# 2026 IEEE 3rd International Conference on Big Data Science and Engineering (ICBDSE 2026)

## Kunming, China
## 12-14 June 2026

IEEE Catalog Number: CFP260F1-POD
ISBN: 979-8-3315-5244-2

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: | CFP260F1-POD |
| ISBN (Print-On-Demand): | 979-8-3315-5244-2 |
| ISBN (Online): | 979-8-3315-5243-5 |

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 |



# TABLE OF CONTENTS

Equipment Operation Status Assessment Based on Multi-condition Data Drive ..... 1
*Yunhe Zhang, Jingwei Sun, Xianxian Zhang, Xianghui Han, Fanjun Meng, Xiangfei Yang*

MISR-MCL: A Multi-scale Sequential Recommendation Model Based on Meta-Intent Contrastive Learning ..... 7
*Jinming Zhang, Jun Zhang, Guilan Luo, Yuxiang Li, Huiqiong Ruan, Qingqing Zhang*

EMGCN: Prediction of Linear Interacting Peptides using Graph Neural Networks Enhanced by a Multi-Head Attention Mechanism ..... 12
*Jun Zhang, Guilan Luo, Yi Li, Jinming Zhang, Huiqiong Ruan, Yuxiang Li*

Disease Diagnosis Model Integrating Adversarial Defense and Robust Feature Learning ..... 16
*Zixin Deng, Jijing Cai, Zhihao Wen, Zijia Yang, Hailin Feng, Kai Fang*

Anti-average Collusion Fingerprint Code Construction Based on Quantized Watermark Embedding ..... 22
*Qianwen Li, Peiru Yang, Qiang Fu, Xiang Wang*

Maize Yield Prediction Model Based on Multi-Scale Time Encoder and Multi-Source Data ..... 28
*Huiqiong Ruan, Jinming Zhang, Guilan Luo, Yuxiang Li, Jun Zhang, Qingqing Zhang*

PROSE: Probability-Driven Cluster Selection for Partition-Based Approximate Nearest Neighbor Search ..... 33
*Lingna Xin, Xuanjing Ye, Chengjun Li, Yaodong Hu*

Foreground Object Search with Knowledge Distillation in the Fourier Domain ..... 38
*Jianming Wang, Jiang Xiao, Jiting Yin, Shuangqing Lv*

Image Fusion based on Diffusion-Inspired Structure Perception and Cross-Modal Fusion Synergy ..... 43
*Jianming Wang, Jiang Xiao, Jiting Yin, Shuangqing Lv*

Small Object Defect Detection Based on RT-DETR ..... 49
*Xinyue Wu, Peifeng Liang*

A Voting-Based Unsupervised Framework for Multivariate Anomaly Detection in Vertical Farming ..... 54
*Shaobo Zhang, Xiao Guo*

A Data-Driven State-Derivative-Aware Neural Controlled Differential Equation Framework for Multi-Sensor Bearing Fault Diagnosis ..... 62
*Yang Chen, Bo Wang, Dazhi Yang, Zhiyi Pan*

Well-Posed Pose Estimation via Lie Group Modeling of Point-Line-Plane Features in Structured Environments ..... 67
*Zhen Zhang, Jinzhan Wei, Guangping Zhang, Jiyue Wang, Hongkuang Tang, Xiaoling Zhou*

Vision-Based Data Analysis for Wogan Citrus Maturity Detection Using an Improved YOLOv8 Model ..... 72
*Peixuan Li, Yinxian Zhang, Yongjie Yuan, Jinhui Cha, Yafei Du, Hongfu Zhang*

High-dimensional Multi-objective Bayesian Optimization with Learned Variable Interactions ..... 77
*Hongyan Wang, Jiayu Huang, Haotian Zheng, Xin Gao, Chi Ding, Ying Liu, Xia Wang, Qing Xu Keqiang Li*

A Study on Blueberry Object Detection and Feature Interpretation Using YOLOv11 and Grad-CAM Visualization ..... 87
*Xie Jie, Lichang Chen, Zhenya Wang, Junwei Huang, Leyan Chen*

Design of an Overall Calibration Algorithm for Camera Array Based on Moving Target ..... 94
*Xiang Liu, Mingkai Li*

YOLO-WTB-Mamba: A Global Context Modeling Method for Human Detection ..... 99
*Yue Wang, Xiaotian Huo, Wenhe Chen*

