SCHOLARLY PUBLICATIONS
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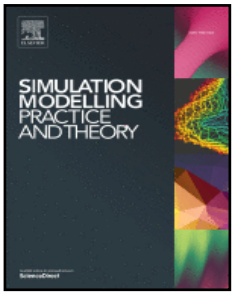
Journal Name: Simulation Modelling Practice and Theory **IF: 4.6**

Title: JaGW: A hybrid meta-heuristic algorithm for IoT workflow placement in fog computing environment

Author: Apat H.K.; Sahoo B.

Details: Vol. 144, November 2025, Article no. 103163

Abstract: In recent years, applications of the Internet of Things (IoT) have experienced rapid growth, driven by the widespread adoption of IoT devices in various sectors. However, these devices are typically resource-constrained in terms of computing power and storage capacity. As a result, they often offload the generated data and tasks to nearby edge devices or fog computing layers for further processing and execution. The fog computing layer is located in close vicinity of the IoT devices and comprises a set of heterogeneous fog computing nodes to supplement the capacities of resource-constrained IoT devices. The fog computing nodes often pose computational challenges for various computation-intensive tasks such as image processing application, comprises various machine learning and artificial intelligence enabled tasks. In such a scenario, finding the effective task placement for dynamic and heterogeneous applications is computationally hard. In this work, we formulate the IoT application workflow placement problem as a multi-objective optimization problem formulated as Integer Linear Programming (ILP) model with the objective of minimizing the makespan, cost of execution, and energy consumption. A hybrid metaheuristic approach is proposed that combines the strengths of the Jaya algorithm (JA) and Grey Wolf Optimization (GWO) named as JaGW to derive a sub-optimal solution. The proposed JaGW is compared with conventional GWO and other state of the art algorithms such as Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO) using the Montage scientific workflow dataset. The simulation results demonstrate that the proposed algorithm achieves an average reduction in energy consumption of 24.84% compared to JAYA, 14.67% compared to ACO, 14.65% compared to PSO, and 8.78% compared to GWO, thereby exemplifying its superior performance over other metaheuristic algorithms.



URL: https://www.sciencedirect.com/science/article/pii/S1569190X2500098X?via%3Dihub

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

Title: Integration of metaheuristic based feature selection with ensemble representation learning models for privacy aware cyberattack detection in IoT environments

Author: Karthikeyan M.; Brindha R.; Vianny M.M.; Vaitheeshwaran V.; Bachute M.; Mishra S.; Dash B.B.

Details: Vol. 15, Issue 1, December 2025, Article no. 22887

Abstract: The Internet of Things (IoT) connects virtual and physical objects inserted with software, devices, and other technology that interchange data utilizing the Internet. It enables diverse devices and individuals to exchange data, interconnect, and personalize services to ease usage. Despite IoT's merits, rising cyberthreats and the rapid growth of smart devices increase the risk of data breaches and security attacks. The increasing complexity of cyberattacks demands advanced intrusion detection systems (IDS) to defend crucial assets and data. AI techniques such as machine learning (ML) and deep learning (DL) have shown robust potential in improving IDS performance by accurately detecting and classifying malicious network behavior in IoT environments. The data normalization stage initially applies Z-score normalization to convert input data into a beneficial format. The AMFS-ELPPCD model utilizes the adaptive Harris hawk optimization (AHHO) model for the feature process selection of the subset. Furthermore, ensemble models such as bidirectional gated recurrent unit (BiGRU), Wasserstein autoencoder (WAE), and deep belief network (DBN) are used for the classification process. Finally, social group optimization (SGO) optimally adjusts the ensemble classifiers' hyperparameter values, resulting in better classification performance. A set of simulations is performed to exhibit the promising results of the AMFS-ELPPCD under dual datasets. The experimental validation of the AMFS-ELPPCD technique portrayed a superior accuracy value of 99.44% and 98.85% under the CICIDS-2017 and NSLKDD datasets over existing models.

URL: https://www.nature.com/articles/s41598-025-05545-5

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

Title: A deep dive into artificial intelligence with enhanced optimization-based security breach detection in internet of health things enabled smart city environment

Author: Jayanthi S.; Suhasini S.; Sharmili N.; Laxmi Lydia E.; Shwetha V.; Dash B.B.; Bachute M.

Details: Vol. 15, Issue 1, December 2025, Article no. 22909

Abstract: Internet of Health Things (IoHT) plays a vital role in everyday routine by giving electronic healthcare services and the ability to improve patient care quality. IoHT applications and devices become widely susceptible to cyber-attacks as the tools are smaller and varied. Additionally, it is of dual significance once IoHT contains tools applied in the healthcare field. In the context of smart cities, IoHT enables proactive health management, remote diagnostics, and continuous patient monitoring. Therefore, it is essential to advance a strong cyber-attack detection method in the IoHT environments to mitigate security risks and prevent devices from being vulnerable to cyber-attacks. So, improving an intrusion detection system (IDS) for attack identification and detection using the IoHT method is fundamentally necessary. Deep learning (DL) has recently been applied in attack detection because it can remove and learn deeper features of known attacks and identify unknown attacks by analyzing network traffic for anomalous patterns. This study presents a Securing Attack Detection through Deep Belief Networks and an Advanced Metaheuristic Optimization Algorithm (SADDBN-AMOA) model in smart city-based IoHT networks. The main aim of the SADDBN-AMOA technique is to provide a resilient attack detection method in the IoHT environment of smart cities to mitigate security threats. The effectiveness of the SADDBN-AMOA method is investigated under the IoT healthcare security dataset. The experimental validation of the SADDBN-AMOA method illustrated a superior accuracy value of 98.71% over existing models.

