2026 8th International Conference on Internet of Things, Automation and Artificial Intelligence (IoTAAI 2026)

Harbin, China
29-31 May 2026

IEEE Catalog Number: CFP26VJ4-POD
ISBN: 979-8-3195-0535-4

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:	CFP26VJ4-POD
ISBN (Print-On-Demand):	979-8-3195-0535-4
ISBN (Online):	979-8-3195-0534-7

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

Research on Multi-Modal Network Resource Scheduling and Power Consumption Optimization Integrating IoT Features 1
Ming Chang, Shuang Yang, Feng Liu

Design Exploring of the Network Protection System for Meteorological Big Data Cloud Platform 8
Huai-ou Tang, Lian-sheng Hua, Gang Ji, Shu Yang, Yong-hua Ji, Jun-jie Huang

Design and Implementation of General Monitoring for Cloud-Based Meteorological Business System on “Tianjing” 13
Guaiguai Liu, Chao Sun, Qing Huo, Feng Gao, Shiwang Chen

Asynchronous Consistent Hashing-Based Dynamic Topology Self-Organization Method for Industrial IoT 21
Shunli Peng, Shibao Sun

A Multi-Dimensional Value-Based Client Selection Method for Federated Learning Under Data Heterogeneity in IoT 25
Rongmeng Lv, Shibao Sun

Carbon Emission Real-Time Calculation Model Based on Federated Learning Blockchain Fragmentation Storage Protocol 29
Junjia Yang, Yanzhen Jin, Yanzuo Chen

Time-Predictable Architecture Analysis Based on T-CREST 33
Hao Pan

A Multi-Scale Aware Time-Series Anomaly Detection Framework for Heterogeneous IoT Devices 45
Bo Zhang, Weidong Xin, Rui He

Adaptive Task Scheduling in Edge-Cloud Systems Via Large Language Model-Based Policy Generation 50
Dachuan Jiang

Research on Resource Allocation Algorithm for Internet of Vehicles Based on Graph Neural Network 55
Haoyu Zheng, Lin Kang, Zeyong Cui, Wenjing Qiao

Research on SSD Load Balancing Based on Fractional-Order Discrete Artificial Potential Field 60
Tai Guo, Dapeng Sun, Min Liu, Chenyuan Wang

Lightweight Graph Attention for Carbon-Aware DAG Scheduling at the Edge 65
Zhou He, Bo Jiang, ChuXuan Shi, YiXin Tian

A Multi-Scale Selective State Space Network for Long-Range Network Latency Forecasting 70
Jian Xu

A State-of-the-Art Survey of Generative AI for Mobile Edge Computing: Architectures, Optimization, and Applications 75
Mingke Chu

A Cross-Directional Selective State Space Model for Efficient Network Latency Forecasting 85
Jinhang Wang

Reliable Identification of RFID Tags Under Rayleigh Fading Channel with Considering Capture Effect in Vehicular Networks 90
Yang Wang, Ziwei Tang, Xiaoying Shuai, Hui Li

Competition- and Timeliness-Aware Adaptive Asynchronous Aggregation for Federated Learning in Edge-Assisted Vehicular Networks 94
Qianxian Zhou, Cheng Zhou

Research on the Construction of IoT Vulnerability Knowledge Graph by Integrating BERT and Graph Attention Network 100
Yuxin Liu, Jiahui Wang, Xinyu He

Coordinating Training and Inference in Heterogeneous Cloud GPU Clusters with Learned Interference Models 104
Tianjian Xia, Xinxin Huang, Yihao Zhou, Feng Chang, Lu Ren

Cost-Aware Cross-Cloud Federated Learning with Learned Client Routing and Aggregation Selection 111
Jiejun Jiang, Jiahui Hu, Yiyun Lyu

Real-Time Optimization of an Intelligent Security System Based on FreeRTOS and ESP8266 117
Xinping Ji, Jiale Tong, Yudong Wang, Bosen Hou, Yiping Shi, Danzhi Wang

Multi-Feature Integration Network for V-D-T Salient Object Detection 123
Hongbo Bi, Bingjie Xia, Cong Zhang, Yunfeng Zhang

