

2025 17th International Conference on Communication Software and Networks (ICCSN 2025)

**Qingdao, China
25-27 July 2025**



**IEEE Catalog Number: CFP2569F-POD
ISBN: 979-8-3315-4939-8**

**Copyright © 2025 by the Institute of Electrical and Electronics Engineers, Inc.
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:	CFP2569F-POD
ISBN (Print-On-Demand):	979-8-3315-4939-8
ISBN (Online):	979-8-3315-4938-1
ISSN:	2159-3566

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

2025 the 17th International Conference on Communication Software and Networks (ICCSN 2025)

Table of Contents

Preface.....	viii
Conference Committees.....	ix
❖ Modern Electronic Communication Systems and Digital Automated Design	
A New Compact Microstrip UWB Power Divider with Quad Notched Bands	1
<i>Junding Zhao, Zhaohui Wan, Haoxiang Jiao, Jiahong Wang, Shuo Ge, Shijun Tang, Xuening Yin, Chengpei Tang</i>	
Linearization of Power Amplifier with Low Sampling Rate Based on Iterative Learning Control.....	5
<i>Jingmei Zhao, Zeyao Ma, Xiaoyu Fang, Shiyue Zhang</i>	
Design and Implementation of Multi-channel Synchronous Acquisition Based on JESD204B Protocol	10
<i>Shubing Wang</i>	
Lyapunov-based Service Deployment Method for Fog Nodes in Intelligent Production Lines	14
<i>Fulong Xu, Zhenyu Yin, Chaoyu Guo, Yijun Xia</i>	
Design of multi-threshold photon detection system in marine lidar	20
<i>Teng Ren, Peihong Zou</i>	
One-dimensional Motion Representation Bernoulli Filter for Arc Motion Target Tracking	24
<i>Xinglin Shen, Huamin Tao, Shanzhu Xiao, Luping Zhang, Moufa Hu, Fei Zhao</i>	
A Miniaturized Band-pass Frequency Selective Surface for Broadband Application	31
<i>Hao Li, Zhao Li, Lichao Wang, Yuelong Lv</i>	
SDN Controller Fault Recovery Strategy Based on Improved Sparrow Search Algorithm	35
<i>Ruwen Liu, Xixiang Huang</i>	
A Method for Polarization Estimation and Direction-Finding Based on Virtual Polarization Synthesis Using 1-Bit Time-Modulated Arrays.....	39
<i>Xitong Yang, Jiazhi Ma, Dongwei Lu, Longfei Shi</i>	
❖ Future Communication Systems and Wireless Transmission Technologies	
Design of IRS-assisted SWIPT System based on Direction Modulation	44
<i>Jia Song, Bo Zhang, Baoju Zhang, Yuan Ding, Jiaxuan Li, Taekon Kim</i>	
A Multicast Network Model Based on SDN and TMAggQ Algorithm	49
<i>Jun Tao, Ya YunYang, Lei Yue, Hao Xu</i>	

UAV-Assisted Vehicle Network Task Offloading System for Multi-Traffic Scenarios.....	54
<i>Yueqin Xu, Xiaoxuan Wang, Xiangqing Su</i>	
Impact of Pilot-Based Smart Jamming on OFDM-Based Communication Systems: BER Degradation and Interference Pattern Analysis	59
<i>Jiawei Zhang, Zhuo Sun, Hao Ma, Ying Wang</i>	
Characterization of Terahertz Materials Based on Ripple Transmission Lines	65
<i>Huimin Wang, Xiaolin Liang, Qi Wang, Xianbao Shi, Qiang Wu, Daohan Wang</i>	
PAPR Reduction for IRS-assisted OFDM Systems by PA-IPTS Technique	71
<i>Shuyan Ding, Shibao Li, Li Li, Xinxin Peng</i>	
Design of Multi User Dual Function Radar-Communication System Based on Direction Modulation.....	76
<i>Jiaxiang Wu, Bo Zhang, Baoju Zhang, Yuan Ding, Zichao Zhuang, Taekon Kim</i>	
Performance Evaluation of an Indoor Positioning Scheme Based on Millimeter Wave Radar	81
<i>Jiaqi Wang, Jinze Sun, Lijiao Ding, Changqiang Jing</i>	
❖ Resource Management and Network Performance Analysis in Intelligent Communications	
Enhanced Coding-Aware Opportunistic Routing for Software-defined WSNs.....	86
<i>YiFan Hu, XiQiang Hou, Pan Liu</i>	
Low Energy Sound Source Positioning based on Data Aggregation in Wireless Sensor Networks.....	92
<i>Yuwu Feng, Lujie Song, Xiuxiu Wu</i>	
MADDPG-Based Joint Latency and Energy Optimization for UE Aggregation Cooperative Transmission.....	97
<i>Jing-Qi Chen, Ruijie Fang, Hua-Min Chen, Qi-Jun Wei</i>	
Energy and Load Balanced Multi-Gateway Selection Strategy.....	104
<i>Yuhan Yao, Tingting Lyu, Zhang Yan, Jiyuan Wang, Jiaqi Cui</i>	
Fight Against Malicious Tracking Jammer: A Quantitative Compensation Based Collaborative Jamming-Deceiving Approach	109
<i>Haoming Li, Fei Song, Zhibin Feng, Yifan Xu, Xiaolong Zhao, Gui Fang</i>	
Path Planning for Relay Node Selection in Complex Marine Space: A Deep Reinforcement Learning Approach.....	116
<i>Yichen Lu, Yun Li, Liping Luo, Yuhua Qin</i>	
❖ Emerging Network Technologies and Information Security	
HNIDD: A Heterogeneous Network Intrusion Detection Approach Using Deep Learning	121
<i>Runze Zhao, Shunli Han, Kui Zhang, Luo Zhao, Huaisheng Yin, Tong Wang</i>	
A Lightweight GAN-based Framework for Block-based Compressed Sensing.....	127
<i>Yushu Liu, Deqiang Wang, Haomin Yang, Zhiwei Li</i>	
PFMeta-IDS: Personalized Federated Meta-learning Automotive Intrusion Detection System with Collaboratively Adaptive and Learnable.....	132
<i>Hong-Quan Wang, Jin Li, Dong-Hua Huang, Yao-Dong Tao</i>	

