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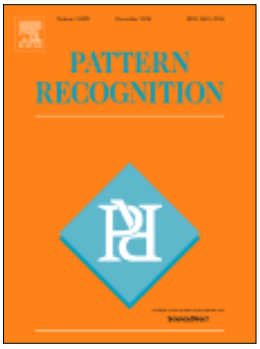
Journal Name: Pattern Recognition **IF: 9.1**

Title: CoMFormer: An explainable multimodal framework for Alzheimer's disease diagnosis

Author: Pallawi S.; Singh D.K.; Singh A.; Khan S.B.; Basheer S.; Singh S.K.

Details: Volume-180, December 2026

Abstract: Neuroimaging plays a key role in understanding the structural and functional brain changes associated with Alzheimer's disease (AD), especially in multimodal pattern recognition. However, single-modality approaches often fail to capture the complex nature of disease progression, while many multimodal methods suffer from high computational cost, overfitting, and limited interpretability. To address these challenges, we propose an explainable multimodal learning framework that integrates structural Magnetic Resonance Imaging (MRI) and functional Positron Emission Tomography (PET) data for accurate and transparent AD diagnosis. The proposed pipeline introduces Multimodal Optimized Diffeomorphic Anatomical Registration (MoDAR) for consistent cross-modality alignment. Feature extraction and fusion are performed using a Soft Progressive Attention–Enclosed Sparse Probabilistic Variational Autoencoder (SPA-SPVA), which learns compact and discriminative representations. For disease staging, we developed a Convolutional Masked Transformer (CoMFormer) that captures both local imaging biomarkers and global dependencies. Model parameters are optimized using a sine-chaotic Greylag Goose Optimization Algorithm (SC-GGOA) strategy to ensure stable convergence. Shapley Additive exPlanations (SHAP) are employed to provide interpretable insights into model decisions. Experimental results on the AD Neuroimaging Initiative (ADNI) dataset demonstrate an accuracy of 98.14%, outperforming recent methods. The framework is generalizable and can be extended to other multimodal biomedical data, highlighting its potential for real-world healthcare applications.



URL: https://www.sciencedirect.com/science/article/pii/S0031320326014366?via%3Dihub

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Journal Name: Cognitive Computation **IF: 7.4**

Title: From Language Models to Agentic AI: A Survey of Autonomous, Action-Enabled, and Collaborative LLM Agents

Author: Bajoria S.; Ranjan S.; Adhitya M.; Suri V.; Hassija V.; Chamola V.; Hussain A.

Details: Volume-18, Issue-1, December 2026

Abstract: Large Language Model (LLM)–based agents are rapidly evolving from passive assistants into autonomous, tool-using, and collaborative systems capable of executing complex, long-horizon tasks across web, software, and physical environments. However, the current literature remains fragmented, with inconsistent terminology, ad hoc architectures, and limited evaluation standards, making it difficult to compare systems or deploy them reliably in real-world settings. This paper presents a unified, taxonomy-driven, and deployment-oriented survey of agentic AI systems, synthesizing recent advances through a modular reference architecture and a four-dimensional taxonomy that characterizes agents along the axes of autonomy, tool use, collaboration, and safety–governance. We systematically analyze representative single-agent, tool-augmented, and multi-agent frameworks within this taxonomy, highlighting design trade-offs, capability scaling patterns, and recurring failure modes. Beyond architectural analysis, we review emerging evaluation methodologies that move beyond static benchmarks to assess agent behavior, robustness, grounding, and operational cost in interactive environments. Importantly, the survey emphasizes practical considerations for enterprise and safety-critical deployment, including access control, human-in-the-loop oversight, and policy enforcement. By unifying conceptual foundations with empirical trends and deployment constraints, this work provides a structured roadmap for researchers and practitioners to design, evaluate, and govern next-generation LLM-based agentic systems.



URL: https://link.springer.com/article/10.1007/s12559-026-10619-1

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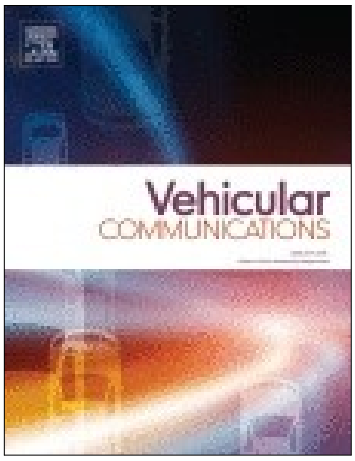
Journal Name: Vehicular Communications **IF: 5.7**

Title: AIR-V: Adaptive UAV-assisted multi-IRS model for vehicular connectivity restoration

Author: Behura A.; Khilar P.M.