GDW-YOLO: An Insulator Defect Detection Algorithm Based on an Improvement of YOLO11n 128
Zefan Fang, Xianjun Wu, Shunbo Xiang, Bing Xu

Research on Interactive Object Detection with Multimodal Large Models 133
Hongyu Xiao, Xinyu Chen, Hongxi Xue, Shicheng Wang, Zhanzhi Guo

Vision Model Scaling and Fusion for High-Precision UAV-Based Human Detection 137
Siyuan Wang

Underwater Image Enhancement via Mamba-Inspired State-Space Disentanglement Refinement 143
Ruizi Wang

Improved YOLOv12n for Small Object Detection in Uav Aerial Imagery 148
Shaokang Zha, Heng Xiao, Junran Wang

BWW-YOLO: An Improved Fall Detection Algorithm Based on YOLOv8n 159
Yuchen Liu, Jiasong Mu

Design of High-Precision Dimension Detection System for Mechanical Parts Integrating Deep Learning and Machine Vision 163
MingJian Wei, YanJun Zhang, HongTao Mou

UAV Ground Dense Target Detection Method Based on Improved YOLOv8 167
Weilong Li, Shangkun Lou, Rui Lu, Guoqiang Feng

Abnormal State Recognition for Three-Mobile-Robot Formation Systems Based on Multi-Source Temporal Feature Fusion 172
Xinlin He, Mengjun Wang

MSM-DETR: An Efficient End-to-End Framework for Real-Time Road Damage Detection 178
Rui Zhang, ZhenMin Yang

Virtual Cutting with Mesh Quality and Growth Control 182
Monan Wang, Mingrui Wang

LGFE: Local-Global Feature Extraction Network for Hyperspectral Image Classification 186
Chunlan Yang, Dawei Xue

A Multi-Contrast MRI Arbitrary-Scale Superresolution Reconstruction Method Based on Normalizing Flow 190
Qiongmin Zhang, Yin Shi, Xiaowei Tan, Xingqi Zhang, Xin Li, Muyan Zha

SF-DADHNet: Spatial-Frequency Fusion with Domain-Aware Dual-Head Network for Generalized Deepfake Detection 194
Naiwen Duan, Ling Xia, Yang Yang, Hao Lin, Bingjie Liu, Jinhua Luo, Min Li, Yu Xiang

HR-DFINE: Real-Time Traffic Sign Detection via High-Resolution Shallow Feature Reconstruction and Inner-GIoU 202
Si Ha, Xuemei Lei

Identification of Rock Fracturing Stages Based on Digital Image Correlation Cloud Maps and a Convolutional Block Attention Module Enhanced DenseNet121 Model 207
Songyan Wang, Duo Wang, Zhejun Pan

Research on Flange Positioning Based on Monocular SLAM 211
Zhongyao Zhang, Yuchuan Feng, Yingzhao Wang, Yanbo Shang, Mingyi Li, Xuanjian Zhao

ADC-YOLO for Insulator Defect Detection in Complex Backgrounds 215
Shuai Song, Shipeng Zhang, Jiajun Ma, Kangfei Zhao

An Improved Pix2PixHD for High-Fidelity Reverse Reconstruction of Semiconductor Lead-Frame Graphics 219
Huanxin Yin, Kai Liu

ACSA-Net:Combining Adaptive Convolution and Self-Attention Network for Point Cloud Classification and Segmentation 227
Guangwei Huang, Sifan Chen, Silin Chen, Fu Liu

YOLOv8s Helmet Wearing Detection Algorithm Based on Multi-Scale Fusion Attention Mechanism 235
Chang Li, Jie Li

DMSN: A Dual-Channel Multi-Perspective Semantic Network for Visual Question Answering 242
Xin Wang, Yao Wang

StarSeg-YOLO11 for Small Threaded-Hole Instance Segmentation 246
Jiaqi Bai, Bingpeng Gao, Xin Cai

A Survey of Intelligent Recognition Methods for Aerial Small Targets Based on Multimodal Recognition 252
Hongpeng Liu, Ye Cheng, Hang Yang, Zhiqian Zhou

DualTransUNet: Dual-Branch Bidirectional TransUNet for Medical Image Segmentation 264
Ziyi Lv, Guihong Li, Tao Fan, Qiang Liu, Zhu Wang, Meng Wang

