and Rani,” Karan Johar). I analyze how both films incorporate familiar tropes of the Hollywood romantic comedy and how this transnational relocation influences the depiction of romance in these films. I foreground the emancipatory politics of both films with regard to the woman protagonist and argue that in spite of gesturing toward popular feminist politics, the films remain steeped in the logics of neoliberal individuality, underpinning the heroine's characterization within the ideology of “choice” and “freedom” as it presents in the neoliberal marketplace. Consequently, I demonstrate how the romantic comedy plot, in its transnational iteration in mainstream Bollywood cinema, is as much about the reconciliation of the romantic couple with their respective families as it is a reflection of contemporary ideologies about gender, sexuality, and romance.

Link:

<https://www.taylorfrancis.com/chapters/edit/10.4324/9781003497912-35/price-love-namrata-rele-sathe>



TITLE:

Immune system involvement and neuropathology in Guillain-barré syndrome: Approaches to therapy

AUTHOR :

Karnik, H.; Wagh, P.; Gawade, A.

JOURNAL NAME:

Indian Journal of Biochemistry and Biophysics (Vol.-62, Issue-12)

DETAILS:

Published on 28 November 2025



ABSTRACT:

Guillain-Barré Syndrome (GBS) is increasing in incidence and is associated with significant morbidity, emphasizing the urgent need for improved therapeutic options beyond current treatments. While intravenous immunoglobulin (IVIG) and plasmapheresis are the primary therapies, their limited ability to prevent long-term neuromuscular impairments highlights the necessity for innovative approaches. GBS is an acute autoimmune disorder that often follows infections, leading to demyelination or damage to nerve axons and resulting in paralysis. This review discusses emerging immunomodulatory treatments, such as monoclonal antibodies aimed at B-cell depletion and complement system inhibition, which provide targeted mechanisms to modulate abnormal immune responses. Additionally, regenerative strategies, including mesenchymal stem cell therapy and neuroprotective agents, are explored for their potential to promote nerve repair and improve recovery. Advances in gene-editing technologies also offer promising possibilities for correcting immune dysregulation at the molecular level. Beyond pharmacological interventions, the review highlights the importance of addressing the complex physical, psychological, and socioeconomic burdens of GBS. Comprehensive rehabilitation comprising physiotherapy, occupational therapy, and psychological support is vital for restoring independence and enhancing quality of life. Future research should focus on personalized treatment approaches, biomarker-guided monitoring, and large clinical trials to improve outcomes and lessen the global impact of GBS.

Link: <https://doi.org/10.56042/ijbb.v62i12.16944>



TITLE:

Prevalence & correlates of dynapenia in elderly with low skeletal muscle mass: A hospital-based cross-sectional study

AUTHOR :

Tejeswini, C.J.; Siddhu, R.; Syed, J.; Pereira, P.

JOURNAL NAME:

Indian Journal of Medical Research (Vol.-162, Issue-5)

DETAILS:

Published on 31 December 2025



ABSTRACT:

Background & objectives Dynapenia, an age-related decline in muscle strength independent of muscle mass loss, is increasingly recognised as a predictor of functional decline and adverse health outcomes. This study aimed to investigate the prevalence and predictors of dynapenia among older adults with low skeletal muscle mass. **Methods** This hospital-based cross-sectional study included 128 participants aged ≥ 60 yr with low muscle mass determined using the EWGSOP-2 criteria. Assessments included handgrip strength using a Jamar dynamometer, a 4-meter gait speed test, the geriatric depression scale, and the clinical frailty scale. Pearson's correlation was used to assess the relationships between muscle strength parameters, gait speed, frailty scores, and depression scores, followed by multivariate logistic regression. **Results** Among individuals with low muscle mass, 66 (51.6%) had dynapenia [29 (43.9%) in females; 37 (56.06%) in males]. Handgrip strength strongly and positively correlated with knee extension strength [coefficient correlation (r) = 0.822, $P < 0.001$] and moderately correlated with gait speed ($r = 0.414$, $P < 0.001$). Both strength parameters were inversely correlated with frailty scores ($r = -0.367$ and $r = -0.316$, respectively; $P < 0.001$). Multivariable analysis identified female gender [Odds ratio (OR) = 7.655, 95% confidence interval (CI): 1.616-36.264, $P = 0.010$], lower socioeconomic status ($P < 0.001$), and gait speed < 0.8 m/s (OR = 22.664, 95% CI: 2.952-174.010, $P = 0.003$) as predictors of dynapenia. Depression was more prevalent in dynapenia patients [25.8% ($n = 17$) vs. 3.2% ($n = 2$), $P < 0.001$]. **Interpretations & conclusions** The prevalence of dynapenia was 51.6 per cent among elderly with low muscle mass, with female sex, lower socioeconomic status, and reduced gait speed as significant correlates. Routine strength assessment is warranted in elderly with low muscle mass.

Link: https://doi.org/10.25259/ijmr_1516_2025



TITLE:

Synthesis, Antiproliferative Activity Evaluation, and Molecular Docking Analysis of N-Hydroxy-2-[4-(2-R1,3-R2,6-R3-quinolin-4-yl)phenyl]acetamides as Promising HDAC8 Inhibitors

AUTHOR :

Gagare, S.S.; Choudhari, V.P.; Jain, A.S.;
Mali, S.N.; Gurav, S.S.

JOURNAL NAME:

Russian Journal of Organic Chemistry (Vol.-
61, Issue-11)

DETAILS:

Published on 14 January 2026



ABSTRACT:

A series of N-hydroxy-2-[4-(2-R1,3-R2,6-R3-quinolin-4-yl)phenyl]acetamides 4a–4n (R1–R3 = Me, Et, Cl, Ph) was synthesized, screened for HDAC8 inhibition and antiproliferative activity, and analyzed via in silico molecular docking. The synthesis of the hydroxamic acid-functionalized quinoline scaffolds involved the Friedlander reaction followed by Friedel–Craft alkylation and ester hydrolysis. The in vitro HDAC8 inhibition potential and antiproliferative activity of the synthesized compounds were assessed by the MTT assays. Molecular docking was performed of the products to the HDAC8 target protein (PDB ID: 5FCW) was performed to determine the binding energies and sites, as well as nature of interactions. In the in vitro HDAC8 inhibition activity, 4g showed a slightly higher ($IC_{50} = 9.53 \mu M$), while 4a exhibited a slightly lower activity ($IC_{50} = 21.24 \mu M$) than the other compounds. Scaffold 4g exhibited good in vitro anticancer activity ($IC_{50} = 3.69 \mu M$) against the COLO 205 cell line, and scaffold 4h was found to be active against two cancer cell lines: HCT 116 ($IC_{50} = 6.91 \mu M$) and COLO320 DM ($IC_{50} = 8.91 \mu M$). Molecular docking predicted high binding affinities of compounds 4g and 4n (-8.1 and -7.9 kcal/mol) to the HDAC8 target protein. The results highlight the HDAC8 inhibitory and anticancer potential of the new hydroxamic acid-appended quinoline derivatives, identifying compound 4g as a particularly promising candidate for further development.

