

2022 IEEE 22nd International Conference on Communication Technology (ICCT 2022)

**Nanjing, China
11-14 November 2022**

Pages 1-644



**IEEE Catalog Number: CFP22411-POD
ISBN: 978-1-6654-7068-1**

**Copyright © 2022 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:	CFP22411-POD
ISBN (Print-On-Demand):	978-1-6654-7068-1
ISBN (Online):	978-1-6654-7067-4
ISSN:	2576-7844

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

2022 IEEE 22nd International Conference on Communication Technology (22nd IEEE ICCT) Table of Contents

Preface	xxx
Conference Committees	xxxi

❖ Communication Protocol Design and Standards

Bisers: An Efficient DHCPv6 Bounding Solution	1
<i>Quan Zhang, Yi Guo, Baolei Mao, Liancheng Zhang, Hongtao Zhang, Mengfan Liu</i>	
Research and Application of Three Protocols Based on AUTOSAR	6
<i>Ying Wang, Bo Gao, Bo Niu</i>	
Comparison of Mobile AdHoc Network Routing Protocols Based on NS3	11
<i>Zhe Wang, Jiao Zhang, Yichi Zhang, Haitao Zhao, Jibo Wei</i>	
A Time Variant Fluid Model for DCQCN Congestion Control Protocol	17
<i>Xinghua Zhao, Junwei Liu, Jun Yao, Jilei Chen, Yajun Yang, Jun Xu</i>	
A Peaking Staggering Transmission MAC Protocol for Underwater Acoustic Networks	22
<i>Zijian Huang, Jinxiang Zhou, Yinbin Cai, Zihao Chen, Chun Shi, Wei Qi</i>	
A Differentiated Identity Authentication Protocol for VANETs Based on Safety Level	28
<i>Yinzhu Yu, Xiaoyan Huang, Ke Zhang, Fan Wu, Supeng Leng</i>	

❖ Coding and Modulation Technology

Implementation of Variable Rate CPM Modulator	34
<i>Yuhao Chen, Penghui Lai, Shilian Wang</i>	
A Fair Subcarrier Activation Method for OFDM-Index Modulation System	39
<i>Zhengguang Zheng, Liyan Lin, Yu Yan, Donghui Yu, Jie Zhang</i>	
Research on Autoencoders for Higher Order Modulation	44
<i>Qiaoshou Liu, Gancheng Yu, Junjie Liu, Xiong Zhou</i>	
ADMM-Induced Low-Complexity Precoder Design Algorithm for Rate-Splitting Multiple Access	49
<i>Guo Li, Chao Wang, Haibin Zhang</i>	

Design and Analysis for Physical-Layer Network Coding with Reconfigurable Superposition Mapping	55
<i>Jiaqi Li, Meng Tang, Hao Wang, Jianhua Chen, Yongtao Yu</i>	
Hybrid Decoding of BP and ADMM for LDPC Codes	60
<i>Dong Wang, Zhiping Shi, Li Deng</i>	
Low Complexity Scaling Factor Aided Decoder for Double Binary Convolutional Turbo Codes.....	65
<i>Jie Gan, Qihua Huang, Yongli Chen, Sishan Chen, Huan Li</i>	
A Low-Complexity Analysis of Finite-Length LT Codes Based on Degree Distribution Evolution.....	71
<i>Zhongyi Wang, Jin Shang, Yimeng Zhang, Fengyu Wang, Wenjun Xu</i>	
The Multiple Access PSK-Chirp System and the Demodulation Based on FrFT	77
<i>Nan Zhao, Xu Zhao, Jie Gan, Dejian Li, Yubing Zhang, Zhenghao Li, Han Liu</i>	
Background Knowledge Aware Semantic Coding Model Selection	84
<i>Fangzhou Zhao, Yao Sun, Runze Cheng, Muhammad Ali Imran</i>	
❖ Electromagnetic Theory and Technology	
LIPO: Local Iterative Physical Optics for Electromagnetic Scattering of Layered Media.....	90
<i>Chuangfeng Zhang, Ming Zhang, Kuang Luo, Jinxin Li, Shaolin Liao</i>	
Simulation of Electromagnetic Metamaterial Carpet for Ground Target Radar Stealth.....	95
<i>Xudong Pang, Liping Wu, Beibei Cao, Shouzheng Zhu</i>	
Electromagnetic Analysis in PINMAP Assignment Optimization Based on T-matrix Method	99
<i>Ruifeng Xu, Ruifeng Li, Da Li, Er-Ping Li</i>	
Methods for Suppressing the Spurious Characteristic Modes in Electromagnetic Scattering Problem.....	104
<i>Ren-Zun Lian, Wan-Yi Cui, Yao Yao, Long Li</i>	
Numerical Singular Integral Methods for Computational Electromagnetics	116
<i>Kuang Luo, Lu Ou, Chuangfeng Zhang, Ming Zhang, Jinxin Li, Shaolin Liao</i>	
❖ Massive MIMO System and Key Technologies	
Low Complexity DOA Estimation Algorithms Based on Propagator for Massive MIMO Systems	121
<i>Xin Liu, Zhongyan Liu, Yuwei Zhao, Yang Liu, Guochen Yu, Shun Na</i>	
Fingerprint Positioning for Massive MIMO Systems Based on Machine Learning.....	127
<i>Xinrui Gong, Xiaofeng Liu, Xiqi Gao</i>	
Max-Min Fairness of Multi-beam Multicast Based on MIMO-NOMA.....	133
<i>Xin Yu, Shufeng Li, Yuwei Feng, Zhiping Xia</i>	
Linear and Nonlinear Detections for Noncoherent Spatial-Multiplexing Based MIMO-MASK.....	138
<i>Longhui Li, Chao Yang, Zewei Hu, Xiaofang Deng, Lin Zheng</i>	

Two-User Cooperative Physical Layer Authentication in Non-coherent Massive MIMO System	143
<i>Li Yan, Junjie Wang, Teng He, Gangtao Han, Shuangzhi Li, Guangyi Liu</i>	
Effect of Antenna Pattern on the Electromagnetic MIMO Communication.....	148
<i>Yongxi Liu, Ming Zhang, Tengjiao Wang</i>	
Decentralized Recursive MMSE Equalizer for Massive MIMO Systems.....	152
<i>Kang Zheng, Hao Gao, Shuai Cui, Jiaheng Wang, Yongming Huang</i>	
❖ MIMO System and Coding Technology	
Precoding Design for Uplink MU-MIMO-OTFS with Statistical Information of Doppler Shift	157
<i>Yaochen Wang, Yuan Zhang</i>	
On the Optimization of Constellation Tilting for MU-MIMO Tomlinson-Harashima Precoding	162
<i>Yifeng Liu, Xuyan Bao, Wei Tang, Siqiang Wang, Zhong Zheng, Zesong Fei</i>	
Design of Hybrid Encryption for Multi-relay Physical-Layer Network Coding System	168
<i>Yanru Yang, Meng Tang, Haihua Li, Guofeng Zeng, Jianhua Chen, Yongtao Yu</i>	
Variable Precision Computing for Multi-user MIMO Precoding: Performance vs. Complexity.....	173
<i>Kaixuan Bao, Wei Xu, Jiehao Miao, Jingrui Li, Jizhou Bai, Bingbin Huang</i>	
Massive MIMO Enabled Unsourced Random Access through LDPC Coding and Random Spreading	178
<i>Yiwei Su, Jianping Zheng, Zijie Liang, Jie Ni</i>	
PCA-BD-Based Broadband Hybrid Precoding for Multi-user Massive MIMO Systems	184
<i>Tianye Zhu, Yiwei Sun, Dongxuan He, Hua Wang</i>	
Matrix Factorization Based Low-Feedback Precoding for Satellite Mobile Communications	190
<i>Meidong Xia, Yuan Zhang, Feng Zhu</i>	
❖ Optical Network and Optical Communication	
A Novel Application of Optical Wireless Communication and Positioning Systems: Low-Cost Obstacle Detection	195
<i>Kehan Zhang, Bingcheng Zhu, Zaichen Zhang</i>	
A Fuzzy Logic System-Based Multidimensional Integrated Routing and Wavelength Assignment Method in Optical Network-on-Chip (ONoC).....	200
<i>Jiahe Zhao, Hui Li, Feiyang Liu</i>	
PAPR Optimization for OFDM Based Underwater Visible Light Communication System	206
<i>Junning Zhang, Lihao Zhao, Liwei Yang, Chen Jin, Shusheng Lv</i>	
A Novel Receiver Based on Rotational Double Prisms for Optical Wireless Communication	211
<i>Fei Yun, Zaichen Zhang, Shengjian Chen, Wenhan Li, Kehan Zhang</i>	

