

**2021 20th International Conference
on Ubiquitous Computing and
Communications
(IUCC/CIT/DSCI/SmartCNS 2021)**

**London, United Kingdom
20 – 22 December 2021**



**IEEE Catalog Number: CFP21H31-POD
ISBN: 978-1-6654-6668-4**

**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:	CFP21H31-POD
ISBN (Print-On-Demand):	978-1-6654-6668-4
ISBN (Online):	978-1-6654-6667-7

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

2021 20th International Conference on Ubiquitous Computing and Communications (IUCC/CIT/DSCI/SmartCNS) **IUCC-CIT-DSCI-SmartCNS 2021**

Table of Contents

Message from the IUCC 2021 General Chairs	xvii
Message from the IUCC 2021 Program Chairs	xviii
Message from the CIT 2021 General Chairs	xix
Message from the CIT 2021 Program Chairs	xx
Message from the DSCI 2021 General Chairs	xxi
Message from the DSCI 2021 Program Chairs	xxii
Message from the SmartCNS 2021 General Chairs	xxiii
Message from the SmartCNS 2021 Program Chairs	xxiv
IUCC 2021 Organizing and Program Committees	xxv
CIT 2021 Organizing and Program Committees	xxviii
DSCI 2021 Organizing and Program Committees	xxx
SmartCNS 2021 Organizing and Program Committees	xxxiii

The 20th International Conference on Ubiquitous Computing and Communications (IUCC-2021)

Session IUCC_01: Ubiquitous Computing

Back-Imaging Scheme in RF-Powered Passive Camera System	1
<i>Yingqi Chen (Dalian University of Technology, China), Liang Liu (Dalian University of Technology, China), Yu Sun (Dalian University of Technology, China), Pengfei Wang (Dalian University of Technology, China), Guowei Wu (Key Laboratory for Ubiquitous Network and Service Software of Liaoning Province, China), Lei Wang (Key Laboratory for Ubiquitous Network and Service Software of Liaoning Province, China), and Chi Lin (Key Laboratory for Ubiquitous Network and Service Software of Liaoning Province, China)</i>	
VPP: A Communication Schema for Population Protocols in VANET	11
<i>Antonio Bordonaro (University of Palermo, Italy), Alessandra De Paola (University of Palermo, Italy), and Giuseppe Lo Re (University of Palermo, Italy)</i>	

Proactive Attack Detection at the Edge Through an Ensemble Deep Learning Model	19
<i>Panagiotis Fountas (University of Thessaly, Greece), Maria Papathanasaki (University of Thessaly, Greece), Kostas Kolomvatsos (University of Thessaly, Greece), and Nikos Tziritas (University of Thessaly, Greece)</i>	
A Secure Federated Learning Mechanism for Data Privacy Protection	25
<i>Hui Lin (Fujian Normal University, China; Fujian Province University, China), Wenxin Liu (Fujian Normal University, China; Fujian Province University, China), and Xiaoding Wang (Fujian Normal University, China; Fujian Province University, China)</i>	
QoE Models for Online Video Streaming	32
<i>Rongqi Zhang (Nanjing University, China), Xu Zhang (University of Exeter, UK), Peiyao Guo (Nanjing University, China), Qilin Fan (Chongqing University, China; Chongqing Key Laboratory of Digital Cinema Art Theory and Technology, Chongqing University, China), Hao Yin (Tsinghua University, China), and Zhan Ma (Nanjing University, China)</i>	

