

2024 International Conference on Ubiquitous Communication (Ucom 2024)

**Xi'an, China
5-7 July 2024**



**IEEE Catalog Number: CFP24IZ3-POD
ISBN: 979-8-3503-7422-3**

**Copyright © 2024 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:	CFP24IZ3-POD
ISBN (Print-On-Demand):	979-8-3503-7422-3
ISBN (Online):	979-8-3503-7421-6

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

International Conference on Ubiquitous Communication 2024 (Ucom 2024)

Table of Contents

Preface.....	ix
Committees.....	x

❖ Communication Theory and Techniques

Hybrid Visible Light Positioning Algorithm of RSS/TDOA Based on Kalman Filter	1
<i>Nie Yao, Sun Yinghui, Fan Xianglin, Wu Huan</i>	
Performance Analysis of Overlay Cognitive Cooperative Communication Based on RSMA	6
<i>Linlin Liang, Zongkai Tian, Haiyan Huang, Nina Zhang, Dehua Zhang, Yue Li</i>	
Path Loss Prediction Based on Deep Neural Networks Considering Fresnel Zone	11
<i>Shirui Wang, Ruisi He, Tong Wu, Jingya Yang, Mi Yang, Shun Zhou, Chenlong Wang, Bo Ai</i>	
Multi-Beam Symbol-Level Secure Communication for Hybrid Near- and Far-Field Communications.....	16
<i>Wensheng Deng, Bin Qiu, Wenchi Cheng</i>	
RIS-assisted Coverage Enhancement in mmWave Integrated Sensing and Communication Networks	21
<i>Xu Gan, Chongwen Huang, Zhaohui Yang, Xiaoming Chen, Faouzi Bader, Zhaoyang Zhang, Chau Yuen, Yong Liang Guan, M'rouane Debbah</i>	
Rate Maximization for RIS-Assisted OAM Multiuser Wireless Communications.....	27
<i>Jun Lan, Liping Liang, Wenchi Cheng, Wei Zhang</i>	
Performance Analysis of Intelligent Reflecting Surface Aided Wireless Reconnaissance in Mountain Areas	32
<i>Yong Xin Guo, Gui Fang, Yunfei Long, Yuxuan Zhang, Quanrui Wang, Xinrong Guan</i>	
Orbital Angular Momentum Active Anti-Jamming in Radio Wireless Communications.....	37
<i>Kexin Zheng, Wenchi Cheng, Liping Liang</i>	
Lightweight Detection of UAV Communication Activity with A Finite Blocklength.....	42
<i>Jianqi Peng, Xiaoling Hu, Shihao Yan, Chunshan Liu, Ran Yan</i>	
Determining Pseudo-Random Chaotic Sequences Complexity Using Refined Fuzzy Entropy	47
<i>Yujie Ling, Chenxi Li, Chuan Zhang, Lei Guan, Wenting Wei, Yue Zhao</i>	
UAV-Terrestrial RSMA Communication Suffering Terrestrial Interference.....	53
<i>Jiarui Liang, Hang Deng, Yuanyuan Peng, Jinpeng Song, Shuai Wang, Gaofeng Pan</i>	
List Decoding of Binary Subspace Chirps	57
<i>Pinmo Li, Jianping Zheng</i>	
Precoding and Power Control Design for Cell-Free XL-MIMO: From Far-Field to Near-Field	63
<i>Jiayao Yang, Jiayi Zhang, Bokai Xu, Huahua Xiao, Bo Ai</i>	