A Loss-Aware Growing Ring Self-Organizing Map (GRSOM)-Based Mapping Algorithm in Optical Network-on-Chip (ONoC).....	216
<i>Yuxiang Niu, Hui Li, Feiyang Liu</i>	
Performance Study of Model-Driven Based Neural Network for VLC Channel Impairments Compensation	221
<i>Pu Miao, Hui Peng, Yu Yao, Peng Chen, Daming Tian</i>	
MMSE-SD Detection Based Mitigation of Interference in Visible Light Communication Systems.....	226
<i>Xinyu Li, Liwei Yang, Maiyun Zhang</i>	
❖ Cognitive Radio and Wireless Transmission	
STAR-RIS Enhanced Cognitive Radio Networks.....	231
<i>Chenchi Wen, Jiakuo Zuo, Pengfei Zhao</i>	
Deep and Shallow Features Fusion Based Deep CNN for Spectrum Sensing in Cognitive Radio	236
<i>Zeyu Liu, Kejun Lei, Yinhang Zhang, Changqing Xiang, Xuming Wang, Xi Yang</i>	
An Improved DFC-Based Cooperative Spectrum Sensing for Cognitive Radio in the Presence of Malicious Users	241
<i>Yongnu Jin, Jiancheng Sun, Yaohui Bai, Sang-Jo Yoo</i>	
Deadline-Constrained Random Access in Cognitive Radio Networks with Multiple-Packet Reception.....	246
<i>Chengran Li, Yidong Guo, Yuan Shen, Ting Fang, Aoyu Gong, Yijin Zhang</i>	
Ultra-Wideband Spectrum Monitoring Using Software Defined Radio	251
<i>Huijie Zhu, Binhui Chen, Yiteng Wang, Lijun Wang</i>	
Radio Wave Propagation Modeling Based on Convolutional Neural Networks	255
<i>Shiqi Wang, Siyi Huang, Xingqi Zhang</i>	
❖ Digital Communication System and Function Optimization	
Integrated Sensing and Communication for Ambient Backscatter Communication Systems.....	260
<i>Tao Huang, Xinyue Xu, Xiaoyan Kuai, Ying-Chang Liang, Xu Zhao</i>	
Optimization of Decode-and-Forward Relaying and RIS Aided MISO System.....	266
<i>Jinqiu Zhao, Zhiquan Bai, Yueying Cai, Shuaishuai Guo, KyungSup Kwak</i>	
Pre-established Entanglement Distribution with Time-Guaranteed Memory Cells Selection in Quantum Networks.....	271
<i>Yazi Wang, Yongli Zhao, Xiaosong Yu, Yongmei Sun, Jie Zhang</i>	
On the Construction of Polar Codes in Two-User Downlink NOMA with Power Allocation and Constellation-Rotation.....	276
<i>Benjamin K. Ng, Chan-Tong Lam</i>	

The Effect of Clock Jitter on Azimuth of DVOR and the Compensation Method.....	281
<i>Zerong Ren, Wei Cheng, Yong Li, Xiang Gao</i>	
Achievable Rates of Asynchronous Uplink Non-orthogonal Multiple Access with GMSK.....	286
<i>Sai Li, Chaoyi Wang, Chongzheng Hao, Jie Li</i>	
Optimization of Federated Learning Communications with Heterogeneous Quantization.....	292
<i>Peng Liu, Tianli Gao, Congduan Li</i>	
A Cross-Layer Optimization Technique Based on Bayesian Reinforcement Learning Extended POMDP Model for Dynamic Spectrum Access	297
<i>Rongkui Zhang</i>	
❖ Communication Equipment Design and Function Control	
Millimeter Wave Beam Tracking Scheme with Neural Network Embedded Kalman Filter.....	303
<i>Jienan Chen, Tingyong Wu, Chentao Liang, Wei Xiang</i>	
The TDOA-Based Kalman Filter for Trajectory Tracking	309
<i>Shunyu Yao, Qiao Meng, Chenye Zhou, Gaojing Li, Shaocong Guo</i>	
Subband Matrix Information Geometry Detector in Heterogeneous Clutter.....	313
<i>Zheng Yang, Yongqiang Cheng, Hao Wu, Xiaoqiang Hua, Xiang Li, Hongqiang Wang</i>	
An HC-DVR Model for Harmonic-Cancellation Digital Predistortion	318
<i>Zunyan Liu, Zhang Chen, Chen Zhao</i>	
Design of Free-Space Optical Wavelength-Division Demultiplexers with a Phase-Only SLM.....	322
<i>Yue Wu, Zaichen Zhang</i>	
Low Complexity Wiener Filter Based Channel Estimation in Pilot Aided OFDM Systems.....	327
<i>Gil Naveh</i>	
Cross-Layer Dynamic Subcarrier Allocation with Adaptive Service Rate Control in SC-FDMA System	332
<i>Xu Zhang, Pan Liu, Tengfei Hui, Jiahong Li, Xiongfei Li</i>	
Atom-Based Microwave Sensing over 60 dB Dynamic Range.....	338
<i>Dong Hou, Guangkun Guo, Ke Liu, Chao Li, Fuyu Sun, Jie Liu, Xiaofeng Li</i>	
A 56-to-66 GHz in-Phase Injection-Coupled Quadrature Voltage-Controlled Oscillator with Low Phase-Noise in 65nm CMOS.....	342
<i>Xiaoming Fan, Chengzhi Jiang, Wenmiao Li, Jiaqi Zhang, Jiaji Fan, Lei Chai</i>	
Delay Mismatches Analysis for Multi-level Outphasing Digital Transmitters	346
<i>Zhang Chen, Zhihu Wei, Jiashun Zhu</i>	

❖ Resource Management and Allocation in Communication Networks

A Joint Resource Allocation and Efficient Communication Scheme Based on FL for the Internet of Vehicles	351
<i>Enchang Sun, Hui Zhang, Ruolan He, Mengsi Li, Dongying Zhang, Yanhua Zhang</i>	
Resource Allocation in Underwater Wireless Optical Communication Systems	357
<i>Meiyan Ju, Xuan Li, Yuyu Gan, Yueheng Li, Guoping Tan, Ping Huang</i>	
Resource Allocation for D2D Underlying Cellular Networks with Incomplete CSI.....	363
<i>Jun Xu</i>	
Dynamic Resource Allocation Algorithm under Visible Light Communication and WiFi Heterogeneous Network	368
<i>Liwei Yang, Boyu Jia, Fang Wang, Jianhui Kang</i>	
Transfer Learning Empowered Resource Allocation for Vehicular Edge Computing	373
<i>Yuhan Zhang, Ke Zhang, Fan Wu</i>	
A Resource Allocation Scheme for Independent Core Transmission of Quantum Key Distribution	379
<i>Lingfeng Lu, Yongmei Sun, Yaoxian Gao, Weiwen Kong</i>	
Multi-objective Optimization Satellite Resource Allocation Algorithm Based on Game Theory	384
<i>DanYang Lv, XiaoQin Song, Lei Lei</i>	
Resource Allocation in Underlay Network with User Diversity.....	389
<i>Jinting Liu, Chiya Zhang, Chunlong He</i>	
Intent-Driven LEO Satellite Networks Resource Management.....	396
<i>Yuqi Wang, Kang Guo, Ningyuan Wang, Zhaotao Qin, Xiaoqing Zhong, Xiaodong Han</i>	
Joint Offloading Strategy and Resource Allocation for MIMO-Based MEC Networks.....	402
<i>Mengyu Zhu, Shaoshuai Gao, Guofang Tu, Deyuan Chen</i>	
Joint Resource Allocation for Enhanced Machine-Type Communication	408
<i>Yang Li, Yan Wang, Yuan Wang, Jiaheng Wang</i>	
Research and System Implementation of Flexible Spectrum Allocation for Hybrid Satellite Network of Laser and Microwave Based on OFC	414
<i>Bin Wu, Chaoyue Zheng, Qingchun Zhao</i>	
Joint Slice Level and Base Station Level Admission Control in RAN Slicing	418
<i>Hong Shen, Yukai Ye, Tiankui Zhang</i>	

❖ **Satellite Communication Network and Signal Transmission**

A Frequency Offset Independent Timing Synchronization Method for 5G Integrated LEO Satellite Communication System	423
<i>Zijian Zhang, Dongdong Wang, Lizhe Liu, Bin Wang, Chenhua Sun</i>	
Invulnerability-Based Constellation Design in LEO Satellite Networks	428
<i>Cui-Qin Dai, Tao Xu, Hong Tang, Qianbin Chen</i>	
Interference Analysis for Mobile Cellular and LEO Satellites Co-existence	434
<i>Zixi Fang, Guoyan Li, Jixin Zheng, Tengjiao Feng</i>	
Local State Routing for Satellite Constellation Networks	440
<i>Xin Xu, Jun Cai, Aijun Liu, Dongming Bian</i>	
High Altitude Platform (HAP) Communication System Based on Satellite Communication Theory	446
<i>Jingyu Zhao, Jianxiao Zou, Zhangping Li, Li Ding, Shanglin Liu, Yiming Liao</i>	
OTFS-Based Communication and Navigation Integrated Signal Transmission for LEO Satellites	451
<i>Yue Li, Guomei Zhang, Jiayue Yu, Guobing Li, Yiheng Li</i>	
Distance Characteristics of Paths with the Minimum Inter-Satellite Hops in LEO Satellite Networks	458
<i>Quan Chen, Lei Yang, Guanglei Song, Zhenglong Yin, Huaguo Yang, Yong Zhao</i>	
Robust Random Access Preamble Detection Scheme for 5G Integrated LEO Satellites Communication Systems	463
<i>Zuxiang Zheng, Dongdong Wang, Lizhe Liu, Bin Wang, Chenhua Sun</i>	
Optimization Design and Application of Positioning Search Technology Based on Satellite Navigation System	468
<i>Junqi Pang, Wenyi Liu, Haifeng Hu, Ruixuan Yang, Ruixing Cao, Zhongliang Zhao</i>	
❖ UAV Cooperative Communication and System	
Task Allocation Method for UAV Swarm Ground Attack Based on IPSO	474
<i>Zhong Yun, Huang Song-hua, Zhang Jie-yong, Zhao Liang</i>	
Deep Reinforcement Learning Based Transmission Scheme for UAV MIMO Communication	481
<i>Sheng Yu, Yang Lu, Xiaofeng Tao</i>	
Energy-Efficient Cooperative Multi-UAV Coverage Scheme with Limited Wireless Backhaul	486
<i>Wei Chen, Wenjun Xu, Lan Lin, Chunlei Huang</i>	
Research on UAV Cooperative Task Assignment Based on Dynamic Multi-objective Evolutionary Algorithm	492
<i>Menggang Sheng, Zeyang Zhang, Min Deng, Zhiqiang Yao</i>	