URL: https://www.nature.com/articles/s41598-025-05850-z

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

Title: Advanced transformer with attention-based neural network framework for precise renal cell carcinoma detection using histological kidney images

Author: Eliazer, M.; Kumar, G.M.; Amaran, S.; Shasikala, Y.; Sahu, M.; Dash, B.B.; Bala, K.

Details: Vol. 15, Issue 1, December 2025

Abstract: Renal cell carcinoma (RCC) is one of the typical categories of kidney cancer and is a varied group of malignancies arising from epithelial cells of the kidney parenchyma. RCC has more than ten subtypes. Classification of RCC sub-types is mainly according to morphologic features seen on histopathological hematoxylin and eosin (H & E)–stained slides. The histology classification of RCCs is of great significance, considering the important therapeutic and prognostic implications of its histologic subtypes. Imaging models play a prominent role in the diagnosis, follow-up, and staging of RCC. Recently, deep learning (DL) has achieved advanced performance in various computer vision tasks, including segmentation, image classification, and object detection. With the provision of sufficient data, the precision of a DL-enabled diagnosis model frequently matches or even exceeds that of qualified doctors. This paper presents an Advanced Transformer and Attention-Based Neural Network Framework for the Intelligent Detection of Renal Cell Carcinoma (ATANNF-IDRCC) model. The aim is to develop an accurate and automated model for detecting and ranking RCC using kidney histopathology images. Initially, the image pre-processing stage utilizes the contrast enhancement method to enhance the image quality. Furthermore, the ATANNF-IDRCC model utilizes the Twins-Spatially Separable Vision Transformer (Twins-SVT) method for feature extraction. For the RCC classification process, a hybrid model of bidirectional temporal convolutional network and long short-term memory with an attention mechanism (BiTCN-BiLSTM-AM) is employed. The performance analysis of the ATANNF-IDRCC technique is examined under the RCCGNet dataset. The comparison study of the ATANNF-IDRCC technique demonstrated a superior accuracy value of 98.26% compared to existing models.

URL: https://www.nature.com/articles/s41598-025-19352-5

SCHOLARLY PUBLICATIONS
School of Computer Applications
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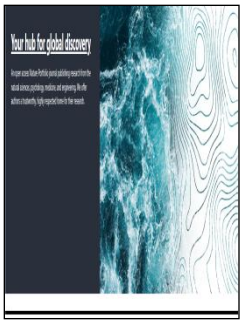
Journal Name: Scientific Reports **IF: 3.9**

Title: Advancements in fusion-based deep representation learning for enhanced cervical precancerous lesion classification using biomedical image analysis

Author: Saranya S.S.; Santhanakrishnan C.; Kumar K.P.M.; Kumar P.A.; Dash B.B.; Rout S.K.; Bala K.

Details: Volume 15, Issue 1, December 2025

Abstract: One such prevalent kind of cancer among women is cervical cancer (CC). Fatality rates and incidence are progressively increasing, mainly in developing countries, due to a lack of experienced specialists, inadequate public awareness, and limited screening facilities. Nevertheless, CC cells exhibit composite textural features, and smaller changes among dissimilar cell subcategories result in greater challenges for the higher-accuracy screening of CC. This systematic analysis aims to assess the predictive value of artificial intelligence (AI) technologies for diagnosing, screening, and predicting CC and precancerous lesions. Deep learning (DL) and AI generally have a positive impact on computer-aided clinical diagnosis, particularly with the increasing accessibility of larger amounts of medical data that can aid AI methods in achieving high performance on various medical tasks. In this paper, a Fusion of Advanced Feature Reduction and Deep Representation Learning Approaches for Cervical Precancerous Lesion Classification (FAFRDRL-CPLC) technique using biomedical image analysis is proposed. The primary purpose of the FAFRDRL-CPLC technique is to serve as a valuable tool for assisting clinicians in the initial study and treatment planning of cervical precancerous lesions. Initially, the FAFRDRL-CPLC approach applies an anisotropic diffusion filtering (ADF) method for pre-processing to reduce noise while preserving crucial edges and lesion details. Furthermore, the fusion of advanced feature reduction models, such as the maximally scalable vision transformer (MaxViT-v2), the simple framework for contrastive learning of visual representations (SimCLR), and the Twins-spatially separable vision transformer (Twins-SVT) models, is employed to capture diverse and complementary representations from the pre-processed images. Finally, the stacked auto-encoder (SAE) classifier is utilized for the precancerous lesion detection process. The FAFRDRL-CPLC method is examined through experimentation using the Malhari dataset. The comparison study of the FAFRDRL-CPLC method demonstrated a superior accuracy value of 98.62% over existing approaches.



URL: https://www.nature.com/articles/s41598-025-20693-4