

# **2021 7th International Conference on Computer and Communications (ICCC 2021)**

**Chengdu, China  
10 – 13 December 2021**

**Pages 1-774**



**IEEE Catalog Number: CFP21D40-POD  
ISBN: 978-1-6654-0951-3**

**Copyright © 2021 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:	CFP21D40-POD
ISBN (Print-On-Demand):	978-1-6654-0951-3
ISBN (Online):	978-1-6654-0950-6

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## **Table of Contents**

# **2021 the 7th International Conference on Computer and Communications (ICCC)**

Preface .....	xxxvii
Committees.....	xxxix

---

### **✧ Coding Theory and Technology**

Improved CA-SCL Decoding of Polar Codes Based on Perturbation .....	1
<i>Zhongze Du, Nina Wang, Mutong Xie, Lin Tian, Jinglin Shi</i>	
User Selection and Leakage-based Precoding for Coordinated Dual-satellite System .....	6
<i>Xinqian Wang, Qi Wang, Mingyang Chai, Chaoyi Zhu, Zhengyu Zhang, Wuyang Zhou</i>	
An Optimized Algorithm of Balise Message Decoding.....	11
<i>Shuzheng Yang, Jingyang Lyu, Dashan Hou</i>	
A GenAlg Optimization of Length-Scalable QCLDPC Codes .....	16
<i>Yunxiao Liu, Ming Jiang, Yidi Zhang</i>	
Low-Complexity Error Correction Algorithm for Cyclic Redundancy Check Codes .....	22
<i>Weisong Liang, Haiyang Liu</i>	
Reducing Search Complexity of Dynamic SC-Flip Decoding for Polar Codes.....	27
<i>Xinyuan Qiao, Hangxuan Cui, Jun Lin, Zhongfeng Wang</i>	
An Optimization on Iterative Weighing Coefficient of Three Dimensional Turbo Product Code .....	32
<i>Ning Zhao, Zhongyong Wang, Hua Jiang, Kexian Gong, Peng Sun, Wei Wang</i>	

### **✧ Data Routing Algorithm and Design**

A Q-Learning Based Routing Algorithm for Software Defined Vehicular Network.....	38
<i>Yiwei Wang, Pengbo Si, Miao Zhang, Meng Li, Ruizhe Yang</i>	
Routing and Spectrum Allocation in Dynamic Optical Satellite Networks .....	43
<i>Guanglei Song, Xianfeng Liu, Quan Chen, Lei Yang, Yong Zhao, Huihua Han</i>	

Genetic-Based Cluster Routing Algorithm for Wireless Sensor Networks .....	48
<i>Guo Jin, Wu Muqing</i>	
Dynamic Reliability Based Multicast Routing Scheme of Power Line Communication Networks .....	53
<i>Lin Liu, Xiaoguang Yin, Yusi Wang, Quanchun Liu</i>	
Design of a Routing Protocol with Minimum End-to-End Delay in MR-MC Network.....	58
<i>Ming Liu, Tao Peng, Deping Lin</i>	
An Energy Saving Routing Strategy with Differentiated Service Provide Ability for UAV Assisted Disaster Rescue .....	64
<i>Ting Ma, Boyang Li, Gaofeng Nie</i>	
LEACH-ICM: An Intra-Cluster Multi-hop Energy Efficient Routing Protocol for WSN .....	70
<i>Jiaming Zhang, Lan Shen, Chunlong Yao, Yanhong Jing, Xing Wang, Zengshou Dong</i>	
A Grid-Based Virtual Routing Algorithm for UAV Systems in Three-Dimensional Space.....	75
<i>Xin Zhao, Kun Guo, Pingmu Huang, Tao Zhang, Yueming Lu, Tiejun Lv</i>	
A Segment List Selection Algorithm Based on Delay in Segment Routing .....	81
<i>Lirong Lai, Mingwei Cui, Fan Yang</i>	
A Hybrid Routing Algorithm based on Destruction Resistance Cost and Reliability in Flying Ad-Hoc Networks .....	88
<i>Kun Guo, Dongbin Wang, Hui Zhi, Yibo Gao, Tao Zhang, Tiejun Lv, Yueming Lu</i>	

## ✧ Data Communication and Transmission

Mobile Internet-oriented Data Preprocessing for Static Routes in Scenic Spots .....	93
<i>Jinghe Zhang, Miao Hong, Xingfa Zhang, Binghe Lu, Weidong Fang</i>	
Research on a Technical Scheme of Family Group Customer Value Evaluation.....	97
<i>Yinchao Cheng, Zhongxian Xu, Ye Guo, Zhihong Zhou, Lin Lin</i>	
An Uplink Node Pairing Algorithm for Nonorthogonal Multiple Access Backscatter Communication Systems .....	104
<i>Feng Wenjiang, Song Tao, Xiang Ling, Zou yongqi, Zhang Juntao, Jiang Weiheng</i>	
Defensive Distillation Based End-to-end Autoencoder Communication System.....	109
<i>Qiaochu Gao, Zhiwei Cao, Dou Li</i>	
Research on the Application of Polar Codes in Underwater Acoustic Communication .....	115
<i>Lijuan Xing, Zhuo Li, Zedong Zhang, Chunyang Zhao</i>	

An Approach to Transmitting URLLC Data with Different Latency Requirements over eMBB Services Based on Deep Reinforcement Learning.....	120
---	-----

*Xiangyu Zhu, Jie Wang, Jiamin Li, Hua Lu, Xinpeng Luo, Qiuyu Lai*

Stackelberg Game-Based High-Reliability Uplink Proactive Multi-Association Transmission for URLLC*.....	125
---	-----

*Zhaoli Zeng, Yingze Wang, Qimei Cui, Xuefei Zhang*

Joint Relay and Jammer Selection for Covert Communication.....	131
--	-----

*Junhao Jiang, Weiwei Yang, Ruiqian Ma*

## ✧ Modulation Theory and Technology

Density-Based Spatial Clustering of Applications with Noise for Modulation Order Blind-Detection in Non-Orthogonal Multiple Access .....	136
--	-----

*Hao Zhang, Ningbo Zhang*

Modulation Recognition Based on Lightweight Residual Network via Hybrid Pruning.....	142
--	-----

*Heng Ji, Wangyang Xu, Lu Gan, Zhengwu Xu*

Custom Convolutional Layer Designs for CNN Based Automatic Modulation Classification Solution .....	147
---	-----

*Yali Guo, Lingjun Zhu, Zhechen Zhu*

Modulation Recognition Based on Lightweight Residual Network via Binary Quantization .....	154
--	-----

*Heng Ji, Wangyang Xu, Lu Gan, Zhengwu Xu*

A Transformer-based CTDNN Structure for Automatic Modulation Recognition.....	159
---	-----

*Weisi Kong, Qinghai Yang, Xun Jiao, Yukai Niu, Gang Ji*

A Modulation Division Based Physical Layer Authentication in Wireless Communication Systems .....	164
---	-----

*Ningning Xie, Xiaodan Hu, Gangtao Han, Jiankang Zhang*

8-12GHz Pre-matched Load Modulation Balanced Power Amplifier .....	169
--	-----

*Zheng Yin, Hongqi Tao, Guangnian Wang, Runnan Guo*

Modulation Division based User Grouping Communication for Massive SIMO in IIoT .....	173
--	-----

*Xiaodan Hu, Ningning Xie, Gangtao Han, Jiankang Zhang*

Radio Modulation Classification Using STFT Spectrogram and CNN .....	178
--	-----

*Jiacheng Wu, Yi Zhong, Anjun Chen*

## ✧ Communication Protocols and Standards

Design of Time-Triggered Service Processing Flow on Ethernet end System.....	183
<i>Zhihai Zheng, Weitao Pan, Zhiliang Qiu, Longjiang Zhan</i>	
A PCIe-based Hardware Acceleration Architecture of the Communication Protocol Stack.....	192
<i>Yuqi Wang, Cheng Wang, Xiaoyan Zhao, Jianfei Tong, Weidong Wang</i>	
An Efficient Authenticated Key Agreement Protocol for D2D Communication .....	199
<i>Sensen Li, Meixuan Li, Bowu Bao, Bin Yu, Jun Tang</i>	
Study on SPMA Protocol and Algorithm Improvement .....	204
<i>Fang Sun, Xupeng Li, Feng Zhang</i>	
Priority Based Adaptive MAC Protocol for UAV Ad Hoc Networks.....	210
<i>Xinglin Mou, Hao Li, Feng Yan, Kai Ding, Tao Wu, Weiwei Xia, Lianfeng Shen</i>	
Research on Unequal Clustering Protocol based on Fuzzy Logic and Entropy Weight Method.....	215
<i>An Quanbiao, Wu Muqing, Lu Sixu</i>	
A Survey on Methodologies and Techniques for IPv6 Network Alias Resolution .....	220
<i>Mengfan Liu, Yi Guo, Liancheng Zhang, Ming Hu</i>	
A Symbol Rate Estimation Scheme for Non-Cooperative Communication.....	225
<i>Jian Lu, Wenbo Xu, Siye Wang, Huiying Qi, Yabin Li</i>	
<b>✧ Channel Estimation and Analysis</b>	
Measurements and Characteristics for Vehicle to Everything Channel in Tunnel Scenario at 5.9GHZ .....	230
<i>Zhaoyang Su, Liu Liu, Yuanyuan Fan, Shuoshuo Dong, Lan Zhang, Jiahui Qiu, Xiaobo Lin</i>	
Finite Blocklength NOMA on SWIPT-Enabled Energy Harvesting Relay with Hardware Impairments .....	235
<i>Qingwen Wang, Lu Tang, Yicong Li, Jing Yang</i>	
Image Encryption Methods in Deep Joint Source Channel Coding: A Review and Performance Evaluation .....	240
<i>Jialong Xu, Bo Ai, Wei Chen, Ang Yang, Peng Sun</i>	
A Low-complexity Variational Bayesian Learning Algorithm on Channel Estimation Using Group Sparse Structure.....	245
<i>Sheng Zhang, Yanru Wang, Wuyang Zhou</i>	
Fast and Efficient Physical Layer Secret Key Generation over Static Wireless Channels.....	251
<i>Jie Tang, Ruifei Wang, Huan Huan Song, Hong Wen</i>	

Available Closed-Form Solutions for the $K(K > 3)$ Interference Alignment System.....	257
---	-----

*Weihua Liu, Xueyan Chen, Jin Xu, Lixun Huang, Zhe Zhang*

Code-Aided Blind Iterative Channel Estimation for OFDM Systems .....	262
--	-----

*Jiaxuan Li, Xuhui Ding, Yue Zhang, Jizhuang Hou, Zhiru Ma, Jiawen Chen, Qian Li*