PGCF-Net: Progressive Gated Complementary Fusion for Infrared and Visible Images 269
Chengxi Zhu, Guihong Li, Yajie Zhao, Tao Fan, Qiang Liu, Meng Wang

An Improved U-Net and Random Forest Method for Height Prediction 273
Dongliang Yang, Siwen Sun, Xiaodan Cong, Changjiang Song

MSLiteNet: A Lightweight Multi-Scale Attention Network for PCB Defect Classification 278
Shenghong Yang, Shanhong He, Wenqi Zhu

A Lightweight YOLO-Based Manhole Cover Status Detection Method on MaixCAM 282
Chuanzan Liu, Changlu Hu

MTMTrack:Multi Template Mamba Tracker with Bidirectional State Space 286
Keyuan Ren, Gang Xiao, Ninghao Ma, Jun Jia

Deep-Broad Fusion:Condition-Adaptive Fault Prediction Framework for Hybrid Power Systems 296
Kang Wang, Yongdong Luo, Zijian Xue, Quanbo Ge, Wei Xiao, Weiqi Kang, Kaicheng Zhang

CBAM-TCN-Transformer-BiLSTM with IALA Optimization for Diesel Engine Fault Diagnosis 302
Xinyue Wang, Gang Yao

PSO-Based LQR-PID Compound Control for Single-Axis Tracking of a Two-Axis Gimbal 307
Huan Liang, Ruilin Huang, Yaoxuan Wang

Robotic Grasping Method Based on Rgb-D Visual Localization and Damped Pseudoinverse Motion Control 312
Yezhen Gao, Ying Yu

Research on Intelligent Quartz Temperature Observation Instrument 318
Xingli Liu, Ruihan Gao, Hongyan Xu, Xue Pan

A Study on Unmanned Aerial Vehicle Path Planning Based on an Improved Greylag Goose Optimization Algorithm 323
Wen Gu, Bo Zhang, Lin Zhang, Yanxu Li, Ruohan Tian, Cheng Chen

A Control Method Based on RBF Neural Network, Applied to the Speed and Torque Control of the Engine-Dynamometer System 328
Fangjie Liu, Ziqi Ma

Learning Model Predictive Control for Agile Trajectory Optimisation of Unmanned Aerial Vehicles in Dynamic Environments 334
Leyan Yao

Research on Large-Scale Multi-Wave Coordinated Fire Strike Planning Based on Memetic Algorithm 340
Bozhi Xiao, Runyu Liu, Yisai Hua, Duoquan Sun

Recognition and Sorting Robot Based on OpenMV 345
Chen Wang

Design of a Test Circuit for Microvolt-Level Input Offset Voltage in Operational Amplifiers 352
Fujie Liu

Multi-Objective Optimization of Flexible Job Shop Scheduling in Cloud Remanufacturing Based on Artificial Intelligence Algorithms 356
Chao Li

Sliding-Mode Control of Multi-Region Power Systems Under Cyberattacks 360
Yujiao Yan, Yehong Wu, Yajing Cheng, Ximiao Liu

Disc Brake Control System of Belt Conveyor Based on PID Control Parameter Optimization 364
Shimin Xin

Research on Underwater Geomagnetic Navigation Algorithms for Deep-Sea Human Occupied Vehicles 368
Hongyu Ruan, Qimao Zhang, Qisheng Zhang, Ziyang Wang

Overall Design of an Intelligent Unmanned Delivery System 373
Li Deng, Runhua Liu, Xinglei Qu, Xingshi Hang

Depth Characterization of Curved Composite Delamination Defects Using an Improved 1D-CNN 382
Shengkai Yan, Jiajin Li, Hu Yuan, Gaocheng Chen

Fixed-Time Sliding Mode Speed Regulation Control for PMSM Based on Extended State Observer 386
Jiaxiang Fang, Haifeng Wei, Jia Cui, Ling ang Kong

A Cooperative Exploration and Attack Method for FPV Drones Based on Probabilistic Graph and Improved Auction Mechanism 391
Jiarui Wei, Yujie Wang, Yafei Lu, Leigang Sun

Industrial IoT-Oriented Acoustic Monitoring and Defect Diagnosis for Stud Welding 397
Lu Lu