Details: Volume-62, December 2026

Abstract: Reliable vehicular communication is crucial for smart transportation systems; however, connectivity in Vehicular Ad Hoc Networks (VANETs) is often disrupted by various environmental factors, including mist, heavy fog, dust, rainfall, sand, shadowing from large vehicles, tunnels, or tree obstructions. This article designs a resilient communication framework that integrates multiple intelligent reflecting surfaces (IRS) aided unmanned aerial vehicles (UAVs) for dynamic vehicular link recovery when base stations (BSs) and roadside units (RSUs) are unavailable or impaired. Upon detecting infrastructure (BS/RSU) failure, infrastructure-to-infrastructure (I2I) and Vehicle-to-Vehicle (V2V) modes are used as emergency communication fallbacks. Multi-IRS-aided UAVs are deployed to enhance network connectivity and improve signal strength through adaptive beamforming and reflection-phase optimization. A hybrid control technique is developed to jointly optimize UAV positioning, IRS phase configuration, and link-mode switching to maximize vehicular network throughput and minimize latency under uncertainty environmental factors. Simulation results show that the proposed framework achieves a 7.2% improvement in connectivity stability, 22.6% throughput, 80.4% reduction in communication outage probability, and 27.3% in latency as compared to the conventional UAV relay and single-IRS model.



URL: https://www.sciencedirect.com/science/article/pii/S2214209626000859?via%3Dihub

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Journal Name: Biomedical Signal Processing and Control **IF: 5.7**

Title: HyMAF-Net: A region-aware multi-agent fusion attention transformer for multiclass brain tumor classification

Author: Swain K.P.; Nayak S.R.; Swain S.K.; Sinha U.

Details: Volume-127, 1st November, 2026

Abstract: Magnetic resonance imaging (MRI) is a primary modality for brain tumor diagnosis; however, manual interpretation is time-consuming and subject to inter-observer variability. Furthermore, the complex spatial heterogeneity of tumor regions and long-range contextual dependencies within MRI scans pose significant challenges for automated analysis. To address these issues, we propose HyMAF-Net, a region-aware multi-agent hybrid framework that synergistically integrates convolutional neural networks (CNNs) for local feature extraction and vision transformers (ViTs) for global contextual modeling as a dual feature module. The framework adopts a cooperative multi-agent regional fusion architecture in which region-specific agents perform adaptive feature fusion via attention-based gating, followed by confidence-aware decision making and inter-agent communication for consensus-based classification. The proposed model is evaluated on a publicly available multi-class brain tumor MRI dataset using standardized data augmentation, and optimized training configurations. Extensive experimental analyses are conducted, including comparisons with CNN backbone networks and transformer-based architectures, evaluation against recent state-of-the-art methods, ablation studies to assess the contribution of individual components, and visualization-based interpretability analysis to enhance clinical transparency. In addition, computational overhead, model complexity, and robustness under noisy imaging conditions are systematically examined for model validation. HyMAF-Net consistently outperforms competing approaches across all evaluations, achieving a classification accuracy of 99.01% and improved sensitivity and robustness across tumor categories. These results demonstrate that region-aware multi-agent reasoning combined with transformer-based global representations yields a reliable, efficient, and interpretable framework suitable for real-time clinical decision support.



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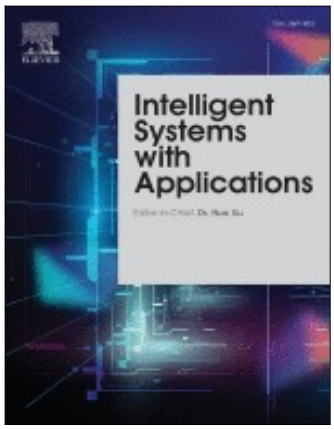
Journal Name: Intelligent Systems with Applications **IF: 5.5**

Title: Quantum augmented salp swarm algorithm with adaptive parameter control (QSSA-APC) for hybrid-CNN hyperparameter tuning in realistic applications

Author: Hati S.K.; Panda N.; Bassir D.; Tejani G.G.