Leveraging Ensemble Learning for Side Channel Analysis on Masked AES.....	267
---	-----

*Feng Gao, Baolei Mao, Lingjuan Wu, Zongmin Wang, Dejun Mu, Wei Hu*

## ✧ **Wireless Sensor Network and Wireless Communication**

Joint Optimization Design for Wireless Sensor and Actuator Networks with Energy Harvesting .....	272
--	-----

*Zhuwei Wang, Zhicheng Liu, Lihan Liu, Chao Fang, Meng Li, Enchang Sun*

Mitigating Multipath Interference for Time of Flight Range Sensors via Deep Convolutional Networks.....	277
---	-----

*Swati Suresh Patil, Vandana S. Inamdar*

Weighted Voronoi Sensing Partition Algorithm for Multi-layer Wireless Sensor Network.....	282
---	-----

*Xing Zehui, Wu Muqing*

Multi-sensor Data Fusion Algorithm Based on Dempster-Shafer Theory .....	288
--	-----

*Xiguang Li, Yue Zhao, Chunlong Fan, Xinye Qiu*

Performance Analysis of Energy Harvesting Full-Duplex Relaying Wireless Communication System .....	294
--	-----

*Lu Tang, Qingwen Wang, Yicong Li, Jing Yang*

Packet Scheduling for Wireless Powered Communication Systems in the Finite Blocklength Regime: A	
--	--

POMDP Approach .....	299
----------------------	-----

*Chenhui Wang, Xin Liu, Siyuan Zheng, Feiran Meng, Junyao Wang, Di Zhai*

Neighbor Discovery with Capture Effect Based on Directional Transmission in Ad Hoc Networks.....	307
--	-----

*Yunliang Liao, Laixian Peng, Renhui Xu, Yaoqi Yang*

## ✧ **Communication and Information System**

Energy-Efficient UAV Communication with 3D Trajectory Optimization.....	312
---	-----

*Zixuan Guan, Siye Wang, Luoyu Gao, Wenbo Xu*

Compression Algorithm for End-to-End Communication using CNN .....	318
--	-----

*Yuanhui Liang, Chan Tong Lam, Benjamin K. Ng*

Analysis of Self-assembly Cooperative Link Technology of Helicopter-borne UAV Bee .....	324
---	-----

*Feng Wang, Ming-ming Guo, Jing-liang Zhang, Lei-gang Hu, Yan-yan Xu, Jia Li*

Transmission Design and Performance Analysis for a Cognitive NOMA-Based Relay Sharing Network ..	328
<i>Yafang Zhang, Suili Feng, Weijun Tang</i>	
Application of A Time-Frequency Synchronization Method in DFT-Precoded Underwater Acoustic OFDM System .....	335
<i>Zihao Wang, Hongtao Zhang, Zhenduo Wang, Zhe Xie, Wu Zhou</i>	
Two-Path Successive Relaying Based on Non-Orthogonal Multiple Access with Partial CSI.....	340
<i>Jie Fan</i>	
Minimum Cost Hybrid Node Protection in NFV.....	345
<i>Chengzong Peng, Danyang Zheng, Xiaojun Cao</i>	
MMSE Based Combining Robust to Beam Pointing Error for Uplink Multi-User SIMO Systems.....	350
<i>Xiaoyu Cao, Yuan Zhang, Peng Du</i>	
LDPC Assisted Blind Frame Synchronization: Efficient Measurement Mechanism and Low-Complexity Algorithm .....	355
<i>Zhongxiu Feng, Mengting Xu, Lixia Xiao, Zhengyu Zhang, Jiaxi Zhou, Tao Jiang</i>	
Improvement of TFRC Congestion Control Algorithm Based on LSTM.....	360
<i>Guanglin Chen, Chenyu Chu, Peide Lou</i>	
<b>✧ Optical Communication and Optical Network</b>	
Asynchronous Hybrid Indoor Positioning System Based on Inertial Navigation and Pseudo-Miller-coding Aided Visible Light Positioning .....	366
<i>Guodong Qiu, Jianfeng Yuan, Lei Zhao, Ming Jiang</i>	
Optimized Sub-Rate Sampling in 80Gbaud DP-64QAM Coherent Optical Receivers.....	372
<i>Penghui Li, Wei Ji, Pengcheng Liu, Fengyu Liu, Xuwei Xue, Yanjun Zhu</i>	
Performance Analysis of Heterogeneous Optical Beams based MIMO Visible Light Communication System .....	377
<i>Jupeng Ding, Chih-Lin I, Lili Wang, Kai Zhao, Jiong Zheng</i>	
On Adaptive Network Deployment for Visible Light Communications.....	382
<i>Xiping Wu, Avishek Nag, Xianqing Jin</i>	
Research on Coordinated Coverage of Non-Lambertian Optical Wireless Communications .....	387
<i>Jupeng Ding, Chih-Lin I, Jintao Wang, Hui Yang, Lili Wang</i>	

Influence of Atmospheric Turbulence on States of Vortex Beams Carrying Orbital Angular Momentum ...	393
<i>Shutian Luo, Xiaofeng Li</i>	
Failure Prediction Based on LSTM and SVM under SDON Architecture.....	398
<i>Pengcheng Liu, Wei Ji, Qiang Liu, Fengyu Liu, Xuwei Xue, Yanjun Zhu</i>	
Joint Optimization for Visible Light Communication and Positioning Based on Information Entropy .....	403
<i>Jian Dang, Shicheng Gao, Zaichen Zhang, Liang Wu, Bingcheng Zhu, Lei Wang</i>	
Identification and Analysis of Key Nodes in Power Optical Network Based on Node Contribution.....	410
<i>Zheng Jiayun, Wu Muqing, Zhao Min</i>	
Security Analysis of a Next Generation TF-QKD for Secure Public Key Distribution with Coherent Detection over Classical Optical Fiber Networks .....	416
<i>Adrian Chan, Mostafa Khalil, Kh. Arif Shahriar, Lawrence R. Chen, David V. Plant, Randy Kuang</i>	
Improved Pilot-Symbol-Aided Phase Estimation Algorithm in Homodyne Coherent Scheme.....	421
<i>Qiang Liu, Wei Ji, Pengcheng Liu, Fengyu Liu, Xuwei Xue, Yanjun Zhu</i>	
<b>✧ Space-Earth Integration Network and Technology</b>	
Performance Analysis of Train-Ground Communication System for Vacuum Tube High-Speed Flying Train .....	425
<i>Botao Han, Liu Liu, Kai Wang, Jiachi Zhang, Tao Zhou, Zhaoyang Su</i>	
A New System to Construct Dense Map with Pyramid Stereo Matching Network and ORB-SLAM2 .....	430
<i>Junchao Zhu, Yongxing Jia, Mingcan Li, Weixiang Shen</i>	
Cooperative Caching Scheme based on Hawkes Popularity Prediction in Vehicular Networks .....	436
<i>Yinfan Huo, Yanhua Sun, Yuping Xing, Zhuwei Wang</i>	
Orchestrating Probabilistic In-band Network Telemetry for Network Monitoring .....	441
<i>Jiangyu Pan, Zhongxiang Wei, Wei Chen, Ye Tian</i>	
An Incentive Mechanism for Computation Offloading in Satellite-Terrestrial Internet of Vehicles .....	447
<i>Xingyu Zhang, Heyang Zhang, Sida Dai, Yang Liu</i>	
Analyzing V2I Channel and Spatial Consistency through Simulation .....	453
<i>Mingmin Liu, Yuyuan Wang, Huafu Li, Yanmei Jing, Gongsheng Zhang, Wenxue He</i>	
Discussion on the Development Direction of Intelligent Integrated Space TT&C Network .....	459
<i>Wei Zhang, Tao Wu, Hong Ma</i>	

## ✧ **Signal Detection and Estimation**

A Digital Channelized Receiver with Overlapped Passband for Accurate Signal Restoration .....	464
<i>Qian Tian, Anping Jiang, Bo Bi</i>	
A Variable Step-size Mixed Modulated Lagrange Explicit Time Delay Estimation Algorithm .....	469
<i>Qiang Tang, Gaoping Shao, Bin Wang, Shuai Shao</i>	
Squaring and Long Coherent Integration Codeless Tracking Algorithm of GPS Authorized Signals .....	474
<i>Yuanlin Wang, Honglei Qin, Danyao Wang, Hongli Lv</i>	
Joint DOA and TOA Estimation for Multipath OFDM Signals Based on Gram Matrix .....	479
<i>Tong Yu, Chen Zhuang, Zhengyu Zhang, Wuyang Zhou</i>	
A Novel Positioning Method based on Leaky Coaxial Cable using TC-OFDM Signal .....	485
<i>Lu Yin, Guowei Li, YuChen Jiang</i>	
An Improved Multi-period LFM Interference Suppression Method Based on Short-Time Fractional Fourier Transform .....	490
<i>Jiaqi Lu, Fei Chu, Weimin Li, Bo Bi, Qiliang Chen</i>	
An Interference Recognition Method Based on Improved Genetic Algorithm.....	496
<i>Jianfei Shu, Yanping Liao, Xiaoming Luan</i>	

## ✧ **Speech Analysis and Recognition**

Crane Song Recognition Based on the Features Fusion of GMM Based on Wavelet Spectrum and MFCC .....	501
<i>Wang Yao, Danjv Lv, Jiali Zi, Xin Huang, Yan Zhang, Jiang Liu</i>	
Research of Speech Biomarkers for Stress Recognition Using Linear and Nonlinear Features .....	509
<i>Na Li, Nan Li, Min Guo, Jindong Feng</i>	
Speech Emotion Recognition for Power Customer Service.....	514
<i>Xutong Li, Rongheng Lin</i>	
Speech Enhancement Based on Time Domain Parallel Full Convolutional Networks.....	519
<i>Xiaoxu Qu, Wenzhi Li</i>	
DCCRN-SUBNET: A DCCRN and SUBNET Fusion Model for Speech Enhancement .....	525
<i>Xin yuan, Qun Yang, Shaohan Liu</i>	

Time Domain Speech Enhancement using Self-Attention-Based Subspace Projection ..... 530

*Ding Zhao, Zhan Zhang, Bin Yu, Yuehai Wang*

## ✧ **Modern Cryptography and Data Privacy**

Formalization of the Secrecy Capacity in Nondegraded Wiretap Channel\* ..... 535

*Liquan Chen, Xing Guo, Tianyu Lu, Yuan Gao*

Privacy-preserving Breast Cancer Prediction via Inner-Product Functional Encryption\* ..... 539

