SCHOLARLY PUBLICATIONS
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Journal Name: Information Fusion **IF: 14.8**

Title: A clinical diabetes prediction based support system based on the multi-objective metaheuristic inspired fine tuning deep network

Author: Dhal P.; Pradhan B.; Fiore U.; Francis S.A.J.; Roy D.S.

Details: Volume 122, October 2025

Abstract: Diabetes Mellitus (DM), a condition that requires early detection and prompt treatment to prevent life-threatening complications, is a critical focus in intelligent healthcare. Accurate diagnosis and prediction of DM are hindered by challenges such as the lack of comprehensive annotated data and an incomplete understanding of the complex interplay between the disease and various physiological factors. To address these challenges, this research introduces MOODM-Net, a Multi-Objective Optimization (MOO)-based deep network for DM prediction. A novel hybrid Feature Selection (FS) approach, combining multi-objective Harris Hawk Optimization (HHO) with Gray Wolf Optimization (GWO), is used to identify the most informative features from different data sources. This FS step, a critical aspect of data fusion in smart healthcare, aims to extract meaningful insights from potentially noisy and redundant information collected from diverse sources such as wearable sensors, Electronic Health Records (EHRs), and genetic data. Using these carefully selected features, the proposed deep network is fine-tuned with a hybrid exploration–exploitation strategy to optimize its performance for accurate DM prediction. Experimental validation on two widely used DM datasets demonstrates that MOODM-Net outperforms existing approaches, achieving superior prediction accuracy. This highlights the potential of this data fusion-driven approach for improving DM management and advancing personalized healthcare solutions within smart healthcare systems.

URL: https://www.sciencedirect.com/science/article/pii/S1566253525002611?via%3Dihub

SCHOLARLY PUBLICATIONS
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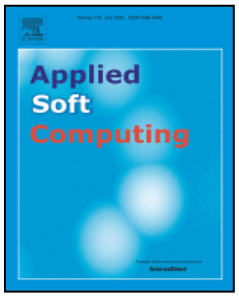
Journal Name: Applied Soft Computing **IF: 6.6**

Title: A deep ensemble-based framework for the prediction of oral cancer through histopathological images

Author: Dhal P.; Mishra D.; Pradhan B.

Details: Volume 179, July 2025, Article number 113258

Abstract: Early diagnosis and treatment for cancer can save lives and is a primary worldwide health concern. This is also true for Oral Cancer (OC), highlighting how crucial early intervention is. OC, specifically Oral Squamous Cell Carcinoma (OSCC), is a complex malignancy with a high mortality rate. One group of diseases that dentists can diagnose and treat is OSCC, which are found in the oral cavity. Deep Learning (DL) algorithms have shown promise in the identification and prediction of OC due to their ability to analyze large datasets and detect subtle patterns in buccal tissue. This work introduces a lightweight ensemble-based DL network for the prediction of OC. The proposed methodology incorporates various DL techniques such as Convolutional Neural Network (CNN), Bidirectional Long Short Term Memory (Bi-LSTM), and Bidirectional Gated Recurrent Unit (Bi-GRU) for extraction of deep features. Here, we have developed the CNN and Bi-LSTM blocks to extract the spatial and contextual features from the histopathological images. Also, the proposed Bi-GRU block increases classification performance by exploiting spatial and sequential features to better capture dependencies within image data when paired with CNNs. After the deep features are extracted from the proposed CNN, Bi-LSTM, and Bi-GRU blocks, they are amalgamated to form a new set of deep features. To forecast the probability of OC among unnoticeable patients during screening, this study uses a soft-voting ensemble classifier to classify after the deep features have been extracted from the proposed deep network based on five baseline classifiers including Logistic Regression (LR), Decision Tree (DT), k-Nearest Neighbors (k-NN), Support Vector Machine (SVM), and Stochastic Gradient Descent (SGD).



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SCHOLARLY PUBLICATIONS
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Journal Name: Sustainable Computing: Informatics and Systems **IF: 3.8**

Title: LESP:A fault-aware internet of things service placement in fog computing

Author: Apat H.K.; Sahoo B.

Details: Volume 32, Issue 2, 2025

Abstract: The rapid advancement of 5G networks enables increase adoption of Industrial Internet of Things (IIoT) devices which introduces variety of time-sensitive applications requires low-latency, fault-tolerant, and energy-efficient computing environments. Fog computing infrastructure that extends cloud computing capabilities at the network edge to provide computation, communication, and storage resources. Due to the limited computing capacity of the Fog node, it restricts the number of tasks executed. The other key challenges are the risk of hardware and software failure during task execution. These failures tend to disrupt the configuration of fog computing nodes, affecting the reliability and availability of services. As a result, this can negatively impact the overall performance and service level objectives. The fault-tolerant-based IoT service placement problem in the fog computing environment primarily focuses on optimal placement of IoT services on fog and cloud resources with the objective of maximizing fault tolerance while satisfying network and storage capacity constraints. In this study, we compared different community-based techniques Girvan-Newman and Louvain with Integer Linear Programming (ILP) for fault tolerance in fog computing using the Albert-Barabási network model. In addition, it proposed a novel Louvian based on eigenvector centrality service placement (LESP) to improve conventional Louvian methods. The proposed algorithm is simulated in iFogSim2 simulator under three different scenario such as under 100, 200 and 300 nodes. The simulation results exemplify that LESP improves fault tolerance and energy efficiency, with an average improvement of approximately 20% over Girvan-Newman, 25% over ILP, and 12.33% over Louvain. These improvements underscore LESP's strong efficiency and capability in improving service availability across a wide range of network configurations.