K-Means Algorithm in Pathogenic Factor Mining and Analysis of SEER Pancreatic Tumor Big Data ..... 106
*Qitao Tang, Yi Tang, Lixia Luo, Yuantao Cheng*

A BiLSTM Framework with Dual Entity Embedding for Sentiment Analysis ..... 113
*Lixia Luo, Che Huang, Jing Liu, Min Zhang*

Data-Driven Quality Optimization for Wafer Manufacturing Process ..... 118
*Jiaqi Wang, Ying Zhang, Yu Yuan*

Data-Driven Visual Perception and Trajectory Planning for AprilTag-Based Precision Landing of eVTOL Aircraft ..... 123
*Qiang Cheng, Bo Li, Qian Guo, Chenqiang Zhao*

A Big Data-Driven NeuroMHE Framework for Quadrotor Disturbance Estimation in Complex Wind Fields ..... 128
*Zekai Zhu, Huitao Wang, Xuanbo Ye, Ji Qi*

Aircraft Adaptive Atmospheric Parameter Reconstruction Method Based On Coarse And Fine Consistency Detection ..... 135
*Denghui Zhang, Yuze Liu, Chong Zhen, Yang Zhang, Zhe Jiang, Yang Zhao*

Research on Aero-Engine Multi-Component Coupling Fault Diagnosis Based on Graph Neural Networks and Sensor Data ..... 146
*Peiqi Zhang, Sheng He*

Spatial Isolation Enhancement for Integrated Sensing and Communications Based on Sensing-Data ..... 151
*Bo Li, Qiang Cheng, Huimin Liu, Kaitai Guo*

Data-Driven Robust Hovering Control for Quadrotor UAVs Under Combined Wind Disturbance and Observation Fault ..... 156
*Huitao Wang, Ji Qi, Zekai Zhu, Xuanbo Ye*

Rapid Design Method for Cislunar Transfer Trajectories via Deep Learning Technologies ..... 163
*Shizhan Gao, Jixin Ding, Xue Bai*

Multi-Objective Optimization of Aircraft Panel Assembly Quality Deviation Based on Surrogate Model and SPEA2 ..... 168
*Tiancheng Xia, Wei Qin, Hongwen Xing*

Efficient AI-Generated Image Detection via Confidence-Aware Cascading ..... 175
*Xiaoqian Chen, Yue Yu, Hongya Wang, Jiameng Zhang, Enting Guo*

A Learnable Wavelet Mixing Network for Multi-Source Domain Generalization in Fault Diagnosis ..... 179
*Nuo Chen, Yongyi Chen, Dan Zhang*

Sentinel-Agent: Autonomous Cognitive Modeling and Utility-Aware Optimization for Legacy Precision Forming Systems ..... 184
*Ananda Felixco, Peixiang Wang, Shuya Zeng, Mingye Mo, Yufei Li, Wei Qin*

Physics-Regularized Few-Shot Learning Method for Static Aerodynamic Coefficient Identification Across Airfoils ..... 190
*Yiming Zhang, Naiming Qi, Zheng Li, Wenyu Feng*

A Knowledge-Guided Evolutionary Framework for Carbon-Aware Multi-Objective Optimization in Data-Driven Networks ..... 195
*Wenyu Ning, Yue Chen*

Research and design of multimodal data-driven AI Intelligent diagnosis system for tongue diagnosis of traditional Chinese Medicine ..... 201
*Di Fan, Jing Yang, Bo Hu, Yulin Liu*

Bag of Tricks for the Stability of Vehicle Semantic Segmentation Model with Noisy Labels ..... 208
*Chaoqun Wang, Limin Cui, Jialiang Zhu, Kai Ding*

Elastic Grid-Based Unified Representation for Urban Low-Altitude Airspace A Multi-Dimensional Spatio-Temporal Framework for High-Density UAV Operations ..... 215
*Xin Zhang, Chao Wang, Yu Liu, Tianqi Lv, Jie Zhang*

Density Optimization K-Means User Grouping Method ..... 220
*Hui Yue*

TrustedDT-Monitor: Design and Implementation of a Trusted Digital Twin and IoT Monitoring Framework ..... 225
*Qiaohong Wu, Ruyuan Liu, Dacheng He, Lingxiang Hu, Zhuohuan Li, Lijun Xiao*