*Chang-Ji Wang, Pan-Pan Li, Xin-Yu Zhou, Ning Liu*

Stochastic Perturbation-based Physical-Layer Secret Key Generation in Quasi-Static Scene ..... 544

*Jianghao Jiao, Liquan Chen*

Verifiable RFID Location Privacy Scheme Based on NIZK ..... 549

*Wang Qingchen, Chen Yuan, Tang Hongyu*

A Dense Dynamic SLAM System Based on Motion Element Filtering ..... 554

*Mingcan Li, Yongxing Jia, Junchao Zhu, Weixiang Shen*

A Cryptographic Resource Management Framework and Dynamic Migration Method Based on Virtualization ..... 560

*Fulin Li, Huifang Ji, Hongwei Zhou, Chang Zhang*

A Modified Key Generation Scheme of Vigenère Cipher Algorithm using Pseudo-Random Number and Alphabet Extension ..... 565

*John Paul G. Perez, Sean Kevin P. Sigua, Dan Michael A. Cortez, Khatalyn E. Mata, Richard C. Regala, Antolin J. Alipio, Mark Christopher R. Blanco, Ariel M. Sison*

A Differential Privacy Mechanism Combining Randomized Response with Laplace Distribution ..... 570

*Youqin Chen, Zhengquan Xu, Jianzhang Chen*

Tulip: An Authenticated Encryption Algorithm with Trusted Identity ..... 578

*Lan Zhang, Bin Yu, Liangsheng He*

A Dynamic and Secure Migration Method of Cryptographic Service Virtual Machine for Cloud Environment ..... 583

*Fulin Li, Huifang Ji, Hongwei Zhou, Chang Zhang*

## ✧ **Target Detection**

Visual Object Detection and Tracking System Design based on MobileNet-SSD ..... 589

*Chen Gao, You Zhai, Xiwei Guo*

An Overview of Improved ViBe Algorithms .....	594
<i>Shiji Li, Zhongmin Li, Wei Li</i>	
Lane Structure Fitting via Row-wise Grid Classification .....	599
<i>Yingying Liu, Tingpei Huang, Haihua Chen, Yucheng Zhang, Chen Sun, Xiaoting Li</i>	
Remote Sensing Image Target Detection Algorithm Based on Multi-dimension Attention .....	605
<i>Pengfei Shi, Rong Fan, Wei Yan, Xuan Zhou, Xinyang Chen</i>	
Key-Point Based Distribution Probability Optimization for Object Detection in Remote Sensing Images..	610
<i>Xiaoke Zhu, Yufei Wang, Xiaopan Chen, Danyang Li, Jitong Zhang, Yulong Cai</i>	
Analysis of Weak Target Detection Performance Based on Radar Communication Integrated Signal CE-OFDM and MSK-LFM.....	615
<i>GAO Mei, RAO Xuan</i>	
A Fabric Defect Detection Method Based on Improved YOLOv5 .....	620
<i>Liaomo Zheng, Xiaojie Wang, Qi Wang, Shiyu Wang, Xinjun Liu</i>	
Stance Detection Using Multi-Head Attention Based Bidirectional GRU .....	625
<i>Peng Jia, Yajun Du, Binyan Lyu, Ruilin Hu</i>	
A Novel Method for Detection of ECG with Deep Learning .....	631
<i>Haiyan Wang, Yanjie Zhou, Bing Zhou, Zongmin Wang</i>	
A Novel Visual Object Detection and Distance Estimation Method for HDR Scenes based on Event Camera .....	636
<i>Tian-Hao Wu, ChengYe Gong, DeLei Kong, Shu Xu, QingJie Liu</i>	
Forest Pest Detection Method Based on DenseNet and Pyramid Pooling .....	641
<i>Xiangchen Yin, Yuansheng Song, Tianqing He, Baogang Song, Guiqing Li</i>	
PCB defect inspection via Deformable DETR .....	646
<i>Jintao Jin, Wei Feng, Qujiang Lei, Guangchao Gui, Weijun Wang</i>	
<b>✧ Image Segmentation and Recognition</b>	
Feature Aggregation and Topology Embedding on Convolution Neural Network for Airway Segmentation .....	652
<i>Rongda Fu, Zhiqiang Shen, Lin Pan, Jinquan Guo</i>	
A Novel Unet Decoding Strategy for Cervical Cell Mass Segmentation .....	657
<i>Guangqi Liu, Qinghai Ding, Xiang Li, Moran Ju, Tianming Jin, Miao He, Bingbing Wei</i>	

Learn from Each Other: Comparison and Fusion for Medical Segmentation Loss .....	662
<i>Junyi Xin, Guanqun Sun</i>	
An Accurate Segmentation Method for Experimental Image of Cells .....	667
<i>Shoucong Li, Weiyang Chen</i>	
Improved K-CV Surface Defects Recognition of Steel Balls Algorithm Combined with PCA and SVM .....	672
<i>Li Lin</i>	
An Intelligent System for 50-Meter Running Test Based on Image Recognition Technology.....	677
<i>Zeyu Caiy, Guanyu Jiang, Xuancheng Li</i>	
Squeeze-Excitation Based Communication Behavior Recognition Approach for Spectrum Sensing Data .....	682
<i>Kaixin Cheng, Lei Zhu, Changhua Yao, Lei An, Guizhen Han</i>	

## ❖ **Image Analysis and Methods**

Performance Analysis of Uplink-dominate Frame Structure .....	687
<i>Sen Xu, Yue Liu, Jincan Xin, Hua Zhang, Shangkun Xiong</i>	
A New Method of Sample Consensus for 2D Images Matching Based on Combination and Sorting for Spacecrafts Autonomous Optical Navigation.....	694
<i>Siyuan Huo, Ruoyan Wei, Xiaogang Ruan, Xiaoqing Zhu</i>	
Efficient Single Image De-raining Using Multi-scale Depthwise Separable Dilated Convolution .....	699
<i>Xiaojun Bi, Zheng Chen, Xiali Li, Jianyu Yue</i>	
Infrared Image Brightness Correction for TIR Object Tracking .....	704
<i>Xiaosong Wang, Haiying Wang, Chao Tian</i>	
Image Stitching via Convolutional Neural Network.....	709
<i>Xinguo He, Lin He, Xinyi Li</i>	
External Sparsity Combined with Internal Low-Rankness for Image Denoising .....	714
<i>Yang Ou, Bailin Li, Jianqiao Luo, Jiacai Liao</i>	
MRSNet: A Spatial and Channel Attention Integration Network Considering Multi-Resolution Improves Image Denoising .....	719
<i>Bingyao Li, Junyi Wang, Jiahong Zhang</i>	
FMR Low-light Tomato Image Enhancement Algorithm Based on Optimized Homomorphic Filter .....	725
<i>Jianheng He, Jianhang Liu, Haihua Chen, Yucheng Zhang, Wanping Wu</i>	

Information-exchange Enhanced Feature Pyramid Network (IEFPN) for Detecting Prohibited Items in X-ray Security Images.....	731
<i>Man Wang, Huiqian Du, Wenbo Mei</i>	
Infrared and Visible Image Fusion via Total Variation and Alternating Direction Method of Multipliers .....	736
<i>Tao Ma, Linlin Du, Xihua Liu, Weijian Huang, Xin Zhao, Shuangquan Ge</i>	
Infrared and Visible Image Fusion via Multi-scale Edge-preserving Filtering and Pulse-couple Neural Network .....	742
<i>Wei Li, Zhongmin Li, Shiji Li</i>	
CFFusion: Cross Framework for Multi-focus Image Fusion.....	747
<i>Chengchao Wang, Rencan Nie, Xue Wang, Shishuang Yu</i>	
<b>❖ Target Tracking and Detection Method</b>	
SiamPBN: Point-based Siamese Network for Rotating Objects Tracking .....	752
<i>Chen Yang, Ximing Zhang, Baopeng Li, Hao Lei, Zongxi Song</i>	
A Real-time Embedded Target Tracking System Based on Deep Learning Model .....	757
<i>Song Jiang, Hang Long, Tianpeng Yang</i>	
An Improved Multi-target Tracking Trajectory Association Algorithm in Dense Clutter Environment .....	763
<i>Xiangsong Huang, Wenyang Wang, Dapeng Pan, Jia Yuan</i>	
Attentive Mix: An Efficient Data Augmentation Method for Object Detection .....	770
<i>Runji Liu, Ying Chen, Jiasheng Wang, Zhaojin Guo</i>	
Comparison of Edge Detection Techniques and Mathematical Morphology in Car Plate Detection Application .....	775
<i>Haofan Dong</i>	
A Double-layer Local Contrast Method for Infrared Small Target Detection.....	782
<i>Linna Yang, Tao Xie, Pengcheng Zhang, Haodan Ran, Weihu Zhao, Jiang Yu</i>	
GoogLeNet-like Model for Pedestrian Attribute Detection in Surveillance Environment .....	787
<i>Changhong Jing, Song Cao, Yanyan Shen, Shuqiang Wang</i>	
Small Moving Object Detection and Tracking Based on Event Signals .....	792
<i>Yuanjun Shu, Yunfeng Sui, Shixuan Zhao, Zhi Cheng, Weiqian Liu</i>	
An Improved YOLOv4 Target Detection Algorithm Combined with DCA .....	797
<i>Xuelian Wu, Jin Huang, Xiangyu Wang, Zheng Fang, Jianbo Li</i>	

Application of Chinese Traffic Sign Detection Based on Yolov4 .....	804
---	-----

*Shuai Liu, Hongxin Li*

## ✧ **Image Classification**

A Neural Network Model Compression Method for Pneumonia Image Classification.....	809
---	-----

*Ming Ji, Weiwei Zhang, Chenghui Zhen, Haoran Yu, Hongbo Zhou, Xin Ma*

Remote Sensing Image Scene Classification Based on Multi-level Feature Fusion.....	816
--	-----

*Ya Chen, Taihao Zheng, Jingjing Han, Mingxin Zheng, Fengbin Zheng*

Image Classification of Leaf Diseases Based on Transfer Learning.....	821
---	-----

*Xiangkui Jiang, Rui Ding, Haochang Hu, Tieshan Wang, Xun Liu, Jianxv Shi*

A Dendritic Neuron Model for Breast Cancer Classification.....	826
--	-----

*Weixiang Xu, Cunhua Li, Mengnan Zhang, Zihao Dong, Yuxiang Dou, Dongbao Jia*

Classifying Object of Standard Grasping Movements Using Data Glove with LSTM Networks.....	831
--	-----

*Yuhuang Zheng, Lihua Xiao*

Low Rank Based Discriminative Least Squares Regression with Sparse Autoencoder Processing for Image Classification .....	836
--	-----