Task-Aware Multi-UAV Cooperative Computing: A Learning-Based Trajectory and Resource Optimization	498
<i>Zewu Li, Chen Xu, Zhanpeng Zhang, Runze Wu</i>	
Multi-UAV Cooperative Computational Latency Modeling and DDPG Optimization	504
<i>Peng Kong, Bo Li, Yonghao Wang, Xiao Huang, Kaibo Shi, Dong Ma, Bo Ran, Jitao Huang</i>	
Joint Computing Offloading and Trajectory for Multi-UAV Enabled MEC Systems	510
<i>Wenlong Xu, Tiankui Zhang, Liwei Yang</i>	
❖ Performance Analysis of Wireless Communication System and Network	
Analysis of the Absorption Attenuation and Phase Shift of Terahertz Wireless Propagation	516
<i>Siqi Liu, Hongqi Zhang, Yuqian He, Lu Zhang, Xianbin Yu</i>	
Beamforming Optimization in MU-MISO URLLC Systems	520
<i>Changqing Ye, Hong Jiang, Liping Deng, Honglang Zhu</i>	
Throughput-Guaranteed Cross-Layer Design for Multi-channel Wireless Networks	526
<i>Fan Zhang, Baozhu Li</i>	
Research on Time Synchronization System of Wireless Network.....	531
<i>Zhen Liao, Mingze Xu</i>	
Joint Energy and Information Beamforming Design for RIS-Assisted Wireless Powered Communication	536
<i>Zhen Chen, Jie Tang, Xiaoyu Du, Xiuyin Zhang, Daniel Ka Chun So, Kai-Kit Wong</i>	
Cache Placement with Virtual Matching in Large-Scale Cache-Enabled Multicasting Wireless Networks	541
<i>Wanning Liu, Ducheng Wu, Yitao Xu, Na He, Tianyao Zhong</i>	
Research on End-to-End Wireless Communication System Based on Two Dimensional Convolution.....	546
<i>Qiaoshou Liu, Junjie Liu, Gancheng Yu, Xiong Zhou</i>	
Radio Environment Map Construction Based on Random Forest Regression	551
<i>Yixiao Du, Hongjun Wang, Jinfan Liu</i>	
Fountain Code based Hop-by-Hop Reliable Data Transmission Scheme in Multi-Hop MANETs.....	557
<i>Changdong Li, Lianghui Ding, Jingan Li, Feng Yang, Liang Qian</i>	
Convolutional Neural Network for Performance Monitoring and Modulation Formation Recognition in Communication System	563
<i>Lifang Zhang, Ting Zhang, Danshi Wang, Wenbin Chen</i>	
On the Optimization of Synchronization Efficiency in Multi-hop Ad-Hoc Networks	568
<i>Yuhong Bao, Lei Lei, Xiaoqin Song, Lijuan Zhang</i>	

❖ UAV Communication and Network Optimization

Content Popularity Prediction with Integrated Features in UAV-Assisted Wireless Caching Networks.....	573
<i>Kaibo Shi, Bo Li, Yonghao Wang, Bo Ran, Peng Kong, Xiao Huang, Dong Ma, Fei Liang</i>	
UAV Swarm Type Recognition Algorithm Based on Dual-Domain Fusion Features and Feature Selection	578
<i>Shuheng Zhang, Ruping Zhai, Yongkai Liu</i>	
Trajectory Radius Optimization for Throughput Maximization of UAV Networks in Emergency Scenarios	585
<i>Jinbo Zhang, Haoyue Wang, Jian Qiao, Naicheng Gong, Yandong Zhang</i>	
Cooperative Multi-UAV Dynamic Anti-Jamming Scheme with Deep Reinforcement Learning	590
<i>Ruidong Wang, Shilian Wang, Wei Zhang</i>	
A DNN Operation Scheme Based on IPSO for UAV-Assisted MEC Networks	596
<i>Zhenqian Wang, Wei Yang, Bo Zhang, Linlin Zhuo, Huigui Rong</i>	
A Task-Based Location Deployment Method for UAV-Enabled Multi-region Network.....	602
<i>Bo Hu, Renpeng Liu, Lingye Zhou</i>	
Multi-agent DDPG Empowered UAV Trajectory Optimization for Computation Task Offloading	608
<i>ZhiJiang Chen, Lei Lei, XiaoQin Song</i>	
BETA-UAV: Blockchain-based Efficient and Trusted Authentication for UAV Communication	613
<i>Sana Hafeez, Mahmoud A. Shawky, Mohammad Al-Quraan, Lina Mohjazi, Muhammad Ali Imran, Yao Sun</i>	

❖ Communication Aware Computing in Wireless Systems

Analysis of Phase Compensation Accuracy of Bandwidth Synthesis for Multi-Carrier-Frequency MIMO Radar	618
<i>Qinyuan Zhu, Guohua Wei, Jiahao Bai, Dongping Huang</i>	
Near-Field Imaging Algorithm of MIMO Radar with the Aid of Reference Points	624
<i>Yu Lan, Danyang Liu, Jianxiong Zhou, Ruidong Wang</i>	
Adaptive CFAR Detectors for Colocated MIMO Radar in Compound Gaussian Clutter	629
<i>Mengjiao Tang, Yao Rong, Sanfeng Hu, Xiaolin Du, Jianbo Li</i>	
NB-Radar: An Effective Method for Detecting Local Network Behaviors	634
<i>Yihang Hao, Ting Wu, Lizhi Peng, Bo Yang</i>	
Digital Compensation Technique for Wideband Phased Array Radar Using Nonlinear Frequency Modulation	639
<i>Gang Wang, Jie Wu, Yuxian Sun, Lixiang Ren, Zhennan Liang, Quanhua Liu</i>	

Adaptive Evolution Algorithm Based on Hypervolume Awareness for Controller Placement	645
<i>Tingting Chen, Zhanqi Xu, Fan Yang, Yunbo Li</i>	
❖ Intelligent Communication Equipment and System	
Reconfigurable Intelligent Surface Assisted Communications Using Dynamic Rotations	652
<i>Ke Wang, Chan-Tong Lam, Benjamin K. Ng</i>	
Performance Analysis and Optimization for RIS-Aided Communication Systems.....	657
<i>Hao Liu, Yaxuan Liu, Wei Xun, Zhuoran Xu</i>	
Min-Max Latency Optimization for Intelligent Reflecting Surface-Assisted Mobile Edge Computing	662
<i>Runxiang Li, Wanming Hao, Fang Wang, Shouyi Yang</i>	
The Smart SD-WAN Architecture.....	667
<i>Weiqliang Cheng, Feng Yang, Tingting Han, Ruibo Han, Wenying Jiang, Geng Zhang, Jin Yang, Xiaoqiu Zhang</i>	
Intelligent Reflecting Surface Enhanced Secure Communication with Multi-Eavesdroppers	672
<i>Binghui Qian, Jingping Qiao, Xintao Dong, Jie Tian, Tiantian Li, Haixia Zhang</i>	
A Survey on Terahertz Communication Theory Assisted by Intelligent Reflecting Surface and Device-to-Device Technologies.....	678
<i>Wei Xun, Yaxuan Liu, Yiyang Ni, Haitao Zhao, Zhuoran Xu, Xingfeng Ge</i>	
Intelligent Adaptive Mechanism of Handover Parameters in High-Speed Railway Communication Network Based on Generative Adversarial Network	683
<i>Qi Wang, Cheng Wu, Jie Sheng</i>	
❖ Antenna Theory and Design	
Improving Separation Performance of Wireless Communication Signals with Antenna Angle Adjustment	689
<i>Miaomiao Gu, Pengcheng Guo, Miao Yu</i>	
Wideband Circularly Polarized Truncated Conical Dielectric Resonator Antenna	694
<i>Lei Chang, Ling-Lu Chen</i>	
A Wideband Circularly Polarized Wearable Antenna Based on Metasurface for WBAN Applications.....	698
<i>Kai Zhang, Ping Jack Soh, Sen Yan</i>	
A Wideband MNG-TL Planar Microstrip Antenna for WLAN Applications	702
<i>Shumin Liao, Hui Lin, Heng Guo, Yixiang Song, Wei Liu</i>	
A Compact Multi Antenna Design with High Isolation in 5G Full Screen Mobile Phone	706
<i>Longjie Yu, Xinrong An</i>	

