2026 6th International Conference on Machine Learning and Intelligent Systems Engineering (MLISE 2026)

Naples, Italy
28-31 May 2026

IEEE Catalog Number: CFP26BE3-POD
ISBN: 979-8-3315-8335-4

IEEE
Advancing Technology for Humanity

Copyright © 2026, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP26BE3-POD
ISBN (Print-On-Demand):	979-8-3315-8335-4
ISBN (Online):	979-8-3315-8334-7

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA

Phone:	(845) 758-0400
Fax:	(845) 758-2633
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

CURRAN ASSOCIATES INC. proceedings .com

TABLE OF CONTENTS

Memory-Efficient Adapter Quantization for On-Device Language Models 1
Nishanth Prakash, Amruta Desai

Physics-Informed Deep Autoencoder for Real-Time Array Calibration on High-Mobility Platforms 8
Hao Lei, Weiping Jiang, Liteng Xing, Pinzhang Zhao

Privacy-Preserving Entity Transformation: A Semantic Compatibility Framework for Language Models 13
Amruta Desai, Nishanth Prakash

Lean Fine-Tuning on a Budget: A Sustainable Framework of Model Tuning Over Resource-Constrained Devices 20
Mounika Karasu, Sadi Alawadi, Fahed Alkhabbas, Mohammad N Aladwan

Research on the Construction of Unbalanced Data Classification Model Based on Multi Objective Evolutionary Algorithm 28
Yanran Li

KAP: Knowledge-Augmented Prefix Tuning for Image Captioning 35
Bingjie Gong, Lin Bai

FMMVCC: Fuzzy Mamba-Based Multi-View Contrastive Clustering for Univariate Time Series 43
Donato Cerciello, Leonardo Schiavo, Angel Panizo-LLedot, Javier Huertas Tato, David Camacho

End-to-End Framework for Intelligent Strategic Agents in Competitive Games 51
Alessandro Sartori, Rossana Zampieri, Corrado Fasciano, Saverio Ieva, Agnese Pinto, Floriano Scioscia Michele Ruta

Type-Conditioned Heterogeneous Transformer for Unsupervised Anomaly Detection in Object-Centric Event Logs 57
Yuxin Wang, Yaoan Jin, Mingke Gao

LOGOS: Logic-Oriented Graph Ontology Synthesis for Interactive Literature Navigation 66
Pi-Wei Chen, Zih-Ching Chen, Rafał Cupek, Jerry Chun-Wei Lin

CRISP: Conformal Resilient Intrusion Detection with Selective Prediction 71
Alberto Moccardi, Alessandra Amato, Rajib Chandra Ghosh, Egidia Cirillo

Ablation Study of Hyperparameters in Spiking Neural Networks: A Case Study for Event-Based Gesture Recognition 81
Salvatore Barone, Luigi Gallo, Filippo Maggioli

Integrating Move-Transition Constraints and Reverse Conditional Generation for Data Augmentation in Low-Resource Academic Move Recognition 89
Hanyu Li, Yuanbo Kong, Meng Wang

Towards Energy-Efficient Federated Anomaly Detection in Dynamic Environments 99
Francesco Vitale, Salvatore Bramante, Alessandro Cilardo, Francesco Flammini, Nicola Mazzocca

Cross-Modal Misalignment as a Systemic Vulnerability in MLLMs 104
Valentina De Angelis, Daniela Annunziata, Stefano Izzo, Fabio Giampaolo, Francesco Piccialli

Rethinking Tabular Data Extraction: A Comparative Study of Traditional and LLM-Based Pipelines 113
Valerio Bellandi, Cristihan Peverelli, Stefano Siccardi

KeyLens: Identifying Critical Reasoning Moments in Vision-Language Models via Expert-Amateur Contrastive Analysis 120
Xiaosong Xu

FU-TTA: Federated Unlearning for Test-Time Adaptation 128
Pian Qi, Jingzhi Tu

A Dynamic Content Safety Policy Updating Framework Based on Online Learning and Concept Drift Adaptation 136
Hao Yuan

Failure-Gated Hierarchical Memory: Preventing Memory Pollution in Long-Horizon LLM Agents via Critic-Guided Write Control 140
Qizhi Liu, Meng Wang, Jing Xie

Performance Overheads in GNN Training: Toward a Generalized Analytical Model 148
Valeria Mele

Research on Machine Translation Model Construction Based on Feature Fusion of Pre-Trained Models 153
Yuhua Qin