*Qi Zhang, Bob Zhang*

Support Vector Machine Classification Algorithm based on Improved Particle Swarm Optimization.....	841
--	-----

*Yifan Zhang, Yong Liu*

A Novel One-Dimensional Convolutional Neural Network for Breast Cancer Classification .....	847
---	-----

*Sohaib Asif, Yi Wenhui, Si Jinhai, Yi Tao, Zafran Waheed, Kamran Amjad*

Analysis and Classification of Job Multiple Characteristics on Supercomputers .....	853
---	-----

*Wenxiang Yang, Zhigong Yang, Gang Xian, Lonfang Zhou*

Summary of Domestic Garbage Classification and Detection Based on Deep Learning.....	858
--	-----

*Haochang Hu, Xiangkui Jiang, Xun Liu, Rui Ding, Shuaiyin Ma, Bo Wang*

A Transformer Architecture with Adaptive Attention for Fine-Grained Visual Classification .....	863
---	-----

*Changli Cai, Tiankui Zhang, Zhewei Weng, Chunyan Feng, Yapeng Wang*

## ✧ **Video Processing Technology and Methods**

A Method of Information Fusion for the Civil Aviation ASTERIX Data and Airport Surface Video Surveillance .....	868
---	-----

*Min Wu, Yuanzheng Xu, Jing Yang, Baoli Zhang*

Deep Motion Vector Prediction for Versatile Video Coding.....	874
<i>Lanlan Li, Kexin Wu, Hongan Wei, Jiaqi Liu, Ying Fang, Haifeng Zheng</i>	
Smart Community Construction System Architecture Based on Five-viewing Demands.....	879
<i>Jianlong Zhou, Yutian Zheng, Qian Yang</i>	
Compressed Video Quality Metric Based on Just-Noticeable-Difference and Saliency-aware Blocking Detection .....	884
<i>Zheng Wang, Guodong Liao, Yuxuan Wu, Liqun Lin, Jing Yang, Haifeng Zheng</i>	
An Unequal Error Protection Scheme of H.265 Video Stream in Unmanned Aerial Vehicle System.....	889
<i>Yue Zhang, Xiaoxia Yao, Jiaxuan Li, Qian Li, Xiaodong Wang</i>	
Dupopt: A Redundancy Video Analysis Mechanism .....	895
<i>Wenwen Li, Yongxiang Zhao, Chunxi Li</i>	
Global-local Feature Aggregation Strategy with Optimal Probability for Video Object Detection.....	901
<i>Yunlong Fan, Ou Li, Guangyi Liu</i>	
Enhanced Bidirectional Propagation Network for Video Super-Resolution.....	906
<i>Da Zhang, Junmin Wu</i>	
Enhanced DIBR Framework for Free Viewpoint Video.....	911
<i>Song Gu, Wenhong Zhang, Ronggang Wang</i>	

## ✧ Face Recognition and Application

Face Recognition System with Feature Fusion for Rehabilitation Robots in Healthcare .....	917
<i>Amna Bhutto, Linsen Xu, Ammara Sattar</i>	
5G based Cloud-Edge Collaboration for Canteen Self-Service Settlement Solution .....	922
<i>Tianrong Rao, Yibo Sun, Jie Li, Xiaoyu Wang</i>	
A Class Attendance System Based on Cloud Face Recognition for Multi-users.....	927
<i>Xinlei Feng, Yi Liu, Changjiang Zhang</i>	
3D Real-time Face Acupoints Recognition System Based on HoloLens 2 .....	932
<i>Xiyu Chen, Hongyu Yang, Yulong Ji, Dongnan Chen</i>	
Multi-View Person Re-IDentification with Wireless Multimedia Sensor Networks.....	939
<i>Zhang Mei-Yan, Yang Qi-Yao, Xu Yi-Nan, Yan Qiu-Zhen</i>	
Human Activity Recognition Based on Data Fusion of FMCW Radar and Image.....	943
<i>Wenlong Li, Xinxin Feng, Zhao He, Haifeng Zheng</i>	

Face Recognition Combined with Gabor Wavelet and Lightweight Convolutional Neural Network ..... 948

*Jingfang Zeng, Jieyu Li, Linglang Feng, Yu Zhang*

## ✧ 3D Model and Image Reconstruction

A 3D Smooth Mobility Model Based on Semi-random Circular Movement for FANETs ..... 954

*Jize Mi, Zhitao Dai*

Research on Digital Protection of Bamboo Tube based on Hani Nationality\* ..... 960

*Han Gao, Wu Xu, Xinda Wang, Qiang Zhang*

Lip Reading Based on 3D Face Modeling and Spatial Transformation Learning ..... 965

*Zhongwei Wu, Waner Chen, Jiewen Xu, Yuehai Wang*

A Robot 3D Grasping Application Based on Binocular Vision System ..... 970

*Xinjun Liu, Wenjiang Wu, Liaomo Zheng, Shiyu Wang*

An Unsupervised Dual Attention Method for 3D Medical Image Registration ..... 975

*Xinwen Yin, Wenhua Qian, Dan Xu, Rencan Nie, Jiebao Zhang*

Pulmonary Nodules Detection via 3D Multi-scale Dual Path Network ..... 980

*Dan Xie, Chunrui Tang, Yibing Li, Xinrui Liu, Maolu Zhuang*

Accelerated MR Fingerprinting Reconstruction Using Dictionary and Local Low-Rank Regularizations ... 985

*Zehao Li, Min Li, Zhuo Zhang*

## ✧ Microwave Theory and Radar Technology

Joint Beamforming and Phase Shift Design for IRS-Assisted MISO SWIPT System with Finite-Alphabet Inputs ..... 991

*Zhen Liu, Yong Zhang, Ying Fan, Xiaodong Zhu*

Improved Dynamic Artificial Potential Field Method Based on Remote Sensing of Internet of Vehicles and Prediction ..... 996

*Ji Gao, Bing Chen, Ji Zhang, Wenming Li, Jie Hao*

ECC-based Hybrid Beamforming Algorithm in MmWave Communication ..... 1005

*Qianqian Shen, Xianzhong Chen, Qingwen Hou*

Path Loss in Metro Train in mm-wave Band with Consideration of Human Body Effect ..... 1010

*Pei Tang*

Semi-supervised t-SNE for Millimeter-wave Wireless Localization ..... 1015

*Junquan Deng, Wei Shi, Jian Hu, Xianlong Jiao*

Higher Resolution in Range and Velocity for Automotive Radar .....	1020
<i>Meiru Zhang, Lin Zou, Xuegang Wang, Yun Zhou</i>	
Waveform Design for Dual-functional Radar and Communication Design Based on Conditional MI.....	1026
<i>Jingyu He, Li Chen, Guo Wei</i>	
Intelligent Knowledge Modeling and Distributed Database Constructing for Intelligent Radar Countermeasure.....	1031
<i>Zhaoxiang Su, Zhen Qin, Bo Deng, Yan Li</i>	

## ✧ **Unmanned System and Intelligent Control Technology**

A Method for Suppressing the Fluctuation of Aircraft Taxiing Posture .....	1036
<i>Fan Yang, Xuan He, Jian Yang, Sen Yang</i>	
Lightweight Stacked Hourglass Network for Efficient Robotic Arm Pose Estimation .....	1041
<i>Qi Wang, Liaomo Zheng, Shiyu Wang, Xinjun Liu</i>	
Resource Optimization Algorithm for Task Offloading of Service Robots with Position Prediction .....	1047
<i>Zhifu Wang, Lusheng Wang, Min Peng, Shi Zhao</i>	
Comparison of Collaboration Methods between Users in Remote Robot Systems with Force Feedback ..	1052
<i>Ruzhou Ye, Yutaka Ishibashi, Pingguo Huang, Yuichiro Tateiwa</i>	
Research on Dynamic Docking Process and Collision Problems of AUV Based on Joint Control Simulation .....	1057
<i>Wei Pan, Yonglin Zhang</i>	
Graphical System Design of Test Cases in Flight Control System .....	1062
<i>Zhang Rongbo, Ma Chaofeng, Fan Chunlong, Zhao Yue</i>	
Joint Trajectory Planning and Resource Allocation for UAV-assisted Information Collection .....	1068
<i>Chenchen Wang, Wenrui Ding, Yizhe Luo, Yufeng Wang, Jiashu Zhang, Jing Xiao</i>	
Research on Hybrid Discrete Particle Swarm Algorithm to Solve UAV Task Assignment Problem.....	1073
<i>Shaokun Yan</i>	
A Method of Multi-UAV Collaborative Task Assignment Based on Multiplexing .....	1078
<i>Zhao Jiayi, Zhao Wendong, Liu Cuntao, Li Aijing, Liu Zeyuan</i>	
Optimal Control Design of Dynamical Tracking for Connected and Automated Vehicles .....	1087
<i>Zhuwei Wang, Mengjiao Xu, Lihan Liu, Yi Xue, Chao Fang, Meng Li, Huamin Chen</i>	

## ✧ **Electronic Information Engineering and Application**

A Design Algorithm of Fractional Delay Filter based on Second-order Cone Programming .....	1092
<i>Jia Kexin, Zhang Rubin</i>	
MOTUNER: An Online Automatic Container Tuning System for Spark on YARN.....	1097
<i>Lanxin Su, Huiyong Liu</i>	
A Reliable Joint MCMA and DD-LMS for Lite DSP in Short-Reach Self-Homodyne Optical Coherent Scheme .....	1102
<i>Qiang Li, Wei Ji, Pengcheng Liu, Fengyu Liu, Yuqian Wang, Yanjun Zhu</i>	
Near Field Electromagnetic Ranging in Low Frequency.....	1107
<i>Hao Wang, Xu Xie</i>	
HPLC Monitoring System Design Based on Noise Decomposition .....	1112
<i>Huang Rui, Liu Mouhai, Lu Jun, Lin Weiwei</i>	
Digital Pre-charging Algorithm for High Accuracy Low Power DTC using Jump Search Scheme .....	1117
<i>Rensheng Shen, Tao Zhou, Zhishuo Wang, Jiaqi Wang, Botao Xiong, Yuchun Chang</i>	
An Electromagnetic Environment Situation Assessment and Abnormal Detection Technology .....	1122
<i>Weilin Hu, Mengbo Zhang, Chuang Peng, Lunwen Wang</i>	
IsDenseNet: A Framework for Complex Power Quality Disturbances Detection .....	1128
<i>Jie Liu, Qiu Tang, Jun Ma, Lianhui Liang, Wei Qiu</i>	
<b>❖ Electronic Science and Information Technology</b>	
Secure Rate Maximization for Reconfigurable Intelligent Surface Assisted Transmission with Low-resolution DACs.....	1133
<i>Kexin Li, Huiqin Du</i>	
Reform on Circuit and Electronic Technology Experiment Based on Virtual-real Combination .....	1138
<i>Yan Wang, Qinglin Wu</i>	
Compressed Bloom Filter Method of DDS Middleware based on FPGA.....	1143
<i>Pengfei Liu, Chenzhuo Jiang, Xiaolu Zhang, Wenxian Yu</i>	
A CMOS Triple Cascode X-band Power Amplifier with Dual Feedback Based Active Linearizer.....	1148
<i>Cheng Cao, Zemeng Huang, Yubing Li, Tao Tan, Umair Yasir, Leilei Xiao, Kai Yue, Hongjie Zeng, Xiuping Li</i>	
A Novel Parallel Blind Equalizer for Underwater Acoustic Based on Dual Mode*.....	1153
<i>Zhi Sheng Lv, Bin Feng, Li Tan</i>	