Adaptive Response Surface Method for Antenna Gain Optimization of Large Platforms	712
<i>Zhengguang Yang, JinLong Jiao, Lang Han, Cuidong Gao, Zhijia Liu</i>	
A Novel Metasurface-Based Decoupler for Wideband Stacked Patch Antenna Array	717
<i>Wenlu Qiu, Jinxin Li, Pei Xiao, Shaolin Liao</i>	
Stable and Robust Improvement of AMP for Supporting Massive Connectivity.....	722
<i>Xin-Pei Zhou, Ying-Chun Yang, Jie Zhang, Yan-Yan Wang, Li Li</i>	
Bit Error Rate Analysis of Mechanical Antenna Based on Frequency Modulation.....	728
<i>Xi Wu, Tianhui Fu, Longfei Wang, Yao Kong, Xuebo Zhang, Menglei Xiu</i>	
A Supplementary Antenna Alignment Method Based on Terahertz Communication between LEO-LEO	732
<i>Dongnuan Cui, Weiqian Duan, Shutian Song, Ruiliang Song, Niefeng Sun, Ning Liu</i>	
Transparent Antenna Research and Application.....	736
<i>Li Nan, Zhao Jie, Shao Zhe, Deng Wei</i>	
Power Transport Theorem (PTT)-Based Decoupling Mode Theory (DMT) for Wave-Port-Fed Transmitting Antennas	741
<i>Ren-Zun Lian, Long Li</i>	
A Flexible and Foldable Frequency-Reconfigurable Antenna Based on Liquid Metal	753
<i>Qian-Yu Wang, Chun-Wei Li, Peng Qin, Zhong-Shan Deng</i>	
Design of a "H" Type Defect Ground Coupled Feed Array Antenna.....	757
<i>Zhang Xiong, Liu Ling, He De Jun</i>	
❖ Wireless Transmission Technology in Space Communication	
Spectrum Analysis for Modulation Classification in Aeronautical Wireless Communication Systems	762
<i>Kun Liu, Xin Xiang, Wanze Zheng, Yishi Sun, Liyan Yin, Chunhui Li</i>	
Simulation Evaluation of Delay Tolerance Network Performance in Air-Ground Cooperative Scenarios	767
<i>Qihang Chen, Chunyuan Tian, Dawei Ma, Shuangze Yang</i>	
Research on Frequency Selection Method for Spatial Terahertz Communication under Multiple Constraints	774
<i>Yuanzhi He, Chensheng Ma</i>	
Atmospheric Two-Way Time Transfer over Kilometers Free-Space Link with Dual Optical Frequency Comb	782
<i>Wantao Huang, Changfeng Chen, Dong Hou</i>	

❖ **Vehicle Communication and Edge Computing**

Characterizations on Non-stationary Channel Statistics for High-Speed Train Communications in Viaduct Scenario 787

Kaien Zhang, Yan Zhang

How to Deploy RIS to Minimize Delay Spread in HST Communications: Railroad Side, or Train Side? 793

Ke Wang, Chan-Tong Lam, Benjamin K. Ng

Collaborative Task Offloading for Vehicular Edge Computing 798

Yujun Ming, Supeng Leng

Communication in Autonomous Vehicles through 5G Onboard Units - Understanding the Experimental Setup 804

M Jalal Khan, Manzoor Ahmed Khan, Obaid Ullah, Sumbal Malik, Hesham El-Sayed

Improving User Data Rate Performance for Hybrid RF/VLC Outdoor Vehicular Communications..... 812

Maged Fakirah, Supeng Leng, Mohammad. A. B. Mohammad, Ahmed Abualnor, Mesfin Leranso Betalo

❖ **Sensors and Wireless Sensor Networks**

MARTO: A Multi-agent Deep Reinforcement Learning Based Online Topology Optimization Scheme for Wireless Sensor Network 817

Jiangong Zheng, Xiaotong Guo, Jianxin Liao, Chao Sun, Tongyu Song, Jing Ren, Ping Zhang, Siyang Liu

A Lifetime-Enhanced Genetic Clustering Method for Heterogeneous Wireless Sensor Networks 824

Xinting Zhang, Xiaoqin Song, Lijuan Zhang, Lei Lei

Research on Coverage Reinforcement Strategy in Ocean Surveillance Wireless Sensor Networks 829

Chaofan Duan, Yingguang Luo, Guobin Fu, Jing Feng, Haotian Chang

Health Risk Assessment and Monitoring System Based on Multi-sensor Information Fusion and Contrast Learning..... 836

Nannan Chong, Kunpeng Chen, Dehao Kong

Curvature-Sensitivity-Enhanced Fiber-Optic Sensor Based on Bragg Hollow Core Fiber..... 842

Sixiang Ran, Zhongke Zhao, Wenjun Ni, Chunyong Yang

DRED: A DRL-Based Energy-Efficient Data Collection Scheme for UAV-Assisted WSNs 846

Jianxin Liao, Chao Sun, Jiangong Zheng, Xiaotong Guo, Tongyu Song, Jing Ren, Ping Zhang, Siyang Liu

❖ **Energy Management and Energy Saving Technology in Wireless Communication System**

Cost Modeling and Optimization of Solar-Grid-Battery Hybrid Power Supply under Green Base Station ... 852

Bo Ran, Bo Li, Dong Ma, Kaibo Shi, Yonghao Wang, Xiao Huang, Peng Kong, Bo Fan

An Energy Consumption Minimization Optimization Scheme for HAP-Satellites Edge Computing	857
<i>Chengli Mei, Cheng Gao, Yanxia Xing, Xilin Bian, Bo Hu</i>	
Energy Consumption Optimization of Joint Offloading Computation Based on MD-mUAV-mBS.....	863
<i>Xiao Huang, Bo Li, Yonghao Wang, Peng Kong, Kaibo Shi, Dong Ma, Bo Ran, Bo Fan</i>	
Energy-Efficient Edge Association in Digital Twin Empowered 6G Networks	869
<i>Ruixi Zhao, Ke Zhang, Yan Zhang</i>	
Energy Efficiency Optimization for Distributed RIS-Assisted MISO System Based on Statistical CSI	875
<i>Chenghong Yang, Kai Yu, Xiangbin Yu</i>	
GCD Optimization and Intelligent Management for Green Base Station with Battery Control	880
<i>Dong Ma, Bo Li, Yonghao Wang, Bo Ran, Peng Kong, Xiao Huang, Kaibo Shi, Wei Li</i>	
❖ Internet of Things Technology and Engineering Application	
A Low-Complexity MMSE-HIC Scheme for NOMA-Based LEO Satellite IoT Systems.....	886
<i>Weizong Sun, Dewei Yang, Jingming Kuang, Dong Chen, Zheren Long</i>	
Augmented Twin Empowered Intelligence for Lightweight Device in Internet of Things.....	892
<i>Zhangxinyu Chen, Yunkai Wei, Supeng Leng</i>	
Data Cleaning Technology of Substation Internet of Things Based on Time Series Association.....	899
<i>Xuefeng Ning</i>	
Delay Optimization of Power Internet of Things Based on Edge-Cloud Collaboration	905
<i>Julaiti Abulizi, Qingsheng Hu, Wei Wang</i>	
Enhanced Mobile IoT Security Protection Method Based on CPK and Zero Trust.....	911
<i>Ziyi Jia, Wei Wu, Zhe Jia, Xiaopeng Yang, Qiang Wang, Hao Li</i>	
Design and Analysis of Airport Intelligent Border System Based on Zigbee Technology.....	917
<i>Youcheng Liang, Haitao Chen</i>	
❖ Modern Cryptography and Encryption Technology	
A Physical Encryption Scheme for OTFS System	921
<i>Jilin Chen, Xinjin Lu, Wei Li, Ying Huang, Yanqun Tang, Yue Ma</i>	
Public-Key Turbo-Polar Codes as a Candidate for Post-Quantum Cryptography.....	927
<i>Ziwei Chen, Deyuan Chen, Can Zhang, Shaoshuai Gao</i>	
Attribute-Based Keyword Searchable Encryption Scheme for Multi-authority in Cloud Storage	933
<i>YaLian Wu, XinYu Li, Zheng Liu</i>	
Secrecy Performance of MISO Fluctuating Two-Ray Fading Channels.....	940
<i>Xiang Gao, Rui Zhao, Hongxin Lin, Xi Luo</i>	