A Model Compression Framework for Edge-Deployable LoRa Device Authentication.....	142
<i>Xuehao Zhu, Yang Yang, Tianyu Yang, Yunxia Liu, Liang Ma, Na Wang</i>	
Implementation of IES Data Spatial Interpolation Using KNN and Improved Genetic Algorithm	150
<i>Yu Zhang, Xuerong Cui, Juan Li</i>	
Q-Learning-Based Adaptive Backoff Window MAC Protocol Leveraging Historical Success Rates and Real-Time Feedback.....	155
<i>Jiyuan Wang, Tingting Lyu, Jiaqi Cui, Yan Zhang, Yuhan Yao</i>	
❖ Digital Signal Acquisition, Detection, and Processing Methods	
Lip Synchronisation for Mobile Based on Dynamic Sub-band Weighting.....	160
<i>Pin Wang, Xiaogang Chen, Lijun Fu, Hongwei Zeng, Junwei Liu, Wei Jia</i>	
Kalman Optimal GMSK Signal Timing Synchronization Algorithm Based on SNR Matching	164
<i>Xinyuan Wang, Junqi Duan, Shili Wang, Chong Liu</i>	
Joint estimation of DOA and polarization parameters based on CNN-Transformer hybrid architecture	170
<i>Hao Yu, Tingting Lyu, Yi Fan, Jixiang Li</i>	
Robustness of automatic modulation classification based on a deep neural network in the presence of interference	175
<i>Aleksandr Kharin, Sergei Karamov</i>	
Waveform-beam Joint Suppression Method for Interrupted-Sampling Repeater Jamming	180
<i>Mengyuan Dong, Jiazhi Ma, Hengyu Chen</i>	
An Automatic Modulation Recognition Model with Multi-Scale Triplet Attention	185
<i>Haomin Yang, Deqiang Wang, Yushu Liu, Yatian Liu</i>	
Design of multi-channel signal sampling and efficient data transmission based on FPGA and DSP.....	190
<i>Peihong Zou, Teng Ren</i>	
Real-time Spectrum Analysis with Convolutional Neural Network on Embedded/Edge Hardware Platforms	194
<i>Maksim Zhegulin, Sergey Karamov</i>	
DRN-BiLSTM-Based Algorithm for Sound Source Localization in Reverberant Environments	204
<i>Yiyi Cai, Xinmin Ren, Yu Zhu, Yang Chen</i>	
Non-cooperative Receiving Method for Long Code Spread Spectrum Signals of Linear Shift Register Sequence.....	209
<i>Ruiqi Shi, Xiaoli Li, Mingjiang Wu, Wentao Sun</i>	
Open-Set Specific Emitter Identification Under Cross-Receiver Conditions.....	216
<i>Xuewu Liu, Zhenxing Luo, Junna Shang</i>	
Volterra-Informed Convolutional Neural Network for Wide-Band Pipelined ADC Calibration.....	223
<i>Yan Liu, Xiang Gao, Mingyu Hao, Mengyao Yan, Hui Xu, Haiyong Zheng</i>	
Signal Modulation Recognition Based on Multi-Feature Extraction.....	229
<i>Baoshan Song, Kai Sun, Wei Zhu, Yonghui Su</i>	