Details: Volume-32, December 2026

Abstract: In this study, a Quantum-Augmented Salp Swarm Algorithm with Adaptive Parameter Control (QSSA-APC) is presented as a novel optimization framework for effective hyperparameter tuning of Hybrid-CNN models in practical applications. The suggested method improves the convergence and optimization quality of the current Salp swarm algorithm (SSA) by balancing exploration and exploitation through the combination of quantum-inspired exploration and adaptive parameter control. Benchmark functions from IEEE CEC 2017, CEC 2020, and CEC 2022 under 50, 100, 10 and 20-dimensional problem spaces which span over unimodal, multimodal, hybrid, and composite issue classes are used to thoroughly assess the approach. Statistical significance is confirmed using the Wilcoxon signed-rank, Friedman and Holm post-hoc tests, supported by Cliff's delta effect size analysis. Typical optimization measures, and convergence behavior are all part of performance analysis. Additionally, across a number of real-world image datasets, the suggested hybrid CNN–Transformer model modified by QSSA-APC shows appreciable gains in performance metrics and convergence analysis. The efficiency, higher robustness and scalability of QSSA-APC as a dependable metaheuristic optimizer for intricate, high-dimensional learning and engineering optimization problems are demonstrated by these results which proves it as a potential tool for realistic hybrid CNN hyperparameter optimization in challenging tasks.



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Journal Name: IF: Scientific Reports **IF: 4.9**

Title: PoinCLIP-VAD: a hyperbolic cross-modal fusion framework for video anomaly detection

Author: Senapati D.P.; Pani S.K.; Baliarsingh S.K.; Dev P.P.; Somula R.

Details: Volume-16, Issue-1, December 2026

Abstract: Weakly supervised video anomaly detection (WSVAD) is fundamentally constrained by the absence of frame-level annotations, which leads to noisy instance selection in Multiple Instance Learning (MIL) and weak correspondence between temporal video segments and semantic descriptions. Vision-language models address this by enabling cross-modal alignment between visual features and textual labels, but when these representations are learned in Euclidean space, they struggle to capture subtle semantic variations and often produce ambiguous instance ranking under weak supervision. To address this limitation, we propose PoinCLIP-VAD, a vision-language framework that performs cross-modal fusion in hyperbolic space. The model embeds visual and textual features into a shared Poincaré ball geometry, where non-linear distance scaling provides a more expressive representation of latent semantic relationships induced by cross-modal interactions, without relying on predefined hierarchical structures. This geometry-consistent formulation enables more reliable similarity estimation and better preserves distinctions between normal and anomalous patterns. The framework adopts a dual-block architecture consisting of a classification block for coarse anomaly scoring and a video-text alignment block for fine-grained correspondence using negative Poincaré distance. Extensive experiments on benchmark datasets demonstrate that PoinCLIP-VAD achieves an AUC of 90.62% on UCF-Crime and an AP of 86.93% on XD-Violence, confirming improved anomaly discrimination and more consistent cross-modal alignment under weak supervision.

URL: https://www.nature.com/articles/s41598-026-56792-z

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Journal Name: Scientific Reports **IF: 4.9**

Title: Lifelong learning enabled GAN framework for brain MRI FLAIR synthesis and tumor segmentation

Author: Mohanty J.K.; Dash C.K.; Piri J.; Acharya B.; Deferisha A.D.

Details: Volume-16, Issue-1, December 2026

Abstract: Accurate synthesis of missing MRI modalities plays a crucial role in multi-modal neuro-imaging pipelines. In real-world setups, each hospital or scanner does not always provide all MRI modalities for diagnosis. As FLAIR MRI sequence shows tumor boundaries especially edema, many sites lack FLAIR MRI sequence or have low-quality FLAIR. In this work, we propose a 2.5D (using 7 slices) GAN-based framework for synthesizing missing modality i.e., FLAIR images from T1-weighted and T2-weighted inputs, followed by tumor segmentation on multiple sequential tasks, each representing a new data distribution. The generator employs a U-Net architecture enhanced with residual blocks and convolutional block attention module (CBAM), while a PatchGAN discriminator and an U-Net-based segmentor to ensure both visual fidelity and downstream utility. The model is trained with a combination of perceptual, structural losses, along with segmentation consistency constraints on a lifelong learning strategy using EWC method on 4 sequential tasks from BraTS2020 dataset. Quantitatively, the proposed model achieves an average SSIM score of 0.902, PSNR score of 28.375 dB, MAE value of 0.023 and LPIPS value of 0.119 over sequential tasks. The model has also achieved an average Dice and HD95 score of 0.79 and 7.68 mm respectively. The model shows very good performance on backward as well as forward transfer of knowledge, which confirm the effectiveness of synthesis-segmentation pipeline and the potential of lifelong learning in medical image synthesis and segmentation with good accuracy and minimal catastrophic forgetting.