Session IUCC_02: Ubiquitous Communications

OFDM Signal Design Based on Electrode-Based Through-the-Earth Communication	40
<i>Gan Zhang (Beijing Information Science and Technology University, China), Zhan Xu (Beijing Information Science and Technology University, China), Jinhui Chen (Beijing Information Science and Technology University, China), and Xiaowen Wen (Beijing Information Science and Technology University, China)</i>	
The Impact of Routing Protocols on the Performance of TCP in VANETs	46
<i>Abdelkader Ralem Ahmed (University of Blida1, Algeria), Mohamed Ould-Khaoua (University of Blida1, Algeria), and Mahmoud Meribout (Khalifa University, UAE)</i>	
4-ary CSK Modulation Scheme Better than RGBW for LCD-Screen Camera Communications	54
<i>Alex Cartagena Gordillo (Universidad Nacional Tecnologica de Lima Sur, Peru)</i>	
Spiking Mean Field Multi-Agent Reinforcement Learning for Dynamic Resources Allocation in D2D Networks	60
<i>Pei-Gen Ye (Guangzhou University, China), Wei Liang (Central South University, China), Qiang Lu (Central South University, China), Rong-Fang Xiao (Central South University, China), Zhong-Yong Guo (Central South University, China), and Kai-Xiang Sun (Central South University, China)</i>	
Joint Optimization of Latency and Reward for Offloading Dependent Tasks in Mobile Edge Computing	68
<i>Yanqi Gong (Shaanxi Normal University, China), Fei Hao (Shaanxi Normal University, China), Yifei Sun (Shaanxi Normal University, China), and Longjiang Guo (Shaanxi Normal University, China)</i>	

Energy-Efficient Power Control and Resource Allocation Based on Deep Reinforcement Learning for D2D Communications in Cellular Networks	76
<i>Sami Alenezi (University of Exeter, United Kingdom), Chunbo Luo (University of Exeter, United Kingdom), and Geyong Min (University of Exeter, United Kingdom)</i>	

Session IUCC_03: Ubiquitous System, Services and Applications (I)

DcNetCache: Datacenter In-Network Caching for Large-Scale Key-Value Stores	84
<i>Yingwu Zhu (Seattle University)</i>	
A Fuzzy Bayesian Network Based on Fault Tree for Vaccine Safety Risks Analysis	92
<i>Muzhou Hou (Central South University, China), Dan Xiong (Central South University, China), Xiaoliang Xie (Hunan University of Technology and Business, China), and Guo Wei (University of North Carolina at Pembroke\USA)</i>	
A Reinforcement Learning-Based Task Classification Mechanism for Privacy-Enhanced Mobile Crowdsensing Strategy	100
<i>Mengyao Peng (Fujian Normal University, China; Fujian Province University, China), Hui Lin (Fujian Normal University, China; Fujian Province University, China), and Xiaoding Wang (Fujian Normal University, China; Fujian Province University, China)</i>	
A Mobile Crowd Sensing Ecosystem Based on Fog Computing Infrastructure	108
<i>Liwei Lin (Fujian University of Technology, China), Xia Lin (Technology Center of Fuzhou Customs District, China), and Xiaoding Wang (Fujian Normal University, China)</i>	
Preserving Privacy for Edge Weights in Communication Networks	116
<i>Jiaru Wang (Fujian Normal University, PR China), Jiankang Song (Fujian Normal University, PR China), Ziyi Wan (Fujian Normal University, PR China), Yanze Huang (Fujian University of Technology, PR China), and Limei Lin (Fujian Normal University, PR China)</i>	

Session IUCC_04: Ubiquitous System, Services and Applications (II)

IoTVT Model: A Model Mapping IoT Sensors to IoT Vulnerabilities and Threats	123
<i>Mathew Nicho (Zayed University, UAE) and Shini Giriya (Yellowstone Business Consultants FZE, UAE)</i>	
Design and Implementation of Anti-Wireless Electricity Rubbing System	130
<i>Qiwei Wang (Monash University, Australia)</i>	
Design and Animate the Representative 3D Model of Soothsayer of the Shang Dynasty	139
<i>Hong Yang (University of Zhejiang, China), Qing-sheng Li (University of Zhejiang, China), Gui-li Tao (University of Zhejiang, China), Han Xu (University of Exeter, UK), Zhen-hui Chai (University of Zhejiang, China), and Xing-hong Fu (University of Zhejiang, China)</i>	
Design and Implementation of Smart Bracelets Mutual Authentication System	146
<i>Qiwei Wang (Monash University, Australia)</i>	