Ablation Study of Gaussian RBF-KAN for PDEs Approximation 157
Pasquale De Luca, Emanuel Di Nardo, Emilio Garzia, Livia Marcellino, Angelo Ciaramella

Sparse Density-Aware Oversampling Algorithm 165
Zhengquan Li, Yunbin He

Lightweight Multi-Agent Self-Evolution in Constrained Environments 170
Jiadong Gan, Huizhao Li, Jun Yang

Entropy-Guided Adaptive Hierarchical Clustering for Imbalanced Learning via Dynamic Neighborhood Radius 178
Jiawei Wang, Yunbin He

A Lightweight MLLM-Driven Multimodal RAG Framework for Evidence-Grounded Question Answering 183
Zhemin Zhao, Yafei Si

A Multi-Task Prompt Collaborative Optimization Method Based on LoRA Low-Rank Adapters 187
Xinyue Zhang

Spectral Clustering Optimization Algorithm Based on Graph Attention 191
Huining Wang, Yunbin He

Research on Retrieval-Augmented Hindi-Chinese Document-Level Machine Translation for Multiple Domains 195
Xingfu Liu

Interpretable Binary Classification Model Integrating OPLS-DA and SHAP 201
Chunyu Wang, Ling Tong

Prompt Engineering for Chinese Factivity Inference via Predicate-Argument Triples and Linguistic Rules 205
Lingyun Fan, Biao Zhang, Xiaoyu Chen, Peiyu Chen, Binyang Li

Task-Conditioned Symbolic Routing for Causal Question Answering in Large Language Models 212
Yuanbo Kong, Xiaosheng Ma, Meng Wang

Integrating Reverse Knowledge Distillation for Unsupervised In-Vehicle Network Intrusion Detection 219
Yixuan Liu, Shuyue Wang, Meng Wang, Peng Liu, Haibo Chen

A Sequence-Linguistic Re-Modeling-Based Intrusion Detection Method for In-Vehicle CAN Buses 224
Yixuan Liu, Jun Xu, Meng Wang, Yixuan Wang, Xinkang Tong

FedASUT: Absolute-Threshold Sparsification with Update Tracking for Communication-Efficient Federated Learning Systems 230
Matthew Rollings, Simranjit Sidhu, Ewan Walker, Jack Towler, Lauren Hutchinson, Alexander Lines Rishabh Kishore, Hamza Ali, Rehmat Ullah, Chuadhry Mujeeb Ahmed, Aydin Abadi, Rajiv Ranjan

When Not to Write Memory: Governing False Promotion from Correlated Agent Traces 236
Yijiashun Qi, Xiang Xu, Yuxuan Li

A Single-Protocol Privacy-Utility Comparison of Conditional Generative Augmentation 243
Zhichao Fan, Yanhang Li, Zexin Zhuang, Qikai Yang

VeriAct-Agent: Evidence-Verified Tool Execution for Reliable LLM Agents 248
Chong Zhang, Jianan Sun, Ziyan Hu, Junqi Zhang, Yuxiao Wang, Zhenyu Yang

Time Series Classification via Multi-Gate ResNet with Multiscale Decomposition 254
Zhichao Wu, Yangyang Liu, Di Shen, Jinhua Zhang

An End-to-End Framework for Ischemic Stroke Lesion Segmentation and Clinical Summary Generation Using Transformer-Enhanced 3D U-Net and LLM 264
Dilan Dogru, Mehmet Akif Ozdemir, Onan Guren

Real-Time Handwriting Recognition with Embedded Machine Learning and Portable Hardware 270
Daniel Tunyinko, Dave Leori Donbo, Nathan Amanquah

CAVE-DCS: Computational Audio-Vocal Emotion Detection in Clinical Settings 277
Aman Soni, Girija Rajakumar, Rashmi Chawla, Giancarlo Fortino

QuaBiT-Net: Metaheuristic-Optimized Quality-Aware Bilateral Transformer for Multimodal Iris and Palmprint Biometric Authentication 283
Indu Singh, Ishaan Singhal, Harish Ramaswamy, Harsh Anand

Full-Frame and Predicted-ROI Fusion for Kidney Stone Classification in Ultrasound Images 292
Ceyda Boz, Yücel Kocyigit

Situation-Aware Human Behavior Recognition in Smart Homes Using Ambient and Wearable Sensing 296
Zia Ur Rehman, Gloria Beraldo, Riccardo De Benedictis, Alessandro Umbrico, Gabriella Cortellessa

