SCHOLARLY PUBLICATIONS
School of Computer Engineering
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Journal Name: Technology in Society **IF: 10.1**

Title: Adverse impacts of metaverse-induced cognitive biases on the immersive shopping experience: A conceptual model developed from a qualitative approach

Author: Ghosh S.; Behera R.K.; Bala P.K.; Rana N.P.

Details: Volume 82, September 2025, 102916, Article

Abstract: Immersive shopping (IS) is the usage of simulation-based technology like metaverse to create interactive and highly personalised shopping experiences for customers wherein they spend quality time selecting the products, which increases their familiarity with the brand. When compared to a standard shopping experience, the IS experience (ISE) offers brick-and-mortar retailers a positive brand image. However, the metaverse can induce cognitive biases (CBs) in customers that can negatively influence their reasoning and decision-making. CB is the systematic error in thinking that occurs when people are processing and interpreting information during the shopping, which affects their decisions and judgments. Therefore, this study explores the adverse impacts of metaverse-induced CBs on ISE for brick-and-mortar retail customers. Using simple random sampling, data were collected from 20 customers, and a qualitative approach was used for data analysis. The finding produces three adverse impacts for ISE. First, metaverse-induced CBs create a digital divide between customer communities, and the integration of retail services with the metaverse further aggravates the risk of this divide. Second, metaverse-induced CBs create financial malfeasance, which makes the metaverse susceptible to financial biases. Third, metaverse-induced CBs increase business reputation risk by adversely impacting decision-making, strategy formulations, and outcomes.

URL: https://www.sciencedirect.com/science/article/pii/S0160791X2500106X?via%3Dihub

SCHOLARLY PUBLICATIONS
School of Computer Engineering
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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

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

Title: Demystifying SAR with attention

Author: Patnaik N.; Raj R.; Misra I.; Kumar V.

Details: Volume 276, 1 June 2025, Article number 127182

Abstract: Synthetic Aperture Radar (SAR) imagery is indispensable for earth observation, offering the ability to capture data under challenging conditions such as cloud cover and darkness. However, its grayscale format and speckle noise hinder interpretability and pose significant challenges for traditional processing methods. This study introduces an innovative framework for SAR image colorization, leveraging an Attention-Based WGAN-GP (Wasserstein GAN with Gradient Penalty). The model incorporates multi-head self-attention mechanisms to enhance feature extraction, capture long-range dependencies, and dynamically suppress noise through a novel variance-based attention adjustment mechanism. Extensive evaluations on Sentinel-1 and Sentinel-2 datasets across diverse terrains, including agriculture, urban areas, barren land, and grasslands, demonstrate the model's superiority over existing approaches. It achieves an LPIPS score of 0.27, SSIM of 0.76, and an average inference time of 0.22 s, showcasing its ability to preserve spatial coherence and perceptual quality even in complex, noisy environments. This capability enables real-time applications in disaster management, flood monitoring, and urban planning, providing actionable insights and advancing the state-of-the-art in SAR image processing.

URL: https://www.sciencedirect.com/science/article/pii/S0957417425008048?via%3Dihub

Journal Name: Computers in Biology and Medicine **IF: 7.0**

Title: A novel deep neural network approach to detect and monitor cocaine drug abuse

Author: Swetapadma A.; Kumari D.

Details: Volume 191, June 2025, Article number 110130

Abstract: Purpose: Cocaine is one of the most commonly used drugs that may lead to physical and mental health problems. It is necessary to identify individuals having cocaine use disorder as early as possible to monitor them properly. The objective of this work is to predict the time of cocaine use in scenarios where clinical testing is not possible. The time of cocaine use is defined as how many days before the individual has used cocaine. Methodology: It is possible to predict the time of cocaine use based on personality traits and demographic information as features. The personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness, impulsivity, and sensation seeking) along with demographic information features (education level, age, gender, country of residence, and ethnicity) have been used to predict the time of cocaine use. These features are given as inputs to long short-term memory networks (LSTM) to predict the time of cocaine use. Findings: The highest F-score for the prediction of time of cocaine use for the LSTM method is found to be 0.99. A comparative study has also been carried out using both deep neural networks and artificial neural networks to predict the time of cocaine use to demonstrate the superiority of the LSTM method. The proposed method shows promising results for predicting the time of cocaine use and can be considered for monitoring the cocaine use disorder. Practical and social implications: The proposed method will be an efficient tool to identify the mental health of a person if the person has cocaine use disorder. As a result, proper treatment can be given to the individual in time. Originality: The originality of the work is that it predicts the time of cocaine use with better accuracy. The LSTM method has not been used previously for predicting the time of cocaine use.