Instrumented Activity Dice for Assessing Throwing Performance: A Pilot Study	156
<i>Seethu M Christopher (Maastricht University, Netherlands) and Rico Möckel (Maastricht University, Netherlands)</i>	

The 20th International Conference on Computer and Information Technology (CIT-2021)

Session CIT_01: Artificial Intelligence and Data Science

CAN Reverse Engineering Based on the Differential Method	164
<i>Sixian Yu (Beijing University of Posts and Telecommunications, China), Guoai Xu (Beijing University of Posts and Telecommunications, China), Zixiang Bi (Beijing University of Posts and Telecommunications, China), Guosheng Xu (Beijing University of Posts and Telecommunications, China), and Xuanwen Zhang (Comprehensive Research Center Information Technology in the MIIT of China, China)</i>	
Dynamic Gesture Recognition Based on Multimodal Fusion Model	172
<i>Juan Fang (Changchun University of Science and Technology, China), Chao Xu (Changchun University of Science and Technology, China), Chao Wang (Changchun University of Science and Technology, China), and Hua Li (Changchun University of Science and Technology, China)</i>	
A Novel Fish Counting Method with Adaptive Weighted Multi-Dilated Convolutional Neural Network	178
<i>Junfeng Wu (Tianjin University, China; Dalian Ocean University, China), Yizhi Zhou (Dalian Ocean University, China), Hong Yu (Dalian Ocean University, China), Yuxuan Zhang (Dalian Ocean University, China), and Jing Li (Dalian Ocean University, China)</i>	
Classify Project Programming Languages (PLP) in GitHub: Clustering in Machine Learning	184
<i>Faten Slama (University of Manouba, Tunisia), Imen Ismail (University of Sousse, Tunisia), and Lassaad Latrach (University of Manouba, Tunisia)</i>	
Prediction Method of Underground Density Abnormal Body in Gravity Data Based on Convolutional Neural Network	190
<i>Rui Wang (Changchun University of Science and Technology, China), Chi Wang (Changchun University of Science and Technology, China), Zhengwei Xu (Chengdu University of Science and Technology, China), Hua Li (Changchun University of Science and Technology, China), Yuxin Zhang (Changchun University of Science and Technology, China), Qiang Li (Changchun University of Science and Technology, China), and Ziyue Wang (Changchun University of Science and Technology, China)</i>	
An Underwater Fish Individual Recognition Method Based on Improved YoloV4 and FaceNet	196
<i>Huanjun Zhang (Dalian Ocean University, China), Junfeng Wu (Dalian Ocean University, China), Hong Yu (Dalian Ocean University, China), Weifang Wang (Dalian Ocean University, China), Yuxuan Zhang (Dalian Ocean University, China), and Yizhi Zhou (Dalian Ocean University, China)</i>	

Session CIT_02: Reliable Wireless Communications

Simulating Network Link Compression in Loss-Less Wireless Sensor Networks (WSNs) Environment	201
<i>Rozita Teymourzadeh (University of San Francisco, USA), Ramona Carmen Stoica (University of San Francisco, USA), Robert Chang (Waymo LLC, USA), and Vahab Pournaghshband (University of San Francisco, USA)</i>	
Optimization Strategy of Satellite Signal Processing Software Based on Feiteng FT-2000 Computing Board	208
<i>Keyu Wu (University of Chinese Academy of Sciences, China), Fengge Wu (University of Chinese Academy of Sciences, China), and Junsuo Zhao (University of Chinese Academy of Sciences, China)</i>	
Low-Complexity Lattice Reduction Aided Schnorr Euchner Sphere Decoder Detection Schemes with MMSE and SIC Pre-Processing for MIMO Wireless Communication Systems	216
<i>Goodwell Kapfunde (University of Hertfordshire, United Kingdom), Oluyomi Simpson (University of Hertfordshire, United Kingdom), and Yichuang Sun (University of Hertfordshire, United Kingdom)</i>	
Modeling Short-form Video Transfer in Information Centric Network	224
<i>Han Xu (University of Exeter, UK), Haozhe Wang (University of Exeter, UK), Jia Hu (University of Exeter, UK), and Zhengxin Yu (Lancaster University, UK)</i>	