Link: <https://doi.org/10.1134/S1070428025601347>



TITLE:

Metaheuristic Optimization and Machine Learning-Based Unit Commitment Strategies in Smart Grids

AUTHOR :

Katre, R.; Khadse, C.; Bhadade, R.

JOURNAL NAME:

Engineering, Technology and Applied Science Research (vol.-15, Issue-5)

DETAILS:

Published on October 2025



ABSTRACT:

This study introduces Machine Learning and Metaheuristic-Based Unit Commitment (ML-MetaUC), which is a hybrid method for intelligent UC in smart grids. The ML component uses supervised models such as linear regression and random forest on historical and real-time environmental data to predict the upcoming demands for electricity. The Metaheuristic Optimization (MO) layer uses several methods, including Differential Evolution (DE) and Ant Colony Optimization (ACO), to ascertain the appropriate time to activate the generators. Simulation on the IEEE 14-bus test system showed that ME-MetaUC reduced operating expenses by 10.7% and boosted convergence speed compared to traditional approaches. In addition, the proposed framework has a high degree of flexibility to various load scenarios, contributing to increased system dependability. Under conditions of uncertainty, the ML-MetaUC framework, a data-driven and scalable solution for smart grid energy management, makes it possible to schedule producing units robustly and more effectively.

Link: <https://doi.org/10.48084/etasr.12853>



TITLE:

An Exploration Of Leadership Challenges In
Government Hospitals In India During
Health Crises

AUTHOR :

Ganti, S.; Chaudhary, N.; Luther, V.S.;
Banerjee, S.

JOURNAL NAME:

Asia Pacific Journal of Health Management
(Vol.-20, Issue-2)

DETAILS:

Published on 11 September 2025



ABSTRACT:

Introduction: Leadership in Indian government hospitals faces serious challenges during health crises like the COVID-19 pandemic, including bureaucratic delays, resource constraints, and ethical dilemmas in resource usage. These issues are further worsened by federal-state tension, inadequate adaptive competency, and systemic inequities, usually resulting in suboptimal crisis response and burnout. This paper includes a systematic literature review (SLR) for exploring these challenges and dynamics to inform practice and policy. By critically reviewing existing literature, the study focuses on bridging the gap in understanding crisis-specific stressors and general healthcare management problems, highlighting the need for a transformative approach in resource-deficient settings.

Method: The SLR method follows PRISMA guidelines, searching databases such as Scopus, PubMed, and Google Scholar. 17 articles were finally selected to be included in the study following the inclusion and exclusion criteria specified. Major themes were identified from the extensive review of the selected articles

Results: Three interconnected themes emerged: systemic operational challenges covering sub-themes of resource scarcity and governance delays; leadership styles and competencies, including adaptive deficits and mental health gaps; and policy reforms, which covered decentralisation and training as sub-themes. Sub-themes revealed crisis-specific aggravated challenges, such as rural inequities and burnout, with regional successes like Kerala's (Indian State) adaptive strategies contrasting national hierarchical failures.

Conclusion: The review reveals the importance and need for an evolutionary leadership shift to develop resilience in Indian hospitals. Recommendations include adaptive training, decentralisation, mental health support, global partnerships, and post-crisis evaluations.

Link: <https://doi.org/10.24083/apjhm.v20i2.4817>



TITLE:

Work-life balance and organisational effectiveness: an emphasis on mediating effect of employee commitment

AUTHOR :

Panda, A.; Bankar, S.

JOURNAL NAME:

International Journal of Business Excellence
(Vol.-37, Issue-4)

DETAILS:

Published on 5 January 2026



ABSTRACT:

Balancing work and life is a never-ending issue. Today's global marketplace necessitates unwavering 'work-life commitment' in the form of conflicting professional responsibilities. Hence, maintaining a high level of work-life balance is critical to recruiting and retaining personnel in organisation. Employee attitudes, behaviours, commitment as well as well-being are also affected by this type of practise. In these modern times, ample number of business process outsourcing industries has been found in striking a work life balance so as to enhance organisational effectiveness by increasing the commitment level of employees in the organisation and at particular in their related job. However, this type of expected employee behaviour is quietly becoming a barrier to maintaining work-life balance. As a result, the effects of work-life balance on organisational effectiveness must be investigated in this context, focusing on the role of employee commitment in the association between work-life balance and organisational effectiveness.

Link: <https://doi.org/10.1504/IJBEX.2025.150878>





TITLE:

Teaching Learning–Based Optimization for Optimizing Process Parameter in Wire Electrical Discharge Machining (WEDM)

AUTHOR :

Kulkarni, S.; Kulkarni, O.K.; Jawade, S.A.; Pachpore, S.; Kakandikar, G.

JOURNAL NAME:

Handbook of Smart Manufacturing Technologies: Industrial Engineering in the Digital Age

DETAILS:

Published on December 2025



ABSTRACT:

The world of nontraditional machining has a valuable machining tool, namely, wire electrical discharge machining (WEDM). WEDM is used widely due to its significant features such as a higher amount of accuracy and superior surface quality, which ultimately leads to higher productivity. WEDM deals with a large number of parameters involved in the process, which makes it tough to gain a correct combination of the optimum settings of parameters, which leads to greater accuracy. The Taguchi method is most extensively applied for the optimization of a single response, as it gives the optimum value of every response. Taguchi's L25 orthogonal array was used during experimentation. In this chapter, teaching learning–based optimization (TLBO) algorithm is used to optimize the process parameters of the WEDM process for surface roughness ($\text{https://www.w3.org/1998/Math/MathML" display="inline">R a \text{https://www.w3.org/1999/xlink" xlink:href="https://s3-euw1-ap-pe-df-pch-content-public-p.s3.eu-west-1.amazonaws.com/9781003502647/9cbc5f07-d810-4fdd-979e-073604c01a53/content/ieq0022.tif"/>}$) as the response variable. The TLBO algorithm is one of the best algorithms that gives an optimized solution for real-life problems. The TLBO algorithm is based on the old-style teaching learning method of students and teachers. This chapter deals with the influence of various input parameters, which comprise pulse-off time, pulse-on time, wire tension, wire feed, lower flush, and upper flush for the high-carbon, high-chromium steel material and TLBO, which is used to obtain the optimum result of the surface roughness.