EDGE-HAS-Seg: Edge Enhancement with Hierarchical Adaptive Structure for Segmentation 301
Kerui Liu

A Physics-Informed Dual-Stream Neural Network for Multispectral Satellite Image Super-Resolution Using the SEN2VENµS Dataset 306
Antonio Marino, Alessandro Bottino, Vincenzo Vocca, Salvatore Cuomo

Security Evaluation of Autonomous-Driving 3D Object-Detection Systems via LiDAR Point-Cloud Wavelet-Entropy Features and AdvGAN Attacks 311
Minzhou Wang

Fairness-Aware Multimodal Glaucoma Detection via Neurosymbolic Learning with Differentiable Clinical Constraints 315
Antonino Ferraro, Martina Iammarino, Fabiano Pecorelli, Semanto Mondal, Giuseppe De Pietro

Analysis of Indoor Object Detection Model for the Seamless Navigation 320
Ravi Raj, Ilker Demirkol, Francisco del Águila López, Francesc Xavier Moncunill-Geniz

DA-YOLO: Degradation-Aware Vehicle Detection for Low-Visibility Scenarios 325
Wen Su, Guifang Guo

SuperPoint-Based Checkerboard Feature Point Detection for Spectral Calibration of a DMD Polarization Spectral Imaging System 329
Ziteng Wang

HMF-RTDETR: A UAV Small Object Detection Method Based on Hierarchical Multi-Feature Fusion 334
Yangliu Xiong, Wei Weng

LADC: A Dual-Branch Adaptive Image Enhancement Method Based on Feature Decoupling 339
Qingpeng Li, Haonan Li, Xinyu Ouyang, Zijian Li

Application of Graph Transformer Network With Multi-Modal Sensor Data Fusion for Machining Quality Prediction in Industrial Robots 347
Mingan Wu

A Semi-Supervised Noisy Label Learning Framework with Distribution Alignment for Chagas Disease ECG Detection 351
Hao Chen, Songtao Jiang

A Machine Vision-Based Cleanliness Grading Method for Sand and Gravel via Surface Impurity Ratio 355
Fuming Li, Hui Li, Fengsheng Guo, Peng Li, Jing Zhang, Xian Zhou, Zeyu Fan

Pixel Contrastive Learning Image Segmentation Algorithm Based on Negative Guidance and Positive Constraint 360
Huanxin Yin

Subway Tunnel Defect Detection Algorithm Based on RAG-DETR 366
Yuwei Li, Zhenhai Zhang

Zero-DCE-D: Zero-Reference Low-Light Image Enhancement with a Lightweight Multi-Scale Denoising Branch and Mish Activation 370
Jinghan Wang, Hailong Chen, Dongnan Zhang

Design of Autonomous Navigation System for Mobile Robots Based on Multi-Sensor Fusion and Deep Reinforcement Learning 374
Xiaoping Xu

YOLOv11-Site: Cross-Scene Multi-Scale Detection for UAV Construction Safety with EMA and WIoU V3 378
Huiying Li, Zhe Yu

Real-Time Weapon Detection on Edge Devices for School Campus Safety Using Optimized YOLO-ONNX Inference with Non-Maximum Suppression 382
Tushar Jangade

BiLN-Net: A Lightweight Dual-Branch Network with Bidirectional Interactive Attention for Pulmonary Nodule Classification 389
Yueying Zhou, Jianmin Dong

Counterfactual Audio Training and Modality Faithfulness Analysis for Audio-Visual Question Answering 393
Xiyue Yang, Yongwang He, Boyuan Lian

Active Acoustic Pulse and Image Fusion for Low-Carbon Steel Weld Defect Detection 399
Yulong Xing, Nan Liu, Xin Wang, Xingguo Li

Self-Supervised Meta-Learning Framework for Generalizable Quality Assessment of Ai-Generated Images 404
Zhao Liu, Xiangxing Kong

FCINet: Frequency-Aware Cross-Frequency Interaction Network for Fine-Grained Truck Classification 408
Zhen Zeng, Junliang Pan, Xuekun Yang, Hao Li

An Intelligent Machine Learning Framework for Radar-Based River Flow Monitoring and Estimation 416
Qing Gao, Yonghuai Yang, Yuansheng Huo, Mei Zhang

System-Level Performance Analysis and Hardware Acceleration of Pre-processing in Edge AI Object Detection Pipelines 420
Mohammed Elmir, Nathan Amanquah