Session CIT_03: Networking Transmission and Multimedia Processing

Trying an IP Over NDN Packet Gateway	232
<i>Marielena Márquez-Barreiro (Universidade de Vigo, Spain), Miguel Rodríguez-Pérez (Universidade de Vigo, Spain), and Sergio Herrería-Alonso (Universidade de Vigo, Spain)</i>	
Sensitivity-Aware Configurations for High Packet Generation Rate LoRa Networks	240
<i>Hanan Alahmadi (King Abdulaziz University, Saudi Arabia), Fatma Bouabdallah (King Abdulaziz University, Saudi Arabia), Baraq Ghaleb (Edinburgh Napier University, UK), and Ahmed Al-Dubai (Edinburgh Napier University, UK)</i>	
Performance Evaluation of Probabilistic Broadcast in Low-Power and Lossy Networks	247
<i>Djahida Ali-Fedila (University of Blida 1, Algeria) and Mohamed Ould-Khaoua (University of Blida 1, Algeria)</i>	
On Data Wastage When User Becomes Idle in HTTP Adaptive Streaming	255
<i>Thai Duong Tran (Hanoi University of Science and Technology, Vietnam), Chanh Tran Minh (Shibaura Institute of Technology, Japan), Hoang Hai Tran (Hanoi University of Science and Technology, Vietnam), Eiji Kamioka (Shibaura Institute of Technology, Japan), and Tan Phan Xuan (Shibaura Institute of Technology, Japan)</i>	

Session CIT_04: Information Technology and Smart Health

An Automatic Method for Identifying the Microscopic Feature of Ray-Cell Number	261
<i>Qizhao Lin (Fujian polytechnic of information technology, China), Jian Qiu (Southwest Forestry, China), Hong Wang (Fujian polytechnic of information technology, China), Wenyin Chen (Fujian polytechnic of information technology, China), Yong Guo (Fujian polytechnic of information technology, China), and Chaofeng Zhang (Fujian polytechnic of information technology, China)</i>	
A Supporting System for Implementing an Evaluation Model of Classroom Teaching Quality Based on Students' Self-Estimation	267
<i>Niu Lianqiang (Shenyang University of Technology, China), Wang Kunpeng (Shenyang University of Technology, China), Zhang Shengnan (Shenyang University of Technology, China), Zheng Jiawei (Shenyang University of Technology, China), and Xu Gang (ShenYang Chinasoft Excellency Information Technology Co., Ltd, China)</i>	
A Study on the Creation of 3D Models of Cultural Properties by SfM using an Elaborate Diorama of a Non-Existing Excavation Site	273
<i>Miki Sugano (Kyushu Institute of Technology, Japan), Wanpeng Shao (Kyushu Institute of Technology, Japan), Ken'ichi Kakizaki (Kyushu Institute of Technology, Japan), and Shunsuke Araki (Kyushu Institute of Technology, Japan)</i>	
The Effects of Regularisation on RNN Models for Covid-19 Time Series Forecasting	281
<i>Marcus Carpenter (University of Exeter, UK), Chunbo Luo (University of Exeter, UK), and Xiao-Si Wang (Applied Research British Telecommunications plc., UK)</i>	
Privacy Preservation of COVID-19 Contact Tracing Data	288
<i>Anifat M. Olawoyin (University of Manitoba, Canada), Carson K. Leung (University of Manitoba, Canada), and Qi Wen (University of Manitoba, Canada)</i>	
BERT-BiLSTM-Caps Language Model for Screening of Children's Severe Mental Retardation	296
<i>Qianhong Zhang (Wuhan University of Technology, China), Wei Meng (Wuhan University of Technology, China), Jie Hao (Wuhan College, China), Huawei Tan (Renmin Hospital of Wuhan University, China), Simeng Ma (Renmin Hospital of Wuhan University, China), Mincheng Cai (Wuhan University of Technology, China), Dujuan Liu (Renmin Hospital of Wuhan University, China), Zhongchun Liu (Renmin Hospital of Wuhan University, China), and Jun Yang (Wuhan University of Technology, China)</i>	

