SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Transactions on Neural Networks and Learning Systems **IF: 8.9**

Title: Distill to Delete: Unlearning in Graph Networks With Knowledge Distillation

Author: Sinha, Y.; Mandal, M.; Kankanhalli, M.

Details: October 2025

Abstract: Graph unlearning has emerged as a pivotal method to delete information from an already trained graph neural network (GNN). One may delete nodes, a class of nodes, edges, or a class of edges. An unlearning method enables the GNN model to comply with data protection regulations (i.e., the right to be forgotten), adapt to evolving data distributions, and reduce the GPU-hours carbon footprint by avoiding repetitive retraining. Removing spe cific graph elements from graph data is challenging due to the inherent intricate relationships and neighborhood dependencies. Existing partitioning and aggregation-based methods have limitations due to their poor handling of local graph dependencies and additional overhead costs. Our work takes a novel approach to address these challenges in graph unlearning through knowledge distillation, as it distills to delete in GNN (D2DGN). It is an efficient model-agnostic distillation framework where the complete graph knowledge is divided and marked for retention and deletion. It performs distillation with response-based soft targets and feature-based node embedding while minimizing KL-divergence. The unlearned model effectively removes the influence of the deleted graph elements while preserving knowledge about the retained graph elements. D2DGN surpasses the performance of existing methods when evaluated on various real-world graph datasets by up to 43.1% (AUC) in edge and node unlearning tasks. Other notable advantages include better efficiency, better performance in removing target elements, preservation of performance for the retained elements, and zero overhead costs.

URL:
https://www.researchgate.net/publication/396374710_Distill_to_Delete_Unlearning_in_Graph_Networks_With_Knowledge_Distillation

SCHOLARLY PUBLICATIONS
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Journal Name: IEEE Internet of Things Journal **IF: 8.2**

Title: Protecting IoT-Enabled Healthcare Data at the Edge: Integrating Blockchain, AES, and Off-Chain Decentralized Storage

Author: Mohanta B.K.; Awad A.I.; Dehury M.K.; Mohapatra H.; Khan M.K.

Details: 2025

Abstract: Over the past two decades, the rapid growth of the Internet of Things (IoT) has begun to transform traditional healthcare systems into intelligent systems; however, hospitals have encountered challenges in securely storing patient data within centralized architectures due to their lack of efficiency and security features. Blockchain technology offers a secure and reliable decentralized framework for storing and sharing healthcare data among various stakeholders, including patients, doctors, nurses, insurance companies, and pharmaceutical firms. In this paper, we propose a blockchain-based data-protection scheme deployed at edge nodes. The proposed scheme uses the InterPlanetary File System (IPFS) model to address storage and data-protection issues in an IoT-edge-enabled smart health-care system. First, the security issues in smart healthcare systems are identified, and the impact of these issues on patient privacy and hospital infrastructure are considered. Then, a technique based on the 128-bit Advanced Encryption Standard is proposed to encrypt patient information and store it in an IPFS-based decentralized network. Edge-computing techniques are used to perform computations at the edge level within a decentralized architecture, thereby addressing the computational challenges associated with cloud computing. Lastly, the encryption keys are stored using blockchain technology to address the issue of restricted computational power on low-end devices through off-chain and on-chain business processes. The experimental results demonstrate that the proposed scheme achieves a key management time of 0.2 ms, file retrieval time of 0.57 seconds, throughput of 0.11 Mbps, encryption time of 1.96 ms, and decryption time of 1.91 ms. These findings indicate that the proposed scheme outperforms previously reported approaches with respect to key management time, file retrieval efficiency, and its potential for edge deployment and off-chain capabilities.

URL: https://ieeexplore.ieee.org/document/10839037

SCHOLARLY PUBLICATIONS
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Journal Name: Expert Systems with Applications **IF: 7.5**

Title: Integration of EEG-based BCI technology in IoT enabled smart home environment: An in-depth comparative analysis on human-computer interaction techniques

Author: Kumar Gouda S.; Choudhry A.; Satpathy S.P.; Shukla K.M.; Dash A.K.; Pasayat A.K.

Details: Volume 294, December 2025

Abstract: The advent of smart home technology has revolutionized the way individuals communicate with their living spaces, offering efficiency, convenience, and comfort. The integration of brain-computer interface (BCI) technology within smart home environments presents a promising avenue for transforming human-computer interaction (HCI) paradigms. This review paper synthesizes current research findings on optimizing smart home user interfaces through HCI utilizing electroencephalography (EEG)-based BCI technology. EEG-based BCIs offer a novel approach to interface design by directly interpreting users neural signals, thereby enabling seamless interaction with smart home devices. By using EEG signals to figure out what people are thinking and feeling, BCI creates a direct way for people and machines to communicate naturally, without using traditional input methods. The paper examines a few explicit key components such as signal acquisition, feature extraction, feature selection, classification algorithms, and system integration. Furthermore, the review evaluates the effectiveness, challenges, and future prospects of EEG-based BCIs in optimizing HCI within smart home ecosystems. Insights from this review contribute to the understanding of how it can revolutionize user interaction paradigms, leading to more intuitive, efficient, and personalized smart home environments. This work presents a comprehensive study on the proposed topic by consolidating useful information from various sources and exhibiting it in a single paper to provide quality data to the novice researchers to help them in this field of research.