A Scalable CNN Accelerator with FPGA On-board Resource Optimization for Semantic Segmentation..	1158
<i>Chao Wang, Keqiang Yue, Wenjun Li, Haozhe Shen, Rulin Zhang, Yuhang Li</i>	
Adaptive Kalman Filter with Strong Tracking for Train Positioning System .....	1163
<i>Liu Jia, Xu Ning, Wang Rui, Li Ke, Du Meng</i>	
Visual Detection Based Security and Control System in Power Construction .....	1168
<i>Chen Wu, WuHao Huang, HongYu Ni, WenXu Yan</i>	
<b>✧ Algorithm Design, Optimization and Calculation</b>	
Resource Optimization Algorithm for Task Offloading with Predicted Congestion .....	1173
<i>Jin Li, Lusheng Wang, Min Peng, Shi Zhao</i>	
Optimized LRU Algorithm for STT-MRAM/SRAM Hybrid Cache Architecture.....	1178
<i>Yueling Li, Wang Kang, Weisheng Zhao</i>	
A Differentially Private SVD Recommendation Algorithm with User Tags.....	1183
<i>Zehua Li, Weisheng Yu</i>	
Grasshopper Optimization Algorithm for Blind Source Separation Based on Independent Component Analysis .....	1188
<i>Yueyun Yu, Benjamin K. Ng, Chan-Tong Lam</i>	
A Novel Modified Ant Colony Optimization Algorithm by Resetting and Updating Pheromone for Vehicle Routing Problem with Time Windows .....	1194
<i>Chiabwoot Ratanavilisagul</i>	
Dynamic Scheduling Algorithm Based on Random Distribution for Mimic Defense System* .....	1199
<i>Hongyu Lin, Liquan Chen, Tianyu Lu, Yuan Gao</i>	
A Maximum Average Weight Matching Algorithm for Collective Tasks Allocation in the Collective Computing System .....	1204
<i>Zundong Zhang, Yunlong Zhao, Yang Li</i>	
ATDP: An Adaptive Spatio-Temporal Trajectory Clustering Algorithm Based on Density Peak .....	1210
<i>Zebang Liu, Jingzhi Cao, Luo Chen, Wei Xiong, Nanyu Chen, Ye Wu</i>	
Simulation of Interaction of Folded Waveguide Space Traveling Wave Tubes with Derivative-free Mixed-integer Based NEWUOA Algorithm.....	1215
<i>Shuoran Li, Pengcheng Xie, Zihao Zhou, Zhanpeng Wang, Zhiliang Li, Xiao Liang, Bo Qu</i>	
Guiding Points Sampling-Based Large-Scale Evolutionary Multi-Objective Optimization .....	1220
<i>Haoyuan Zeng</i>	

Digital Twin-driven Multi-objective Optimization Production Scheduling with Restraint Tool Resources.. 1228

*Jinsong Liu, Dong Yu, Yi Hu, Haoyu Yu, Wuwei He, Lipeng Zhang*

An Improved Variable Step Size LMSTDE Algorithm Based on Fourth-order Cumulant ..... 1234

*Yanping Liao, Shuang Liu*

## ✧ Machine Learning and Neural Networks

Fire Detection Based on Infrared Filter and Deep Learing ..... 1239

*Mingjie Meng, Minglun Zhang*

A Combined Neural Network Based on Deep Learning for AMR ..... 1244

*Pei Li, Longlong Wang*

An Evaluation Model of Demolished Houses based on Improved Deep Learning ..... 1249

*Lv Haifeng, Pu Baoming*

Nifty Price Prediction from Nifty SGX using Machine Learning, Neural Networks and Sentiment Analysis ..... 1256

*Niveditha Minnoor, Shobha G*

A DDoS Attack Traffic Detection System Based on Deep Learning ..... 1261

*Gong Chen, Yumeng Zhao, Lisha Shuai, Jintang Luo, Xiaolong Yang*

A Methodology Based on Deep Reinforcement Learning to Autonomous Driving with Double Q-Learning ..... 1266

*Zhicong Liu, Jing Hu, Tiecheng Song, Zhonghu Huang*

Joint Latency and Energy Consumption Optimization with Deep Reinforcement Learning for Proximity Detection in Road Networks ..... 1272

*Tongyu Zhao, Yaqiong Liu, Guochu Shou, Yihong Hu*

A High Energy Efficiency and Low Resource Consumption FPGA Accelerator for Convolutional Neural Network ..... 1278

*Jianwei Zhang, Houjia Cai, Jinghu Li*

Time Error Compensation with Neural Network for Time Synchronization in TSN ..... 1284

*Haoze Yu, Guochu Shou, Xiaodong Zhang, Ledong Hu, Yaqiong Liu, Yihong Hu*

Time and Position Aware Graph Neural Networks for Session-based Recommendation ..... 1289

*Qingbo Sun, Zhijun Zhang, Sheng Sang, Fang Dong*

A Lightweight Deep Neural Network for Wideband Power Amplifier Behavioral Modeling .....	1294
--	------

*Huilan Wu, Sai Huang, Yuqi Zeng, Shanchuan Ying, Hua Lu*

## ✧ Software and Data Engineering

Research and Test on Software Performance Index of Open CNC System.....	1299
---	------

*Lipeng Zhang, Dong Yu, Yi Hu, Wuwei He, Haoyu Yu, Jinsong Liu*

Implementation and Verification of LTE-V2X Algorithm Based on Software Radio Platform.....	1304
--	------

*Meilu Liu, Liu Liu, Lingfan Zhuang, Yuanyuan Fan, Zhaoyang Su, Kai Wang*

Malware Detection Using an Improved Active Learning Approach .....	1309
--	------

*Huang Na, He Jingsha*

Dynamic Controller Placement for Software-Defined LEO Network Using Deep Reinforcement Learning .....	1314
---	------

*Anqi Wei, Hui Yu, Xiupu Lang, Bo Yang*

Study on Costs of Software-based Heterogeneous Redundant Execution .....	1321
--	------

*Bolin Ma, Zheng Zhang, Xinsheng Ji, Hao Liu, Gaofei Zhang*

Parallel Clustering for Interference Alignment with Max-Min Fairness in Hybrid Data Center Networks .	1325
---	------

*Chenwu Hu, Long Suo, Hongyan Li, Yijun Lu, Fei Liu*

A Unified Programming Model over Heterogeneous Data Planes .....	1331
--	------

*Xianhai Li, Zhou Shi, Jiangyu Pan, Ye Tian*

Research and Application of Query Optimization Based on HBase .....	1336
---	------

*Kai Lei, Xiaoyu Xiong, Zengzhou Wang, Fangzhou Shi, Jian He*

## ✧ Mobile Computing and Edge Computing

Reinforcement Learning Based Service Migration Strategy to Minimize Service Cost with Delay Constraint in Edge Computing.....	1341
---	------

*Xun Huang, Qiang Zhang*

Mobility-aware Predictive Computation Offloading and Task Scheduling for Mobile Edge Computing Networks .....	1349
---	------

*Huixin Li, Yang Sun, Yanhua Zhang, Binghui Jin, Zhuwei Wang, Wenjun Wu, Chao Fang*

On the Placement of Edge Server for Mobile Edge Computing.....	1355
--	------

*Danyang Zheng, Chengzong Peng, Xiaojun Cao*

Efficient Task Offloading Using Reinforcement Learning in Mobile Edge Computing for Network RTK... 1360

*Ke Xu, Hui Zhao*

Traffic Forecasting with Adversarial Domain Adaptation in Edge-Computing Systems ..... 1366

*Geng Chen, Xianlu Xu, Haifeng Zheng, Xinxin Feng*

Privacy-Preserving Edge Intelligent Computing Based on Federated Learning ..... 1371

*Haodong Xie, Yuanbo Guo, Kailiang He, Yuxin Song, Yuankai Liu*

## ✧ Computer and Electrical Engineering

Current Control for PMSM Based on Data-Driven Control ..... 1378

*Meng Chen, Xianggong Li, Yangyang Han*

Channel Modeling by Ray Tracing for City Underground Power Pipe Gallery ..... 1383

*Wei Bai, Yuebin Wu, Chengpeng Lu, Yang Lu, Cheng Zhong*

Intelligent Analysis of Line Loss Based on Game Theory Combined with Weighting - TOPSIS Method . 1389

*Le Wei, Zheng Li*

Fault Detection of Permanent Magnet Synchronous Motor Based on SVD-RF..... 1394

*Dongnan Zhao, Hengliang Shi*

A Differential Privacy-enhanced Federated Learning Method for Short-Term Household Load Forecasting in Smart Grid\*..... 1399

*Yumeng Zhao, Wendum Xiao, Lisha Shuai, Jingtang Luo, Shiying Yao, Min Zhang*

Application Research of Power Line Full Band Carrier in Low Voltage Distribution Network..... 1405

*Yutu Liang, Zhan Shi, Xiuzhu Wang, Zhihua Yang*

Sidelobe Suppression Using Modified Multiple Population Genetic Algorithm..... 1410

*Jiarun Yu, Yafeng Wang, Jiayin Wang, Zhiyu Han*

The Design of Holistic Vulnerability Measure Method Integrated with Topological Properties and Security Capabilities for Smart Grid Control System ..... 1415

*Dongliang Gao, Quanming Zhang, Shujuan Sun, Xiao Liu, Jingtang Luo, Junhua Li, Min Zhang*

A Transformer Based Approach for Open Set Specific Emitter Identification..... 1420