The 4th International Conference on Data Science and Computational Intelligence (DSCI-2021)

Session DSCI_01: Social Network Analysis and Applications

Dynamic Social Network Embedding Based on Triadic Closure Pattern Analysis	302
<i>Min Yang (Xihua University, China), Xiaoliang Chen (Xihua University, China), Mingfeng Zhao (China West Normal University, China), Yajun Du (Xihua University, China), and Xianyong Li (Xihua University, China)</i>	

A Novel Random Walk Strategy for Network Embedding using Community Aware and Node Influence Biasing	309
<i>Zhibin Wang (Xihua University, China), Xiaoliang Chen (Xihua University, China), Mingfeng Zhao (China West Normal University, China), Xianyong Li (Xihua University, China), and Yajun Du (Xihua University, China)</i>	
Identifying Influential Nodes for Blocking Information Cascades Based on Improved Structural Holes in Social Networks	316
<i>Jing Han (Shaanxi Normal University, China), Li Li (Shaanxi Normal University, China), and XiaoHua Zheng (Shaanxi Normal University, China)</i>	
A CPN-Based Information Propagation Model in Online Social Networks	323
<i>Jinming Kong (Shaanxi Normal University, China), Wangyang Yu (Shaanxi Normal University, China), and Fei Hao (Shaanxi Normal University, China)</i>	
An Overlap Community Propagation Algorithm Based on Topics and Community Structure in Social Networks	331
<i>Hong-quan Bai (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Lei-lei Shi (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Lu Liu (University of Leicester, UK), John Panneerselvam (University of Leicester, UK), and Zi-xuan Han (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China)</i>	

Session DSCI_02: Data Analytics and Mining

An Effective Approach for Predicting P-Value using High-Dimensional SNPs Data with Small Sample Size	339
<i>Jiayu Wang (Yunnan University, China), Fengtao Nan (Yunnan University, China), Po Yang (University of Sheffield, UK), Yun Yang (Yunnan University, China), and Jun Qi (Xi'an JiaoTong-Liverpool University, China)</i>	
Simulation-based Evaluation of the Reliability of Bayesian Hierarchical Models for sc-RNAseq Data	345
<i>Sijia Li (University of Leeds, United Kingdom), Martín López-García (University of Leeds, United Kingdom), and Luisa Cutillo (University of Leeds, United Kingdom)</i>	
A New Interval Algebra for Temporal Data Modeling and Analysis	353
<i>Kai Cheng (Kyushu Sangyo University, Japan), Sunao Sawada (Kyushu Sangyo University, Japan), and Kesuke Abe (Kyushu Sangyo University, Japan)</i>	

A Public Blockchain-Based Identity Management Scheme and Petri Net-Based Verification	361
<i>Ji-qin Liu (Jiangsu University, China), Yan Wu (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Lei-lei Shi (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Zhi-yuan Li (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), and Chen Liu (Jiangsu University, China)</i>	

Sentiment Analysis of E-Commerce Reviews Based on Long Short-Term Memory Networks with Dropout Layer and Optimization	369
<i>Zhen-Hui Chai (Communication University of Zhejiang, China), Jun Huang (Tengke education technology co., ltd., China), Li Chen (Communication University of Zhejiang, China), Run Wang (Communication University of Zhejiang, China), and Fei Hao (Shaanxi Normal University, China)</i>	

Session DSCI_03: Artificial Intelligence and Machine Learning

Facial Expression Study Based on 3D Facial Emotion Recognition	375
<i>HongYuan Cao (Shaanxi Normal University, China) and Chao Qi (Shaanxi Normal University, China)</i>	