URL: https://www.sciencedirect.com/science/article/pii/S0957417425023486?via%3Dihub

SCHOLARLY PUBLICATIONS
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Journal Name: EPJ Quantum Technology **IF: 5.8**

Title: Key reconciliation protocol for quantum key distribution

Author: Sharma, N; Saxena, V; Chamola, V; Hassija, V

Details: Volume 12, Issue 1, Article no. 21, 2025

Abstract: In quantum cryptography, secret communications are delivered through a quantum channel. One of the most important breakthroughs in quantum cryptography has been the quantum key distribution (QKD). This process enables two distant parties to share secure communications based on physical laws. However, eavesdroppers can still interrupt the communication. To overcome this, we propose a different way to detect the presence of Eve through the polynomial interpolation technique. This technique also allows us for key verification. This approach prevents the receiver as well as the intruder from discovering the sender's fundamental basis. To fully utilize IBM quantum computers' quantum computing capabilities, this paper attempts to show % error against alpha (strength of eavesdropping) and the impact of noise on the success probability of the desired key bits. Furthermore, the success probability under depolarizing noise is explained for different qubit counts. In the enhanced QKD protocol, using polynomial interpolation for reconciliation shows a 50% probability of successful key generation. This is even when the noise is increased to the maximum capacity.

URL: https://epjquantumtechnology.springeropen.com/articles/10.1140/epjqt/s40507-025-00319-4

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Open Journal of the Computer Society **IF: 5.7**

Title: A Detailed Comparative Analysis of Automatic Neural Metrics for Machine Translation: BLEURT & BERTScore

Author: Mukherjee A.; Hassija V.; Chamola V.; Gupta K.K.

Details: Volume 6, Article2025

Abstract: Bleurt a recently introduced metric that employs Bert, a potent pre-trained language model to assess how well candidate translations compare to a reference translation in the context of machine translation outputs. While traditional metrics like Bleu rely on lexical similarities, Bleurt leverages Bert's semantic and syntactic capabilities to provide more robust evaluation through complex text representations. However, studies have shown that Bert, despite its impressive performance in natural language processing tasks can sometimes deviate from human judgment, particularly in specific syntactic and semantic scenarios. Through systematic experimental analysis at the word level, including categorization of errors such as lexical mismatches, untranslated terms, and structural inconsistencies, we investigate how Bleurt handles various translation challenges. Our study addresses three central questions: What are the strengths and weaknesses of Bleurt, how do they align with Bert's known limitations, and how does it compare with the similar automatic neural metric for machine translation, BERTScore? Using manually annotated datasets that emphasize different error types and linguistic phenomena, we find that Bleurt excels at identifying nuanced differences between sentences with high overlap, an area where BERTScore shows limitations. Our systematic experiments, provide insights for their effective application in machine translation evaluation.

URL: https://ieeexplore.ieee.org/document/10964149

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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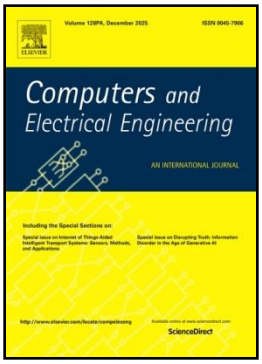
Journal Name: Computers & Electrical Engineering **IF: 4.9**

Title: Secure and anonymous model training using pixel-level encryption for privacy-preserving AI with obfuscation-based representation learning

Author: Razi, Q; Chougule, A; Chalapathi, GSS; Hassija, V

Details: Volume 128, Part B, December 2025

Abstract: We present a novel framework for privacy-preserving model training that embeds pixel-level AES-ECB encryption directly into the deep learning pipeline, enabling computation on encrypted medical images without exposing raw data. To address the challenge of learning from visually obfuscated inputs, we introduce an obfuscation-based representation learning mechanism that extracts task-relevant features while preserving utility. Extensive experiments on COVID-19, Malaria, and Pneumonia classification tasks demonstrate that our method achieves competitive performance, with only (1.7%) accuracy degradation compared to training on unencrypted data. Comprehensive quantitative evaluations, including Structural Similarity Index (SSIM), Peak Signal-to-Noise Ratio (PSNR), Entropy, Histogram Chi-Square Distance, and Number of Pixel Change Rates (NPCR), confirm strong visual obfuscation, ensuring data confidentiality. Our framework integrates seamlessly with existing medical imaging workflows, supporting deployment in hospitals, telemedicine systems, and cross-institutional collaborations, making it a practical solution for privacy-preserving AI in regulated healthcare environments.