Micro-Architectural Evaluation of an FPGA-Based LSTM Accelerator 426
Obed K. Allotey Babington, Alosius Akonteh, N. Amanquah

Semantic Navigation and High-Precision Autonomous Docking for Mobile Robots in Nuclear Medicine Environments 431
Weiping Jiang, Hao Lei, Liteng Xing, Aiguo Song

From Activity Recognition to Predictive Thermal Comfort: A User-Aware Sequential Learning Framework 436
Sundas Sarwar, Zia Ur Rehman, Daniela Annunziata, Fabio Giampaolo, Francesco Piccialli

Feasibility of PPO-Based Structured Gait Adaptation for Contact-Rich Snake Robot Locomotion in a Straight Pipe 441
Michal Kelemen, Marek Vagas, Ivan Virgala

Line-of-Sight USV Path Following with Online Learning-Based Sideslip Compensation 450
Luka Martinović, Lazar Ašanin, Žarko Zečević

Analysis of Machine Learning Framework for QoS in 5G/6G Mobile Networks 456
Toni Janevski

Regime-Aware Deep Learning Framework for Predictive Maintenance in Industrial Systems 460
Nikhil Barot, Rasha S. Gargees, Kritika Gupta

Mixed-Effects Modelling of Brain Morphology for Alzheimer's Disease Progression 464
Hafiz Muhammad Ali Bhatti, Andrea Rosani, Muhammad Faheem, Usman Ali, Umer Ramzan Giuseppe Di Fatta

HiNeS-IDS: Hierarchical Neural Selective Intrusion Detection System 471
Egidia Cirillo, Alberto Moccardi, Marcello Pelosi, Flora Amato

QoS Assurance Mechanism for 5G Network Slicing Based on the Deep Reinforcement Learning PPO Algorithm 481
Qingyang Li

Graph-Transformer Framework for Topology-Aware Blocking Prediction in Elastic Optical Networks 485
Farzaneh Nourmohammadi, Reza Taherkhani, Uzay Kaymak

A Data-Driven Framework for Contamination Risk Assessment in High-Volume Lithium-Ion Battery Manufacturing 492
Ginzu Fung Guan, Xindi Liu, Lintao Wang

Fast-Response UAV Delivery Path Planning in Urban High-Rises via Reinforcement Learning 497
Xuanyi Song

Inverse Optimal Control for Aircraft Intent and Parameter Identification in Storm-Avoidance Trajectories 501
Almudena Buelta, Alberto Olivares, Ernesto Staffetti

Perimeter Exploration Optimization for Last-Mile Delivery on the OPEN Benchmark: A Multi-Factor Viewpoint Scheduling Method 513
Hao Tang, Wentao Wang

Probabilistic Daily AQI Forecasting with Monte Carlo Dropout in Lightweight Transformers 517
Yong Fang

Dynamic Evaluation Model for Full-Coverage Efficiency of Grid Governance Driven by Multi-Source IoT Perception Data-Engineering Practice Inheriting the Institutional Concept of Full Coverage 521
Xiuyan Zhang, Jie Tang

Covariance-Aware Continuous Ranked Probability Score with Multiscale Ewma Monitoring for Industrial Process Faults 525
Qingpeng Bi, Yumeng Sun, Chengwei Wu, Lin Ma, Ximeng Yu

Numerical Simulation and Effect Study of Mass Concrete Temperature Control Based on Hybrid Intelligent Algorithms 530
Fan Su, Chuan You

Data-Driven Intelligent Design Method for Topological Structure of Natural Gas Gathering and Transportation Pipeline Network 534
Chenyu Xu

Unified Identity Layer for Hyperscale Ecosystems: A Framework for Cross-Platform User Attribution and Experimentation 540
Yuning Bao, Yujuan Qiu, Heyu Wang

Emergency Evacuation Route Planning for Shopping Mall Buildings Under Fire Conditions Based on PPO 544
Yi Guo, Lei Niu

Trustworthy Predictive Maintenance: Physics-Informed XAI for Probabilistic RUL Estimation 554
Alessandro Del Prete, Zahida Mashaallah, Flora Amato

Regression Prediction of Battery Health Status for New Energy Vehicles Based on Machine Learning Algorithms 560
Yibo Su

Hydrascale: Trust-Coupled Elastic Scaling for Federated Ci/Cd Pipelines Using Bounded Autonomous Agents 565
Nilesh Jaiswal, Karthik Pappu, Deepak Pai