Transmit Power Minimization in a Mutualistic Symbiotic Radio with Hybrid Active-Passive Communication Network	68
<i>Hailong Zhang, Bo Li, Ruixuan Mi, Xi Song, Kan Feng, Wenhui Li</i>	
Covert Communications against UAV Surveillance via Probabilistic Transmission.....	73
<i>Ting Yin, Sheng Wang, Yida Wang, Shusen Zhang</i>	
MUSIC-Based Residual Uniform Frequency Offsets Mitigation Method for Underwater Acoustic Differential OFDM Communications	79
<i>Qilong Xiong, Yuzhou Li</i>	
Experimental Research of Blind Source Separation Anti-jamming Based on Spread Spectrum Communication.....	85
<i>Xiongfei Li, Xiangyang Meng, Yangming Guo, Hang Zhang, Xiaoyu Zhang</i>	
Multi-Antenna Covert Communications with a BPP Field of Wardens.....	91
<i>Hangmei Rao, Shihao Yan, Jianquan Wang, Xi Peng, Sa Xiao, Wanbin Tang</i>	
Predictive Beamforming for ISAC-NOMA Enabled Vehicle Networks.....	97
<i>Aoying Li, Yujie Wang, Wei Liang, Lixin Li, Wensheng Lin</i>	
Joint Optimization Method for Simulation Parameters and Hardware Latency in High-Precision Navigation Channel Emulators	102
<i>Pengpeng Li, Shuibin Zhong, Zhicheng Lv, Weihua Mou</i>	
Impacts of Imperfect SIC and Hardware Impairment on Cooperative NOMA Networks with Spectrum Sharing.....	107
<i>Haiyan Huang, Yuhao Wei, Linlin Liang</i>	
Rotating Extremely Large-Scale MIMO with Generative AI for Vehicular Communications	112
<i>Jiakang Zheng, Jiayi Zhang, Hongyang Du, Jiawen Kang, Dusit Niyato, Bo Ai</i>	
Energy Efficiency Maximization for STAR-RIS Assisted Uplink NOMA Transmission Systems	117
<i>Xiansheng Zeng, Yulong Zou, Yulei Lou</i>	
Movable Antenna Assisted OAM Wireless Communications with Misaligned Transceiver.....	122
<i>Hongyun Jin, Wencheng, Haiyue Jing, Jingqing Wang</i>	
Secrecy Rate Maximization for Active RIS Assisted Communication Systems with Transceivers Hardware Impairments.....	127
<i>Zhanrong Huang, Yulong Zou, Yulei Lou</i>	
Dynamic Beamforming Design for Near-Field MIMO Communications.....	132
<i>Zheng Zhang, Yuanwei Liu, Zhaolin Wang, Jian Chen, Long Yang</i>	
Intelligent Reflecting Surface Assisted Anti-jamming for Multi-user Wireless Communications	138
<i>Yunfei Long, Wendong Yang, Xinrong Guan, Yangyi Zhang</i>	
DCT Scheme in LOS Propagation Based on UCA	142
<i>Ke Gao, Wencheng, Jingqing Wang</i>	
Intersymbol Interference Cancellation for Ultra-wideband Sensing and Communication Systems.....	147
<i>Xufang Wang, Feng Lin, Yi Wu</i>	
Multi-Frequency Resonant Circuit Based Multi-User Emergency Through-the-Earth Communication with Magnetic Induction	152
<i>Zhenyu Wang, Jianyu Wang, Wencheng</i>	