URL: https://www.sciencedirect.com/science/article/pii/S0045790625007001

Journal Name: Biomedical Signal Processing and Control **IF: 4.9**

Title: A modified Gray Wolf Optimization algorithm for early detection of Parkinson's Disease

Author: Santhosh K.; Dev P.P.; A. B.J.; Lynton Z.; Das P.; Ghaderpour E.

Details: Volume 109, November 2025, Article number 108061

Abstract: Parkinson's disease (PD) is one of the most common neurodegenerative diseases, causing significant morbidity and mortality worldwide. PD can be diagnosed at an early stage by analyzing patient datasets, such as speech and handwriting samples. In this paper, a modified version of the classical Gray Wolf Optimization (GWO) is proposed with an application to detect early-stage PD through processing such datasets. The new model (MGWO-eP) aims to enhance the algorithm's exploration capability (e) and overcome local optima issues by adjusting a key parameter (P) that controls the search agents' positions. The MGWO-eP is then applied as a feature selection technique to predict PD in its early stages, using samples of speech and writing. The effectiveness of MGWO-eP is validated by benchmark optimization functions for achieving the global optimum. Then six popular machine learning classifiers are applied to three benchmark PD prediction datasets that include hand-writing and speech samples from people with and without PD, namely HandPD Spiral, HandPD Meander, and SpeechPD. The proposed model achieves best overall accuracies of 96.30% (with voting), 94.45% (with random forest), and 98.31% (with voting), outperforming GWO and particle swarm optimization algorithms as they get stuck with local optimal solutions. The results show that the proposed model is robust and can be used for early detection of PD in patients through analyzing datasets, such as their handwriting and speech to help the patients access treatments early in the disease, prolonging time spent with adequate symptom control and delaying years of disability/morbidity.

URL: https://www.sciencedirect.com/science/article/pii/S1746809425005725?via%3Dihub

Journal Name: Computers and Electrical Engineering **IF: 4.9**

Title: Reconstruction resilient privacy-aware dataset distillation using feature distribution matching technique

Author: Razi, Q.; Chalapathi, G.S.S.; Hassija, V.

Details: Volume 129, January 2026

Abstract: Dataset distillation has emerged as a powerful technique for reducing the size of training data while preserving model performance. This offers significant advantages in various domains, particularly in medical imaging, where data annotation is expensive, storage is limited, and computational resources are constrained. In this paper, we propose a novel distillation technique that combines diffusion models with distribution matching to generate distilled data for three medical image datasets, i.e., Pneumonia, COVID-19, and Brain Tumor detection. The diffusion component enables the generation of high-quality and diverse synthetic samples, while distribution matching ensures alignment with the underlying data distribution, thereby preserving discriminative features. We further design an autoencoder-based reconstruction framework to analyze and compare the vulnerability of original, conventional distilled, and our proposed distilled datasets to reconstruction attacks. In addition, we incorporate privacy risk evaluations using membership inference attacks (MIA) and attribute inference attacks (AIA). Experimental results show that our method achieves better classification accuracy and stronger privacy preservation compared to existing distillation approaches. These findings suggest that dataset distillation, particularly with our proposed framework, not only improves computational efficiency but also acts as an effective privacy-enhancing mechanism, making it a promising approach for secure and scalable medical artificial intelligence (AI) applications.

URL: https://www.sciencedirect.com/science/article/pii/S0045790625007657?via%3Dihub

SCHOLARLY PUBLICATIONS
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Journal Name: IEEE Transactions on Computational Social Systems **IF: 4.5**

Title: Privacy Utility Tradeoff Between PETs: Differential Privacy and Synthetic Data

Author: Razi Q.; Datta S.; Hassija V.; Chalapathi G.S.S.; Sikdar B.

Details: Volume 12, Issue 2, Pages 473 – 484, 2025

Abstract: Data privacy is a critical concern in the digital age. This problem has compounded with the evolution and increased adoption of machine learning (ML), which has necessitated balancing the security of sensitive information with model utility. Traditional data privacy techniques, such as differential privacy and anonymization, focus on protecting data at rest and in transit but often fail to maintain high utility for machine learning models due to their impact on data accuracy. In this article, we explore the use of synthetic data as a privacy-preserving method that can effectively balance data privacy and utility. Synthetic data is generated to replicate the statistical properties of the original dataset while obscuring identifying details, offering enhanced privacy guarantees. We evaluate the performance of synthetic data against differentially private and anonymized data in terms of prediction accuracy across various settings—different learning rates, network architectures, and datasets from various domains. Our findings demonstrate that synthetic data maintains higher utility (prediction accuracy) than differentially private and anonymized data. The study underscores the potential of synthetic data as a robust privacy-enhancing technology (PET) capable of preserving both privacy and data utility in machine learning environments.