Unscented Kalman Filter Correction Using Stacking Ensemble Learning for UAV Position Estimation 402
Yinuo Yang

Research on Health Condition Early Warning of Tobacco Redrying Motors Based on Deep Learning 407
Hengjiang Liu, Yunhai Gu, Xinhai Bao, Yang Lyu, Fei Xia

The Design and Application of the Intelligent Key System for Pumped Storage Power Stations 412
Songyan Qu, Yu Liang, Xing Li, Xiaoping Li, Wenyang Bai, Haiyang Zhang

ACO-PSO Hybrid Path Planning With Pheromone Gradient Field for Smooth and Safe Robot Navigation 419
Yukuan Xie, Weijie Wang, Qiguang Zhao, Qiang Zhang

Multi-Strategy Enhanced SOO and DPC-SVM for Rolling Bearing Fault Diagnosis 424
Junwei Mai

Unmanned Data Center Equipment Inspection Using Hermes Multi-Agent Framework with Hindsight Memory Mechanism 428
Chen Li, Yu Sun, Boyu Shi, Manwen Li, Heyu Zhang

Development and Application of Large-Scale Models in the Smart Home Domain 433
Yang Yang, Qiang Li, Xiaoli Huang, Yuanhai Shen, Shuhan Cheng

Lagrangian Trajectory-Based Diagnosis Framework for Huang-Huai Cyclone Heavy Snowfall Classification and Forecasting 438
Haijun Yu, Shuxin Han, Libao Zhang, Yan Wu, Tianyu Li, Meirong Shao

Data-Driven Nonstationary Modeling for Extreme Precipitation Return Period Differences and Future Scenario Response Advantages 445
Xue Chen, Ziyang Wang, Hemin Sun, Mengzhu Gao, Ying Zhou, Tiao Qian, Jing Zhao

Minimizing Angle Estimation Mean Squared Error Using an Improved Artificial Rabbits Optimization Algorithm 452
Feng Wang, Mingyan Jiang, Dongfen Yuan, Ze Zhao

Research on a Fusion Model of Satellite Remote-Sensing Fire Points and Ground PM10 Observations Based on a Multilayer Perceptron 456
Biao Hou, Liang Qiao, Shuhan Peng, Yingkui Yang, Shuxin Han, Chuntao Zhu

XGBoost-Based Multi-Data-Driven Method for Small-Scale Wind Direction Prediction 462
Shuhan Peng, Biao Hou, Bo Huang, Zhaowei Zhang, Chuntao Zhu

Multi-Source Fusion with Adaptive Bias Correction for Minute-Level $100-\mathrm{m}$ Wind Forecasts 468
Tiao Qian, Yu Bai, Ling Gao, Yan Wu, Yaping Liu, Yinwei Zhang, Zhongkai Zhao

Research on a Gridded Precipitation Fusion Algorithm Based on ECMWF Ensemble Forecasts 473
Yan Wu, Huijun Zhang, Yujing Xie, Haijun Yu, Yingying Meng, Libao Zhang, Guangna Zhao, Guozhong Ma

Snow Depth Retrieval Using XGBoost in Heilongjiang Province 481
Shuxin Han, Haijun Yu, Heng Zhang, Xiaolei Su, Huajian Xin, Yuhang Pei

Prompt Engineering for Empowering Audio Large Models in Interference Recognition: Strategy Optimization and Zero-Shot Scenario Adaptation 491
Qiu Yang

Research on the Whole-Process Solution of Intelligent Monitoring and Artificial Hail-Suppression 496
Pinwei Cao, Yan Wu, Guodong Jing, Yang Ju, Miaomiao Zhang, Jingyi Ma

Dynamical-Statistical Subseasonal Prediction of Early Summer Heavy Precipitation in the Songliao River Basin Based on CMA-CPSv3 503
Tianyu Li, Haijun Yu

Attention Mechanisms in Deep Learning: A Technical Review with a Focus on Efficiency and Edge Deployment 510
Xiaoling Bai, Xinghan Li, Li Sun, Tao Su

Long-Term Daily Temperature Prediction for Mid-and High Latitude Regions Based on Deep Learning 515
Liyan Wang, Haochen Li, Yuanming Shao, Jing Ma