URL: https://www.nature.com/articles/s41598-026-60310-6

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Journal Name: Scientific Reports **IF: 4.9**

Title: Emo-aware: an intelligent and personalized model for driver emotion and health metrics assessment in advanced driver assistance systems

Author: Mishra S.; Saha S.; Das H.; Shabaz M.; Basheer S.; Alyahya A.

Details: Volume-16, Issue-1, December 2026

Abstract: Driving can be enhanced if the vehicle quickly responds to the driver's emotions. Accurate recognition of the driver's emotional state is essential for advanced driver assistance systems (ADAS). The existing models restrict to single-modal data and fail to acquire hidden emotions which affects the prediction accuracy. Also, they lack real time data integration with self driving vehicles. Thus, a more robust multimodal model is needed to combine driver's vital metrics and emotional behaviors for enhanced safety and dynamic vehicle-human interactivity. The proposed model 'Emo-Aware' blends real-time data from multiple sensors, including face emotion detection cameras, speech emotion detection microphones, heart rate sensors, and blood pressure sensors. The captured data are preprocessed to remove noise, retrieve relevant features and amplify to the desired state. Further, it processes this integrated data using a CNN model with hard voting method to precisely assess driver's sentiments. The proposed framework is validated in a simulator using benchmark multimodal datasets, demonstrating its effectiveness for driver emotion assessment and laying groundwork for future real-world ADAS deployment. The robustness of model lies in its capability to adjust driving constraints on basis of the emotion quotient of driver thereby providing a personalized driving environment. Upon model's implementation, there is a notable rise in accuracy and fall in the loss function. The diagonal values in the confusion matrix represent class-wise emotion detection accuracies of 0.92, 0.93, 0.91, 0.95, 0.92, and 0.86, corresponding to the emotions of disgust, fear, happiness, neutrality, sadness, and surprise, respectively.



URL: https://www.nature.com/articles/s41598-026-72113-w

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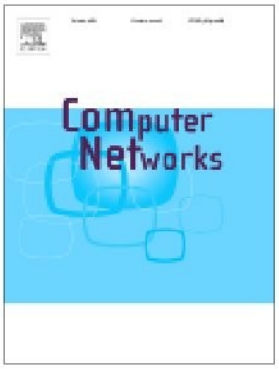
Journal Name: Computer Networks **IF: 4.7**

Title: Intelligent controller placement in SDN-enabled mobile edge computing network via hybrid optimization algorithm

Author: Chandra P.K.; Sharma S.; Ray N.K.; Negi S.K.

Details: Volume-289, October 2026

Abstract: Recent advancements in mobile applications such as virtual reality, augmented reality and intelligent multimedia services have significantly increased the demand for low-latency and high-performance computing environments. Software Defined Networking (SDN)-enabled Mobile Edge Computing (MEC) has emerged as an effective framework for integrating mobile devices, edge servers and cloud resources to support efficient resource management and real-time service delivery. However, existing controller placement approaches suffer from limitations such as poor load balancing, high controller-switch communication cost, increased propagation delay and insufficient fault tolerance in large-scale dynamic MEC environments. To address these challenges, this paper proposes an Optimized Controller Placement in Software Defined Mobile Edge Computing Network (OCP-SDMECN) using an Enhanced Mother Assisted Wolverine Optimization Algorithm (EMA-WOA). The proposed framework initially performs optimal controller selection by analyzing controller characteristics such as modularity, graphical user interface support and legacy network compatibility. Subsequently, EMA-WOA is employed for optimal controller placement by jointly considering multiple constraints including load balancing, deployment cost and network reliability. The novelty of the proposed EMA-WOA lies in the integration of mother optimization-assisted position updating with the scavenging and hunting behaviors of Wolverine Optimization Algorithm, which improves global exploration capability and prevents premature convergence toward local optima. Simulation results demonstrate that the proposed EMA-WOA-based OCP-SDMECN framework significantly improves controller placement efficiency compared with existing approaches such as MOA, WaOA, PFO, TSO, CCA-PSO and HAS-PSO. The proposed method achieved a minimum controller-switch cost of 93 after 100 iterations, reduced total placement cost to 98.257 and attained higher reliability of 0.87 under 28 switches.