Design of a Multi-frequency Antenna Loaded with SRR Structure.....	158
<i>Yuxuan Fang, Yang Liu, Qiwei Li</i>	
Channel Estimation of Uplink Extremely Large-Scale MIMO in Wideband Near-Field Communications	163
<i>Qinxuan Ruan, Jianping Zheng</i>	
An Analytical Model for Coordinated Multi-Satellite Joint Transmission System.....	169
<i>Xiangyu Li, Bodong Shang</i>	
Weighted Sum Rate Maximization for Smart Reflective Surfaces Based on Improved Lion Swarm Algorithm	174
<i>Feng Wang, Mingyan Jiang, Keqin Jiang, Ze Zhao</i>	
STAR-RIS Assisted Secure Wireless Powered Communications with Cooperative Jamming	180
<i>Haolian Chi, Kunrui Cao, Beixiong Zheng, Jingyu Chen, Siwei Tang, Danyu Diao, Haiyang Ding</i>	
❖ Signal Processing & Image Processing	
Wireless Sensing Using Off-the-Shelf WiFi 6E Card	187
<i>Xuanhong Liang, Howard H. Yang, Kun Guo, Tony Q. S. Quek</i>	
Trapezoidal Gradient Descent for Effective Reinforcement Learning in Spiking Networks	192
<i>Yuhao Pan, Xiucheng Wang, Nan Cheng, Qi Qiu</i>	
Nonstationary Jammer Excision Based on Sparse Reconstruction and Support Vector Regression.....	197
<i>Jiangbo Si, Zeyu Wang, Hang Hu, Naofal Al-Dhahir</i>	
UAV Object Detection Based on Joint YOLO and Transformer	202
<i>Yifan Gao, Rui Ding, Fuhui Zhou, Qihui Wu</i>	
Fast CU Inter Partitioning Method for VVC Based on the Optimal Prediction Residual Maps	207
<i>Chenxi Ma, Mingyi Yang, Fuzheng Yang</i>	
Optimization Strategy for 3D Mesh Displacement Coding in the V-DMC Standard	212
<i>Xuanrui Zhang, Wenjie Zou, Zhuoyi Lv</i>	
Cramér-Rao Bound Analysis for MUSIC-like Source Number Estimation in Indoor Sound Source Localization	217
<i>Xiyu Song, Qing'sheng Qin, Shiqi Wang, Fangzhi Yao, Mei Wang, Hongbing Qiu</i>	
Density-Adaptive Octree-based Point Cloud Geometry Compression.....	227
<i>Ren Huang, Guiqi Wang, Wei Zhang</i>	
A Perceptual-Driven Adaptive Reference Picture Resampling Method in VVC	232
<i>Jianxiang Sun, Mingyi Yang, Fuzheng Yang</i>	
Blind Reconstruction of Binary Primitive BCH Code Based on Error Codeword Correction	237
<i>Haochen Mu, Yunzhi Wu, Li Li</i>	
Enhancing Mesh Parameterization Efficiency: A Study on Patch Generation Optimization in V-DMC Standard	243
<i>Haidi Huang, Zhe Sun, Wenjie Zou, Zhuoyi Lv</i>	
An Integrated Communication and Navigation Waveform Design Based on OFDM with Index Modulation.....	248
<i>Yinjie Ma, Lifeng Wang, Supeng Leng, Dianxiong Liu</i>	
Asymmetric Multi-scale Dilated Attention Based Network for Remote Sensing Image Compression	254
<i>Haoyi Ma, Peicheng Zhou, Jia Jia, Ran Tang, Keyan Wang, Yunsong Li</i>	

Parameter-efficient Transformer Network for Radar Anti-jamming Strategy Design	259
<i>Liangqi Liu, Tianpeng Pan, Wenqiang Pu, Bo Jiu, Junkun Yan</i>	
A Reference Frame Compression Scheme via AVS Perceptual Lossless Compression in Video Coding.....	264
<i>Meng Wu, Huanbang Chen, Fuzheng Yang, Haitao Yang, Junkai Feng</i>	
Reconfigurable Intelligent Surface-Assisted Wireless Powered Sensing and Communication Networks	269
<i>Zhengyu Zhu, Kaixuan Guo, Zheng Chu, De Mi, Yuanwei Liu, Sami Muhaidat</i>	
Assessing Wireless Screen-casting Services: A Comprehensive Quality of Experience Model.....	276
<i>Zhicheng Zhang, Tianyu Zhang, Jiarun Song</i>	
Cloud Gaming Video Coding Algorithm Assisted by Pixel-level Motion Vector Prediction Utilizing Camera Information	281
<i>Haonan Sun, Yuan Chen, Yifan Wang, Fuzheng Yang, Kun Yang, Gaoxing Chen</i>	
❖ Networking	
An Architectural Design of Network Scenario Cognitive Engine Based on Metacognitive Core	286
<i>Lei Chen, Lifeng Wang, Dianxiong Liu</i>	
A Credit Based Abnormal Traffic Filtering Method for Time Sensitive Network in Substations	292
<i>Huibin Jia, Yanyan Liu, Kun Wu, Jiahe Li, Zhihua Wang</i>	
Error Correction for SDN Routing and Forwarding.....	297
<i>Xufang Wang, Feng Lin</i>	
Active Intelligent Reflecting Surface Aided Secure Communication with Covert Constraint.....	302
<i>Changjun Liu, Jia Shi, Zhusong Yin, Yongchao Wang</i>	
Inter-Satellite Links-Enabled Cooperative Satellite Edge Computing	308
<i>Caiguo Li, Bodong Shang</i>	
A Predictiveness-enhanced PROPHET Based on Triple Exponential Smoothing in Mobile Opportunistic Networks	314
<i>Demin Peng, Yanan Chang, Xingzhuo Duan, Jianqun Cui</i>	
Resource Allocation for Vehicle-Satellite-Cloud Empowered Vehicular Edge Metaverse	320
<i>Caiguo Li, Bodong Shang, Yanhui Wu</i>	
SMT-based Traffic Scheduling Algorithm for TSN.....	325
<i>Chunlong Liu, Wei Huangfu, Jiahao Huo, Xiaolong Cui</i>	
A Data Collection Scheme Using Transformer Autoencoder in Wireless Sensor Networks	332
<i>Jiahui Xu, Cuiran Li</i>	
Relay Assisted Covert Communications in Underlay Cognitive Radio Networks.....	337
<i>Hongbin Fan, Weiwei Yang, Wenqiang Feng, Chuanzhen Rong</i>	
❖ Optical Communication	
Convolutional Neural Networks for Fiber-Bending Eavesdropping Attacks Detection in Coherent Optical Communication Systems	342
<i>Wenshuai Qin, Qihan Zhang, Weigang Hou, Xu Zhang, Xiaoxue Gong</i>	
Inter-Layer Link Allocation in Multilayer LEO Optical Satellite Networks.....	346
<i>Yulong Fan, Yongli Zhao, Wei Wang, Kunpeng Zheng, Yinji Jing, Yuanjian Zhang, Zhang Jie</i>	