URL: https://ieeexplore.ieee.org/document/10753017

SCHOLARLY PUBLICATIONS
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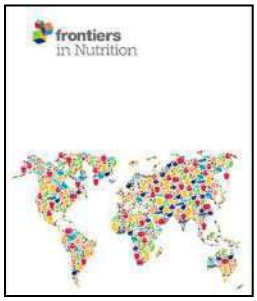
Journal Name: Frontiers in Nutrition **IF: 4.0**

Title: AI-driven transformation in food manufacturing: a pathway to sustainable efficiency and quality assurance

Author: Agrawal K.; Goktas P.; Holtkemper M.; Beecks C.; Kumar N.

Details: Volume 12, 2025, Article number 1553942

Abstract: This study aims to explore the transformative role of Artificial Intelligence (AI) in food manufacturing by optimizing production, reducing waste, and enhancing sustainability. This review follows a literature review approach, synthesizing findings from peer-reviewed studies published between 2019 and 2024. A structured methodology was employed, including database searches and inclusion/exclusion criteria to assess AI applications in food manufacturing. By leveraging predictive analytics, real-time monitoring, and computer vision, AI streamlines workflows, minimizes environmental footprints, and ensures product consistency. The study examines AI-driven solutions for waste reduction through data-driven modeling and circular economy practices, aligning the industry with global sustainability goals. Additionally, it identifies key barriers to AI adoption—including infrastructure limitations, ethical concerns, and economic constraints—and proposes strategies for overcoming them. The findings highlight the necessity of cross-sector collaboration among industry stakeholders, policymakers, and technology developers to fully harness AI's potential in building a resilient and sustainable food manufacturing ecosystem.



URL: https://www.frontiersin.org/journals/nutrition/articles/10.3389/fnut.2025.1553942/full

SCHOLARLY PUBLICATIONS
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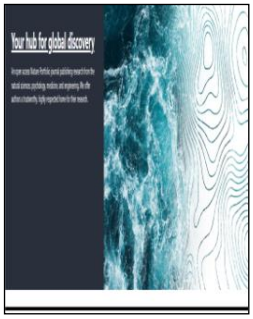
Journal Name: Scientific Reports **IF: 3.9**

Title: TL-PneuNet: a transfer learning-based pneumonia classification framework

Author: Tripathy, B.; Khan, S.; Bebortta, S.; Kamal, A.; Tripathy, S.S.; Fazil, M.; Albarrak, A.M.

Details: Volume 15, Issue 1, December, 2025

Abstract: Pneumonia is a severe respiratory ailment that may be caused by viruses, fungus, and bacteria. Pneumonia causes the accumulation of water, purulent material, or other fluids in the air sacs (alveoli) of the lungs. A delay in the identification of pneumonia may be life-threatening. Nevertheless, the limited radiation levels used for diagnosis result in unreliable detection, posing a significant obstacle in the field of pneumonia detection in healthcare. Transfer Learning (TL) may revolutionize healthcare by offering an effective method for differentiating between normal and pneumonia patients. Therefore, we have proposed a TL utilizing model for predicting pneumonia. Our experiment uses 5856 highly imbalanced chest X-ray images to fit different vision models such as Xception, VGG16, and ResNet152V2 using TL approach. After training, our model performs exceptionally well on the X-ray dataset, achieving an accuracy of 80.45, 80.77, and 83.17% respectively. However, the results show that the ResNet152V2 performs exceptionally well as compared to other models. Also, it achieves a precision and recall score of 79.87 and 97.69% respectively. The results exemplify the potential of our framework to help pulmonologists and physicians make rapid diagnoses of pneumonia patients by providing accurate and fast pneumonia classification.



URL: https://www.nature.com/articles/s41598-025-24180-8

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Scientific Reports **IF: 3.8**

Title: An intelligent framework for skin cancer detection and classification using fusion of Squeeze-Excitation-DenseNet with Metaheuristic-driven ensemble deep learning models

Author: Dorathi Jayaseeli J.D.; Briskilal J.; Fancy C.; Vaitheeshwaran V.; Patibandla R.S.M.L.; Syed K.; Swain A.K.

Details: Volume 15, Issue 1, December 2025

Abstract: Skin cancer is the most dominant and critical method of cancer, which arises all over the world. Its damaging effects can range from disfigurement to major medical expenditures and even death if not analyzed and preserved timely. Conventional models of skin cancer recognition require a complete physical examination by a specialist, which is time-wasting in a few cases. Computer-aided medicinal analytical methods have gained massive popularity due to their efficiency and effectiveness. This model can assist dermatologists in the initial recognition of skin cancer, which is significant for early diagnosis. An automatic classification model utilizing deep learning (DL) can help doctors perceive the kind of skin lesion and improve the patient's health. The classification of skin cancer is one of the hot topics in the research field, along with the development of DL structure. This manuscript designs and develops a Detection of Skin Cancer Using an Ensemble Deep Learning Model and Gray Wolf Optimization (DSC-EDLMGWO) method. The proposed DSC-EDLMGWO model relies on the recognition and classification of skin cancer in biomedical imaging. The presented DSC-EDLMGWO model initially involves the image preprocessing stage at two levels: contract enhancement using the CLAHE method and noise removal using the wiener filter (WF) model. Furthermore, the proposed DSC-EDLMGWO model utilizes the SE-DenseNet method, which is the fusion of the squeeze-and-excitation (SE) module and DenseNet to extract features. For the classification process, the ensemble of DL models, namely the long short-term memory (LSTM) technique, extreme learning machine (ELM) model, and stacked sparse denoising autoencoder (SSDA) method, is employed. Finally, the gray wolf optimization (GWO) method optimally adjusts the ensemble DL models' hyperparameter values, resulting in more excellent classification performance. The effectiveness of the DSC-EDLMGWO approach is evaluated using a benchmark image database, with outcomes measured across various performance metrics. The experimental validation of the DSC-EDLMGWO approach portrayed a superior accuracy value of 98.38% and 98.17% under HAM10000 and ISIC datasets across other techniques.