Link: <https://doi.org/10.1201/9781003502647-4>



TITLE:

Exact Theoretical Rating Law For Sharp-Crested Elliptic, Semi-Elliptic, And Circular Weirs

AUTHOR :

Achour, B.; Amara, L.; Kulkarni, K.H.

JOURNAL NAME:

Larhyss Journal (Vol.-2025, Issue-64)

DETAILS:

Published on December 2025



ABSTRACT:

The study derives an exact theoretical (loss-free) stage-discharge law for sharp-crested elliptic and semi-elliptic weirs, with the circular weir obtained as a rigorous specialization. The formulation cleanly separates universal hydraulic scaling from a dimensionless geometry-flow depth kernel, which is made analytically explicit by converting the defining integral into an exact Euler-Beta series valid on the full admissible range. The kernel is shown to satisfy the two endpoint constraints by construction, square-root onset at small flow depth and the full-height anchor equal to $4/15$, providing a transparent, first-principles reference for analysis and calibration. Building on this foundation, the study constructs a compact Padé-type surrogate with four-significant-figure coefficients that preserves the governing physics and achieves uniform, sub-0.05% deviation from the exact series; the worst case, $= 0.04\%$, is near the upper range; even smaller at full height. The result is a unified, practice-ready evaluator: differentiable for sensitivity, numerically stable across the entire range, and straightforward to implement in design tools and realtime control. Because the theory isolates geometry from losses, discharge coefficients can be appended multiplicatively without contaminating the kernel, preserving the correct ordering between theoretical and actual discharge. A table and error curve benchmark the Padé law against the exact series, confirming near-reference accuracy with computational economy suitable for design charts, calibration workflows, and embedded applications. This work thus replaces empirical or fitted surrogates, with a shape-exact analytic kernel and a compact Padé evaluator of the theoretical discharge. Multiply the theoretical flowrate relationship by the site-calibrated discharge coefficient C_d to obtain the operational stage-discharge relationship.

Link:

<http://larhyss.net/ojs/index.php/larhyss/article/view/16784>





TITLE:

Social Empowerment And Sustainability For
Women Empowerment And Diversity
Inclusion Equity

AUTHOR :

Banerjee, S.; Srivastava, S.K.; Gaurav, K.;
Gupta, A.A.; Ray, S.

JOURNAL NAME:

MSW Management (vol.-35, Issue-2)

DETAILS:

Published on December 2025



ABSTRACT:

The empowerment of women is well-known as a valuable factor of sustainable development and social equity, but gender imbalances remain strong forces that restrict the women's involvement and empowerment over the long-term horizons in the social, economic, and institutional spheres. This paper examines how social empowerment and sustainability can be used to enhance sustainable women empowerment in the context of diversity, inclusion, and equity (DEI). The aim of the study is to investigate the role of social empowerment, sustainability awareness, diversity and inclusion practices, and equity and institutional support in sustainable empowerment outcomes of women.

The main quantitative research design was adopted as the survey was carried out online among 259 respondents. Data analysis was performed in SPSS and correlation tests and multiple regression were applied to determine correlation between the study variables. The result shows high positive correlations of all independent variables and sustainable results of women empowerment. The result of the regression analyses suggests that the practices that predict sustainable women empowerment relate most to equity and institutional support and diversity and inclusion, whereas the social empowerment and sustainability awareness practices are less predictive as independent variables. The paper explains the significance of coordinated, equity-based, and inclusive approaches to the realization of long-term women empowerment. The implications of the findings are significant to the policy makers, organisations, and development practitioners because it implies that the empowerment programs must be institutionalised to achieve sustainability and long-term effectiveness.

Link:

<https://mswmanagementj.com/index.php/home/article/view/499>



TITLE:

Performance Evaluation and MLP Prediction
of Flax-and Graphene Oxide-reinforced
Polyester Composites

AUTHOR :

Gupta, R.K.; Langote, V.; Raj, M.S.; Tonk,
A.; Nanthakumar, S.; Emmela, E.; Selvaraju,
S.

JOURNAL NAME:

Journal of Environmental Nanotechnology
(Vol.-14, Issue-4)

DETAILS:

Published on 30 December 2025



ABSTRACT:

This research examines the mechanical properties of composites made from flax fiber and polyester resin. Hybrid composites were produced by integrating flax fiber, known for its exceptional tensile and flexural strengths, with graphene oxide nanoparticles (nGO) and polyester resin. The flexural and ultimate tensile strengths of the composites were predicted using a multilayer perceptron (MLP) regression model, a type of artificial neural network (ANN). The composite material FGO-1, comprising 40 wt.% flax fiber, 1 wt.% graphene oxide nanoparticles, and 59 wt.% polyester resin, exhibited outstanding mechanical properties. The FGO-1 sample showed improvements in flexural modulus (46.80%), flexural strength (50.80%), tensile modulus (32%), and tensile strength (37.83%). The energy absorption rate was 32.69%, and its impact resistance exceeded that of the other composite formulations by 8.75%. The ANN model successfully predicted these strengths, achieving R² values of 0.89 and 0.98 for flexural and tensile strengths, respectively. Microstructural analysis using a scanning electron microscope (SEM) was conducted alongside tensile, flexural, impact, and interlaminar shear strength tests to evaluate the composite's performance.

Link: <https://doi.org/10.13074/jent.2025.12.2531662>



TITLE:

Legal Governance of Participatory Notes and Foreign Institutional Investments in India: Implications for Sustainable Capital Markets

AUTHOR :

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

JOURNAL NAME:

Legal Frameworks for Sustainable Global Business

DETAILS:

Published on January 2026



ABSTRACT:

Foreign Institutional Investors (FIIs) play a pivotal role in emerging capital markets, particularly in India, where their investment decisions significantly influence market liquidity and sentiment. One of the most debated vehicles through which FIIs operate is the Participatory Note (P-Note), an offshore derivative instrument that enables indirect access to Indian securities. This chapter critically examines the evolving legal and regulatory frameworks governing FII investments through P-Notes, with a focus on India's efforts to balance financial openness with market integrity, investor protection, and regulatory compliance. The chapter provides a nuanced understanding of how regulatory bodies such as the Securities and Exchange Board of India (SEBI) and the Reserve Bank of India (RBI) have responded to challenges such as tax avoidance, money laundering, and market manipulation. In doing so, it highlights the practical successes and limitations of current interventions and explores the tension between investor anonymity and systemic transparency. In alignment with the broader objective of fostering sustainable global business, this study reflects on the role of legal governance in enhancing trust, promoting ethical capital flows, and safeguarding long-term market stability. The chapter also proposes evidence-based policy recommendations for improving oversight and accountability in line with global best practices. It contributes to interdisciplinary discourse by connecting capital market regulation with broader goals of financial sustainability, responsible governance, and international legal harmonization.