*Haifeng Xu, Xiaodong Xu*

## ✧ Cloud Computing and High-performance Computing

HEP: Heuristic Similarity Calculation based on the Minimum Entropy Principle.....	1426
Jinhua Yang	
Sentiment Analysis Based on Bi-Dual Inference .....	1431
Yujian Zhou, Yajun Du, Binyan Lyu, Ruilin Hu	
Visual Analysis of the High-performance Computing Jobs Based on the Comprehensive Load Scoring Algorithm .....	1436
Gang Xian, Yangkun Tang, Wenxiang Yang, Xuejun Li, Xiaorong Zhang, Jie Yu	
MMReLU: A Simple and Smooth Activation Function with High Convergence Speed.....	1444
Longda Wu, Shuai Wang, Liping Fang, Huiqian Du	
Priority-Based Scheduling Approach to Minimize the SLA Violations in Cloud Environment.....	1449
Louai Sheikhani, HaiFeng Lu, Chunhua Gu	
Q-Learning Based Delay-Aware Content Delivery in Cloud-Edge Cooperation Networks.....	1458
Chao Fang, Changtong Liu, Hang Xu, Zhiwei Wang, Huamin Chen, Yang Sun, Xiaoyan Hu, Deze Zeng and Mianxiong Dong	
Resilient Control Plane Design for Inter-Datacenter Cloud Network with Various Attacks.....	1463
Ping Lu, Zhengzheng Yan, Letian Yi, Jing Zhu, Zuqing Zhu	
Surface Defect Detection Based on Deep Learning and Collaborative Cloud-edge Computation.....	1469
Shunjie He, Bo Yang, Dafeng Zhu, Cheng Li	
<b>✧ Data Analysis and Information Security</b>	
Construction of Perfect Gaussian Integer Sequences with High Energy Efficiency Based on Difference Sets .....	1475
Kai Liu, Yuandong Liu, Zebin Chang	
Joint Resource Allocation for Online and Offline Tasks in Data Centers.....	1480
Liwan Lin, Yinghong Ma, Yan Chen, Yijun Lu, Ni Yang	
Joint Extraction of Entities and Relations by Adversarial Training and Mixup Data Augmentation .....	1486
Hongjing Chen, Gang Lu, Xiaojun Wu, Yumei Zhang	
$\ell_{2,1}$ -norm minimization for Unsupervised Feature Selection from Incomplete Data .....	1491
Linge Fan, Xinrong Wu, Wei Tong, Weijun Zeng	
Application of DNN with MDPE in Intrusion Detection .....	1496
Shirui Wang, Zheyu Zhang, Jun Sun, Yuewei Wu	

Auto-Generated Code Detector - A Preprocessor to Enhance Security, Quality, Maintenance and Accurate Productivity Calculation of Code.....	1500
<i>Ratnesh Parihar, Priya Kar, Shravan Kumar</i>	
ARPIC: Personal Information Recognition of ID Card with Interference of Watermark.....	1505
<i>Wenqiang Miao, Chunhong Zhang, Zheng Hu, Chenhe Zhang</i>	
Outlier Detection and Abnormal Subspace Search Based on Autoencoder and Genetic Algorithm for High-Dimensional Data.....	1510
<i>Jiamu Li, Ji Zhang, Jian Wang, Youwen Zhu, Mohamed Jaward Bah, Gaoming Yang, Yuquan Gan</i>	
Medicare Fraud Detection Using WTBagging Algorithm .....	1515
<i>Jiahe Yao, Siyu Yu, Changwu Wang, Tiejun Ke, Hongjun Zheng</i>	
<b>✧ Advanced Blockchain Technology and Security Management</b>	
Weighted RAFT: An Improved Blockchain Consensus Mechanism for Internet of Things Application.....	1520
<i>Xiaojun Xu, Lu Hou, Yankai Li, Yunxin Geng</i>	
Secure Authentication Scheme for VANET Based on Blockchain .....	1526
<i>Yuyang Cheng, Shiyuan Xu, Miao Zang, Shuo Jiang, Yidong Zhang</i>	
MTdt: Enabling Meta-Transactions for Data Tracking of Industrial Workflow.....	1532
<i>Jingang Yu, Minghao Tang, Shu Li</i>	
An Efficient Data Query Method of Blockchain Based on Index .....	1539
<i>Mingmin Li, Hongman Wang, Fangchun Yang</i>	
Research on Blockchain Security Protection.....	1545
<i>Yue Yin, Danjv Lv, Xin Huang, Jiang Liu, Shanshan Xie, Yan Zhang</i>	
VAPKI: A Blockchain-Based Identification System with Validation and Authentication .....	1551
<i>Chengkai Rao, Zhaowen Lin</i>	
Blockchain-Based Mechanism for Electronic Healthy Records Sharing Using Fine-grained Authorization .....	1557
<i>Ruoxi Chen, Zhanbo Li</i>	
Blockchain-based Supervised Anonymous Crossdomain Authentication Scheme .....	1565
<i>Liquan Chen, Wenyi Wu, Guiyu Kou, Linyue Zhang</i>	
Uncle Incentive Mechanism Adjustment against Selfish Mining in Ethereum.....	1570
<i>Lu Ding, Yong Zhao</i>	

## ✧ Computer Model and Mathematical Calculation

The Trust Evaluation and Anomaly Detection Model of Industrial Control Equipment Based on Multi-service and Multi-attribute.....	1575
<i>Chen Xin, Liu Xianda, Jiang Yiheng, Wang Chen</i>	
Improved Collaborative Filtering Recommendation Model .....	1582
<i>Qingbo Sun, Peng Wen, Zhijun Zhang, Weihua Yuan</i>	
A Temperature Time Series Forecasting Model Based on DeepAR .....	1588
<i>Yanping Liao, Chao Liang</i>	
Inventory Control under Unobserved Losses with Latent State Learning.....	1594
<i>José Manuel Vera</i>	
Water Level Prediction Model Based on GCN and LSTM .....	1600
<i>Li Lyu, Meng Fang, Ning Wang, Jian Wu</i>	
Robust Model Aggregation for Federated Learning with Heterogeneous Clients .....	1606
<i>Ruiting Xu, Xinxin Feng*, and Haifeng Zheng</i>	
Research on Online Diagnosis Model of Metering Point Anomaly Based on High Precision and High Resolution High Frequency Acquisition Station Area Master Meter.....	1611
<i>Qiu Huadong, Li Xiong, Yuan Jian, Wang Jiaying, Yao Li, Hu Yingjun</i>	
Visibility Prediction Based on XGBoost And Markov Chain Combined Model .....	1617
<i>Hui Tang, ZhenHan Wei, JiangLi Liu</i>	
Bridge Architecture for Medical Question Answering with Negative Sample Training.....	1623
<i>Hongli Liu, Yanquan Zhou</i>	

## ✧ Knowledge and Information Engineering

Entity Representation Learning with Multimodal Neighbors for Link Prediction in Knowledge Graph .....	1628
<i>Wenxuan Liu, Hao Duan, Zeng Li, Jingdong Liu, Hong Huo, Tao Fang</i>	
Evaluation and Evolution of NAOnto – An Ontology for Personalized Diabetes Management for Native Americans .....	1635
<i>Vikram Pandey, Juan Li, Shadi Alian</i>	
MovieMat: Context-aware Movie Recommendation with Matrix Factorization by Matrix Fitting .....	1642
<i>Hao Wang</i>	

Intelligent Answer System Based on Vulnerability Knowledge Graph .....	1646
<i>Yongfei Li, Yuanbo Guo, Yaohui Hao, Yao Wang, Anqi Yin, Yingze Liu</i>	
Federated Learning of User Mobility Anomaly Based on Graph Attention Networks .....	1652
<i>Yingjie Tang, Ruijuan Jia, Xiaoming Zhou, Zhao Li, Hao Jin, and Chenglin Zhao</i>	
Mislabeled Samples Adjustment Based on Self-paced Learning Framework.....	1659
<i>Zhongtao Huang, Xiaojuan Li, Lingzhu Deng, Kaizhen Wei, Yunfeng Sui</i>	
Uncertainty Based Hybrid-intelligence Multi-branch Wargaming .....	1664
<i>Jin Xin, Wang Xinnian, Zhou Fang, Ding Ran</i>	
A Greedy Strategy of Multiplexing uRLLC Traffic Within eMBB Services for HSR .....	1670
<i>Jiachi Zhang, Lu Li</i>	
Co-Evolutionary of Public Goods Games Based on Learning Topology .....	1675
<i>Xiaoja Zhou, Mie Wang, Shaoxiang Liu, Weikang Yin, Lifei Han, Haigang Zhang</i>	
Weak ties Discovery Based on Network Representation Learning and Structural Features .....	1680
<i>Ruilin Hu, Yajun Du, Peng jia</i>	
Fully-Supervised Semantic Segmentation Networks: Exploring the Relationship between the Segmentation Networks Learning Ability and the Number of Convolutional Layers .....	1685
<i>Jiacai Liao, Libo Cao, Wei Li, Yang Ou, Cong Duan, Hu Cao</i>	
<b>✧ Computer Theory and Application</b>	
KMRE: An Efficient and Compatible Runtime to Execute Android Application on Linux System .....	1693
<i>Xiaodong Liu, Jie Yu, Yusong Tan, Cailong Huang, Long Peng, Xiang Li</i>	
An Efficient Method of Supervised Contrastive Learning for Natural Language Understanding.....	1698
<i>Haifeng Gao, Bin Dong, Yongwei Zhang, Tianxiong Xiao, Shanshan Jiang, Yuan Dong</i>	
A Joint Entity-Relation Extraction Method with Sparse Parameter Sharing Architecture .....	1705
<i>Dierong Chen, Juanjuan Cai, Chuanzhen Li</i>	
Composite Evolutionary GAN for Natural Language Generation with Temper Control.....	1710
<i>Fanglei Sun, Qian Tao, Jianqiao Hu, Jieqiong Liu</i>	
A Real-time Detection Method of Available Backhaul Capacity in UDN With Backhaul Constraint .....	1715
<i>Xiaorui Ji, Gang Chuai, Weidong Gao</i>	
Blind Regularized Constant Modulus Multiuser Detection via a Newton Algorithm .....	1722
<i>Ying Liu, Bin Liao</i>	

CSI-Based Violent Behavior Detection Method .....	1727
---	------

*Huan Liu, Jun Chang, Li Zhang, Bin Huang*

Region-and-Attention Network for Semantic Segmentation .....	1733
--	------

*Rui Wang, Ping Gong, Xiaoxi Liu*

Performance Analysis of Repetition-based Grant-free Access for URLLC .....	1738
--	------

*Nana Zhang, Hua Zhang, Jun-Bo Wang*

Dual Branch Relation Network with Feature Weighting for Few-Shot Learning.....	1743
--	------