Big Data-Driven Anomaly Detection for Imbalanced Network Traffic Using a CNN-BiGRU Dynamic Weighting Model ..... 231
*Gang Zhao, Li-Min Cui, Yong-Bo Yao, Ya-Ting Liu, Zhen-Jie Zhang*

Construction and Research of Rare Disease Screening Model Based on Feature Optimization and Ensemble Learning ..... 236
*Tong Yin, Tongxi Zhang, Xiaorui Wang, Tuanbiao Zou*

Evolution and Evaluation of Lightweight YOLO Models for Coffee Detection and Yield Estimation in Complex Environments ..... 247
*Yun Dai, Qi Luo, Zhenping Qiang, Xiaorui Wang*

Asymmetric Cross-Domain Gating Network for UAV Propeller Fault Diagnosis Using Flight Logs ..... 261
*Jiapeng Zhou, Jiajia Zhang, Yongyi Chen, Dan Zhang*

Scalable Model of Data Factor Transaction Rules Based on Smart Contracts ..... 266
*Haosu Cheng, Lefei Wang, Donghui Ding, Haoran Li, Kangkang Zhang, Shuaikai Gao*

Research on an Incremental Community Detection Algorithm for Large-Scale Dynamic Complex Network ..... 273
*Beibei Zhang, Haokai Liu, Yaling Zhang*

Multi-Modal Fusion-Based Sea Surface Wind Speed Retrieval Using CYGNSS Observations and Pangu-Weather Model ..... 279
*Enhong Liu, Rui Sun, Bowen Liu*

Big Data-Driven TransMixer-style Model for Sea Surface Wind Speed Retrieval from Large-Scale CYGNSS GNSS-R Data ..... 284
*Qinglin Wang, Rui Sun*

Robust Quantile-Constrained SURE for Unsupervised Adaptive NonCartesian MRI Reconstruction ..... 289
*Zhe Ma*

Intention Recognition Method of High Orbit Spatial Targets Based on Large Language Model Agents ..... 295
*Yuan Chai, Yifan Wang, Zhaoyue Chen, Xiaoyi Wang, Renjian Hao, Ming Xu*

Data-Driven Intelligent Detection Methods and Systems for Coffee Beans in Natural Orchards ..... 303
*Mengmeng Qiao, Sizhe Song, Xiao Chen, Weijun Xie, Guoyi Xia*

Bird Song Recognition Using a Lightweight Residual Network for Big Data Applications ..... 308
*Jingyi Zeng*

A Data Augmentation Method for Rolling Bearings Based on CB-DDPM-DA under Imbalanced Data Conditions ..... 312
*Lichang Chen, Xianqiu Zhou, Jiaxin Zheng, Zhenya Wang, Leyan Chen*

Ai SecureDataGuard: A Big Data Security, Privacy-Preserving and Visualization System for LLM-Powered Smart Homes ..... 318
*Jun Zhou, Hongying Li, Fan Wang*

AI-Driven Evidence Compression and Causal Prioritization for Heterogeneous Complex-System Data ..... 325
*Peixiang Wang, Qingdan Xu, Yufei Li, Mingye Mo, Shuya Zeng, Wei Qin*

AI-Driven Federated Learning for Secure Internet of Drones in 6G Networks ..... 330
*Muhammad Asghar Khan, Mansoor Khan, Sagheer Abbas, Farhan Ullah, Kamran Ali Memon Salabat Khan*

TriPST-Net: Phase-Aware Lightweight Tri-Branch Spatio-Temporal Graph Neural Networks for Traffic Sequence Forecasting ..... 336
*Sen Wu, Peilin Meng, Ping Guo*

Smart Contract-Based Data Quality Verification in Trustworthy Data Spaces ..... 341
*Jie Qin, Hao Wang, Guoyuan Ding, Jianzhong Zhang, Zongshuai Cui, Da Chen*

PGFDepth: Prompt-guided Gated Fusion for Robust Depth Estimation ..... 347
*Chendong Yuan, Ziyan Wang, Songyue Yang, Chiwei Li, Zhangyu Wang, Bin Zhou, Chen Peng*

Scan-Specific Hash-Based Parallel MRI Reconstruction Network ..... 356
*Chuting Jiang*

Privacy-Preserving Proximity Discovery Using Private Set Intersection for Unmanned Aerial Vehicles ..... 362
*Yu Sun, Fangwei Ye, Qihui Wu, Qiao Xue*