Link: <https://doi.org/10.4018/979-8-3373-4192-7.ch004>





TITLE:

Mechanism of environmental toxicity of emerging contaminants

AUTHOR :

Patil, Y.; Gade, S.; Bhanage, B.

JOURNAL NAME:

Advances in Treatment Methods Towards Emerging Contaminants: Sources, Occurrences and Health Effects

DETAILS:

Published on January 2026



ABSTRACT:

Contaminants of emerging concern (CECs) exert a profound and enduring impact on the biological systems within the environment. Over the past 50 years, various emerging contaminants have been linked to damage at both community and species levels. In animals, chemical-induced inflammatory responses and oxidative stress have the capacity to disrupt or hyperstimulate immune systems. CECs have been observed to penetrate cell membranes, leading to the leakage of intracellular components. In terrestrial organisms, these substances contribute to reproductive toxicity and a decline in populations of aquatic, avian, and terrestrial species. Evidence of oncogenicity in both animals and humans has been documented, particularly concerning liver, pancreatic, and lung cancers. Additionally, neurotoxicity and developmental toxicity in humans and animals, along with disruptions to endocrine systems, are widely recognized. Significant levels of antibiotics have also been detected in various water sources, which may be sufficient to promote resistance in microbial species, including waterborne pathogens that can infect humans and animals. The presence of microplastics within the human body has been acknowledged, with microparticulates found in the placenta, male reproductive system, blood, and breast milk. This chapter examines the mechanisms of ecotoxicity associated with the various contaminants classified as CECs.

Link: <https://doi.org/10.1016/B978-0-443-34270-7.00025-0>



TITLE:

SCF complex: Master regulator of metabolic adaptations in cancer cells

AUTHOR :

Nagaraju, N.; Bhatt, S.; Dudhe, P.B.;
Gambhire, M.S.

JOURNAL NAME:

Emerging Strategies in Cancer Metabolism:
Role of Gut Microbiota, Reactive Oxygen
Species, and Short Chain Fatty Acids

DETAILS:

Published on January 2026



ABSTRACT:

Short-chain fatty acids (SCFAs), mainly acetate, propionate, and butyrate, are generated through fermentation of dietary fibers by gut microbiota. SCFAs are crucial in the management of cancer due to their roles in metabolic and signaling pathways. They exhibit anticancer effects by influencing immune regulation, inflammation, and cellular metabolism. In cancer, SCFAs can suppress tumor growth and metastasis by impacting essential cellular processes of cell cycle, autophagy, and cancer-related signaling pathways. Data show that SCFAs can modify metabolic profiles of cancer cells, increasing production of reactive oxygen species (ROS) and affecting pathways linked to fatty acid and glucose metabolism. This metabolic reprogramming is vital for maintaining energy balance and growth of cancer cells, which often depend on altered fatty acid metabolism to support their rapid proliferation. Moreover, SCFAs have been found to boost the effectiveness of conventional anticancer therapies, indicating a synergistic effect when used in combination with chemotherapeutic agents. The therapeutic potential of SCFAs extends beyond their direct anticancer properties to their ability to reshape gut microbiome, further influencing cancer progression and treatment responses. By encouraging growth of SCFA-producing bacteria, new strategies for cancer prevention and therapy could be developed. SCFAs offer a promising approach for enhancing cancer management through their diverse roles in metabolic adaptation and immune modulation, underscoring the significance of the gut microbiome in cancer development and treatment efficacy.

Link: <https://doi.org/10.1016/B978-0-443-33459-7.00007-7>



TITLE:

Role of polyoxometalates in Li-ion batteries:
recent advancements

AUTHOR :

Didwal, P.N.

JOURNAL NAME:

Polyoxometalate-Based Materials and
Applications

DETAILS:

Published on January 2026



ABSTRACT:

Although fossil fuels and nuclear energy have demanded energy in the past decades, such energy sources can diminish the threat of global warming, climate change, and pollution. Lithium-ion batteries (LIBs) are among the best options for developing high energy storage systems. As is known, the development of cathode and anode brings excellent hope for high energy density LIBs. Nowadays, lithium metal oxide (LiCoO₂, LiMnO₂, LiNiO₂, etc.) cathode and graphitic carbon anode are the most famous in the battery market. Polyoxometalates (POMs) based materials have received different attention in energy storage systems compared to traditional battery materials. POM-based electrodes (anionic molecular metal oxides with valent transition metals, e.g., V, Nb, W, Ta, Mo, etc.) have open frameworks and independent structural units and overcome the general insertion-type electrode materials. Including structure's versatility, POMs possess high molecular weight, nontoxic, nonvolatile properties, good thermal stabilities, soluble in organic solvents, and superior redox properties. Although POMs overcome the limited single electron exchange properties of insertion-type materials or conversion materials with compact ligand linkage, their electronic conductivity is low, and their anion can dissolve in the electrolyte. Therefore POMs coordinate with conductive materials to modify the electronic structure for significant battery performance. The chemical modification of POMs exhibits better electrical conductivity and a large specific surface area. However, considering the need for time, research on POM-based electrode materials still requires significant effort to produce advanced and highly stable electrode materials for high energy and long-life LIBs. Therefore the detailed analysis of the POM-based materials is crucial to understanding and controlling their electrochemical properties and expanding the applicable range of materials for energy storage applications.

Link: <https://doi.org/10.1016/B978-0-443-15686-1.00015-6>





TITLE:

Developments in categorizing and handling emerging contaminants in ecosystem: Toxicity assessment, analytical approaches, revolutionary pathways, environmental fate, and remedy

AUTHOR :

Gade, S.; Patil, Y.; Bhanage, B.