Deciding Complete Integer Lattices via Localization	946
<i>Yue Cao, BaoSheng Huang</i>	
Secrecy Performance Analysis of UAV-Based Relay Communications with SWIPT	952
<i>Danyu Diao, Buhong Wang, Kunrui Cao, Runze Dong, Tianhao Cheng</i>	
Frequency Spectrum Density Prediction Based on Sequence-to-Sequence Deep Learning Model	957
<i>Ya-Dong Zhao, Zheng-Wei Chang, Jie Zhang, Ling-Hao Zhang, Li Li</i>	
❖ Channel Detection and Estimation	
On Capacity Achieving of Sparse Regression Code with the Row-Orthogonal Matrix.....	963
<i>Yizhou Xu, Teng Fu, Yuhao Liu, Tianqi Hou</i>	
Dynamic Sequential Channel Allocation in Cache-Enabled Wireless Multicasting Networks.....	969
<i>Tianyao Zhong, Ducheng Wu, Guoxin Li, Wanning Liu</i>	
Model-Based Structured Covariance-Aided Channel Estimation for Massive MIMO Systems	973
<i>Xingjian Li, Zhiqun Song, Lizhe Liu, Xuejun Sha, Yong Li, Bin Wang</i>	
Spectral Efficiency of Wireless Systems in Correlated Channels with Receive Antenna Selection	978
<i>Ahmed Abualnor, Nadir A. Siddig, Maged Fakirah</i>	
Designing of Decision Criterion on FCrSK in Time-Frequency Dual Selective Channel.....	983
<i>Xiaohong Nie, Chao Yang, Linan Wang, Jing Zhang, Lin Zheng</i>	
Tensor Completion-Based Channel Estimation for Semi-passive RIS Assisted System	988
<i>Mengyi Qi, Qi Liu, Xuan Wei, Pengpeng Lv</i>	
Outage Performance Analysis for SWIPT Based HPTS DF Relaying Networks with Direct Link under Channel Estimation Error.....	994
<i>Feng Gao, Yucan Bi, Yan Chen</i>	
Real-Time Hardware Emulation of Frequency Non-stationary UWB Channels with Continuous Frequency Response	999
<i>Ruirui Feng, Kai Mao, Qiuming Zhu, Qiangjun Zhou, Yanheng Qiu, Xiaomin Chen</i>	
Channel Estimation of mmWave Massive MIMO System Based on Manifold Learning	1004
<i>Peng Gu, Yunchao Song, Chen Liu</i>	
Channel Prediction Using a System of Ordinary Differential Equation.....	1009
<i>Lei Wang, Guanzhang Liu, Jiang Xue</i>	
Joint Identification of Modulation and Channel Coding Based on Deep Learning	1015
<i>Fang Deng, Xingrong Huang, Shujun Sun, Shengliang Peng</i>	
BEM Based Fast Time-Varying Channel Estimation Method for 5G Integrated Satellite Systems	1020
<i>Shunyao Yang, Dongdong Wang, Lizhe Liu, Bin Wang, Chenhua Sun</i>	

Joint Channel Estimation and Symbol Detection for UAV-Assisted Systems Using Tensor Framework.... 1025
Heyun Lin, Zhihai Zhang, Xinhong Pan, Xin Luo, Yuan Cheng

❖ **Signal Acquisition and Generation Method**

Radar Waveform Design Based on Time-Bandwidth Random Modulation LFM Signals..... 1031
Zejia Tang, Qinglong Bao, Jiameng Pan, Huahua Dai, Weidong Jiang

Cooperative Caching and Beamforming for CoMP-Enabled Mobile Edge Networks 1038
Baoyi Cheng, Xiaoyan Huang, Ke Zhang, Fan Wu, Supeng Leng

Waveguide Invariant for Time-Frequency Intensity Striations 1044
Shuanglan Li, Weining Mao

α -MF Detection Based on Spatial Correlation of Sea Clutter..... 1049
Hongxin Wei, Lin Zheng, Chao Yang, Ningyan Wei, Zhenghong Liu

RIS-Assisted Beamforming for FDD Multi-user Communications 1054
Wei Zhang, Yi Jiang

Quartic Optimization for Ambiguity Function Shaping via RTR Algorithm under ADPM Framework 1060
Haoyu Yi, Weidong Jiang, Xinyu Zhang, Kai Huo

❖ **Signal Detection and Estimation**

A Detection Algorithm of Amplitude and Phase Consistency Based on Deviation Degree and Correlation Coefficient..... 1065
Mingshan Yang, Yang Zhao, Xiaoyan Du, Xianfeng Zhang

Signals of Opportunity Navigation Using LTE Downlink Signals 1070
Yiteng Wang, Huijie Zhu, Tianyi Liang, Jiachuan Qian

Two-Dimensional DOA Estimation Based on Noncircular Signals from a Tensor Perspective 1075
Hao Li, Bin Ba, Jin Zhang, Chengzhou Liu, Qiang Jin, Liye Zhang

IRS-Assisted Weighted Sum-Rate Maximization Semi-persistent Scheduling in NR-V2X..... 1081
Juncai Chen, Fan Wu, Ke Zhang, Xiaoyan Huang, Supeng Leng

The Effect of Unequal Time of Rising and Falling Edge on Three Level RF-PWM Signal..... 1087
Jiashun Zhu, Qiang Zhou, Zhang Chen, Zhanyang Xu, Siyu Zeng

Estimation of the Number of Signals in White Noise via Large-Sample and High-Dimensional Asymptotic Theory 1092
Yao Rong, Lewen Zhang, Mengjiao Tang, Zeqiong Zan

Information Geometry of the Locally Most Powerful Test 1097
Yongqiang Cheng, Xiaoqiang Hua, Hao Wu, Hongqiang Wang

DOA Estimation with Few Snapshots Based on Iterative Adaptive Approach and Eigenvalue Decomposition	1102
<i>Junjie Weng, Jun Liu, Siyu Sun</i>	
❖ Signal Identification	
Identification of Active Jamming Based on Swin Transformer Model and Splitting Features	1107
<i>ZiJun Hu, Xinliang Chen, Zhennan Liang, Bowen Cai</i>	
Recognition Method of Underwater Acoustic Bionic Communication Signal Based on Autocorrelation Function.....	1114
<i>Xingyu Xiao, Bin Wang, Jian Zhang, Yuting Meng</i>	
Feeling the Groove: Identification of Bass Patterns from Polyphonic Audio	1121
<i>Himadri Mukherjee, Matteo Marciano, Ankita Dhar, Kaushik Roy</i>	
CNN-Zero: A Zero-Shot Learning Framework for Jamming Identification	1126
<i>Ningsong Zhang, Junren Shen, Yuxin Shi, Yusheng Li</i>	
Individual Recognition Method of Radiation Source Based on Deep Subdomain Adaptation Network.....	1132
<i>Zhen Tang, Tao Zhang, Xiaomeng Yang, Lei Qian</i>	
Waveform Recognition of UAV Swarm Communication in Multipath Channel.....	1138
<i>Ruping Zhai, Sai Li, Shuheng Zhang, Jiarong Ping</i>	
❖ Signal Analysis and Processing	
A Bias Reduction Method for TDOA/GROA-Based Localization	1144
<i>Ziqiang Zhang, Bin Yang, Ding Wang, Tiantian Chen</i>	
Performance Analysis and Verification of Single Auxiliary Source Suppression Array Error	1149
<i>Chongyu Hao, Wei Shi, Baowei Wang, Junquan Deng</i>	
A Digital Noise Signal Synthesis Method Based on a Combination of Table Look-up and Transformation	1154
<i>Yindong Xiao, Bo Peng, Ke Liu, Zaiming Fu, Cong Hu</i>	
The Design of a Novel Hardware Trojan without Inactive Signal for AES	1159
<i>Kaiyu Zhao, Fang Zhou, Ning Wu, Jin Zhao, Fen Ge</i>	
A New Method for Power-Aware Signal Integrity Analysis with Spice Model of Power Distribution Network	1164
<i>Hao Huang, Zhi Ye, Yang Liu, Shixiang An</i>	
Two Simulation Methods of J Wave Signal in ECG	1169
<i>Xingrui Wang, Lei Sun, Anhao Wen, Yucong Leng, Xiang Lu</i>	

Power Allocation and Beamforming Vectors Optimization in STAR-RIS Assisted SWIPT1174
Pengfei Zhao, Jiakuo Zuo, Chenchi Wen

❖ **Speech Communication and Speech Recognition**

A Dual-Channel Speech Encryption Scheme Based on Silicon Photonic Microcavity (SPM) Chaos and Dynamic DNA Encoding1179
Hao Cheng, Yan Wang, Xiaodong Ren, Zheng Peng, Wei Cheng, Jiagui Wu

DGCN: Dynamic Gate Convolutional Networks for Speech Enhancement1184
Yantao Chen, Binhong Dong, Cuiting Liu, Wenhui Xiong

Multi-scale Generative Adversarial Network for Speech Bandwidth Extension1189
Haosen Lin, Junmei Yang, Xikun Chen

HKSR: A Research of Code-Switching Hong Kong Cantonese Speech Recognition Based on Multi-task Rescoring Strategy1194
Yuting Huang, Bi Zeng, Zhentao Lin, Jia Cai

Image Approach to Uzbek Speech Recognition 1201
Musaev Mukhammadjon Mahmudovich, Abdullaeva Malika Ilkhamovna, Turaev Bobur Shukhrat Ogli

