



SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: IEEE Transactions on Industrial Informatics

IF: 9.8

Title: A3S-Net: An Adaptive State-Space Framework for Resource-Efficient EEG-Based Cognitive State Monitoring in Industrial Human–Machine Interaction

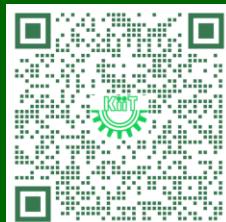
Author: Rai R.K.; Parui S.; Singh D.K.; Srivastava G.

Details: August 2026

Abstract: Mental stress is a critical cognitive factor that directly affects human performance, safety, and decision-making in modern industrial and intelligent systems. Although electroencephalography (EEG) provides a noninvasive and information-rich modality for stress monitoring, many existing approaches rely on computationally expensive recurrent architectures, fixed temporal segmentation, and rigid processing pipelines, limiting their suitability for real-time deployment in resource-constrained environments. This article presents A³S-Net, an adaptive state-space framework designed for efficient inference in industrial human–machine interaction scenarios, with a focus on EEG-based cognitive state monitoring. The proposed approach formulates stress recognition as a feedback-regulated adaptive inference problem, allowing dynamic control of computational effort based on prediction confidence. At its core, the framework introduces an adaptive state-space modeling mechanism that captures long-range temporal dependencies with linear computational complexity. Information-driven temporal segmentation and a confidence-guided control strategy further improve computational efficiency and flexibility. Experimental results on the simultaneous task EEG workload and during mental arithmetic tasks datasets demonstrate that the proposed framework achieves competitive classification performance compared to recurrent and attention-based methods, while significantly reducing computational overhead. The proposed adaptive inference mechanism achieves up to 58.4% effective computational reduction with low runtime latency (8.9 ms) while maintaining competitive stress recognition performance under resource-constrained deployment settings. These findings indicate that feedback-driven adaptive inference provides a practical pathway toward efficient, reliable, and scalable intelligent systems for real-world industrial environments.



URL: <https://ieeexplore.ieee.org/document/11670225>





SCHOLARLY PUBLICATIONS

School of Computer Science and Engineering

KIIT Deemed to be University

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>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: Cognitive Computation

IF: 7.4

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

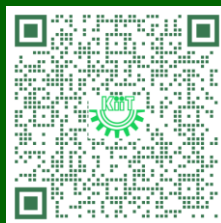
Author: Bajoria S.; Ranjan S.; Adhitya M.; Suri V.; Hassija V.; Chamola V.; Hussain A.

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>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: Biomedical Signal Processing and Control

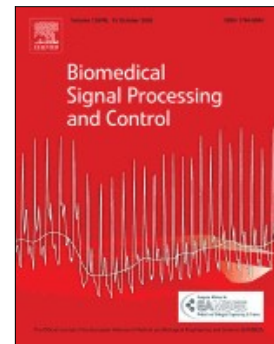
IF: 5.7

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

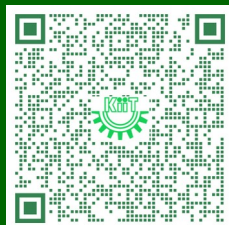
Author: Swain K.P.; Nayak S.R.; Swain S.K.; Sinha U.

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.



URL: <https://www.sciencedirect.com/science/article/pii/S1746809426015648?via%3Dihub>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: Computers

IF: 5.2

Title: ARCHER: A Cycle-Accurate RISC-V Emulator for Microarchitectural Side-Channel and Memory Encryption Research

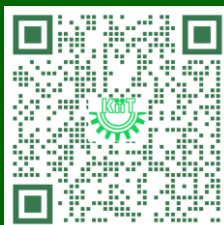
Author: Mishra J.; Sahay S.K.; Mishra S.; Pathak A.

Details: Volume-15, Issue-8, August 2026

Abstract: Microarchitectural side-channels leak data through caches, branch predictors, store buffers, and speculative execution. Evaluating defenses at cycle-model fidelity has forced a choice between functional tools (Spike, QEMU) and gem5's hours-long Linux boots. ARCHER is a cycle-model-relative RV64IMAFDC RISC-V emulator with pluggable superscalar out-of-order execution, coherent caches, simultaneous multithreading, 1 to 16 harts, and thirteen speculation policies: an unrestricted baseline plus five classical defenses and seven new defenses spanning issue-gate, predictive-redirect, and selective-cleanup mechanism families. It boots Linux 6.6 in under three minutes, runs (Formula presented.) faster (geometric mean) than gem5's DerivO3CPU on head-to-head bare-metal microbench, matches gem5 within (Formula presented.) % on 4 of 10 workloads, matches Chipyard's fab-ready RTL to a 9.4% mean cycle-count deviation under two fitted match-configurations, and produces bit-identical architectural output to QEMU at a median (Formula presented.) host-throughput advantage over Chipyard's Verilator flow. Every published Spectre-family defense drives leakage to zero at sub-0.3% instructions-per-cycle (IPC) loss on a full Linux boot, and each new policy is validated on the attack surface its mechanism defends. The Adaptive Memory Encryption Scheme (AMES) adds a bus-layer engine with four authenticated ciphers (each validated bit-exact against its published specification) and per-leaf mask-XOR for Differential Power Analysis (DPA) hardening; a first-order Correlation Power Analysis consistency check confirms the direction of the theoretical bound under the shipped leakage model. Together, ARCHER and AMES provide a single INI-configurable environment for cycle-model side-channel evaluation in minutes rather than hours.



URL: <https://www.mdpi.com/2073-431X/15/8/479>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: Scientific Reports

IF: 4.9

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

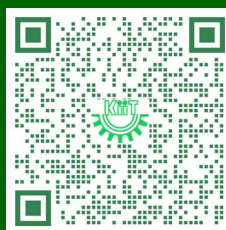
Author: Senapati D.P.; Pani S.K.; Baliarsingh S.K.; Dev P.P.; Somula R.

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>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: Computer Networks

IF: 4.7

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

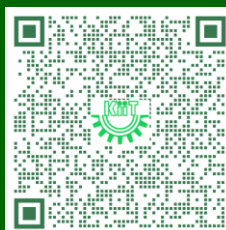
Author: Chandra P.K.; Sharma S.; Ray N.K.; Negi S.K.

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.



URL: <https://www.sciencedirect.com/science/article/pii/S1389128626007322?via%3Dihub>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

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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

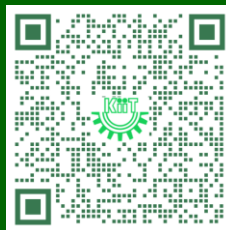
Author: Ranjan P.; Pradhan C.

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>





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: IEEE Access

IF: 4.2

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

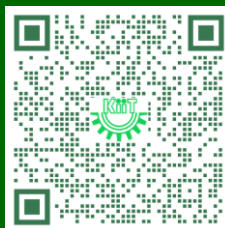
Author: Saha B.P.; Dash S.R.

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.

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





SCHOLARLY PUBLICATIONS

School of Computer Engineering

KIIT Deemed to be University

Journal Name: International Journal of Computational Intelligence Systems

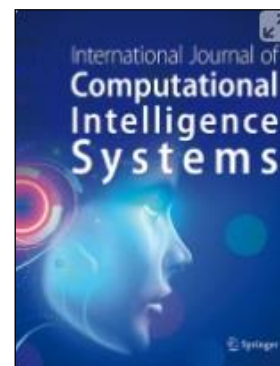
IF: 4.0

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>





SCHOLARLY PUBLICATIONS School of Computer Engineering KIIT Deemed to be University

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>