JOURNAL NAME:

Advances in Treatment Methods Towards Emerging Contaminants: Sources, Occurrences and Health Effects

DETAILS:

Published on January 2026



ABSTRACT:

A multitude of papers on various facets of emerging toxins have been published in the past couple of decades, covering their occurrence in the environment to their treatment, and their ecological impacts. “Emerging contaminants” (ECs) have just been thoroughly studied in the past 20 years, which includes both naturally occurring and man-made substances such as medications and their metabolites, including drugs prone to abuse, personal care items, nanomaterials, and antibiotic-resistant genes via resistant microbes. The rapid development of highly sensitive and effective analytical tools has led to an increase in our understanding of ECs by allowing the detection and measurement of unknown contaminants in complex environmental matrices, engineered nanomaterials, and antibiotic resistance genes. This chapter is focused on progress in categorizing and handling ECs in the ecosystem. The discussion includes toxicity assessment, analytical approaches, a note on environmental fate, and remediation approaches to mitigate the risk of ECs. Remediation is a major topic of research and regulation, and while conventional approaches tend to fail the requirements of pollution remediation, a slew of sophisticated methods are being evaluated and adopted, many involving oxidative removal of compounds, while algal bioreactors are being embraced as cheap and effective methods of remediation.

Link: <https://doi.org/10.1016/B978-0-443-34270-7.00011-0>



TITLE:

Comparative Assessment of Selected
Straight Conical Diffuser Models for Small
Wind Turbine

AUTHOR :

Mahajan, M.R.; Nikhade, S.D.; Kale, S.A.

JOURNAL NAME:

Journal of Engineering Science and
Technology Review (Vol.-18, Issue-6)

DETAILS:

Published on January 2026



ABSTRACT:

Increasing the wind velocity at a wind turbine rotor by covering with a diffuser is an important topic in small wind turbines research. Various shapes and parametric studies have been reported by researchers. Still, the basic diverging diffuser is widely considered as an important shape. Considerably different results were reported by researchers during computational fluid dynamics (CFD) and experimental studies at different dimensions, working conditions and solving models making it difficult to identify the optimal diffuser model. Hence, this research work presents computational research on nine selected conical diffusers from previous studies, under the same velocity and computational conditions. Two dimensional CFD analyses of these diffuser models without wind turbine rotor are carried out using ANSYS Fluent 2022 to compare the geometric effects on flow acceleration. The inlet diameter (D) is fixed for all diffuser models during CFD analysis. Length ($0.23D$ to $1.5D$) and flange height (0 to $0.5D$) are scaled accordingly. The expansion angle varies from 2.12 to 40 degrees. The results are also validated with the literature results. Furthermore, four different Multi-Criteria Decision Making (MCDM) methods include the Analytic Hierarchy Process (AHP), the recently developed simple and novel R Method, the Simple Additive Weighting (SAW) and the Weighted Product Method (WPM) are used to compare the diffuser models. A good agreement is observed among the results of these MCDM methods.

Link:

<https://www.scopus.com/pages/publications/105027035629>



TITLE:

Fabrication methods of BiOX as a highly efficient photocatalyst

AUTHOR :

Bhagwat, S.B.; Kulkarni, D.; Jaspal, D.

JOURNAL NAME:

BiOX-based Photocatalysts for Dual Applications: Water Treatment and Energy Storage

DETAILS:

Published on January 2026



ABSTRACT:

Globally, water pollution is a serious problem due to an increase in industrialization and urbanization. Water gets contaminated by various hazardous materials such as organic dyes, pharmaceuticals, and pesticides, which are highly toxic to human health. Therefore, the development of sustainable methods and technologies is essential for the removal of these contaminants from water. Various methods have been applied in the exclusion of these contaminants such as ultrafiltration, adsorption, coagulation, etc., which lead to secondary pollution. Semiconductor photocatalysis is considered a green method for the treatment of wastewater as it converts various organic pollutants into harmless compounds such as CO₂ and H₂O. Compared to conventional photocatalysts such as titanium dioxide and zinc oxide, bismuth oxyhalides (BiOX) are highly efficient due to their promising features such as visible light absorption ability, layered structure, and many other advantages. Various fabrication methods of BiOX including thermal processes (hydro and solvo), hydrolysis, precipitation, synthesis assisted by ultrasonic or microwave, etc., have been extensively discussed. Various approaches for the enhancement of BiOX photocatalytic activity such as elemental doping, facet control, heterojunction, and Bi (bismuth)-rich strategy have been summarized. New developments in the production of BiOX with special emphasis on green methods for synthesis have been covered. Challenges in the manufacturing of BiOX-based photocatalysts have been summarized.

Link: <https://doi.org/10.1016/B978-0-443-23861-1.00009-2>



TITLE:

Intraheterostructure BiOX nanophotocatalyst

AUTHOR :

Kadam, P.; Kadam, P.; Kadam, S.; Gujar, J.G.; Gadekar-Shinde, S.; Sonawane, S.S.

JOURNAL NAME:

BiOX-based Photocatalysts for Dual Applications: Water Treatment and Energy Storage

DETAILS:

Published on January 2026



ABSTRACT:

Our society's most recent significant undertakings have been energy and environmental challenges. As a green technique, photocatalysis has been identified as a promising solution for the above problems. This chapter gives an outline of the applications of BiOX (X = Cl, Br, and I) in photocatalysis. BiOX having a ternary structure (V–VI–VII) semiconducting materials attracted the attention due to their tunable band gaps, wide light absorption range, low recombination rate, optical properties, as well as relaxed layered nanostructures. To improve the performance of BiOX materials, the design of heterostructure is an effective way. In this chapter, we summarize some synthetic methods of BiOX semiconductors focusing on highly active BiOX visible-light-driven photocatalysts. This chapter may lead to a feasible, green, and efficient BiOX nanophotocatalyst. In recent years, there has been a lot of interest in strategies that combine high throughput (HT) with machine learning (ML) to speed up the identification of potential novel materials. Recent advances in photocatalysis combined with machine learning approaches promise to expedite photocatalyst discovery, but there are considerable difficulties in the future.

Link: <https://doi.org/10.1016/B978-0-443-23861-1.00015-8>



TITLE:

‘One Nation One Subscription’: Questions about its generalizability-What it portends for the Traditional Health Care system in the country?

AUTHOR :

Rastogi, S.; Hankey, A.

JOURNAL NAME:

Annals of Ayurvedic Medicine (Vol.-14, Issue-1)

DETAILS:

Published on February 2025



ABSTRACT:

The One Nation One Subscription (ONOS) is a visionary initiative of the Govt of India aiming to provide access to scholarly research e-journals from prominent publishers covering the disciplines of STEM (Science, Technology, Engineering, and Mathematics), medical, management, social sciences and humanities, to all eligible individuals in the country.

Link: <https://aamjournal.in/?mno=235171>



TITLE:

Applications of liquid biopsy in translational oncology

AUTHOR :

Ingawale, R.; Chand, S.; Pradhan, R.;
Kushwaha, M.; Singh, R.