Vessel Trajectory Prediction Based on Multi-Scale Temporal Pyramid Encoding and Scale Attention Fusion 570
Chiming Wang, Dongke Zheng, Shunzhi Zhu, Zhenjun Li, Bingkun Wu, Qin Nie

An Artificial Intelligence Approach for Predicting and Explaining Air Pollutants in Urban Areas 577
Eliezer Zahid Gill, Daniela Cardone, Alessia Amelio

t-LEAP: Pedagogically Feasible Counterfactual Explanations for Language Learner Dropout Prediction 581
Satish Kumar KC, Anmol Bhatta, Kushal Bhandari, Ushana Bhattarai, Puspa Subedi, Pooja Bohara Shraddha Khadka

Early Anomaly Diagnosis Method for 750kV High-Voltage Cables Integrating Physical Constraints and Multi-Source Monitoring Data 589
Fei Gai, Qingsen Cai, Feng Jing, Xiuli Lu

CepLoc: A Cepstral-Based CSI Fingerprinting Method for Indoor Localization 596
Yong Zhang, Yajing Kong

Intelligent Resource Allocation and Performance Optimization for 5G Network Slicing Based on Machine Learning 600
Haijun Yang

Study on Water Quantity Optimization Scheduling Strategy in Hydraulic Engineering Construction Under the View of Intelligent Algorithm 604
Ruibo Wang

Non-Hermitian System Modeling and Adaptive Algorithm Optimization for Grid Energy Storage Sudden Change Prediction 607
Junfang Sun, Junjun Ma, Weiqing Wang, Jin Jin

Prediction of the Evolution of Environmental Microbial Biogeographic Distribution Based on Spatiotemporal Graph Convolutional Networks and Long-Term Monitoring Series 611
Lvxin Zhu

Prediction of the Optimal NIPT Testing Time Point for Male Fetuses Based on XGBoost and SHAP 615
Zetong Li

BayesDR-LCB: Bayesian Doubly Robust Off-Policy Evaluation with Posterior Lower Confidence Bounds for Industrial Recommender Systems 622
Ruoru Yan

HiLo-GNN: High-Low Trajectory Discrepancy Learning for Complex Network Resilience Prediction 626
Jingwen Jia, Chenghua Gong, Tianlong Fan, Linyuan Lü

An LLM-Based Multi-Agent Architecture for Schema-Aware Data Mining in Intelligent Information Systems 630
Marzia Canzaniello, Sara Amitrano, Anna Borrelli, Lingyu Qiu, S M Asiful Huda, Francesco Piccialli

Hybrid Intelligent Paradigm Integrating Pearson Trend Extraction with Evolutionary Neural Networks for Time-Series Settlement Forecasting 640
Xinyi Liu, Xiangxing Kong

Design and Validation of a Highly Reliable Intelligent Control System for Façade-Cleaning Robots Based on Lora Distributed Architecture 644
Fujun Yang, Chaofeng Liu

LSTM-Based Short-Term Water Level Forecasting for Urban Flood-Prone Areas with Application to Intelligent Gate Scheduling 649
Xian Wu, Quanhong Li, Weihang Zhang, Yajun Shi, Xian Zhou, Zheng Fang

Design of Intelligent Knob Based on FOC Vector Control 654
Tingmei Yao, Yaoxing Chen, Xing Li

Genetic Algorithm-Optimized Back-propagation Artificial Neural Network for Sediment Prediction of Purple Soil Slopes 660
Xian Zhou, Quanhong Li, Guoyong Chen, Qi Lu, Ya Liu, Xia Chen

Evidence-Verified Root Cause Localization for Microservice Incidents under Tool and Telemetry Noise 664
Lu Ren, Yihang Tang, Bingxu Chen, Jingzhou Tao, Fangyi Chen

VeriTrail-RCA: Evidence-Verified Root Cause Localization for Microservice Backends 670
Rong Hu, Yuxuan Zheng, Ruochen Fang, Jingfeng Zhou

TopoRCA-Lite: Dynamic Topology-Aware Root Cause Localization Under Limited Observability 676
Wenrui Ma, Zirui Liu, Ruili Jiang, Yu Jiang

ESA-Net: An Expectation-Satisfaction Asymmetry Network with Adaptive Gap Penalty for Cross-Cultural Digital Service Evaluation 682
Zongsheng Chen, Kening Da, Yanli Sun, Christos Kelepouris, Chunyan Wang