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

Title: GANCE: Generative Adversarial Network Assisted Channel Estimation for Unmanned Aerial Vehicles Empowered 5G and Beyond Wireless Networks

Author: Gupta, C; Das, RK; Barik, RK; Qurashi, SN; Roy, DS; Yadav, SS

Details: Vol. 13, 2025

Abstract: Unmanned aerial vehicles (UAVs) have discovered a plethora of societal applications such as remote sensing, disaster management, medical emergency, security and surveillance, etc. UAVs require fast and reliable communication lines, and selecting the appropriate channel estimation (CE) technique is pivotal in reliable communication. Orthogonal time frequency space (OTFS) is an innovative modulation technique designed to support reliable communication in rapid mobility environments for 5G and beyond applications, effectively addressing challenges posed by Doppler shifts and multipath propagation. Current OTFS receivers utilize threshold methods such as least squares (LS) and minimum mean square error estimators for CE. To further enhance the accuracy and robustness of the CE process, this paper proposes a generative adversarial network (GAN) for learning channel parameters and performing CE in OTFS-based communication systems for high-speed UAVs (100-500 km/h). Firstly, a system model considering the Doppler effect has been modeled mathematically, and then the solution to the CE problem is presented for UAVs-assisted networks using GAN. The proposed GAN architectures comprise a U-Net-based generator and a PatchGAN discriminator for adversarial training of the model. The proposed model is compared with the baseline approaches in terms of bit error rate (BER), outage probability (OP), and normalized mean squared error (NMSE) for different velocities and modulation schemes. The proposed model has given an improvement of 70%, 55%, 45% in BER performance and 40%, 30%, 20% in OP compared to the conventional LS estimator, machine learning-based estimator, and deep learning-based estimator, respectively.

URL: https://ieeexplore.ieee.org/document/10815946

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

Title: A Novel Pairing Free Revocable Certificateless Encryption with Ciphertext Evolution for Healthcare System

Author: Singh M.R.; Barik R.K.; Qurashi S.N.; Thokchom S.; Roy D.S.

Details: Volume 13, 2025

Abstract: With the advancement of modern healthcare systems, patients now utilize medical sensor nodes to generate health data. These data are then transmitted to healthcare providers for analysis and diagnosis of the patient. These data are sensitive in nature and, therefore, need to preserve their privacy, security, and confidentiality. Another crucial aspect of a healthcare system is the effective revocation of malicious users. Revocable encryption schemes, particularly those with ciphertext evolution, have emerged as promising solutions. However, all the existing revocable schemes with ciphertext evolution have expensive bilinear pairing, map-to-point hash, modular exponentiation operations, rendering them unsuitable for resource constrained medical sensor nodes. In this paper, we propose a novel pairing free revocable certificateless encryption scheme with ciphertext evolution. Also, we prove that our scheme is secure against adaptive chosen ciphertext attacks. Our comparative analysis demonstrates that our scheme achieves substantial reductions in total computational cost by 74.9% to 86.4% and reduces ciphertext communication cost by 45.9% to 72.9%, making it the most effective among related schemes.

URL: https://ieeexplore.ieee.org/document/10851271

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

Title: A Faster, Integrated and Trusted Certificate Authentication and Issuer Validation System based on Blockchain

Author: Priyadarshini R.; Pandey R.; Ankit K.C.; Bhandari D.; Khadka B.; Barik R.K.; Saikia M.J.

Details: Volume 13, 2025

Abstract: Verifying the legitimacy of original documents such as educational degree certificates is crucial. If these are found to be fraudulent, it can cause significant disruptions in the hiring process, resulting in substantial productivity losses. The researchers suggested several proposals to preserve these certificates. However, the challenge is still to have an integrated, tamper-proof and low-cost solution where the certificate issuer and the certificate itself are validated in a single platform. This paper proposes an integrated solution that uses a decentralized blockchain-based certificate verification and issuer validation system. In addition to this, it will protect the certificates from being tampered with. To search faster, hash function mapping has been employed. The proposed solution is experimentally validated by creating a blockchain network using Ethereum where each peer node represents an entity of a certificate verification system such as a validator, certificate issuer, certificate holder and the end-user of the client. The performance of the designed solution is measured by the execution and transaction cost in terms of gas consumption. A comparative analysis has been performed on similar types of tasks reported in the existing work performed on the same platform. It has been observed that the cost incurred for adding a certificate is minimal for the proposed approach. Furthermore, the searching time for the certificates is minimized by using a hash-based searching methodology. The results show that the search time has drastically gone down when certificates are not available.

URL: https://ieeexplore.ieee.org/document/10872957