JOURNAL NAME:

Liquid biopsy in Cancer Management:
Integrating Diagnostics and Clinical
Applications

DETAILS:

Published on January 2026



ABSTRACT:

Liquid biopsy has emerged as a transformative technique in the field of oncology, enabling noninvasive analysis of biomarkers from bodily fluids to enhance cancer diagnosis and monitoring. This chapter provides a comprehensive overview of liquid biopsies, tracing their historical development and evolution into a vital diagnostic tool. We discuss various biomatrices utilized in liquid biopsies, such as blood, urine, and saliva, and outline the processes involved in sample collection and analysis. Key diagnostic platforms employed for liquid biopsy evaluation are highlighted, alongside the major components and molecular biomarkers pertinent to cancer detection and management. The significance of liquid biopsy in translational oncology is emphasized, showcasing its potential to improve patient outcomes through personalized treatment approaches. Furthermore, we elaborate about clinical applications of liquid biopsy techniques in various solid tumors, underscoring their role in early detection, treatment response monitoring, and disease recurrence assessment. Finally, we explore future directions for research and development in this dynamic field, concluding with insights into the ongoing evolution of liquid biopsy technologies and their implications for oncology.

Link: <https://doi.org/10.1016/B978-0-443-27496-1.00014-2>



TITLE:

Liquid biopsy in Cancer Management

AUTHOR :

Bhatt, S.; Anitha, K.; Chenchula, S.; Mishra, N.(Book editor)

JOURNAL NAME:

Liquid biopsy in Cancer Management:
Integrating Diagnostics and Clinical
Applications

DETAILS:

Published on 2025



ABSTRACT:

Liquid biopsy in Cancer Management: Integrating Diagnostics and Clinical Applications provides a comprehensive overview of liquid biopsy, covering its fundamental principles, technological advancements, clinical applications, and future prospects. In 16 chapters, the book focuses both on the practical implications of liquid biopsy in cancer management, and on its role in early detection, treatment monitoring, and personalized therapy. It emphasizes the integration of liquid biopsy into both diagnostic practices and therapeutic strategies, highlighting its potential to transform cancer care. The book discusses the latest research findings and explores future directions in liquid biopsy research, providing readers with a forward-looking view of the field.

It includes case studies and examples to illustrate the clinical utility of liquid biopsy and enhance understanding of its applications. Overall, the book aims to be a comprehensive and authoritative resource on the subject, providing readers with a thorough understanding of the current state and future directions of liquid biopsy in cancer management.

Link: <https://www.sciencedirect.com/book/edited-volume/9780443274961/liquid-biopsy-in-cancer-management>



TITLE:

Liquid biopsy in prostate cancer

AUTHOR :

Patil, Y.; Inamdar, N.; Mulye, N.

JOURNAL NAME:

Liquid biopsy in Cancer Management:
Integrating Diagnostics and Clinical
Applications

DETAILS:

Published on January 2026



ABSTRACT:

Conventional investigative approaches for prostate cancer (PC) include serum tests for prostate-specific antigen (PSA) and ultrasound-guided tissue biopsy, which fall short of the clinical expectations of unambiguous diagnosis and are poorly compliant with many patients. PSA-based clinical diagnoses are frequently attributed to “overtreatment” as PC are frequently nonaggressive and rarely develop into metastasis or mortality. As prostate enlargement confounds the interpretation of PSA as a biomarker for PC, an unmet need has emerged for sophisticated, less invasive, and more reliable diagnostics. To this end, liquid biopsy is rapidly proving to be a powerful platform for probing blood as a vehicle for PC-specific markers which include circulating tumor cells (CTCs), cell-free DNA (cfDNA), circulating tumor DNA (ctDNA), RNA derived from platelets, and exosomes. The unique advantage of liquid biopsy is the rapidity of the evaluation, in combination with the relative ease of testing. CTCs, cf/ctDNA, and platelet/exosome transcriptomics offer unambiguous metrics of disease burden, which not only improve patient outcomes due to improved surveillance but also provide insights into oncological developments such as tumor heterogeneity, mutational changes, and drug resistance, all of which allow implementation of personalized medicine. With several diagnostic companies now offering liquid biopsy evaluations for PC, a paradigm shift is on the horizon for timely diagnosis of PC, its surveillance, and a perception change of the disease, which has lower mortality to begin with. The chapter aims to provide a comprehensive review of PC and the role of liquid biopsy with the various markers of the disease. A molecular examination of the disease process and nucleic acid metabolism is presented for an in-depth review into the nature of biomarkers in the liquid biopsy platform.

Link: <https://doi.org/10.1016/B978-0-443-27496-1.00012-9>



TITLE:

Introduction to liquid biopsy

AUTHOR :

Tiwary, N.K.; Nilkari, A.P.; Kulkarni, M.S.;
Pathak, G.; Bhatt, S.

JOURNAL NAME:

Liquid biopsy in Cancer Management:
Integrating Diagnostics and Clinical
Applications

DETAILS:

Published on January 2026



ABSTRACT:

Cancer is a worldwide pandemic. Despite significant research in the field of cancer diagnosis and treatment, the cure of the disease is still a great challenge. It affects a person's quality of life to a great extent. It also has emotional and financial burden on the patients and their families. Despite being the second leading cause of mortality worldwide, many cancers are generally not diagnosed in the early stage due to a lack of symptoms and good detection tools. Liquid biopsy is a diagnostic test done on body fluids, blood, urine, or saliva to look for cancer cells from any tumor in the body. It also identifies pieces of DNA, RNA, or other small molecules released from tumor cells into the patient's body fluids. Early detection of cancer can be done by using this technique with good sensitivity. Since it allows multiple samples to be taken over time, it is helpful to identify the detrimental changes occurring during the disease. This technique is useful to detect the early stages of various cancer types as well as helpful in identifying the effectiveness of treatment. It is a noninvasive technique, which is more acceptable to the patients as compared to the conventional biopsy technique. This technique more effectively showed the mutation in genes, which is difficult to observe in a small tissue sample taken for the conventional biopsy technique. This technique requires a very less quantity of sample to be analyzed. Liquid biopsy can also be recommended when cancer is metastatic and not responding to treatment. The metastatic cancer can spread in different parts of the body including body fluids and blood. This chapter gives a preliminary idea of the liquid biopsy technique.

Link: <https://doi.org/10.1016/B978-0-443-27496-1.00013-0>



TITLE:

Recent approaches in point-of-care-tests (POCTs) for fungal pathogens

AUTHOR :

Burade, D.K.; Pandit, L.K.; Varma, S.;
Pawar, A.T.; Shinde, M.D.; Amalnerkar, D.;
Chaudhari, B.P.