An Ensemble Learning Approach for Predicting Phenotypes from Genotypes	382
<i>Tingxi Yu (Shanxi Agricultural University, China), Wuping Zhang (Shanxi Agricultural University, China), Jiwan Han (Shanxi Agricultural University, China), Fuzhong Li (Shanxi Agricultural University, China), Zhihong Wang (Shanxi Agricultural University, China), and Chunqing Cao (Shanxi Agricultural University, China)</i>	

A Comparative Study of Machine Learning Algorithms to Predict Road Accident Severity	390
<i>Shakil Ahmed (Manukau Institute of Technology, New Zealand), Md Akbar Hossain (Manukau Institute of Technology, New Zealand), Md Mafijul Islam Bhuiyan (University of Alberta, Canada), and Sayan Kumar Ray (Manukau Institute of Technology, New Zealand)</i>	

Spatio-Temporal Tensor Multi-Task Learning for Precision Fertilization	398
<i>Yu Zhang (University of Sheffield, UK), Tong Liu (University of Sheffield, UK), Yang Li (Ant Data Ltd., UK), Ruijing Wang (Chinese Academy of Sciences, China), He Huang (Chinese Academy of Sciences, China), and Po Yang (University of Sheffield, UK)</i>	

Performance Analysis of Distributed Deep Learning Frameworks in a Multi-GPU Environment	406
<i>Tulasi Kavarakuntla (Manchester Metropolitan University, UK), Liangxiu Han (Manchester Metropolitan University, UK), Huw Lloyd (Manchester Metropolitan University, UK), Annabel Latham (Manchester Metropolitan University, UK), and Samson B. Akintoye (Manchester Metropolitan University, UK)</i>	

Session DSCI_04: Computational Intelligence and Cutting-edge Applications (I)

Nuclei Instance Segmentation and Classification in Histopathological Images using a DT-Yolact	414
<i>Yuhang Jia (Shaanxi Normal University, China), Cheng Lu (Shaanxi Normal University, China), Xue Li (Shaanxi Normal University, China), Miao Ma (Shaanxi Normal University, China), Zhao Pei (Shaanxi Normal University, China), Zengguo Sun (Shaanxi Normal University, China), and Yuli Chen (Shaanxi Normal University, China)</i>	
Agent's Feedback in Preference Elicitation	421
<i>Miroslav Kárný (The Czech Academy of Sciences, Institute of Information Theory and Automation, Czech Republic) and Tereza Siváková (The Czech Academy of Sciences, Institute of Information Theory and Automation, Czech Republic)</i>	
Hanfu Online Social Network Design Based on Personalized Recommendation Technology	430
<i>Zehang Li (Beijing Institute of Technology, China), Peiqing Cao (Royal College of Art, UK), Yushun Liu (Beijing Institute of Technology, China), Jianming Yang (Beijing Institute of Technology, China), and Bowen Sun (Beijing Institute of Technology, China)</i>	
Virtual Reality Immersive Interactive Design Based on Big Data Technology	436
<i>Yang Wang (School of Design and Arts Beijing Institute of Technology, China)</i>	

Session DSCI_05: Computational Intelligence and Cutting-edge Applications (II)

Sound Event Detection Based on Bidirectional Temporal Convolutional Network and Gated Recurrent Unit	445
<i>Yihan Chen (Shaanxi Normal University, China), Min Guo (Shaanxi Normal University, China), and Zhiqiang Li (Shaanxi Normal University, China)</i>	
Design and Application of Virtual Avatar Framework Based on E-Commerce Live Streaming	451
<i>Xing-hong Fu (Communication University of Zhejiang, China), Qing-sheng Li (Communication University of Zhejiang, China), Na-ye Ji (Communication University of Zhejiang, China), Han Xu (University of Exeter, UK), Zhen-hui Cai (Communication University of Zhejiang, China), and Hong Yang (Communication University of Zhejiang, China)</i>	
A Dynamic Collaborative Filtering Algorithm Based on Convolutional Neural Networks and Multi-Layer Perceptron	459
<i>Qiang Sun (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Lei-lei Shi (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Lu Liu (University of Leicester, UK), Zi-xuan Han (Jiangsu University, China; Jiangsu Key Laboratory of Security Tech. for Industrial Cyberspace, Jiangsu University, China), Liang Jiang (Jiangsu University, China), Yao Lu (University of Leicester, UK), and John Panneerselvam (University of Leicester, UK)</i>	