URL: https://www.nature.com/articles/s41598-025-92293-1

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Scientific Reports **IF: 3.8**

Title: A hybrid fused-KNN based intelligent model to access melanoma disease risk using indoor positioning system

Author: Mishra S.; Das H.; Mohapatra S.K.; Khan S.B.; Alojail M.; Saraee M.

Details: Volume 15, Issue 1, December 2025

Abstract: The Indoor Positioning System (IPS) based technology involves the positioning system using sensors and actuators, where the Global Positioning System (GPS) lacks. The IPS system can be used in buildings, malls, parking lots and several other application domains. This system can also be useful in the healthcare centre as an assisting medium for medical professionals in the disease of the diagnosis task. This research work includes the development and implementation of an intelligent and automated IPS based model for melanoma disease detection using image sets. A new classification approach called Fused K-nearest neighbor (KNN) is applied in this study. The IPS based Fused-KNN is a fusion of three distinct folds in KNN (3-NN, 5-NN and 7-NN) where the model is developed using input samples from various sensory units while involving image optimization processes such as the image similarity index, image overlapping and image sampling which helps in refining raw melanoma images thereby extracting a combined image from the sensors. The IPS based Fused-KNN model used in the study obtained an accuracy of 97.8%, which is considerably more than the existing classifiers. The error rate is also least with this new model which is introduced. RMSE (Root Mean Square Error) and MAE (Mean Absolute Error) value generated with the proposed IPS base Fused-KNN the model for melanoma detection was as low as 0.2476 and 0.542 respectively. An average mean value computed for accuracy, precision, recall and f-score were found to be 94.45%, 95.2%, 94.4% and 94.9% respectively when validated with 12 different cancer-based datasets. Hence the presented IPS based model can prove to be an efficient and intelligent predictive model for melanoma disease diagnosis, but also other cancer-based diseases in a faster and more reliable manner than existing models.

URL: https://www.nature.com/articles/s41598-024-74847-x

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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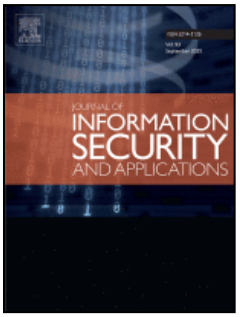
Journal Name: Journal of Information Security and Applications **IF: 3.7**

Title: Rhetorical Structure Theory-based machine intelligence-driven deceptive phishing attack detection scheme

Author: C., Patra, Chanchal; D.R., Giri, Debasis Ratna; B., Kundu, Bibekananda; T., Maitra, Tanmoy; M., Wazid, Mohammad

Details: Volume 94, November 2025

Abstract: The easiest way for users to interact with one other is via emails or messages. However, the growing incidence of cybercrime necessitates the astute use of emails or messages. These days, one of the biggest risks is phishing as well as smishing. Attackers aim to get sensitive user data by means of phishing emails. Credit card information, passwords, usernames, and other sensitive data are included. These might result in severe financial loss. The literature has a plethora of anti-phishing techniques for identifying phishing email or messages. However, fraudsters are always coming up with new techniques, making it difficult to develop anti-phishing techniques to stop phishing or smishing attack. This paper discusses a novel methodology leveraging Rhetorical Structure Theory (RST) to validate whether a given text of emails or messages are deceptive or not. A balanced dataset of deceptive and non-deceptive have been collected and annotated manually using different features like term Discourse Connectors, Rhetorical Relations, Deception likely tags and sentence type features. The work involved experiment with different machine learning classifiers trained using these features in order to achieve higher accuracy in deception phishing detection task. The proposed technique exhibits high accuracy on the dataset when RST based linguistic features are used. When ensemble classifiers are used instead of individual classifiers, the optimal classification performance is achieved, leading to an increase in accuracy. In comparison to the individual learners, the results of our experiment demonstrate that the proposed technique achieved the greatest accuracy, precision, recall, and F1-score values.