JOURNAL NAME:

Nanotechnology Applications for the
Diagnosis and Therapeutic Treatment of
Fungal Diseases

DETAILS:

Published on January 2026



ABSTRACT:

The global prevalence of fungal infections represents a considerable public health concern, particularly for immunocompromised individuals. The increasing utilization of broad-spectrum immunosuppressive agents has resulted in a significant increase in fungal infection, accompanied by the emergence of drug-resistant strains. Conventional fungal infection identification based on direct microscopic examination, culture, and histopathology of infected tissue exhibits consequences; a late diagnosis takes longer to treat. Addressing the limitation of the traditional identification method, this chapter reviews the application of point-of-care-test (POCT) for fungal infection diagnosis. Also, it summarizes recent advancements in POCT technologies, highlighting both proven and commercially available diagnostic systems. The practical requirements of POCT and devices include rapid processing, portability, sensitivity, selectivity, and operational simplicity. The World Health Organization's ASSURED guidelines, which are further developed to REASSURED offer a useful framework for developing POCT diagnostic tools. POCT systems, which facilitate rapid and accurate fungal pathogen detection, are classified according to their detection methods, utilizing diverse readout strategies such as lateral flow assays, microfluidic platforms, molecular diagnostics, and artificial intelligence-assisted analysis. This chapter further analyzes the emerging POCT technologies, including point-of-care ultrasound, clustered regularly interspaced short palindromic repeats (CRISPR) based fungal pathogen identification, and microfluidic systems. Furthermore, the chapter addresses an analysis of future optimization strategies for POCT methodologies, which will significantly improve diagnostics, leading to the development of a more robust and adaptable healthcare system.

Link: <https://doi.org/10.1016/B978-0-443-29273-6.00006-0>





TITLE:

A Comprehensive Review of KPI That Affects Time Optimization in Residential Construction Project

AUTHOR :

Sonawane, M.B.; Thakare, A.S.

JOURNAL NAME:

CISSC 2025 - Proceedings of the International Conference on Challenges and Innovations for Smart and Sustainable Cities 2025

DETAILS:

Published on November 2025



ABSTRACT:

The establishment of effective key performance indicators (KPIs) is crucial for optimizing time management in construction projects, particularly in the residential sector. This review synthesizes existing literature on KPIs, emphasizing their role as essential metrics that enable project managers to assess and enhance performance across dimensions such as time efficiency, cost control, and quality assurance. By focusing on specific KPIs like schedule adherence, milestone achievement, and client satisfaction, construction managers can gain insights into project progress, identify delays, and implement corrective actions. Additionally, integrating methodologies such as the analytic hierarchy process (AHP) and Delphi techniques refines the selection and prioritization of KPIs, ensuring alignment with project objectives and stakeholder needs. The proposed framework for KPI development offers a systematic approach to measuring and improving time efficiency, highlighting the importance of stakeholder engagement and the use of both quantitative and qualitative data for comprehensive performance assessment. To fully leverage this framework, further research is needed to validate the proposed KPIs and explore their applicability across diverse construction contexts, enhancing their relevance and effectiveness in mitigating delays and improving project outcomes.

Link: <https://doi.org/10.1061/9780784486481.006>





TITLE:

Recurrent Neural Networks for Predictive Modeling in Cancer Time Series Data

AUTHOR :

Burungale, M.; Bhosale, S.J.; Gudur, R.;
Mantri, S.

JOURNAL NAME:

AI-driven Innovations in Physiotherapy and
Oncology 2

DETAILS:

Published on 8 November 2025



ABSTRACT:

There has been a considerable emphasis on applying recurrent neural networks (RNNs) in predictive modeling within the medical field, particularly for cancer treatment. This chapter analyzes the application of RNN architectures, specifically long short-term memory and gated recurrent units, for cancer monitoring over time series data. It discusses the clinical workflows involving model implementation, which include data cleansing, feature extraction, validation and even automation. The chapter presents a systematic review of the methods used within the literature to document, alongside the datasets and benchmarks to discover some emerging trends, gaps and best practices that are available. The application of deep learning to high-dimensional data has led to groundbreaking advancements in diagnostic imaging, genomic medicine and clinical decision support, greatly transforming healthcare. The estimation of survival probabilities in oncology has been estimated by using statistical models such as the Cox proportional hazards model..

Link: <https://doi.org/10.1002/9781394423552.ch13>



TITLE:

International Regulatory Authorities for
Medical Devices

AUTHOR :

Tawade, A.; Pradhan, S.; Jaiswal, V.;
Kuchekar, A.; Gawade, A.

JOURNAL NAME:

Pharmaceutical Regulatory Affairs:
Principles and Practices

DETAILS:

Published on November 2025



ABSTRACT:

A complex web of regulatory bodies, each with its structure and criteria to guarantee the efficacy and safety of medical devices, oversees the worldwide medical device sector. The US Food and Drug Administration (FDA), the European Medicines Agency (EMA), and other significant organizations in Asia, Africa, and Latin America are just a few of the important international regulatory authorities whose functions and responsibilities are examined in this chapter. We explore these agencies' historical development and the regulatory paths they provide for market approval. The International Medical Device Regulators Forum (IMDRF) and the Global Harmonization Task Force (GHTF) are two organizations that lead harmonization efforts. This chapter illustrates the difficulties faced by manufacturers in traversing multiple regulatory frameworks. Additionally, special attention is given to the impact of technological advancements, such as digital health and artificial intelligence, on regulatory practices and the need for adaptive and forward-looking regulatory strategies. By providing a comprehensive overview of the international regulatory landscape for medical devices, the chapter aims to inform industry professionals, policymakers, and academics about the complexities and dynamics of medical device regulation in an increasingly interconnected world. Ultimately, it underscores the importance of international collaboration and harmonization in fostering innovation while ensuring the highest standards of patient safety and public health.

Link: <https://doi.org/10.1201/9781003570981-15>





TITLE:

Understanding the Scale-Up and Post-Approval Changes (SUPAC) Guidelines

AUTHOR :

Jaiswal, V.; Tawade, A.; Gawade, A.;
Kuchekar, A.