Self-Evaluation of Lightning Nowcasting Products Based on Multi-Source Data 521
Zhilu Chen, Hai Yu, Kongzheng Wang, Liang Chen

Research on Temperature Fusion Method Based on Two-Model Ensemble Forecasts 527
Yan Wu, Yujing Xie, Huijun Zhang, Yingying Meng, Tiao Qian, Libao Zhang, Zhenyu Yu, Guangna Zhao

Three-Dimensional Hierarchy of Embedded Cells Within a Squall Line 537
Yang Ju, Linlin Wu, Fei Wang, Nong Chen, Guodong Jing

Intelligent Recognition and Warning Analysis of Tornado and Downburst Storms 549
Yujing Xie, Yan Wu, Huijun Zhang, Ling Gao, Yihan Zhou, Meirong Shao

Research on Short-Term Meteorological Disaster Risk Prediction Based on Analytical Network Process 556
Huijun Zhang, Yan Wu, Yujing Xie, Ling Gao, Chengwei Wang

LR-Former: A Location-Aware Gated Fusion Transformer for Short-Term Sea Surface Wind Speed Prediction 562
Yinbu Wang, Xiaowei Song, Menglong Li, Lei Yang, Shuangyang Wu, Kaixuan Cao

IF-LSTM Fusion Model for $PM_{2.5}$ Prediction and Anomaly Early Warning 568
Jiaxin Li, Jinxing Zhao

Building Reliable AI Systems: A Framework That Bridges Architecture and Operations 572
Chen Qi, Xiaoying Qiao

Precipitation Phase Identification and Feature Analysis During the Winter Half-Year in Heilongjiang Province Using an Adaptive Cost-Sensitive Random Forest 577
Limin Liu, Libao Zhang, Xiujie Zhou, Minhui Yan, Yongmei Yao

GEM: Graph-Evidence Executive Planning for Lightweight LLM Agents in Text-Based Embodied Tasks 585
Shiliang Xu, Wei Xie, Tao Zuo

A Bayesian-Optimized Multi-Scale Oversampling Method for Imbalanced Software Defect Prediction 592
Yue Qiu, Qian Chen, Junjian Liu, Boyan Su, Fanqiang Zeng

Structure-Aware Multimodal Rumor Detection via Scene Graph Enhanced Representation Learning 597
Yicheng Li, Yong Liu

A Multi-Stage Learning Framework for Core Loss Prediction with Waveform Classification and Temperature-Adaptive Modeling 601
Zhengyu Ma, Sigui Hu

Multitrack Music Generation Based on Graph Representation and Hierarchical Structure Encoding 606
Tao Liao

Uncertainty-Aware Counterfactual Auditing of Sequential Elimination Decisions 611
Yiqin Yang, Boyang Duan

Analytical Cost Model Guided GEMM Optimization for Heavy-Tailed LLM Workloads 615
Hua Zheng, Cheng Li, Hantao Liang, Yu Liu, Junquan Peng

Analysis of Solving Ordinary Differential Equations in Fractional Logic 620
Yangchun Hu, Shaojun Shi

Code Defect Detection and Automatic Repair Based on Large Language Models 624
Zhaoqi Chu

Based on a Two-stage Enhancement Multimodal Dynamic Siamese Attention Fusion Network Model for Plant Trait Prediction 629
Rui Chen, Suyan Duan, Dangen Li, Junjie Lu, Wenkai Sun, Yaxuan Liu, Hang Pan, Janmei Zhang

A Comparative Study of Machine Learning and Deep Learning Models for Chinese Weibo Sentiment Analysis 633
Jiayao Wang, Guangyuan Ma, Changhao Cai, Tongxuan Yin

A UAV-Based Multimodal Depression Early Warning Framework Using Vision-Language Models and Cross-Attention Transformers 637
Xinkun Zhang, Bin Yang

PSSM-Based Protein Secondary Structure Prediction with CNN-BiGRU Feature Fusion and a Visualization Platform 642
Mengqi Zhang

CacheCast: Learning-Guided KV Cache Placement for Multi-Tenant Cloud LLM Serving 647
Jianan Sun, Ziyan Hu, Junqi Zhang, Zhenyu Yang, Chong Zhang