A GRU-Based Late Reverberation Suppression Method for Single-Channel Speech Dereverberation..... 1207
Nuo Li, Wancheng Zhang, Zunwen He, Yan Zhang

❖ **Power Communication Technology in Smart Grid**

Quantum Cryptography Technology and Application in Smart Grid 1213
Julaiti Abulizi, Hu Qingsheng, Wang Wei

Assessment of Security Index for SCADA Systems in Smart Grids..... 1218
Qiaomu Jiang, Yiqin Lu, Bin Wang, Linxia Zhang, Wen Long

MADDPG Based RAN Network Slicing for Smart Grid with NOMA 1224
Yuwei Wang, Jie Wang, Jiamin Li, Pengcheng Zhu, Dongming Wang, Xiaohu You

Critical Nodes Identification for Power Communication Network under Electrical Interdependent Effects of Smart Grid 1230
Quanming Zhang, Shiyong Yao, Qing Zhao, Min Zhang, Ruiguang Ma, Zhichao Ren

Research on Power Line Communication Path Search under the Background of New Energy Access 1235
Zhaolei He, Mengmeng Zhu, Cong Lin, Jin Liu, Rui Fang, Lei Wan

Service-Aware and Interference Avoiding Multi-node Parallel Resource Scheduling Algorithm for Smart Grid Networks..... 1240
Chengbo Hu, Xueqiong Zhu, Yongling Lu, Zhen Wang, Jinggang Yang, Rong Sun, Hai Xue

❖ Next Generation Communication Network Technology and Future Development

IDS _M : Intent-Driven Slice Management and Maintenance for 6G RANs	1244
<i>Jingwen Zhang, Chungang Yang, Alagan Anpalagan, Ru Dong, Lulu Zhang</i>	
Ergodic Achievable Rate for RIS-Assisted D2D Communication over Nakagami- <i>m</i> Fading	1250
<i>Fan Yang, Yiyang Ni, Wenchao Xia, Yaxuan Liu, Hui Zhang, Haitao Zhao</i>	
CAP-Net: A Deep Learning-Based Angle Prediction Approach for ISAC-Enabled RIS-Assisted V2I Communications.....	1255
<i>Ruixiang Wang, Fanghao Xia, Jingxuan Huang, Xinyi Wang, Zesong Fei</i>	
Next Generation Access Network Based on Hyperchaotic Spread Spectrum Sequences	1260
<i>Liwei Yang, Maiyun Zhang, Yuanhao Jiang, Xiangyuan Peng, Xinyu Li, Zhehao Xu</i>	
A Sensing-Based Cooperative Position Scheme for Perceptive Mobile Network towards 6G	1265
<i>Yajuan Wang, Jing Jin, Liang Ma, Xiaozhou Zhang, Mengting Lou, Tao Jiang, Qixing Wang, Guangyi Liu, Jiangzhou Wang</i>	
An Intent-Driven Next-Generation Mobile Communication Management System	1270
<i>Ru Dong, Chungang Yang, Junjie Guo, Jingwen Zhang, Jiaorui Huang</i>	
❖ Network Authentication and Security	
A Novel Semi-supervised Anomaly Detection Method for Network Intrusion Detection	1276
<i>Xinran Wang, Xiaofeng Qiu</i>	
DNN7: An Efficient Network Intrusion Detection Model	1281
<i>Hao Li, Xiangbo Wu, Yangyang Zhao, Xiaopeng Yang, Erlu He, Zhe Jia</i>	
Physical Layer Security of Cooperative NOMA Systems with an Untrusted User	1287
<i>Dan Jiang, Yuanyuan Gao, Nan Sha, Xiaoyu Wang, Na Li</i>	
WindArms: More Efficient DGF Coverage-Guided Tracing	1293
<i>Yunheng Luo, Jianshan Peng, Jiahan Lin</i>	
An Abnormal Traffic Detection Based on Attention-Guided Bidirectional GRU	1300
<i>Hao Li, Erlu He, Chunxu Kuang, Xiaopeng Yang, Xiangbo Wu, Zhe Jia</i>	
GNSS Spoofing Detection Based on Abnormal Receiver Noise and Carrier-to-Noise Ratio Metric.....	1306
<i>Min Deng, Honghao Wang, Dexiang Ming, Yangzhuo Chen</i>	
Telecom Fraud Detection via Imbalanced Graph Learning	1312
<i>Xinxin Hu, Haotian Chen, Hongchang Chen, Shibo Zhang, Shuxin Liu, Xing Li</i>	
Implementing Continuous Authentication in Network Connection Based on Improved SPA	1318
<i>Kun Jiang, Yao Xiao, Shumei Yuan, Xuan Si</i>	

❖ Network Attack and Defense

- A Defense Method Against Persistent Fault Attack..... 1323
Zhixiang Xu, Ning Wu, Fang Zhou, Fen Ge
- Design and Implementation of DDoS Attack and Defense Simulation Subsystem Based on Mininet..... 1328
Yongliang Zhao, Rongheng Lin, Hua Zou, Wei Zeng
- An Anti-jamming Intelligent Decision-Making Method for Multi-user Communication Based on Deep Reinforcement Learning 1335
Lan Zhang, Liang Ma, Feng Tian, Tianyi Liang
- Design and Analysis of Inter-RBs Hopping SCMA System under Jamming Attacks..... 1340
Kun Yang, Qi Zeng, Xing Liu, Ke Fang, Xianhua Niu
- An Improved Information Transmission Technology Based on Trust Value Against SSDF Attack..... 1346
Chang Xiangbei, Qi Lina, Chen Chengbing

❖ Network Address Detection and Analysis

- Hostname Correlation Based IPv6 Address Fast Scanning Technology of Windows Nodes 1353
Ming Hu, Liancheng Zhang, Yi Guo, Lanxin Cheng, Wenwen Du, Xupan Ma
- CGA Configuration Detection Method of IPv6 Nodes by Combining Active Probing with Passive Sniffing 1358
Liancheng Zhang, Jianping Sun, Juwei Yan, Yi Guo, Lanxin Cheng, Wenwen Du
- A CIDS Mode DDoS Blacklist Mechanism Based on Smart Contract in SAVI-Enable IPv6 Network..... 1363
Yufu Wang, Xingwei Wang, Rongfei Zeng, Min Huang
- A Packet Fields Authenticity Check Based Detection Technology of IPv6 Spoofing Behaviors..... 1370
Liancheng Zhang, Wenhao Xia, Xinyu Song, Lanxin Cheng, Wenwen Du, Xupan Ma
- 6FloodDetector: An IPv6 Flooding Behaviors Detection Technology Based on Eigenvalues and Thresholds 1375
Liancheng Zhang, Wenhao Xia, Weibin Huang, Wenwen Du, Yi Guo, Lanxin Cheng

❖ Information Network Management and Optimization

- DACS: A Double-Layer Application Classification Scheme for Hybrid Zero-day Traffic..... 1380
Yulong Liang, Fei Wang, Shuhui Chen
- IoT-Botnet Traffic Detection Based on Deep Forest 1388
Yalian Wu, Xieen He, Xingnian Chen
- Ontology-Based Network Intent Refinement Framework 1394
Ying Ouyang, Fuqiang Li, Chungang Yang, Ruitao Song, Xianglin Liu, Zeyang Ji

LogPS: A Robust Log Sequential Anomaly Detection Approach Based on Natural Language Processing 1400

Dongjiang Li, Jing Zhang, Xianbo Zhang, Feng Lin, Chao Wang, Liang Chang

❖ **5G/6G and Future Communication**

Research and Design of Dual-Band 1:8 Wilkinson Power Dividers for 5G Application 1406

Xicong Chen, Fumin Lin

Deep Learning-Based Joint Modulation and Coding Scheme Recognition for 5G New Radio Protocols ...1411

Xiang Chen, Xinyao Wang, Hanyu Zhao, Zesong Fei

5G Integrated Radio Transmission Scheme for Low Earth Orbit Satellite Access Network..... 1417

Dongdong Wang, Chenhua Sun, Lizhe Liu, Shunyao Yang, Zijian Zhang, Jianwei Li, Zuxiang Zheng, Xiujie Wang

Spectrum Efficient Coexistence between 5G NR Unlicensed and WiGig in 60 GHz Band 1421

Fang Liu, Yan Yang

Noise Prediction Based on Machine Learning in Quantum Secured SWDM B5G Fronthaul Networks..... 1426

ChengLong Wang, YongMei Sun, WeiWen Kong, YaoXian Gao

Low Latency MCS Design for LEO Satellite Communication Based on 5G..... 1432

Zuolin Jin, Dechao Chen, Jinxuan Huang

Satellite Ephemeris Broadcasting Architecture for 5G Integrated LEO Satellite Internet..... 1437

Jianwei Li, Dongdong Wang, Lizhe Liu, Bin Wang, Chenhua Sun

❖ **Pattern Recognition**

Recognizing Automotive Ethernet Device by Extracting Fingerprint from Power Spectrum..... 1442