MMPDNet: Multi-Stage & Multi-Attention Progressive Image Denoising	467
<i>Jiangbo Xue (Shaanxi Normal University, China), Jiu Liang (Shaanxi Normal University, China), Yu Zhang (Shaanxi Normal University, China), Jinhe He (Shaanxi Normal University, China), Yu Zhang (Shaanxi Normal University, China), and Yanda Hu (Shaanxi Normal University, China)</i>	

The 11th International Conference on Smart Computing, Networking and Services (SmartCNS-2021)

Session SmartCNS_01: Smart Computing

Multi-Label Text Classification Based on Multidimensional Information Extraction	474
<i>Bin Fan (State Grid Corporation, China), Feng Zhu (State Grid Corporation, China), DJ Ning (Chinese Academy of Sciences, China), and Junzhe Lu (Chinese Academy of Sciences, China)</i>	
Vehicle User Identification Model Based on Telecom Big Data	484
<i>Zifan Chen (Beijing University of Posts and Telecommunications, China) and Qingqing Zhang (Research Institute, China United Network Communications Corporation, China)</i>	
Correlation Metric Selection Based Correlation Alignment for Cross-Project Defect Prediction	490
<i>Jingwen Niu (Shaanxi Normal University, China), Zhiqiang Li (Shaanxi Normal University, China), and Chao Qi (Shaanxi Normal University, China)</i>	
Adaptive Data Masking-Based Named Entity Recognition	496
<i>Yunlu Yang (China Academy of Information and Communications Technology, China), Miaoqiong Wang (China Academy of Information and Communications Technology, China), Rundong Yu (China Academy of Information and Communications Technology, China), Ji Fang (China Academy of Information and Communications Technology, China), Meiyong Guo (China Academy of Information and Communications Technology, China), Kairu Lei (China Academy of Information and Communications Technology, China), and Lu Li (China Academy of Information and Communications Technology, China)</i>	
Performance Analysis on Electric-Vehicle Charging in Low Temperature Environment	503
<i>Zhaohui Wang (China Automotive Technology Research Center Co., Ltd, CATARC Automotive Test Center (Tianjin) Co., Ltd, China), Baoqiang Zhang (China Automotive Technology Research Center Co., Ltd, CATARC Automotive Test Center (Tianjin) Co., Ltd, China), Chuan Li (China Automotive Technology Research Center Co., Ltd, CATARC Automotive Test Center (Tianjin) Co., Ltd, China), and Lixue Chen (China Automotive Technology Research Center Co., Ltd, CATARC Automotive Test Center (Tianjin) Co., Ltd, China)</i>	

Session SmartCNS_02: Smart Networking

Performance Study of Improved BBR Congestion Control Algorithm using QUIC in Wireless LAN 508

Mengjie Zuo (Wuhan University of Technology, China), Haoying Wu (Wuhan University of Technology, China), Yi Han (Wuhan University of Technology, China), Yi Zhong (Wuhan University of Technology, China), and Jiazheng Wang (Liuzhou Wuling Automobile Industry Co., Ltd, China)

OSS Data Based Evaluation Algorithm for Radio Utilization Rate Under 5G Massive MIMO 514