URL: https://www.sciencedirect.com/science/article/pii/S2214212625002212?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

Journal Name: IEEE Access **IF: 3.6**

Title: Can We Trust AI with Our Ears? A Cross-Domain Comparative Analysis of Explainability in Audio Intelligence

Author: Chakrabarty, S.; Bishwas, P.; Bandyopadhyay, M.; Sublime, J.

Details: October 2025

Abstract: The rapid growth of deep learning has led to major successes in audio classification, but the "black box" nature of these models slows down their use in important areas like healthcare where trust is critical. This paper addresses this problem through a detailed study on the use of Explainable AI (XAI) for audio-based systems. Six distinct datasets are used to evaluate a consistent deep learning model, including speech emotion reco gnition, environmental sound classification, and healthcare (heart, lung, and cough sounds). The study analyzes both audio-only models and multimodal models that combine audio features (spectrograms and MFCCs) with demographic data. A set of three distinct XAI techniques, namely LIME, SHAP, and Grad-CAM, is used to explain how the models make their predictions. Our key findings show that XAI methods are very useful for checking how the models work, confirming that they learn to focus on clinically and acoustically relevant features in the audio signals. The analysis also shows the power of multimodal explanations, where tools like SHAP and LIME can trace a prediction back to both acoustic patterns and specific demographic data, showing how the model creates a complete, patient-specific picture. The main contribution of this work is a broad, comparative study that provides a more complete understanding of explainability in the audio domain. The results confirm that XAI is an important part of the entire process of building a model, helping with validation, debugging, and the creation of more reliable and human-aligned AI systems for real-world use.

URL:
https://www.researchgate.net/publication/396564384_Can_We_Trust_AI_with_Our_Ears_A_Cross-Domain_Comparative_Analysis_of_Explainability_in_Audio_Intelligence

Journal Name: IEEE Access **IF: 3.6**

Title: MCRel: A Minimal Cut Set-Based Approach for Reliability Analysis of Sensor-Based IIoT

Author: Rani Sahu, D.; Ray, N.K.; Tripathy, P.

Details: Volume 13, November, 2025

Abstract: The rapid evolution of sensors has facilitated to its usage in the domain of Industrial IoT (IIoT). The component of IIoT includes sensors, devices, actuators, applications and cloud servers. Sensors are the important element of IIoT which are heavily prone to errors, interference and link issues etc. At this juncture, the efficiency and credibility of sensor networks has been a challenging problem for the design of IIoT system that can tolerate the network failure without any network disconnectedness, thereby improving the sustainability of the IIoT system for prolonged time period. Network reliability is a pivotal factor for finding the effectiveness of IIoT networks. This work proposes accurate and efficient minimal cut set based reliability estimation (MCRel) technique that analyzes the reliability of sensor networks and helps in well organized way of designing the IIoT system. This approach aims to estimate the reliability of the system using the self-generated minimal cut set based approach (MCRel). The algorithm is implemented on varied IIoT applications wavering from smaller to larger systems with complex communication links. This article presents an illustration of the generation of cut arcs and minimal cut sets, along with the framing of an unreliability expression with the computation of the reliability value. To evaluate the reliability of the IIoT system, a comprehensive analysis comparing MCRel with other contemporary algorithms has been conducted. The simulated findings demonstrate that, with an improvement of more than 15%, the MCRel outperforms competing algorithms, especially during the period of peak network traffic.

URL: https://ieeexplore.ieee.org/document/11230528

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Access **IF: 3.6**

Title: An Explainable AI Framework Integrating Variational Sparse Autoencoder and Random Forest for EEG-Based Epilepsy Detection

Author: Mishra, P.; Das, H.

Details: Volume 13, October 2025

Abstract: Epilepsy is a medical condition characterized by sudden and frequent sensory disruptions which is commonly detected by electroencephalogram (EEG) analysis. However, analyzing these signals is challenging for traditional classifiers due to their non-stationary nature and high dimensionality. Deep learning (DL) techniques offer significant potential for fast and accurate medical decisions, especially when addressing imbalanced medical datasets. Therefore, this research proposes a novel artificial neural network architecture called the Variational Sparse Autoencoder (VSAE), which combines the strengths of a Sparse Autoencoder (SAE) and a Variational Autoencoder (VAE). The VSAE produces compact, sparse, and informative features for Random Forest (RF) classification, while Explainable AI techniques (XAI) methods like SHapley Additive exPlanations (SHAP) and Local Interpretable Model-agnostic Explanations (LIME) enhance interpretability and transparency. LIME provides local interpretability whereas SHAP offers global interpretability by identifying the most influential EEG features contributing towards seizure detection. Additionally, 10-fold cross-validation (CV) is used to validate the proposed model. Compared to other conventional linear and non linear models, the proposed VSAE model demonstrates accuracy of 96.81%, precision 94.03%, recall 89.74% and F1 score 91.83% respectively.