Zhichao Huang, Guyue Li, Aiqun Hu, Jiabao Yu, Siyun Wu

Traffic Sign Recognition Based on Multi-branch Residual Mixture Model..... 1447

Hu Chaoqi, Li Yaohui, Fu Zehao

OPGW Cable Risk Identification Method Based on K-means Clustering..... 1452

Peizhe Xin, Jing Zou, Shulin Zhang, Qi Xiao, Jun Lu, Yong Wei

Research on Airport Bird Recognition Based on Deep Learning 1458

Yutong Chen, Yufen Liu, Zihan Wang, Jiayi Lu

Accurate and Fast Mask Recognition Based on Multiple Color Areas Detection and Face Landmarks Locating 1463

Jinwei Lin

Research on Intelligent Sorting System..... 1468

Yanghong Mao, Chuixin Chen

❖ **Electronics and Communication Engineering**

DPD and Compensation under RF Impairments in the Hardware by BiLSTM.....	1472
<i>Yihao He, Yan Li, Gang Wu</i>	
Deep Learning-Based Joint Detector for Cooperative Communication	1477
<i>Ling Jiang, Ruosong Shi, Lianhan Chen, Zhiyong Liu</i>	
Joint Receiver Design with Natural Redundancy.....	1482
<i>Zhaorui Zhu, Hongyi Yu, Zhenyu Wang</i>	
Analysis of Influence of Noise Interference on Frequency Measurement Results of IFM Receiver	1488
<i>Chao Li, Bo Peng, Ji-Kang Sun</i>	
A High-Sensitivity Wake-up Receiver Using Tunnel Diode for ISM Band	1493
<i>Bingru Wu, Diandian Zhang, Tao Ma, Ruixuan Jiang, Hanming Gao, Guanghui Liu</i>	
Flattening Design and Simulations to the Metamaterial-Based Hyperbolic Reflector	1497
<i>Xudong Pang, Beibei Cao, Liping Wu, Shouzheng Zhu</i>	
Low-Power Double-Edge Triggered D Flip-Flop Based on the Conditional Discharge Technique	1501
<i>Siyue Qiu, Maoqun Yao, Zhiqiang Liu</i>	
Research on Terminal Fingerprint Extraction and Temperature Adaptability Based on CAN Bus	1506
<i>Wei Fang, Jiabao Yu, Yanjun Ding, Xiaozhong Hu, Sheng Li, Aiqun Hu</i>	

❖ **Development of Electronic Equipment Based on AI**

Implementation of Bidirectional LSTM Accelerator Based on FPGA.....	1512
<i>Hao Wang, Danfeng Qiu, Fen Ge, Ying Yang</i>	
Frequency Measurement for Laser Stabilization Based on the Beat-sampling Method	1517
<i>Yanbin Shui, Zhongtao Shen, Xuan Wang, Changqing Feng, Shubin Liu</i>	
An A3C Deep Reinforcement Learning FPGA Accelerator based on Heterogeneous Compute Units.....	1521
<i>Ziyu Li, Fen Ge, Fang Zhou, Ning Wu</i>	
An Identity Authentication Method Based on Accelerometer and Gyroscope	1526
<i>Ru Zhao, Junrui Liu, Xiaorong Zhao, Deqiang Wang</i>	
Efficient Configurable Digit-Serial Multiplier Based on Improved Karatsuba Algorithm over $GF(2^m)$	1531
<i>Xinyu Wang, Ning Wu, Fang Zhou, Fen Ge</i>	
Attention-CNN-Aided Specific Emitter Identification Method with Limited Radio Frequency Dataset	1536
<i>Shufei Wang, Yibin Zhang, Jinlong Sun, Tomoaki Ohtsuki, Guan Gui</i>	
A Block Assembly Tool for Design Automation of FPGA Implementations	1541
<i>Ke Du, Stéphane Domas, Michel Lenczner</i>	

A Hybrid CNN Compression Approach for Hardware Acceleration	1546
<i>Xin Yue, Fen Ge, Fang Zhou, Ning Wu, Yi Zhang</i>	
3D Chaos Generating by 555 Timer	1551
<i>Jie Cheng, Haiyong Huang, Wenshi Li</i>	
Reconfigurable Multi-algorithm Neural Network Accelerator Based on Target Detection	1555
<i>Wang Han, Ning Wu, Fang Zhou, and Fen Ge</i>	
❖ Computer Vision and Image Processing	
A Double-Layer Image Encryption Scheme Based on Silicon-Based Optical Chaos	1560
<i>Hao Liu, Hao Cheng, Yan Wang, Zheng Peng, Xiaodong Ren, Yubei Shuai, Shengyin Zang, Jiagui Wu</i>	
Research on the Imaging Method of Long-Distance High-Speed Targets in the Earth-Moon Space.....	1565
<i>Ruyin Xue, Danru Yu, Jichuan Li, Chen Zhao</i>	
Multistage 3D Hand Pose Estimation Algorithm Based on Skeleton Points	1571
<i>Wenqiang Wang, Lihua Tian, Chen Li</i>	
Improved Hierarchical Architecture for Graph Classification	1576
<i>Zhimo Li</i>	
3D Human Movement Pose Generation Based on Pre-trained AI Model with Skeleton Constraint Analysis and Intelligent Prediction	1582
<i>Jinwei Lin</i>	
Multi-Frame Detection via Matrix Information Geometry-Based Track-Before-Detect Algorithm.....	1590
<i>Hao Wu, Yongqiang Cheng, Zheng Yang, Xiaoqiang Hua, Hongqiang Wang, Xiang Li</i>	
❖ Digital Image Analysis and Calculation	
Mixed Residual Convolutions with Vision Transformer in Hyperspectral Image Classification.....	1595
<i>Ying Cao, Yang Wang, Zhijian Yin, Zhen Yang</i>	
Fast Registration Algorithm of MVCT and KVCT Based on Mutual Information	1600
<i>Ziting Fan, Yuxin Lei, Jun Zhang, Ruijie Yang, Junhai Wen</i>	
Wavelength-Dependent Image Defogging Method Based on Mie Scattering of Fog Droplets	1605
<i>Lurui Yang, Kai Liu, Yongqing Huang, Xiaofeng Duan, Qi Wang, Xiaoxia Du, Xiaodong Chen</i>	
An Implicit Saliency Guided Infrared and Visible Image Fusion Method.....	1612
<i>Zhang Qingwei, Fan Fangfang, Zhong Yiwen, Wang Changying, Xiao Zhongjie</i>	
Research on Image Defogging Algorithm for Power Monitoring	1617
<i>Li Jiang, Chaoxing Zhao</i>	

A Two-Branch Network Based on Pixel-Pair and Spatial Patch Model for Hyperspectral Image Classification	1622
<i>Xichen Zhai, Jun Liu, Siyu Sun</i>	
The Appropriate Image Enhancement Method for Underwater Object Detection.....	1627
<i>Zheng Zhang, Qingshan Tong, Chuanchuan Yi, Xianhui Fu, Jia Ai, Zhaopeng Wang</i>	
A Spatial Non-cooperative Target Image Semantic Segmentation Algorithm with Improved Deeplab V3+	1633
<i>Zonghua Qu, Chunling Wei</i>	
Multi-person Identification and Localization Algorithm Using RGB-D Image Segmentation.....	1639
<i>Xu Han, Jun Yan</i>	
YOLOMask: Real-time Instance Segmentation with Integrating YOLOv5 and OrientMask.....	1646
<i>Yang Wang, Zhikui Ouyang, Runhua Han, Zhijian Yin, Zhen Yang</i>	
❖ Image and Multimedia Technology	
Joint Calibration of Binocular-ToF Camera and Docking Ring Correction	1651
<i>Liang Hu, Dianqi Sun, Huixian Duan, Haodong Pei</i>	
Robust Vision SLAM Based on YOLOX for Dynamic Environments	1655
<i>Huangbin Yan, Xin Zhou, Junya Liu, Zhijian Yin, Zhen Yang</i>	
QoE Oriented Adaptive Optimization for 360° Virtual Reality Videos.....	1660
<i>Rui Deng</i>	
Shot-Based Content Adaptive Robust Digital Video Watermarking Algorithm Against Camera Recording	1667
<i>Jiayi Bai, Xin Wang, Yana Zhang, Cheng Yang</i>	
Subjective Quality Assessment of HDR Stereoscopic Omnidirectional Videos	1672
<i>Manman Liu, Jihao You, Ruitao Chen, Ziwei Ye, Gangyi Jiang</i>	
3D Dynamic Ray-Tracing Method for Vehicle-to-Vehicle Propagation Channels.....	1678
<i>Gang Liu, Li-Qiang Niu, Hao-Yi Xu, ChongHu Cheng</i>	
A Multimodal Fusion Network Based on Hypergraph for 3D Shape Retrieval	1682
<i>Xiaoting Huang, Liping Nong, Wenhui Zhang</i>	
❖ Intelligent Image Detection and Application	
Research on Cable Aging and Joint State Detection Technology under the Effect of Multi-physical Field Coupling	1688
<i>Fanbin Meng, Gang Zheng, Yu Nan, Jiangtao Li</i>	