*Yifan Tong, Hui Tian, Xiurong Jiang, Jianqin Yin*

A Multi-Version Spatio-Temporal Indexing Method Based on Clipped Minimum Bounding Boxes .....	1752
---	------

*Jingzhi Cao, Zebang Liu, Wei Xiong, Luo Chen, Nanyu Chen, Ye Wu*

## ❖ Computer System and Engineering

COTR: Convolution in Transformer Network for End to End Polyp Detection .....	1757
---	------

*Zhiqiang Shen, Rongda Fu, Chaonan Lin, Shaohua Zheng*

Surface Material Classification Based on Tapping Sound Characteristics.....	1762
---	------

*Kai Wang, Hongji Zeng, Weize Feng, Quanfei Zheng and Ying Fang*

Train Passengers Prediction for Railway Management System Using Regression Analysis .....	1767
---	------

*Bhai Nhuraisha I. Deplomo, Jocelyn F. Villaberde, Arnold C. Paglinawan*

A new dropout leaky control strategy for multi-channel narrowband active noise cancellation in irregular reverberation room .....	1773
---	------

*Wenzhao Zhu, Bo Xu, Zong Meng, Lei Luo*

Graph Transformer Attention Networks for Traffic Flow Prediction .....	1778
--	------

*Haochun Ruan, Xinxin Feng and Haifeng Zheng*

The Common Ancestor Time Estimation of SARS-CoV-2 Based on Phylogenetic Analysis .....	1783
--	------

*Yang Lu, Kai Niu, Zhiqiang He*

ASTER Thermal Infrared Quantitative Inversion Research on the SiO <sub>2</sub> Content of Surface Rocks in the Eastern Tianshan Area of Xinjiang.....	1790
--	------

*Xin Li, Changbao Yang, Weizhi Sun, Senmiao Guo*

tMPH: A Client-only Multisource Multipath HTTP Solution for Android Applications .....	1796
--	------

*Qingchen Zhao, Xiaodong Xu*

## ❖ Digital Image Processing and Application

Non-invasive Image Quality Assessment Based on Eye-tracking .....	1802
<i>Hongan Wei, Sang Lin, Weiling Chen*, Jing Chen, Yannan Zheng</i>	
Roaming Automatic Generation Method based on Panoramic Image .....	1807
<i>Danning Hu, Hongliang Wang</i>	
ADJSCC- <i>I</i> : SNR-Adaptive JSCC Networks for Multi-Layer Wireless Image Transmission.....	1812
<i>Xiuwen Bao, Ming Jiang, Hao Zhang</i>	
A Text-to-Image Generation Method Based on Multi-attention Depth Residual Generation Adversarial Network .....	1817
<i>Shuo Yang, Xiaojun Bi, Jian Xiao, Jing Xia</i>	
Cloud Image Super-Resolution Based on Residual Network .....	1822
<i>Guodong Jing, Yun Ge</i>	
Group Feature Information Distillation Network for Single Image Super-resolution.....	1827
<i>Ming Zhuo Chen, Jun Ming Wu</i>	
HEVC Chroma Component Prediction Algorithm Based on Luminance Template Matching .....	1832
<i>Zou Zhou, Dan Luo, Zeng Li, Jingbo He, Shuhua Xiong, Honggang Chen</i>	
Multi-Directional Weighted Interpolation for Color Imaging System.....	1837
<i>Ruichao Li, Lihao Zheng, Rongjun Feng, Xiangdong Chen</i>	
Facial Acupoints Location using Transfer Learning on Deep Residual Network.....	1842
<i>Yanglu Chen, Hongyu Yang, Dongnan Chen, Xiyu Chen</i>	
Discriminative Multi-feature Representation for Renal Cancer Detection based on Histopathology Images .....	1848
<i>Jianxiu Cai, Qi Zhang, Bob, Zhang, Bihui Cao, Manting Liu, Cheng Zhi, Deji Che, Kangshun Zhu</i>	
Vehicle recognition by SDCD lamp sectional distance .....	1853
<i>Zuchun Ding, Wenying Mo</i>	
<b>✧ MIMO System and Communication Engineering</b>	
A Simplified Beamforming Assisted SM-MIMO Scheme with Blind Linear Detection .....	1859
<i>Jingyi Miao, Run Huang, Shu Fang, Jun Xie, Pengfei Zhu, Shaofang Zhang, Tianxi Huang</i>	
Beam Domain Oversampling with Pruned FFT for Virtual Massive MIMO in FDD Systems .....	1864
<i>Jianjun Li, Pengju Wang, Aihua Zhang, Bing Ning</i>	

PARAFAC-Based Channel Estimation for Relay Assisted mmWave Massive MIMO Systems.....	1869
<i>Heyun Lin, Guoyi Zhang, Wei Mo, Tianbao Lan, Zhihai Zhang, Siyu Ye</i>	
Research on Space-Time Block Code Technology in MIMO System .....	1875
<i>Conglin Pan, Si Chen, Wei Wu, Jiachuan Qian, Lijun Wang</i>	
Efficient Channel Estimation for Multi-user MIMO Multi-relay Communication Systems .....	1880
<i>Zhihai Zhang, Tianbao Lan, Heyun Lin, Xinhong Pan, Jiali Cao</i>	
Joint Line Search and ALS Channel Estimation for Intelligent Reflective Surface Assisted MIMO System .....	1885
<i>Jiye Luo, Bin Dai</i>	
Pilot Assignment Based on Graph Coloring with Sum-Rate Maximization in Cell-Free Massive MIMO ..	1890
<i>Rongheng Chen, Hong Wang, Rongfang Song</i>	
Inter-Cluster Interference Minimization Based Nonlinear Precoder for MIMO-NOMA Systems.....	1895
<i>Jia Zhang, Guomei Zhang, Guobing Li, Xiaodan Zhao</i>	
<b>✧ Network Resource Allocation and Control</b>	
Opportunistic Admissibility and Resource Allocation for Slicing-based Radio Access Networks .....	1900
<i>Zihao Qi, Bin Cao, Long Zhang, Wei Hong, Zhongyuan Zhao, Jie Tong, Xiang Bai</i>	
A2C Deep Reinforcement Learning-based MEC Network for Offloading and Resource Allocation.....	1905
<i>Haoran Cui, Dongyu Wang, Qi Li, Xiaoyu Liu, Hua Lu</i>	
Optimal Power Allocation for D2D underlaying Cellular Networks: An MDP based Approach .....	1910
<i>Jun Xu, Caiyun Li</i>	
NOMA-D2D Technology-aided Low Delay Resource Allocation for MEC Networks .....	1915
<i>Huameng Tao, Nan Ma, Xiaoqi Qin, Baoling Liu</i>	
Dynamic Load Balancing Strategy Based on Link Preference in SDN .....	1920
<i>Mengxin Chen, Min Xiang, Chunmei Huang, Hui long Mao</i>	
<b>✧ Satellite Engineering and Space Communication</b>	
A Handover Strategy Based on User Dynamic Preference for LEO Satellite .....	1925
<i>YiHan Lei, LiFeng Cao, MengDa Han</i>	
Design and Implementation of Congestion-Control Strategy for LEO Satellite Based on NS3.....	1930
<i>Jinling Chen, Cheng Wang, Xiaoyan Zhao, Jianfei Tong, Weidong Wang</i>	

A Privacy-Preserving Incentive Mechanism in Satellite-Terrestrial Crowdsensing.....	1937
Boxiang Zhu, Jiarui Li, Zhongkai Liu, Yang Liu	
A FPGA-based Design and Implementation of Satellite Ground Fusion Downlink .....	1943
Yang Shi, Cheng Wang, Jianfei Tong, Xiaoyan Zhao, Weidong Wang	
Leakage Minimization Based Precoding for Multi-beam Satellite Communications with Phase Noise and Carrier Frequency Offset.....	1949
Yan Gu, Yuan Zhang, Peng Du	
Performance Analysis of NOMA-based Overlay Cognitive Integrated Satellite-Aerial-Terrestrial Networks .....	1954
Kefeng Guo, Rui Liu, Yunxin Guo, Shibing Zhu, Haifeng Shuai, Changqing Li	
Analysis of Satellite Interference Source Location Algorithm.....	1959
Hui Yan, Laiding Zhao, Gengxin Zhang, Cen Ruan	
A Spatial Resource Allocation Method in Massive MIMO-LEO Satellite Communications .....	1964
Ding Xiang, Xu Xin, Bian Dongming, Zhang Senbai	
Demand-based Scheduling with Sum-rate Maximization for Multiuser Multibeam Satellite Systems.....	1971
Na Li, Yanru Wang, Xinqian Wang, Chaoyi Zhu, Zhengyu Zhangy, Wuyang Zhou	
A Joint PAPR Suppression Scheme of DS-SSS-GFDM System using DFT Precoding and Clipping for Satellite Communications.....	1976
Huanyu Liu, Yuan Jiang, Xin Liang	

## ✧ Network Model and Optimization

Communication Network Nodes Importance Based on Improved Artificial Immune Algorithm .....	1985
Yulong Song, Lei Wang, Xinrong Wu, Mengmeng Yin, Yu Zhang, Xiang Wang	
IRS-Assisted Secure Communications Against Simultaneous Jamming and Eavesdropping .....	1991
Yifu Sun, Kang An, Yonggang Zhu, Meng Li, Shaoqin Kou	
Delay-Intolerant Covert Communications with Downlink Non-orthogonal Multiple Access.....	1997
Maochun Wang, Weiwei Yang, Ying Qian, Kun Wang, Bing Liu	
A New Model for Simultaneous Detection of Phishing and Darknet Websites* .....	2002
Xu Jie, Lan Haoliang, Ju Ao	
A NFV-based Universal Network Simulator Platform with Visualization Playback .....	2007
Ji Xia, Ming Chen, Yunlong Zhao, Liang Liu	

A Flow Scheduling Model for SDN Honeypot Using Multi-Layer Attack Graphs and Signaling Game..... 2012

*Weigui Huang, Yifeng Sun, Wang Ou, Yubin Wang*

Research on an Cascade Failure Model of Improved Scale-Free Network ..... 2021

*Mengmeng Yin, Lei Wang, Changhua Yao, Xinrong Wu, Yulong Song, Yu Zhang*

Multi-domain Time Synchronization Model and Performance Evaluation in TSN ..... 2028

*Ledong Hu, Guochu Shou, Xiaodong Zhang, Yaqiong Liu, Yihong Hu*

## ✧ Computer Network and Communication Security

Layered Security Multicast Algorithm based on Security Energy Efficiency Maximization in SCMA Networks ..... 2033

*Lei Chen*

Research and Design of high Performance VPN Security System Based on VPP ..... 2038