URL: https://ieeexplore.ieee.org/document/11202459

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: IEEE Access **IF: 3.4**

Title: Temporal-Aware Transformer Approach for Violence Activity Recognition

Author: Chatterjee R.; Roy Choudhury R.; Kumar Gourisaria M.; Banerjee S.; Dey S.; Sahni M.; Leon-Castro E.

Details: Volume 13, Article 2025

Abstract: The need for effective violence detection in public spaces has intensified with increasing antisocial behavior and violence. Traditional surveillance systems, which are relying on human operators, face delays and resource challenges. Using advances in artificial intelligence (AI) and computer vision, this research presents a scalable deep learning architecture for real-time violence detection using two approaches. In the first approach, Convolutional Neural Networks (CNN) and bidirectional long-short-term memory (BiLSTM) networks are combined, where MobileNetV2 is used for spatial feature extraction and BiLSTM for temporal pattern recognition, achieving an accuracy of 95.6%. The second approach incorporates a spatial-temporal transformer (TransformerSeq) in place of BiLSTM, improving performance to 97.2% by capturing spatiotemporal relationships in video data more effectively through self-attention for temporal feature learning. The lightweight SOTA MobileNetV2, along with the proposed MobileTransformerSeq, enables the effective differentiation between violent and non-violent activities, demonstrating the potential to enhance public safety in diverse settings.

URL: https://ieeexplore.ieee.org/document/10965696

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Journal Name: IEEE Access **IF: 3.4**

Title: Identification of Depression Patients Using LIF Spiking Neural Network Model from the Pattern of EEG Signals

Author: Sahu R.; Pattnaik P.K.; Anbanathen K.S.M.; Muthaiyah S.

Details: Volume 13, Pages 55156 – 55168, 2025

Abstract: Interpreting electroencephalography signals and the abnormality of the signals can help to find the specific pattern for specific diseases like depression. A Spiking Neural Network is a machine learning approach that emphasizes the data value and manipulates the value to find the particular signal feature. Finding the specific abnormal features of electroencephalography signals can help to detect depression patients. Since a vast number of individuals are suffering from depression and the treatment of depression is possible by detecting depression patients earlier, different deep learning and conventional machine learning approaches were proposed. But speed, accuracy, and reality with less time and space complexity are essential factors in detecting depression patients in our society. We have proposed a leaky integrate and fire spiking neural network model for interpreting the electroencephalography signals of depression patients. The electroencephalography signals of a sixty-channel dataset of 121 subjects are taken for the experiment where frequency for each channel of a subject is recorded for 2 mins in 2-second time intervals, and the dataset contains 4,35,600 data with 121 instances and 3600 attributes. A leaky integrate and fire model is applied to the electroencephalography signals to find the spike sequences and potentials. Then, a three-layered neural network approach is stacked to generate a classifier. The performance of the classifier is shown to be approximately 98% accuracy. Generating a noble classifier and implementing it with a mask of metal disk benefited society for easily and quickly detecting a depression patient, and corresponding treatment can be started.

URL: https://ieeexplore.ieee.org/document/10930766

SCHOLARLY PUBLICATIONS
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Journal Name: Journal of Visual Communication and Image Representation **IF: 3.1**

Title: CA-VAD: Caption Aware Video Anomaly Detection in surveillance videos

Author: Senapati D.P.; Pani S.K.; Baliarsingh S.K.; Dev P.P.; Tripathy H.K.

Details: Volume 294, December 2025

Abstract: n video anomaly detection, identifying abnormal events using weakly supervised video-level labels is often tackled with multiple instance learning (MIL). However, traditional methods struggle to capture temporal relationships between segments and extract discriminative features for distinguishing normal from anomalous events. To address these challenges, we propose Caption Aware Video Anomaly Detection (CA-VAD), a framework that integrates visual and textual features for enhanced semantic understanding of scenes. Unlike conventional approaches relying solely on visual data, CA-VAD uses a pre-trained video captioning model to generate textual descriptions, transforming them into semantic embeddings that enrich visual features. These textual cues improve the differentiation between normal and abnormal events. CA-VAD incorporates an Attention-based Multi-Scale Temporal Network (A-MTN) to process visual and textual inputs, capturing temporal dynamics effectively. Experiments on CUHK Avenue, ShanghaiTech, UCSD Ped2, and XD-Violence datasets show that CA-VAD outperforms state-of-the-art methods, achieving superior accuracy and robustness.

URL: https://www.sciencedirect.com/science/article/pii/S104732032500135X?via%3Dihub

SCHOLARLY PUBLICATIONS
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Journal Name: International Review of Retail, Distribution and Consumer Research **IF: 3.0**

Title: Evolution of sustainable retailing and how it influences consumer behavior: a bibliometric review

Author: Singh A.P.; Behera R.K.; Bala P.K.