JOURNAL NAME:

Pharmaceutical Regulatory Affairs:
Principles and Practices

DETAILS:

Published on November 2025



ABSTRACT:

The Scale-Up and Post-Approval Changes (SUPAC) guidelines are a set of regulatory frameworks established by the US Food and Drug Administration (FDA) to facilitate the scale-up of pharmaceutical manufacturing processes and to manage post-approval changes in drug formulations and production. These guidelines aim to ensure that any modifications made to drug products do not adversely affect their safety, efficacy, or quality. This document provides an overview of the key aspects of SUPAC, including the rationale behind the guidelines, the types of changes covered, and the methodologies for assessing the impact of such changes. It also discusses the implications of SUPAC for pharmaceutical development, regulatory compliance, and industry best practices.

Link: <https://doi.org/10.1201/9781003570981-5>



TITLE:

An improved multivariate manufacturing process monitoring framework for individual and subgroup of observations using one-class classifier support vector machines

AUTHOR :

Maji, A.; Mukherjee, I.; Manatkar, R.

JOURNAL NAME:

Annals of Operations Research

DETAILS:

Published on 29 December 2025



ABSTRACT:

This study proposes an improved distribution-free multivariate process monitoring framework that uses radial kernel one-class classifier support vector machines (OCC-SVM) to simultaneously monitor 'location' and 'scale' parameters in a single chart statistic. The proposed unique integrated framework is suitable for monitoring varied sampling scenarios (e.g., individual and rational subgroup of observations). Thus, the work addresses a critical gap in the existing literature, emphasising separate approaches for different sampling scenarios. A novel unsupervised bi-objective heuristic is proposed for near-optimal hyperparameter selection of the OCC-SVM chart, addressing the interaction between kernel bandwidth and penalty factor, an area previously not considered. In the OCC-SVM chart, another challenge is the occurrence of rank-deficient 'scale' monitoring matrices when the subgroup size is smaller than the number of quality characteristics. This study addresses this issue by integrating the l_1 -norm graphical lasso ('glasso') estimator with an optimal shrinkage parameter, ensuring a well-conditioned (full-rank) matrix for precise 'scale' monitoring. Monte-Carlo simulations with various multivariate distributions and real-life case studies validate the effectiveness and robustness of the proposed integrated process monitoring framework compared to existing charts.

Link: <https://doi.org/10.1007/s10479-025-06991-0>



TITLE:

Antibacterial Activity of Plasma Electrolytic Oxidation Coated Ti6Al7Nb for Biomedical Applications

AUTHOR :

Pesode, P.; Barve, S.

JOURNAL NAME:

Biomedical Materials and Devices

DETAILS:

Published on 28 December 2025



ABSTRACT:

This study investigates antibacterial behaviour of plasma electrolytic oxidation (PEO) coated Ti-6Al-7Nb for biomedical applications. Antibacterial coating is developed on Ti6Al7Nb by plasma electrolytic oxidation (PEO) technique. sodium metasilicate (Na_2SiO_3), sodium phosphate dodecahydrate ($\text{Na}_3\text{PO}_4 \cdot 12 \text{H}_2\text{O}$) were used as an electrolyte. Silver nano particles are used for antibacterial property. To determine how varying percentages of silver nanoparticles affect their antibacterial properties, three different percentages 0.5, 1.0, and 1.5% are used. The size of the zone of inhibition approach was used to measure the antibacterial property of coated Ti6Al7Nb titanium alloy. The coated surfaces were characterized using FESEM and EDS techniques. Phases analysis was done with XRD technique. Corrosion resistance of coating is checked by EIS technique. The incorporation of AgNPs enhances antibacterial efficacy against *S. aureus* and *E. coli*, with the highest inhibition zones (17.33 mm, 17.5 mm) at 1.5 g/L AgNP concentration. Also, it was observed that with increase in silver nanoparticles percentage there are improvement in hardness and corrosion resistance of PEO coated Ti6Al7Nb. These findings show that PEO-coated Ti-6Al-7Nb is a good option for biomedical applications as it shows enhanced hardness, corrosion resistance, and antibacterial activity.

Link: <https://doi.org/10.1007/s44174-025-00630-9>





TITLE:

Dementia Care System: Python-Based Voice Alarms and Prompts, Geo-Fencing

AUTHOR :

Bhadale, A.; Joshi, Y.; Tawade, S.; Kulkarni, S.

JOURNAL NAME:

2025 International Conference on Information, Implementation, and Innovation in Technology, I2ITCON 2025

DETAILS:

Published on 4 November 2025



ABSTRACT:

Remembering daily tasks can be challenging for many people, but this issue is often managed using task managers and alarms. However, individuals suffering from dementia require special care and attention to adhere to their routines. Traditional alarm systems often have low effectiveness for dementia patients. This project addresses the challenges dementia patients face in following daily routines and aims to reduce the stress experienced by caregivers. The software solution incorporates features such as persistent voice recognition alarms, GPS-based location tracking, geo-fencing, voice integration, and machine learning. The voice-activated alarm system will continuously prompt the patient until a response is received, ensuring task completion and notifying the caregiver. By offering personalized scheduling and voiceactivated alerts for important appointments, reminders, and chores, the system serves as a helpful tool for caregivers. In addition to reducing caregiver burden, this solution empowers patients, helping them feel more confident and independent.

Link: <https://doi.org/10.1109/I2ITCON65200.2025.11210616>





TITLE:

Self-Learning Adaptive Hearing Aid Filter
Using Q-Learning

AUTHOR :

Rawandale, U.S.; Kotkar, S.; Middha, S.

JOURNAL NAME:

2025 International Conference on
Information, Implementation, and Innovation
in Technology, I2ITCON 2025

DETAILS:

Published on 4 November 2025



ABSTRACT:

This research presents a novel adaptive filter selection framework for hearing aid systems using a lightweight, model-free reinforcement learning algorithm — Q-learning. Unlike traditional fixed-band filtering, the proposed system uses real-time audio features — Signal-to-Noise Ratio (SNR), Zero Crossing Rate (ZCR), and Spectral Centroid — to classify the acoustic environment into discrete states. The Q-learning agent dynamically selects from a predefined set of bandpass filter and gain actions, learning over time to maximize speech enhancement quality based on PESQ (Perceptual Evaluation of Speech Quality) and STOI (Short-Time Objective Intelligibility) metrics. Trained on the NOIZEUS dataset, which includes ten realworld noise types, the agent demonstrated robust adaptability, outperforming traditional filtering methods. This system is lightweight, interpretable, and suitable for real-time deployment in hearing aids, unlike black-box deep reinforcement learning models that require large computational resources. The proposed method bridges classical signal processing and intelligent adaptive control, offering a practical solution for hearingimpaired users in dynamically noisy environments.

Link:

<https://doi.org/10.1109/I2ITCON65200.2025.11210507>



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