*Xiaogang Wei, Liang Guo, Ye Wang, Xing Liu, Jin Deng*

McEliece Coding Method based on LDPC Code with Application to Physical Layer Security ..... 2042

*Lintao Li, Yiran Xing, Xiaoxia Yao, Yuquan Luo*

Research on Automated Cyber Asset Scanning Tools based on Cybersecurity Knowledge Graph ..... 2046

*Xiaofeng Zhong, Yue Zhang, Jingju Liu, Guozheng Yang, Shicheng Zhou, Peng Wang*

Website Security Assessment for Xizang Universities Using ANFIS-PSO Model ..... 2050

*Xiaojun Guo, Pengju Zhou, Qianfan Zhang*

Intelligent Path Planning Algorithm for Cooperative Traversal Task of Multiple Unmanned Ground Vehicles ..... 2055

*Lixiong Zhang, Yan Guo, Xiaoxiang Song, Duan Xue, Bing Ren*

A Blockchain Based Privacy-Preserving Incentive Mechanism for Internet of Vehicles in Satellite-Terrestrial Crowdsensing ..... 2062

*Zhuojia Ma, Yingqing Wang, Jiawei Li, Yang Liu*

## ✧ IOT and Key Application Technologies

A Low-Complexity CP-Free OFDM Design for NB-IoT Networks ..... 2068

*Wentong Han, Zheng Dong, Hongji Xu, Yuxi Liu, Lei Chen*

Research on Location Mechanism of Electric Internet of Things based on IPv6 ..... 2074

*Yaming Wen, Wei Bai, Yang Lu, Feng Tao, Xin Xv*

Resource Allocation and Optimization for UAV-Assisted IoT Based on MEC and Blockchain ..... 2080

*Chengze Zhao, Meng Li, Pengbo Si, Ruizhe Yang, Zhuwei Wang, Yanhua Zhang*

Design of Truly Unmanned Smart Parking Lots Based on Xinghai IoT Platform ..... 2087

*Jianlong Zhou, Shuguo Li, Hao Zou, Qian Yang*

Dynamic Missing Data Recovery Method with Low Complexity in Internet of Things ..... 2091

*Xiaoxiang Song, Yan Guo, Ning Li, Jie Liu*

A Hybrid AES encryption for IOT using Adversarial Network ..... 2096

*Yi Zhao, Shuai Zhang, Qian Tu, Xiaohui Li*

## ✧ **Electronic and Communication Engineering**

Weighted Sum Rate Maximization for Intelligent Reflecting Surface Assisted Multiuser System with Low-Resolution DACs ..... 2101

*Si Li, Huiqin Du, Duoying Zhang*

Low Complexity Hybrid Beamforming for Intelligent Reflecting Surface Aided Communication Systems with One-Bit DACs ..... 2106

*Yuan Huang, Huiqin Du*

Research on Network Management Technology of Power Line Carrier Communication in Low-Voltage Distribution Network Based on Digital Twin ..... 2112

*Jinhong CHEN, Ruiqi DENG, Yangyang GUO, Wanli LIN, Wei CAO, Kefei GUAN*

Application of Multi-mode Heterogeneous Communication in Low-Voltage Distribution Network ..... 2117

*Zhirong PENG, Yang CHENG, Jiajun CHEN, Shuang ZHAO, Kui LAI, Jinming DAI*

A C&W-based Attack Algorithm for End-to-End Communication Systems ..... 2122

*Cao Qiuyu, Feng Man, Ba Teer, Ma Haibo*

Design of Transponder Message Transmission Mechanism Based on Error Correction Code BCH ..... 2127

*Xiaoyu Liu, Jingyang Lyu*

Design of UAT Transceiver Based on ZIF Architecture ..... 2132

*Jiaming Chen, Li Li, Peng Zhang, Maolin Lei, Zhonghui Ma*

Implementation of Adaptive Airborne SAR Motion Compensation Algorithm based on FPGA ..... 2138

*Ke Wang, Weijiang Wang, Yue Ma, Chengbo Xue*

## ✧ **Antenna Design and Development**

The Upper Bound of Capacity for Multi-Mode Networking with Multi-beam Antenna Array .....	2143
Yuhua Wang, Laixian Peng, Renhui Xu, Shuai Cheng	
An Ellipsoidal Luneburg Lens Antenna for Gain Enhancement and Beam Scanning .....	2149
Bochao Wang, Cun Wang, Qi Zhu	
Flexible Monopole Antenna for IoT Applications: A Survey.....	2154
Muhammad Usama Raza, Zhongqing Zhang, Tong Liu, Muhammad Usman Shoukat, Ashfaq Niaz, Kun Luo	
Multi-antenna Array-based AoA Estimation Using Bluetooth Low Energy for Indoor Positioning.....	2160
Shuai He, Hang Long, Wei Zhang	
Design of Frequency Reconfigurable Antenna Based on Metasurface .....	2165
Yijie Yuan, Xuehong Sun, Yanpeng Zhang, Lingzhi Zhao, Yanni Wang	
An AFSS-based Multipattern Reconfigurable 5G Antenna .....	2170
Yanpeng Zhang, Xuehong Sun, Liping Liu, Yijie Yuan, Yanni Wang, Lingzhi Zhao	
Ultra-wide band OAM Antenna Based on Circular Phased-array Conical Dielectric Resonator .....	2175
Lingzhi Zhao, Xuehong Sun, Liping Liu, Yanni Wan, Yijie Yuan, Yanpeng Zhang	
A Single-fed Octagonal OAM Antenna Based on CMT.....	2180
Yanni Wang, Xuehong Sun, Liping Liu, Lingzhi Zhao, Yanpeng Zhang, Yijie Yuan	
An Effective Integrated Communication and Localization Method Based on Digital Phased Array Antenna .....	2185
Yipeng Li, Jizeng Zhao, Xiaofei Jiang, Jie Lin	
Transmit Antenna Combination Optimization and Detection Algorithm for Joint-Mapping-Based Variable Active Antenna Spatial Modulation System .....	2190
Binghai Li, Yun Wu, Xueqin Jiang, Enjian Bai	
Link Scheduling for Multiple-Directional Antennas in Ad hoc Network: A Quasi-order Theoretic Viewpoint .....	2195
Shuai Cheng, Renhui Xu, Laixian Peng, Xiaomei Wang	
<b>❖ Information Network and Multimedia Application</b>	
Limit-Caching: A Caching Scheme Based on Limited Content Popularity in ICN .....	2201
Hongyu Guo, Hui Li, He Bai, Tao Sun, Zhe Huang	
A Simultaneous Denoise and Dereverberation by a Use of Two-Stage Joint Network .....	2206
Junjie Xia, Hongqing Liu, Yi Zhou, Zhen Luo	

A Network Architecture Containing Both Push and Pull Semantics .....	2211
<i>Jianming Que, Hui Li, He Bai, Lihong Lin, Soung-Yue Liew, Lunchakorn Wuttisittikulkij</i>	
Handover Authentication Mechanism Based on Consensus and Ticket for Space Information Network.	2217
<i>Mengda Han, Lifeng Cao, Yihan Lei, Xuehui Du</i>	
Finding Important Edges in Networks through Local Information .....	2225
<i>En-Yu Yu, Yan Fu, Jun-Lin Zhou, Duan-Bing Chen</i>	
Identification of Key Nodes in Complex Networks .....	2230
<i>Qiao Lilin, Wu Muqing, Zhao Min</i>	
Effect Evaluation of Network Protection Based on Fuzzy-AHP .....	2235
<i>Chen Ping</i>	
Old Wine in A New Bottle: A Homogeneous Fraud Sites Discovery Framework.....	2239
<i>Wei Xia, Xin He, Wei Wang, Zhen Li, Jialin Zhang, Gang Xiong</i>	
<b>✧ 5G and Future Communication Technology</b>	
Coverage Enhancement for 5G NR Networks: Solutions, Specification Impact and Performance Analysis .....	2244
<i>Nanxi Li, Hang Yin, Jianchi Zhu, Jing Guo, Xiaoming She</i>	
Design of High Performance SIW Filter in Millimeter Wave Band .....	2249
<i>Xinhe Shi, Dan Fang, Liguo Sun</i>	
Genetic Algorithm for LTE and WiFi Networks in 5G Heterogeneous Environment.....	2254
<i>Yuewei Lin</i>	
Resource Allocation for 5G URLLC in Cooperative Industrial Networks.....	2259
<i>Pingchao Wang, Hua Zhang, Jun-Bo Wang</i>	
Channel Characteristics for 5G in Urban Rail Station at 3.5 GHz Based on Ray-Tracing .....	2264
<i>Pei Tang</i>	
Slicing Allocation Optimization Based on MEC Service-Aware in 5G Smart Grids Enabled Surveillance System .....	2269
<i>Xiaolong Yang, Tao Yao, Rui Xin, Chenjun Sun, Chao Ma</i>	
The KICK-OFF of 6G Research Worldwide: An Overview.....	2274
<i>Wei Jiang, Hans D. Schotten</i>	
<b>✧ Signal Acquisition and Analysis</b>	

Research on Removing Ocular Artifacts from Multi-Channel EEG signals .....	2280
<i>Zheng Longxin, Miao Minmin, Hu Wenjun</i>	
Intelligent Propagation Model Method for RSRP Prediction Based on Machine Learning.....	2287
<i>Sai Wu, BaoJuan Ma, JiaRui Zhang, SiSi Zheng, WeiPing Shao, WeiJun Zheng</i>	
For RF Signal-Based UAV States Recognition, Is Pre-processing Still Important At The Era Of Deep Learning? .....	2292
<i>Changhao Ge, Shubo Yang, Wenjian Sun, Yang Luo, Chunbo Luo</i>	
A Digital Parallel Receiver Structure Based on Frequency Domain Symbol Synchronization and Feedback Frequency Domain Equalization.....	2297
<i>Zhiru Ma, Shili Wang, Ruihao Song, Jian Yan, Jiaxuan Li, Rui Wang</i>	
Cross-Band Spectrum Prediction Algorithm Based on Transfer Learning and Meta Learning .....	2303
<i>Chuang Peng, Mengbo Zhang, Weilin Hu, Lunwen Wang</i>	
A Spectrum Monitoring and Analyzing Algorithm Based on Sparse Fourier Transform .....	2308
<i>Jizhuang Hou, Jiayi Lv, Yue Zhang, Zhiru Ma, Jiaxuan Li, Rui Wang</i>	
Research on the Application of UHF RFID Metal-mountable tags in Military Food.....	2313
<i>Tian-jiao Ma, He Liu, Jin-jie Li</i>	

#### Author Index