Yuchao Jin (Research Institute, China United Network Communications Corporation, P.R. China), Yi Li (Research Institute, China United Network Communications Corporation, P.R. China), Shengli Guo (Research Institute, China United Network Communications Corporation, P.R. China), Xinzhou Cheng (Research Institute, China United Network Communications Corporation, P.R. China), Fei Li (China United Network Communications Group Corporation, P.R.China), Deyi Li (Research Institute, China United Network Communications Corporation, P.R. China), Lexi Xu (Research Institute, China United Network Communications Corporation, P.R. China), Yuwei Jia (Research Institute, China United Network Communications Corporation, P.R. China), and Lijuan Cao (Research Institute, China United Network Communications Corporation, P.R. China)

Survey on 5G Network Expansion Methods 522

Yi Li (Research Institute, China United Network Communications Corporation, P.R.China), Yuchao Jin (Research Institute, China United Network Communications Corporation, P.R.China), Yuting Zheng (Research Institute, China United Network Communications Corporation, P.R.China), Xiaomeng Zhu (Research Institute, China United Network Communications Corporation, P.R.China), Xinzhou Cheng (Research Institute, China United Network Communications Corporation, P.R.China), Fei Li (China United Network Communications Corporation, P.R.China), Lexi Xu (Research Institute, China United Network Communications Corporation, P.R.China), and Lijuan Cao (Research Institute, China United Network Communications Corporation, P.R.China)

5G Residency Enhancement Method Based on 5G Beam Intelligent Optimization 528

Tian Xiao (Research Institute, China United Network Communications Corporation, China), Kun Chao (Research Institute, China United Network Communications Corporation, China), Guanghai Liu (Research Institute, China United Network Communications Corporation, China), Yi Li (Research Institute, China United Network Communications Corporation, China), Guoping Xu (China United Network Communications Group Corporation, China), Lexi Xu (Research Institute, China United Network Communications Corporation, China), Chen Cheng (Research Institute, China United Network Communications Corporation, China), Yuchao Jin (Research Institute, China United Network Communications Corporation, China), and Yuting Zheng (Research Institute, China United Network Communications Corporation, China)

Performance Analysis of the IEEE 802.11p EDCA for Vehicular Networks in Imperfect Channels... 535

Ning Wang (University of Exeter, UK) and Jia Hu (University of Exeter, UK)

Network Security Situation Assessment Methods and Tactics Based on Multivariate Spatiotemporal Attack Graph Model	541
<i>Anshun Zhou (China United Network Communication Corporation, China)</i>	
<i>and Mingde Huo (China United Network Communications Corporation, China)</i>	

Session SmartCNS_03: Smart Services

A Novel Cost-Sensitive Capsule Network for Audit Fraud Detection	549
<i>Feng Zhu (State Grid Corporation of China, China), DJ Ning (Chinese Academy of Sciences, China), Yu Wang (Chinese Academy of Sciences, China), and Shipeng Liu (Chinese Academy of Sciences, China)</i>	
A Domain Model for SARS-CoV-2 Rational Vaccine Design to Engineer a Prediction Tool for Binding Affinity and Antigenicity	557
<i>Aritra Ghosh (Florida Atlantic University, USA), Maria M. Larrondo-Petrie (Florida Atlantic University, USA), and Mirjana D. Pavlovic (Florida Atlantic University, USA)</i>	
Deep Learning-Based Fusion of Visible Light Positioning and IMU Sensors	565
<i>Luchi Hua (Southeast University, People's Republic of China), Yuan Zhuang (Wuhan University, People's Republic of China), and Jun Yang (Southeast University, People's Republic of China)</i>	
Design of Virtual Reality Education Platform Based on 5G MEC	572
<i>Zhen Guo (Communication University of China, China; China Unicom Smart City Research Institute, China), Pengzhou Zhang (Communication University of China, China), and Junjie Xia (China Unicom Smart City Research Institute, China)</i>	
Telecom Big Data Based Precision Marketing Algorithms for Financial Industry	579
<i>Xueyi Hao (Beijing University of Posts and Telecommunications, China) and Chen Cheng (China United Network Communications Corporation, China)</i>	
Author Index	587