Robust DOA Estimation for Coprime Array via a Complex-valued Convolutional Attention Network	234
<i>Yi Fan, Tingting Lyu, Hao Yu, Fenglin Yu</i>	
❖ Next-generation Satellite Communications and Key Technologies	
On System Cost Optimization for Satellite and HAP Assisted Internet of Things	239
<i>Xueqi Du, Zhenyu Na, Ningtao Zhang</i>	
Joint Doppler and Phase Noise Compensation Method for Inter-Satellite Coherent Laser Communication	244
<i>Sixiao Zhao, Yujie Lin, Xuhui Ding</i>	
An improved ResNet-ViT Fusion Model for Satellite Communication Jamming Recognition	250
<i>Jia Xu, Rong Shi, Xuhui Li, Jiying Zhang</i>	
Offloading and Transmission Scheduling for Deterministic Tasks under Overlapping Coverage of Multiple LEO Satellites	259
<i>Yuan Zhang, Guoli Tu</i>	
Minimum Hop Count Calculation in LEO Satellite Networks Considering Non-Zero Phasing Factor	264
<i>Dading Zhang, Zhaobin Xu, Hengfei Cheng, Xinbo Yuan, Zhonghe Jin, Xiaojun Jin</i>	
Modulation Recognition of Satellite Communication Signals with Time-frequency Overlap Based on Improved High-order Cumulants	270
<i>Xuhui Li, Rong Shi, Xu Jia, Jiying Zhang</i>	
❖ AI-based Advanced Information Systems and Intelligent Detection Technologies	
CLAD: Semi-Supervised Contrastive Learning with Augmented Negatives for Label-Efficient Industrial Anomaly Detection.....	278
<i>HongLiang Wang, YueNing Li, PengFei Xiu, Jing Xu, Hu Li</i>	
Prediction Method of Bearing Remaining Useful Life Based on PEWA-Transformer	284
<i>Guangyuan Xu, Ruifeng Guo, Zhenyu Yin, Feiqing Zhang</i>	
Multi-Task Attention Convolutional Neural Network for Underwater Acoustic Target Recognition in Few-shot Scenarios	290
<i>Shumeng Sun, Hao Zhang, Wei Huang, Zhenpeng Xu, Junpeng Lu, Yan Wang</i>	
WeldLLM: A Vision-Language Fusion Framework for Weld Defect Detection and Report Generation	294
<i>Zhenyu Yin, Qingshuai Sun, Xiaoqiang Shi, Li Qin, Mingyu Zhang, Feiqing Zhang</i>	
A Low-Complexity Horizontal Layering Detection Algorithm for θ -QAM.....	299
<i>Zhengyuan Shi, Yujie Lin, Xuhui Ding</i>	
ATT-D3RQN: An Attention-Based Deep RL Framework for Urban Pursuit-Evasion Games	304
<i>Hong Gao, Xutong Song, Lina Zhu, Jalel Ben Othman, Changle Li</i>	
A Hierarchical Kolmogorov–Arnold Network Model for Underwater Sound Speed Prediction With Ocean Experimental Results	309
<i>Junpeng Lu, Wei Huang, Zhengyang Xiu, Zhenpeng Xu, Hao Zhang, Yanan Wu</i>	

Research on Compression Algorithms for Time Series Prediction Models in Source Measure Units Based on Pruning, Quantization, and Knowledge Distillation.....	314
<i>Yunlong Duan, Hongjun Wang, Xindi Wang, Yang Yang, Hua Li, Xujian Wang, Siqu Chen, Bohang Xu</i>	
Research on Tool Wear State Prediction Model Based on Knowledge Distillation.....	322
<i>Bengang Liu, Wenjiang Wu, Yunpeng Zhang, TianChi Wu, Chunyang Peng</i>	
❖ Intelligent Image Analysis and Processing Methods	
Forward-Looking Sonar Image Segmentation Using an Improved U-Net Model.....	327
<i>Jiawei Zhu, Qixin Sha, Fangpeng Zhou, Yongzhi Li</i>	
The 6-DOF Pose Estimation Algorithm Based on YOLO11-BiFormer-Robust ICP Model	332
<i>Guoyu Wang, Chunming Hou, Lunxing Li, Songjie Zhou</i>	
YOLO-PSA: A Digital Twin-Driven Robotic Part Detection Method with Pinwheel Convolution and Single-Head Attention for Industrial Manufacturing.....	338
<i>Hongliang Wang, Jing Xu, Lei Wang, Yao Xu, Xiwang Li</i>	
DPDNet: A Real-Time Semantic Segmentation Network with Dual Branches and Progressive Decoding	343
<i>Xiaoqiang Shi, Zhenyu Yin, Feiqing Zhang, Guangyuan Xu, Li Qin, Mingyu Zhang</i>	
Enhanced YOLOv8 with Multi-Scale Dynamic Deformable Convolution and Hierarchical Dual-Attention for High-Precision Crack Detection	348
<i>Hongliang Wang, Hu Li, Pengfei Xiu, Zhengchen Yu</i>	
❖ Author Index	