❖ Machine Learning & Optimization for Wireless Systems

Collaborative Radio Frequency Fingerprint Identification Using Dual-Channel Parallel CNN	351
<i>Hanbo Wang, Jian Wang</i>	
Multi-Hop UAV Relay Covert Communication: A Multi-Agent Reinforcement Learning Approach	356
<i>Hengzhi Bai, Haichao Wang, Jiatao Du, Rongrong He, Guoxin Li, Yuhua Xu</i>	
Root Cause Localization of Wireless Communication Network Faults Based on 1DCNN-Att Network.....	361
<i>Yuehua Han, Wei Liu, Lei Wang</i>	
Adaptable Semantic Compression and Transmission Resource Allocation for Intelligent Image Classification	367
<i>Qian Wang, Jiaqi Ye, Qianqian Yang, Liping Qian, Huijie Zhu</i>	
Multi-label Behavior Cloning for Full-area Exploration in IoT-Enabled Unstructured Unknown Environments	372
<i>Lijuan Xu, Qinghai Yang, Meng Qin</i>	
Decoupled Online Learning Network Method for Analog Beamforming with Antenna Selection	377
<i>Weijie Xiong, Yuhan Zhang, Jingran Lin, Kai Zhong, Jinfeng Hu</i>	
DDQN based Beamwidth and Subcarrier Allocation Strategy for LEO Satellite Communication System with Multi-beam Capability.....	383
<i>Jia Shi, Jinglan Ma, Qing Wei, Wentao Sun</i>	
Minimization of Completion Time for Dynamic and Reliable Data Collection with Multiple UAVs.....	389
<i>Xueli Guo, Xinyi Liu, Jiaqi Zhou, Mengmeng Shi, Xuerui Zhu, Ziyao Zhu</i>	
Joint UAV Trajectory and Power Optimization in Cell-Free mMIMO Systems with Deep Q-Network.....	395
<i>Xianghua Zhang, Zhilong Liu, Jiayi Zhang, Bo Ai</i>	
UAV-RIS Assisted AoI Minimization in IoT Networks: A Reinforcement Learning Approach.....	400
<i>Zihui Gao, Xulong Li, Jiahao Huo, Wei Huangfu</i>	
OSMR: Open-Set Modulation Recognition based on Information Enhancement.....	406
<i>Yuxuan Ling, Linan Wang, Yuqing Wang, Chaoqun Hou, Jianxiong Pan, Neng Ye</i>	
A Semisupervised Graph Convolutional Neural Network-based Earth Station Network Planning Method.....	411
<i>Honghua Zhao, Xuemiao Sun, Guyu Hu, Ke Ding</i>	
A Secure and Efficient Federated Learning Framework for Radio Frequency Fingerprint Recognition	416
<i>Weicheng Liu, Yunsong Huang, Hui-Ming Wang</i>	
Spectrum Map Construction Method based on Spatially-Enhanced Channel Attention.....	421
<i>Siqi Peng, Han Zhang, Congan Xu, Wei Zhang, Yun Lin</i>	
PAPR-Aware Joint Waveform Design of UAV-enabled Integrated Sensing and Communication	426
<i>Meng Gu, Yaxi Liu, Wei Huangfu</i>	
Task Offloading and Trajectory Optimization for UAV-Assisted Mobile Edge Computing.....	432
<i>Mengmeng Shi, Yanchao Xing, Xueli Guo, Xuerui Zhu, Ziyao Zhu, Jiaqi Zhou</i>	
FedsLLM: Federated Split Learning for Large Language Models over Communication Networks.....	438
<i>Kai Zhao, Zhaohui Yang, Chongwen Huang, Xiaoming Chen, Zhaoyang Zhang</i>	
Toward Embodied Intelligence: An Autonomous Exploration System for Multimodal UAV	444
<i>Zihan Hu, Weikai Yang, Meng Zhang, Chengdong Lei, Hongtao Liang, Fuhui Zhou, Qihui Wu</i>	