URL: https://www.sciencedirect.com/science/article/pii/S0010482525004810?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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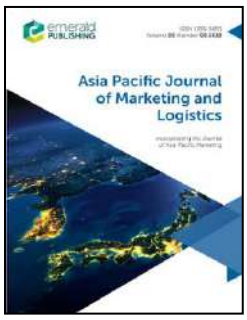
Journal Name: Asia Pacific Journal of Marketing and Logistics **IF: 5.1**

Title: Attractiveness vs similarity: howÂ attributes of AI-based virtual influencers impact credibility, parasocial interaction and purchase intentions of social-media users

Author: Rehman A.U.; Hassan S.H.; Behera R.K.

Details: 26 May 2025, Article

Abstract: Purpose: Virtual influencers (VIs) are a rising force in shaping online user engagement and consumer behavior because, unlike traditional influencers, a VI offers freedom for creativity and provides unique opportunities for brands to control their messaging and advertisements meticulously. Therefore, this study investigates the influence of VI's attributes, including interest similarity, language similarity, physical attractiveness, social attractiveness, and attitude homophily, on their credibility perception and parasocial interaction (PSI) and, subsequently, their effect on willingness to follow recommendations and intention to purchase fashion products promoted by these digital personas on Instagram. Design/methodology/approach: This study collected primary data from 332 Indian Instagram followers of virtual influencers using a structured questionnaire. Subsequently, the analysis was performed using structural equation modeling (PLS-SEM). Findings: The perceived credibility of VIs was significantly influenced by their social attractiveness, physical attractiveness, and attitude homophily, while users' PSI with VIs was significantly influenced by interest similarity, language similarity, physical attractiveness, and attitude homophily. Furthermore, the study found that willingness to follow VI's recommendations is influenced by credibility and parasocial interaction, while intention to purchase fashion products is influenced by credibility alone. Originality/value: There is a dearth of studies that explore the influence of VI's attributes and characteristics on social media users' behavioral intentions in the context of fashion products. Therefore, this study addresses this gap by exploring the persuasive power of VIs on Instagram through the lens of the CASA framework.



URL: https://www.emerald.com/insight/content/doi/10.1108/apjml-01-2025-0144/full/html

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

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

Journal Name: Egyptian Informatics Journal **IF: 4.3**

Title: Intelligent VANET-based traffic signal control system for emergency vehicle prioritization and improved traffic management

Author: Bairi P.; Swain S.; Bandyopadhyay A.; Aurangzeb K.; Alhussein M.; Mallik S.

Details: Volume 30, June 2025, Article number 100700

Abstract: Emergency vehicles (EmVs) are essential for saving lives and reducing damage in critical situations, yet their movement is often hindered by urban traffic congestion and inefficient signal control. Traditional fixed-time and pre-timed traffic signals lack the adaptability needed to prioritize EmVs, causing significant delays. This paper proposes an advanced, intelligent traffic signal control system based on Vehicular Ad-hoc Networks (VANETs) and Vehicle-to-Infrastructure (V2I) communication to optimize EmV passage and improve traffic flow. The system dynamically adjusts signal timings in real time, utilizing an adaptive control algorithm that calculates EmV arrival times, adjusts signal phases, and maintains balance to minimize disruptions to regular traffic. By leveraging V2I communication, traffic controllers receive instant updates on EmV locations and traffic conditions, enabling prioritized EmV passage. Simulation results using SUMO and OMNeT++ demonstrate that this approach can reduce EmV travel time compared to conventional systems, with minimal impact on regular traffic. The system also achieves a high success rate of preemption requests, ensuring that EmVs can pass through intersections without stopping. Furthermore, optimization results reveal that the proposed system outperforms Fixed-Time Control Methods (FTCM) with an average of 66.45% reduction in EmV travel times, Flexible Signal Preemption Methods (FSPM) by an average of 57.08%, and Intrusive Signal Preemption Methods (ISPM) by an average of 12.90%. Above findings highlight the potential of the proposed method in optimizing traffic flow, reducing emergency response times, and improving overall road safety. This research provides a scalable, real-world applicable model for enhancing emergency response efficiency in urban environments.