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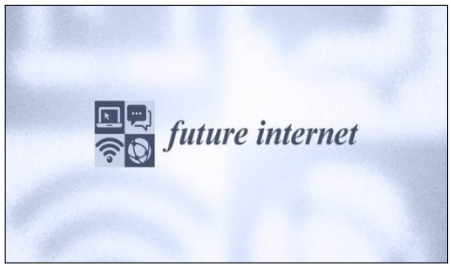
Journal Name: Future Internet **IF: 4.6**

Title: Comparative Analysis of Transfer Learning Architectures for Human Posture Classification Using Silhouette Images

Author: Pradhan A.K.; Tripathy S.; Anbananthen K.S.M.; Pattnaik P.K.; Anbananthen A.

Details: Volume-18, Issue-9, September 2026

Abstract: Human posture classification is an important computer vision task for intelligent monitoring, rehabilitation, assistive systems, and human–machine interaction. This study presents a comparative evaluation of four transfer learning configurations, TL-ResNet-18, TL-ResNet-50, TL-MobileNet, and TL-Xception, under a common experimental protocol—for classifying four human postures (standing, sitting, lying, and bending) from silhouette images. The architectures were evaluated under a common experimental protocol using the same dataset partitioning, preprocessing, augmentation procedures, and principal training settings, while retaining architecture-specific fine-tuning configurations. Performance was assessed using accuracy, F1-score, and ROC-AUC across the training, validation, and test partitions. Among the evaluated architectures, TL-MobileNet achieved the strongest overall held-out classification performance, with a test accuracy of 93.47%, an F1-score of 93.00%, and a ROC-AUC of 99.25%. TL-Xception achieved the same test ROC-AUC of 99.25%, but a lower test accuracy of 92.08%, while TL-ResNet-18 and TL-ResNet-50 achieved test accuracies of 91.81% and 90.00%, respectively. The results demonstrate performance differences among the evaluated transfer learning configurations. Within the evaluated ResNet configurations, greater network depth did not correspond to improved classification performance under the evaluated conditions. Silhouette-based posture classification shows potential for supporting future human-centered smart applications while reducing reliance on appearance-rich imagery. Further evaluation is required to establish cross-dataset generalizability, computational efficiency, and real-time deployment performance.



URL: https://www.mdpi.com/1999-5903/18/9/494

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Journal Name: IEEE Access **IF: 4.2**

Title: A Multi-Model Explainable Framework for Autism Spectrum Disorder Classification Through Questionnaire-Based Screening and Neuroimaging Analysis

Author: Ranjan P.; Pradhan C.

Details: Volume-14, September 2026

Abstract: Autism Spectrum Disorder (ASD) classification using machine learning has shown promising results on behavioral screening datasets, however, such performance may be influenced by embedded questionnaire scoring and threshold-based patterns. This study presents an explainable multi-model ASD classification Framework that consist of questionnaire based screening, augmentation analysis, rule based interpretation, explainable artificial intelligence, and rs-fMRI based neuroimaging classification. The proposed framework is organized into three progressive models. ASD classification on child behavioral dataset focuses on child behavioral screening data and evaluated Logistic Regression, XGBoost, Linear Support Vector Machine, and Bernoulli Naive Bayes with XAI and rule-based interpretation. Multi-cohort ASD classification framework combined child, adolescent, and and adult AQ_10 based datasets and assessed the same classifiers under real, SMOTE, ADASYN, CTGAN, and TVAE training conditions. ABIDE-1 multimodal ASD classification extended the analysis to ABIDE-1 rs-fMRI functional connectivity and phenotypic features using ElasticNet Logistic Regression, Linear SVM, Ridge Classifier, and SGD LogLoss classifier. The questionnaire based models achieved strong performance, with ASD classification on child behavioral dataset framework obtaining a best accuracy of 97% using Linear SVM and Multi-cohort ASD classification framework reaching up to 100% accuracy in selected real and traditional oversampling settings for logistic Regression and linear SVM. SMOTE and ADASYN produced more stable performance than CTGAN and TVAE. ABIDE-1 multi-modal ASD classification framework achieved a best accuracy of 70% using ElasticNet Logistic Regression, reflecting the grater complexity of neuroimaging based ASD classification.