❖ Emerging Technologies, Standards, and Applications

Efficient Multi-Robot Cooperative Transportation Scheduling System.....	449
<i>Xiaodong Li, Yangfei Lin, Zhaoyang Du, Rui Yin, Celimuge Wu</i>	
Coverage Analysis for Air-Ground Integrated-Sensing-and-Communication Networks.....	455
<i>Yihang Jiang, Fanyi Meng, Xinhao Li, Xiaoyang Li, Guangxu Zhu, Kaifeng Han, Qingjiang Shi</i>	
Fast Region-Adaptive Hierarchical Transform with Cross-Component Prediction and Coefficient Reordering.....	460
<i>Xiaoyu Liu, Junjie Wang, Wei Zhang</i>	
Joint Visual and Haptic Signal Transmission for Immersive Interactions in Human Digital Twin	465
<i>Kun Wu, Jiayuan Chen, Changyan Yi, Zili Liu, Xiaoping Lu, Junyi Wang, Jun Cai</i>	
Multi-Access Edge Computing Empowered Integrated Hybrid Sensing and Communication: A Computation-Efficient Design	471
<i>Chenglong Dou, Xumin Huang, Yuan Wu, Liping Qian, Tony Q. S. Quek</i>	
Design and Realization of Remote Real-time Monitoring of Tower Concrete Curing Environment	477
<i>Zhengfa Li, Desheng Zhou, Rui Wang, Haiyan Li, Jian Yang</i>	
Constructing and Evaluating Digital Twins: An Intelligent Framework for DT Development	482
<i>Longfei Ma, Nan Cheng, Xiucheng Wang, Jiong Chen, Yinjun Gao, Dongxiao Zhang, Jun-Jie Zhang</i>	
3D Environment Reconstruction Based on ISAC Channels	487
<i>Junzhe Song, Ruisi He, Zhengyu Zhang, Mi Yang, Bo Ai, Haoxiang Zhang, Ruifeng Chen</i>	
Design of a Spaceborne Earth-Coverage Scanning Phased Array Antenna Based on Mirror Beamforming Networks for MEO Satellite Communications.....	492
<i>Muren Cai, Siyi Du, Xiaowei Shi, Wentao Li, Heng Liu, Qiaoshan Zhang, Yan Li, Chunbang Wu</i>	
Improved Trisoup Geometry Reconstruction in Geometry-based Point Cloud Compression (G-PCC)	497
<i>Kai Yao, Yimo Cao, Wei Zhang</i>	
❖ Joint Communication, Sensing and Computing for Next Generation Network	
Channel State Estimation and Noise Source Location Based on Ambient Backscatter Communication in Substation Scenario	502
<i>Qingqing Wu, Wei Bai, Yang Lu, Yan Ma, Fei Chen</i>	
Secure Design for RIS-Assisted Multi-Target ISAC Systems	510
<i>Xinji Wang, Xin Chen, Haiyang Cao, Zenebe Melesew Yetneberk, Chaowen Liu, Tong-Xing Zheng</i>	
Sensing Processing Method for Integrated Sensing and Communication in Smart Home Linkage.....	516
<i>Gong Chao</i>	
Exploring Adversarial Attacks in Semantic Communication Systems across Diverse Channel Environments.....	522
<i>Mingjia Shi, Yandie Yang, Yun Lin</i>	
Intelligent Positioning Polarity Testing of Space Engine Based on Joint Communication, Sensing and Computing.....	527
<i>Zhongqiang Ren, Maosen Zhang, Hongxia Zhang, Bingbing Ma, Jianzhong Cao, Kun Liu</i>	
Efficient Network Resource Management Based on Near-Zero Power Wireless Iot Communication	535
<i>Weijun Zheng, Ying Wang, Zheng Wang, Chen Xu</i>	

❖ Author index