URL: https://www.sciencedirect.com/science/article/pii/S1110866525000933?via%3Dihub

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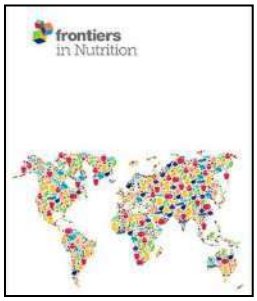
Journal Name: Frontiers in Nutrition **IF: 4.0**

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: 3.8**

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: IEEE Access **IF: 3.6**

Title: Transformers for Vision: A Survey on Innovative Methods for Computer Vision

Author: Palanisamy B.; Hassija V.; Chatterjee A.; Mandal A.; Chakraborty D.; Pandey A.; Chalapathi G.S.S.; Kumar D.

Details: Volume 13, Pages 95496 – 95523, 20 May 2025

Abstract: Transformers have emerged as a groundbreaking architecture in the field of computer vision, offering a compelling alternative to traditional convolutional neural networks (CNNs) by enabling the modeling of long-range dependencies and global context through self-attention mechanisms. Originally developed for natural language processing, transformers have now been successfully adapted for a wide range of vision tasks, leading to significant improvements in performance and generalization. This survey provides a comprehensive overview of the fundamental principles of transformer architectures, highlighting the core mechanisms such as self-attention, multi-head attention, and positional encoding that distinguish them from CNNs. We delve into the theoretical adaptations required to apply transformers to visual data, including image tokenization and the integration of positional embeddings. A detailed analysis of key transformer-based vision architectures such as ViT, DeiT, Swin Transformer, PVT, Twins, and CrossViT are presented, alongside their practical applications in image classification, object detection, video understanding, medical imaging, and cross-modal tasks. The paper further compares the performance of vision transformers with CNNs, examining their respective strengths, limitations, and the emergence of hybrid models. Finally, current challenges in deploying ViTs, such as computational cost, data efficiency, and interpretability, and explore recent advancements and future research directions including efficient architectures, self-supervised learning, and multimodal integration are discussed.

URL: https://ieeexplore.ieee.org/document/11007557

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

Title: Solving 0-1 Knapsack and Bin Packing Problem Using Logical Social Group Optimization

Author: Das R.P.; Jena J.J.; Satapathy S.C.; Hannoon N.M.S.

Details: Volume 13, Pages 95665 – 95691, 30 May 2025

Abstract: The 0-1 Knapsack Problem (KP) and Bin Packing Problem (BPP) are NP-hard combinatorial optimization challenges often tackled using metaheuristics. Both problems have prominent utilization in the real world such as in resource allocation, logistics, decision-making, etc. The binarized variant of metaheuristics available in the literature mostly uses transfer functions for conversion of the domain from continuous to binary. Generally, the conversion functions are computationally expensive which demands more utilization of computational resources. Whereas the boolean functions are performed using bitwise operations which are inherent to the digital computer hardware and are less computationally expensive. This prominent research gap has been addressed in this paper by introducing Logical Social Group Optimization (LSGO), a logic-based binarized variant of Social Group Optimization (SGO) that leverages Boolean logic for improved efficiency. In LSGO, after the binarization by replacing the arithmetic operators with logical operators, one of the variables gets cancelled out. To preserve that variable, two versions of LSGO have been proposed. The first one is LSGO-Reduc where one of the initial operands in the equation is removed or reduced and after reducing it, no variables disappear. The second one is LSGO-Rever, where the boolean operators in the equation are reversed or exchanged and hence, no variables are lost. The three algorithms have been simulated with various datasets of knapsack and its variant problems and bin-packing problem for thorough testing on different problem types and scalability.

URL: https://ieeexplore.ieee.org/document/11018339

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

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

Journal Name: International Journal of Human-Computer Interaction **IF: 3.4**

Title: A Multimodal Human-Computer Interaction for Smart Learning System

Author: Alzubi T.M.; Alzubi J.A.; Singh A.; Alzubi O.A.; Subramanian M.