Top-Down Detection for SAR Regular Minefield based on Faster R-CNN and CFAR	1693
<i>Zhang Yansong, Jin Tian, Wang Yuming</i>	
Stationary and Small Target Detection for Millimeter-Wave Radar	1698
<i>REN Shengjun, HAN Siyang, WANG Baoshuai</i>	
Millimeter-Wave Radar Target Detection Based on Inter-frame DBSCAN Clustering	1703
<i>Siyi Xie, Chaofeng Wang, Xiaohua Yang, Yaping Wan, Tiejun Zeng, Zhenghai Liu</i>	
Agricultural pest detection algorithm based on attention mechanism	1709
<i>Xiaoyu Fan, Yang Wang, Junya Liu, Zhijian Yin, Zhen Yang</i>	
Vehicle Tracking from Bird-Eye View	1714
<i>Kai Tian, Yun Li, Shanlin Sun, Biaohang Sun</i>	
Lane Detection Method Based on Color Feature	1719
<i>Yimin Yang</i>	
Multi-area Target Individual Detection with Free Drawing on Video	1723
<i>Jinwei Lin</i>	
Life Detection Based on UAVs - Thermal Images in Search and Rescue Operation.....	1728
<i>Pascaline Byukusenge, Yihong Zhang</i>	
Infrared-RGB Image Registration for Power Thermal Fault Detection Based on Gradient Hash Matching	1732
<i>Yingnan Geng, Weixuan Diao, Yan Zhao</i>	
Geometric Feature Detection of Space Targets Based on Color Space	1736
<i>Dianqi Sun, Liang Hu, Huixian Duan, Haodong Pei</i>	
Fusing Transformer and YOLOX for Smoke Detection.....	1740
<i>Zhikui Ouyang, Yang Wang, Zhijian Yin, Zhen Yang</i>	
A Vehicle Line-Pressing Detection Approach Based on YOLOv5 and DeepSort.....	1745
<i>Shuning Wu, Fen Ge, Yi Zhang</i>	
❖ Positioning System and Algorithm	
A Single-Observer Passive Location Algorithm Base on Weighted Least Squares Criterion	1750
<i>Jiang Bin, Lu An' nan, You Mingyi, Lou Caiyi, Ye Yunxia, Huang Kai, Shi Binhua</i>	
WiFi Fingerprint-Based Multi-user Localization for Smart Home by WiFi Sensing	1755
<i>Jiayang Ding, Yong Wang, Shaozhong Fu, Haiming Chen, Wendong Xie, Yunsong Liu</i>	

A Narrowband Sound Source Localization Method and System Based on A Non-uniform Linear Microphone Array	1760
<i>Xiaoyu Qian, Xunrui Tang, Ziyuan Wang, and Qiao Meng</i>	
Research on Trajectory Smoothing Optimization Algorithm of Underwater Long Baseline Positioning System	1765
<i>Kun Zhang, Shengrong Zhang, Ju Huang, Chong Shen</i>	
A CSI Based Localization and Identification Recognition Algorithm Using Multi-task Learning and Deep Residual Shrinkage Network.....	1770
<i>Yanzhao Guo, Jun Yan</i>	
DOA-TDOA Hybrid Location Based on Weighted Least Squares with Observation Station Position Errors	1777
<i>Linqiang Jiang, Tao Tang, Paihang Zhao, Ziqiang Zhang</i>	
An Outdoor Localization Approach based on Deep Neural Networks with Cramer-Rao Lower Bound Aided Training Set Rebalancing	1784
<i>M.-Y. You, B.-H. Shi, A.-N. Lu, C.-Y. Lou, Y.-X. Ye, B. Jiang, K. Huang</i>	
An Effective User Localization and Environment Reconstruction Algorithm for WiFi Systems.....	1789
<i>Yuan Tang, Zhihai Zhang, Xinhong Pan, Heyun Lin, Yuan Chen</i>	
Data-Adaptive CNN Used for Multi-parameters Estimation in High-Precision Indoor Localization	1795
<i>Sipeng Tang, Youyun Xu, Li Wei</i>	
❖ Computer Network Model and Data Transmission	
EPM-SR: efficient performance measurement framework for KPIs to support segment routing over IPv6 Network	1800
<i>Wenting Wei, Xiangdong Zhang, Siduo Pan, Lizhe Liu, Qingyi Wang</i>	
A Multi Access VPDN Network Model.....	1806
<i>Jun Tao, Huan Chen, XingXing She, HuaMin Liu</i>	
Reinforcement Learning-Based Stream Reservation for Distributed Time Sensitive Networks	1811
<i>Fengyou Xu, Danfeng Qiu, Bo Lv</i>	
A Machine Learning Based MPTCP Subflow Control Algorithm for Multi-access Heterogeneous Networks	1817
<i>Chengbing Chen, Lingyun Jiang, She Jun, Hongbo Zhu, Jia Gu, Xiangbei Chang</i>	
A Spectrum-Sharing Multiple Terminals Transmission Method in VSAT Networks	1823
<i>Zheng Wang, Tian Li, Xinwei Yue, Yanfei Wu</i>	
Multi-source Heterogeneous Data Processing Technology for Digital Twin Network.....	1829
<i>Hongwei Yang, Pin Lü, Tao Sun, Lu Lu, Cheng Zhou</i>	

Research on IMS Packet Service Triggering Algorithm Based on Double Filtering Criterion	1835
<i>Ning Ma, Qing Miao, Yuan Qin, JinJin Li, TangJie Yuan</i>	
Classification, Building and Orchestration Management of Digital Twin Network Models	1843
<i>Danyang Chen, Hongwei Yang, Cheng Zhou, Lu Lu, Pin Lü, Tao Sun</i>	
❖ Radar Measurement and Imaging Technology	
Application of Complex Network in Intra-pulse Feature Extraction of Radar Emitter Signals.....	1847
<i>Yiming Ma, Taowei Chen, Huiyuan Wang</i>	
Forward-Looking Imaging Method of Airborne Array Radar Based on Uniform Circular Array	1852
<i>Runfa Zhu, Guigeng Lu, Lu Liang, Zhenrong Zhang</i>	
An Efficient Alignment Method for Scanning Data of 77GHz mmWave Imaging Radar	1859
<i>Tongkai Xu, Chunling Hao, Qingshui Guo, Kun Yin, Tang Hu, Lijie Yang</i>	
A Concise Formula for Backscattering Prediction of Truncated Wedge Model.....	1864
<i>Gengjiang Yao, Lijie Chen, Long Xiao, Fan He, Xiao Hu, Zhaowang Cao</i>	
❖ Software Development and Data Model	
Optimal Software Distribution and Allocation Strategies for Improved Datacenter Resource Utilization....	1868
<i>Xiang Luo, Xiaoyuan Cao, Kai Luan, Qiang Bian, Zhi Li, Qiang Zhang, Yang Ning, Xinkai Miao</i>	
Malware Classification Based on GAF Visualization of Dynamic API Call Sequences.....	1873
<i>Hongmei Zhang, Xiaoqian Yun, Xiaofang Deng, Xiaoxiong Zhong</i>	
Performance Evaluation of Prediction Methods of Social Statistics for Nighttime Light Data.....	1878
<i>Xiaomin Du, Feng Li, Jing Tong</i>	
Privacy Preserving Electronic Scoring Scheme based on CKKS.....	1884
<i>Shangshang Chen, Yaqian Zhao, Ruyang Li, Xuelei Li, Jian Zhao, Kai Liu</i>	
A New Blind Equalization Algorithm Based on Data Reusing.....	1889
<i>Liang Wang, Hewen Wei</i>	
Anomaly Detection Method for Interactive Data of Third-Party Load Aggregation Platform Based on Multidimensional Feature Information Fusion.....	1893
<i>Xiao Zhang, Chenghao Zheng, Xianglong Wu, Tianpeng Wang, Hailong Gao, Jing Guo</i>	
❖ Artificial Intelligence Algorithm and Model	
Power Domain Named Entity Recognition Based on Rules and Dictionaries.....	1898
<i>Jue Jiang, Rongheng Lin, Hua Zou</i>	

An Energy-Constrained Optimization-Based Structured Pruning Method for Deep Neural Network Compression	1903
<i>Siping Liu, Qiang Li, Bo Peng, Yanping Qiao, Maosong Lin, Qiang Zeng</i>	
Intelligent Bearing Fault Diagnosis Using Adaptive Time-Frequency Convolutional Features with Multi-task Learning.....	1908
<i>Simin Li, Youjiang Liu, Yongtao Qiu, Shengli Wang</i>	
Short-Term Load Forecasting Method Based on ARIMA and LSTM	1913
<i>Shuo Chen, Rongheng Lin, Wei Zeng</i>	
Multi-Model Bus Arrival Time Prediction using Real-Time Online Information	1918
<i>Zihao Yang, Chan-Tong Lam and Benjamin K. Ng</i>	
Path Loss Model for Wearable Robotic Arm System at MHz Band.....	1923
<i>Weijia Ren, Fanmiao Sun, Lijia Liu, Yifan Wang, Le Song, Jingjing Shi</i>	
Identification of Wellbore Flow Abnormal Working Conditions Based on Deep Learning	1927
<i>Yanzhao Chen, Mengbo Li, Yonghua Li</i>	
Continuous-Graph Attentional Neural Networks for Temporal Link Prediction.....	1932
<i>Jiawei Shi, Jian Shu</i>	

Author Index