Composition-Aware Privacy Evaluation for Differential Privacy Mechanisms ..... 367
*Cheng Lin, Qiao Xue*

A YOLOv11n-BED-WOOD Defect Detection Model Integrating Dynamic Sparse Routing and Multi-Scale Features ..... 372
*Hongxu Li, Zhihong Liang, Qi Feng, Linghao Dai*

Data-Driven Collaborative Perception and Predictive Control for Humanoid Robot Swarms in Unstructured Environments ..... 377
*Xu Zhu, Yuxuan Zhang, Aixu Ji, Zixin Pei, Jincheng Fu, Pangwei Wang*

A Spiking Neural Network-Based Pixel-Level Visual Dynamic Navigation Localization Algorithm for High-Speed Aerial Vehicles ..... 382
*Lanting Cao, Baohua Xu, Jiabin Yuan, Yuqian Zhou*

Dynamic Trajectory Planning for High-Speed Vehicles Based on Spiking Neural Network and Reinforcement Learning ..... 388
*Jian Zou, Baohua Xu, Jiabin Yuan, Yuqian Zhou*

Geometric-Prior-Guided Image-LiDAR Fusion for 3D Object Detection in Hoisting Danger-Zone Safety Monitoring ..... 395
*Linghao Dai, Zhihong Liang, Mingming Qin, Hongxu Li, Qi Feng, Guojian Zeng, Xiaolu Fan*

Real-Time Traffic Data Acquisition, Transmission, and Visualization Test System Based on Physical-Virtual Integration ..... 401
*Zhixuan Miao, Zhaohui Weng, Junnan Xin, Xintong Yang, Siyao Li, Mingfang Zhang*

Recursive Provenance for Full Lifecycle Data Element Circulation Using Off-Chain Proof Aggregation and On-Chain Anchoring ..... 407
*Shanrui Qiao, Kangkang Zhang, Donghui Ding, Haoran Li, Haosu Cheng, Shuaikai Gao*

Data-Driven Machine Learning for Halo Family Initial-Condition Prediction in an Extended CRTBP ..... 414
*Bohao Du, Wenchi Zhao, Zhaoyue Chen*

Hybrid AI and Computer Vision Framework for PCB/SMD Defect Detection with GUI-Enabled IoT Deployment ..... 421
*Ata Jahangir Moshayedi, Dong Haoren, Amir Sohail Khan, S.Ali Eftikhari, Mingjun Zhang, David Bassir*

Domain-Adaptive Dynamic Spiking Neural Network for Energy-Efficient Cross-Condition Bearing Fault Diagnosis ..... 433
*Yang Chen, Dazhi Yang, Xinfeng Ren, Zhiyi Pan*

CALA: A Context-Augmented Lightweight Agent for Record Adjudication ..... 438
*Xin Chen, Siyang Huang*

Knowledge-constrained Causal Discovery for Cross-Condition Transfer Prediction of Tunnel Boring Machine Operating Parameters ..... 443
*Kexin Chen, Gan Zhang*

Signal Modulation Classification Based On Machine Learning Algorithms ..... 450
*Haocheng Ma, Xiaoyan Wang*

Label-Driven Dynamic ABAC for Cross-Domain Access Control in Trusted Data Spaces ..... 455
*Hui Yang, Weiguo Zhao, Honglin Zhang, Zhiyong Li*

Interpretable Machine Learning and Big Data Analytics for Predicting Cardiovascular-Kidney Comorbidity: Evidence from NHANES ..... 460
*Yushun Tang, Siqi Li, Xin Zhou, Na Li, Xudong Jiang, Mengrong Chen*

An Event-Driven and Deep Learning-Enabled Framework for Well Logging Data Processing ..... 465
*Xiaolei Chen, Jun Zhou, Xiugang Ma, Qi Fan, Luqiao Ni, Juan Zhang, Changjiang Yu, Wenmao Yu Xianfei Duan, Gaohan Yan*

Industrial Big Data-Driven Transfer Reinforcement Learning for Energy Optimization of Electrolytic Copper Foil Electrodeposition ..... 471
*Yujie Yan, Dajian Huang*

Quantitative Prediction of Postoperative Disease-Free Survival for Liver Cancer Based on Machine Learning Algorithms ..... 477
*Mengrong Chen, Siqi Li, Na Li, Yushun Tang, Xudong Jiang*