Details: Volume 41, Issue 3, May 2025

Abstract: The rise of digitalization and computing devices has transformed the educational landscape, making traditional teaching methods less productive. In this context, early and continuous user interaction is crucial for designing and developing effective learning applications. The field of Human-Computer Interaction (HCI) has seen significant technological growth, enabling educators to provide quality educational services through smart input and output channels. However, to prevent students from discontinuing their studies and help them grow their careers, a multimodal HCI approach is needed. This paper proposes a multimodal deep learning multi-layer Convolutional Neural Network (CNN) to improve the educational experience. Our designed system aims to create a promising solution for improving the educational experience and enabling educators to provide high-quality educational services to students. Our implementation results show promising real-time performances, including a high success rate in a constriction learning concept, a quality interaction experience, and enhanced educational services. We evaluated the accuracy of five multimodal inputs, including Finger Touch (FT), Hands Up (HU), Hands Down (HD), Voice Command (VC), and Click/Typing (CT). The results indicate an average accuracy of 90.8%, 87%, 88.6%, 91.8%, and 87%, respectively, demonstrating the effectiveness of our proposed approach

URL: https://www.tandfonline.com/doi/full/10.1080/10447318.2023.2206758

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

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

Journal Name: Connection Science **IF: 3.4**

Title: PSPNet EPO-SEB: a novel attention-enhanced hybrid model for accurate histopathological image segmentation

Author: Jena P.P.; Mishra D.; Das K.; Mishra S.; Behera M.P.

Details: Volume 37, Issue 1, 24 May 2025, Article number 2508357

Abstract: Precise histopathological image segmentation is vital for accurate diagnosis and treatment planning. This manuscript proposes a hybrid framework, PSPNet EPO-SEB, combining PSPNet with an emperor penguin optimizer and an attention-enhanced module for improved segmentation performance. The model was rigorously evaluated on two prominent datasets, BACH and Camelyon17, encompassing high-resolution and whole-slide histopathological images, respectively. Experimental results demonstrate that PSPNet EPO-SEB outperforms conventional segmentation models, achieving dice coefficients (DC) of 0.9237 and 0.9186, and intersection over union (IoU) values of 0.8629 and 0.8622 on the BACH and Camelyon17 datasets, respectively. These metrics surpass those of competing models such as U-Net, V-Net, PA-Net, FANet18, Mask R-CNN, R2UNet, with PSPNet EPO-SEB showing enhanced boundary accuracy, True positive rates (TPR) above 0.93, and minimized false positive rates (FPR) at 0.1211 on BACH and 0.1108 on Camelyon17. Furthermore, the proposed model maintains low average error rates (AER) and achieves boundary precision with Hausdorff distances (HD) as low as 12.68 on BACH and 13.04 on Camelyon17, underscoring its accuracy in delineating complex tissue structures. Despite a slight increase in computational time due to optimization and attention mechanisms, the enhanced segmentation precision and boundary adherence make PSPNet EPO-SEB a highly effective solution for complex histopathological image analysis.

URL: https://www.tandfonline.com/doi/full/10.1080/09540091.2025.2508357

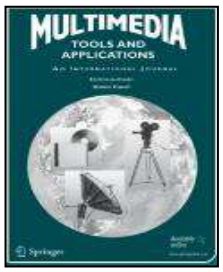
Journal Name: Multimedia Tools and Applications **IF: 3.0**

Title: QuMIN: quantum multi-modal data fusion for humor detection

Author: Phukan A.; Haq Khan A.A.; Ekbal A.

Details: Volume 84, Issue 18, Pages 18855 – 18872, 12 July 2025

Abstract: Humour detection has attracted considerable attention due to its significance in interpreting dialogues across text, visual, and acoustic modalities. However, effective methods to map correlations among different modalities remain an active area of research. In this study, we go beyond traditional machine learning techniques by introducing a Variational Quantum Circuit (VQC) that capitalizes on the inherent quantum properties of superposition, entanglement, and interference. Our proposed model, Quantum Multi-Modal Data Fusion (QuMIN), is designed to better capture and reproduce the interaction across modalities, as well as the internal correlations within each modality. Our introduction of the novel VQC, which augments the DialogueRNN baseline with only an additional 4,809 parameters, signifies a substantial advancement in multi-modal humor detection with improvements of 12.34% in precision, 8.84% in recall and 10.57% in F1 score compared to the state-of-the-art methods.



URL: https://link.springer.com/article/10.1007/s11042-024-19790-9

SCHOLARLY PUBLICATIONS
School of Computer Engineering
KIIT Deemed to be University

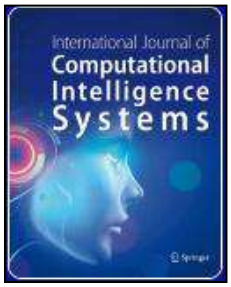
Journal Name: International Journal of Computational Intelligence Systems **IF: 3.0**

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