Details: Volume 294, December 2025

Abstract: Over the years, sustainability has garnered much attention owing to evidence of climate change, United Nations (UN) sustainable development goals, pandemics, and the changing behavior of millennials. Retailers are one of the largest consumers of global natural and human resources. They have joined the sustainability bandwagon by pledging resources and communicating the same to their target customers for better business positioning. This study aims to analyze the conceptual structure of sustainability in the context of retail enterprises and its role in shaping consumer behavior. Therefore, it leverages bibliometric techniques to elaborate on the productivity and impact of the existing body of knowledge in this area through performance analysis and discover the knowledge clusters through science mapping. The data used for this study were sourced by querying the Scopus database for the intersection of terms related to 'sustainability,' 'retail,' and 'consumer behavior.' Subsequently, they were processed and illustrated using RStudio and the bibliometrix package for R to drive insights in bibliometric summaries, including tables, maps, and networks. In addition to highlighting temporal and spatial trends and dominant themes, the study suggests future research avenues in sustainable retailing.

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SCHOLARLY PUBLICATIONS
School of Computer Engineering
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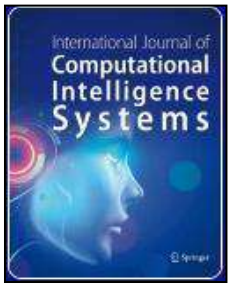
Journal Name: International Journal of Computational Intelligence Systems **IF: 3.0**

Title: Optimized DenseNet Architectures for Precise Classification of Edible and Poisonous Mushrooms

Author: Singh J.P.; Ghosh D.; Singh J.; Bhattacharjee A.; Gourisaria M.K.

Details: Volume 18, Issue 1, December 2025, Article number 143

Abstract: Background: The subtle differences between edible and toxic mushroom species make classification difficult. Traditional methods often result in errors which led to misclassifications and conventional machine learning models often struggle in feature extraction due to subtle differences in mushroom species. Deep learning models, such as DenseNet architectures, offer potential solutions, but due to model complexity, deep architecture and large number of parameters these models suffer from overfitting and computational costs. These can be handled by optimizing the model. This study's primary goal is to enhance the precision and reliability of mushroom classification through deep learning by enhancing the DenseNet-121 structure. Methods: The study analyzes the basic DenseNet-121 model as well as a modified DenseNet-121 with frozen upper layers which preserve important lower level features. Automated hyperparameter tuning is done with KerasTuner, while dropout and weight decay regularization methods are used to control overfitting. Evaluation metrics include accuracy, precision, recall, F1-score, confusion matrices, and other graphical methods. Conclusion: The study demonstrates the effectiveness of architectural modifications and regularization strategies in improving model performance. Despite problems such as possible over-reliance on pre-trained features and computational complexity, the modified DenseNet-121 is useful for accurate mushroom classification. Future study could look into improving freezing procedures and lowering computational demands to extend applicability.



URL: https://link.springer.com/article/10.1007/s44196-025-00871-y

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Human-Centric Computing and Information Sciences **IF: 3.0**

Title: CGF-Deep-CNN: A Novel Computationally Enhanced Multiclass Cyber Attacks Detection Model for Low Powered IoT Ecosystem

Author: Mishra, S; Gaber, T; Tripathy, HK; Mishra, S; Al-Khalidi, M; Bashir, AK

Details: Volume 15, October 2025

Abstract: Recently, heavy network traffic and significant data accumulation have been observed in smart energy-efficient wireless sensor-based applications. These power-aware sensors devices form low-power Internet of Things (IoT) ecosystem. In such applications, IoT nodes gather and analyze private data, which becomes a natural target for cyber-attacks. Many intrusion detection systems (IDSs) are designed to address this issue, but the majority of these systems are computationally expensive with high latency and fail to accurately identify subcategories of cyber-attacks. Attribute selection would help in reducing the data required for attack identification, thereby decreasing delays and memory usage for data storage, while also enhancing detection performance. In this paper, an advanced and optimized IDS model for IoT applications was proposed, utilizing a novel hybrid attribute selection method called credit gain function (CGF). This method incorporates correlation feature selection (CFS) and gain ratio. The proposed attribute selector is used to optimize the dataset through CGF, resulting in a memory-constrained dataset. By employing the proposed CFS method, a novel IDS model based on the Deep-CNN technique is recommended for detecting and classifying cyber-attacks and their sub-categories within an IoT environment. Performance analysis of the presented framework was conducted using four public datasets—IoTID20, UNSW-nb15, NSL-KDD, and KDD—under various metrics, employing different parameters for binary, multi-class, and sub-category classification. The evaluation demonstrated that the proposed IDS model is highly capable, achieving a high accuracy, precision, recall, and F-measure of 98.1%, 96.7%, 96.3%, and 96.8%, respectively. The optimal performance was attained when implementing two convolutional layers and three dense layers of the CNN model with a batch size of 64. Additionally, the presented framework was evaluated to be efficient, with a mean response delay of 2.8 seconds and a low false positive rate of 0.002%. Consequently, the proposed intrusion detection model offers a constructive solution for assessing different cyber-attacks in an IoT ecosystem.

URL: https://hcisj.com/articles/?HCIS202515058&ckattempt=1