Industrial Big Data-Oriented Missing-Aware Intelligent Fault Diagnosis Under Incomplete Vibration Signals ..... 483
*Yilin Hu, Dajian Huang, Jingjing Gao*

A Multi-source Data Fusion and Ensemble Learning Framework for Regional System Efficiency Evaluation ..... 488
*Shuo Zheng, Zhentao Luo*

Deep Fuzzy System for Non-Intrusive Load Monitoring ..... 493
*Jie Lv, Jun Li*

EchoRAFT:Weakly-Supervised Myocardial Motion Estimation via Bitemporal Fusion and Median-Enhanced Contextual Attention ..... 498
*Qingwang Wang, Haoyu Xiao, Zhiqian Fu, Tao Shen*

Protocol-Driven Multi-Agent Orchestration for Federated Distributed Analytics ..... 504
*Soumyodeep Mukherjee*

A Formal Model for Ontology-Driven Data Architecture: Complexity Analysis, Semantic Grounding and Multi-Agent Coordination ..... 510
*Soumyodeep Mukherjee*

Prompt Ensemble Meets Rotation-Weighted TTA: A Lightweight CLIP Framework for Remote Sensing Classification under Few-Shot Splits ..... 517
*Yifei Hu*

LORA-DTI: A Data-Driven Large Language Model Framework for Drug-Target Interaction Prediction ..... 522
*Huiru Li, Bowen Deng, Zhonglv Huang*

A Data-Driven Simulation Framework for GEO Satellite Adversarial Interaction: Situation-Game Modeling and Evaluation ..... 530
*Linli Su*

Ghost-YOLOv11: A Lightweight and Efficient Deep Learning Model for Real-Time Mango Counting ..... 536
*Minh Ngoc Le, Bao Quoc Tien, Duy Thanh Huynh, Luong Vuong Nguyen, Hoang Ngoc Tran*

Root Cause Tracing of Dynamic Coupled Faults in Liquid Storage Tank Assembly Production under Big Data Environment ..... 542
*Yunkai Zhou, Caoyuan Gu, Dajian Huang, Timur Khudaybergenov*

Research on Automotive Open-Source Vulnerability Patch Generation and Assessment Based on Collaborative Large Language Models ..... 547
*Yanan Zhang, Longhai Yu, Cuiping Li, Pingyi Liu, Chenya Bian*

Recognition And Analysis Of Bird Sound Data ..... 555
*Chenhui Han, Lin Liu*

An STM32-Based Automated Data Acquisition System for MLS ..... 560
*Deyu Xu, Zige Huang, Yuan Jiang, Xuejin Yu, Han Lu, Chuanlei Zang*

Wavelet-Attentive BiLSTM: A Time-Frequency Deep Learning Framework for Interpretable Non-Stationary Biosignal Classification ..... 567
*Lijie Yu, Yiping Yuan, Lingchao Meng, Jiaqi Wang, Yingjun Zhao, Cai Yi, Chaojie Yu, Shaolong Zhang Zehao Li, Qin Zhao*

Multi-Model Combined Fault Diagnosis System of MLS Base on Small-Sample High-Dimensional Imbalanced Data ..... 572
*Zige Huang, Haoyi Wang, Han Lu, Chuanlei Zang, Xuejin Yu*

Weight-Decomposed Low-Rank Adaptation of YOLOv12 for Lightweight Multi-State Tomato Perception ..... 580
*Hang Yang, Chen Liang, Qinghui Lai, Chuanxu Luo, Yi Tang, Jialu Wu, Xu Tang*

A Secure and Efficient Data Sharing Mechanism for Trusted Data Spaces Based on Federated Learning and Blockchain ..... 588
*Xinxin Zhang, Wei Lu, Haiyan Chen, Yifei Lin, Yifan Zou*

Motor Health State Prediction Based on Temperature Signals Driven by Digital Twins ..... 598
*Junyan Ma, Wenwen Yang, Adilanmu Sitahong, Yong Huang*

A Study on the Optimization of the XGBoost Model for Short-Term Traffic Flow Forecasting ..... 608
*Yang Liu*

TAM-YOLO: A Real-Time Detection Strategy for Small Objects Derived from Triaxial Attention Modeling ..... 613
*Yueyue Xu, Chengang Dong*