URL: https://ieeexplore.ieee.org/document/11658545

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Journal Name: IEEE Access **IF: 4.2**

Title: NightWatch-TIR-v2: Advancing Thermal Wildlife Species Detection through Explainable Benchmarking

Author: Saha B.P.; Dash S.R.

Details: Volume-14, September 2026

Abstract: Thermal Infrared (TIR) imaging has become an important sensing modality for nocturnal wildlife monitoring because it enables object perception under challenging illumination conditions where conventional RGB imaging systems fail. However, publicly available thermal wildlife datasets primarily focus on image-level classification or application-specific scenarios, providing limited support for localization-aware object detection and explainable model analysis. This paper presents NightWatch-TIR-v2, a comprehensive thermal wildlife detection benchmark comprising 10,765 manually annotated thermal images spanning eleven wildlife species, with high-quality object-level annotations provided in both YOLO and COCO formats. To establish representative performance baselines, five state-of-the-art object detection architectures, namely YOLOv8m, YOLO11m, RT-DETR-l, Faster R-CNN, and EfficientDet-D2, are systematically evaluated under a unified experimental protocol. Experimental results demonstrated excellent localization performance across all evaluated detectors, with EfficientDet-D2 achieving the strongest overall detection accuracy while YOLO11m providing an effective balance between accuracy and computational efficiency. Beyond conventional quantitative evaluation, this work introduces a comprehensive explainability framework based on multi-scale EigenCAM, where unified attention maps are generated from feature representations immediately preceding the detection heads of EfficientDet-D2 and YOLO11m. The proposed framework further introduces the Object Attention Ratio (OAR) and Background Attention Ratio (BAR) to quantitatively measure attention allocation within object regions and surrounding background, enabling dataset-level and species-wise analysis of detector interpretability. Further experimental analyses quantified the distribution of detector attention inside and outside the wildlife bounding-box regions, demonstrating that at the dataset level, both high-performing detectors allocate a substantial proportion of thresholded attention beyond the annotated object boundaries.

URL: https://ieeexplore.ieee.org/document/11692827

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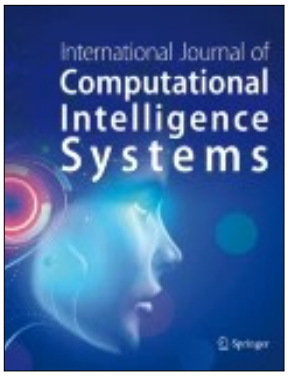
Journal Name: International Journal of Computational Intelligence Systems **IF: 4.0**

Title: A Two-Stage Hybrid Ensemble Framework for Human Activity Recognition Toward Smart Healthcare and Intelligent Environments

Author: Dey R.; Piri J.; Acharya B.; Johari K.; Das P.P.; Deferisha A.D.

Details: Volume-19, Issue-1, December 2026

Abstract: Human Activity Recognition (HAR) plays a crucial role in the development of intelligent systems for smart healthcare, sustainable living environments, and enhanced human well-being. However, conventional machine learning (ML) and deep learning (DL) approaches often face challenges in handling noisy real-world sensor data or require high computational resources. To address these limitations, this study proposes a novel two-stage hybrid ensemble framework that integrates probabilistic outputs from multiple ML classifiers with advanced DL models for robust HAR. In the first stage, diverse ML classifiers, including K-Nearest Neighbors (KNN), Decision Tree (DT), Naive Bayes (NB), Logistic Regression (LR), and Support Vector Machines (SVM) are independently trained to generate class probability vectors. These outputs are then fused to construct a meta-feature representation. In the second stage, deep learning models such as Multi-Layer Perceptron (MLP), Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), Bi-directional Long Short-Term Memory (BiLSTM), and Autoencoder are trained on the meta-feature space to perform final classification. The proposed framework is evaluated on the benchmark Human Activity Recognition Using Smartphones dataset and achieves superior performance with an average accuracy of 99.21%, precision of 99.26%, recall of 99.24%, and F1-score of 99.25%. Statistical validation confirms the robustness and generalization capability of the model compared to state-of-the-art approaches. By enabling accurate, efficient, and scalable activity recognition, the proposed system contributes to the advancement of intelligent healthcare solutions, remote patient monitoring, and inclusive digital ecosystems. This work supports the development of sustainable and human-centric intelligent systems that enhance quality of life and promote well-being in real-world environments.



URL: https://link.springer.com/article/10.1007/s44196-026-01473-y

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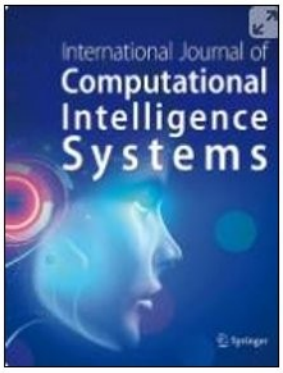
Journal Name: International Journal of Computational Intelligence Systems **IF: 4.0**

Title: Yellow Banded Wasp Algorithm: A Competition-driven Territorial Search Optimizer for Reliable Alignment of Point Cloud Registration

Author: Agrawal U.K.; Panda N.; Aluvalu R.; Tejani G.G.

Details: Volume 19, Issue 1, December 2026

Abstract: This paper presents a fresh swarm-based metaphorical approach termed the Yellow Banded Wasp Algorithm (YBWA) that mimics the adaptive communal dynamics of yellow-banded wasps. The YBWA employs the competition-driven territorial search (CDTS) and the memory-based updating procedure, allowing a balance between exploration and exploitation. The CDTS enables the wasps to adopt a decentralized approach to decision-making, while the memory archive retains the elite solution for future iterations. When utilized together, these aspects simplify the population diversity and the convergence dynamics to the global optimum. The adeptness of YBWA has been meticulously benchmarked on the IEEE-CEC-2017 test functions across dimensions 10 and 30, and the IEEE-CEC-2022 test suite over dimensions 10 and 20. The suggested YBWA outperforms eleven present-day optimization approaches (OAs) in terms of the mean fitness value across all the function types. A chain of non-parametric assessments has been carried out to substantiate the exclusivity of the YBWA. Furthermore, the YBWA has been employed to assess the six rigid transformation components for the Point Cloud Registration (PCR) utilizing the Bildstein Station 1 dataset. The YBWA yields an exact spatial alignment of the point clouds, characterised by low registration error and an optimized set of transformation components. Hence, the YBWA is a viable and reliable approach to be deployed as an optimizer for the registration process and optimistic tasks (OTs).



URL: https://link.springer.com/article/10.1007/s44196-026-01363-3

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Journal Name: Frontiers in Oncology **IF: 3.4**

Title: Multi-plane attention guided 3D nnU-Net for MRI-based cervical cancer segmentation

Author: Mondal J.; Chatterjee R.; Gourisaria M.K.; Sahni M.; LeÃ³n-Castro E.

Details: Volume-16, September 2026

Abstract: Objective – Over 300, 000 people die from cervical cancer, which is the fourth most frequent malignancy in women worldwide. Early identification of cervical cancer has been related to much greater survival rates, and the illness is usually preventable. Accurate cervical segmentation using magnetic resonance imaging (MRI) is critical for diagnosis, treatment planning and response assessment especially in image-guided brachytherapy. Methods – In terms of 3D MRI cervical tumor image segmentation task, several cutting-edge state-of-the-art architectures are explored. We propose a novel model having MultiPlane Attention Guided Enhanced nn-UNet3D model that uses volumetric contextual information to learn spatial relationships across slices simultaneously improving border localization and noise robustness. Results – It is applied on publicly available TCGA-CESC dataset which is part of the Cancer Genome Atlas program (TCGA) and it focuses on cervical squamous cell carcinoma and endocervical adenocarcinoma (CESC). Preliminary results show the accuracy, IoU and Dice score values of 95.04%, 87.87% and 93.52% respectively. Conclusion – This study discusses the significance of MRI scans, which provide high-resolution anatomical information, improving the accuracy of segmentation algorithms in identifying and characterizing aberrant cervical tissues. Future research will concentrate on domain generality across scanners and institutions, multimodal MRI integration and clinical validation in prospective therapy scenarios.

URL: https://www.frontiersin.org/journals/oncology/articles/10.3389/fonc.2026.1862510/full