

IEEE INFOCOM 2020 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS 2020)

**Toronto, Ontario, Canada
6-9 July 2020**

Pages 1-670



**IEEE Catalog Number: CFP2023E-POD
ISBN: 978-1-7281-8696-2**

**Copyright © 2020 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: | CFP2023E-POD |
| ISBN (Print-On-Demand): | 978-1-7281-8696-2 |
| ISBN (Online): | 978-1-7281-8695-5 |

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

TABLE OF CONTENTS

| | |
|---------------------------------------------------------------------------------------------------------------------|----|
| AGE OF INCORRECT INFORMATION FOR REMOTE ESTIMATION OF A BINARY MARKOV SOURCE..... | 1 |
| <i>Clement Kam, Sastry Kompella, Anthony Ephremides</i> | |
| DETECTING STATE TRANSITIONS OF A MARKOV SOURCE: SAMPLING FREQUENCY AND AGE TRADE-OFF | 7 |
| <i>Jaya Prakash Champati, Mikael Skoglund, James Gross</i> | |
| BALANCING DATA FRESHNESS AND DISTORTION IN REAL-TIME STATUS UPDATING WITH LOSSY COMPRESSION | 13 |
| <i>Shaoling Hu, Wei Chen</i> | |
| TRANSMISSION SCHEDULING FOR MULTI-LOOP WIRELESS NETWORKED CONTROL BASED ON LQ COST OFFSET | 19 |
| <i>He Ma, Shidong Zhou, Xiujun Zhang, Limin Xiao</i> | |
| AGE OF INFORMATION FOR ACTUATION UPDATE IN REAL-TIME WIRELESS CONTROL SYSTEMS | 26 |
| <i>Bo Chang, Liying Li, Guodong Zhao, Zhen Meng, Muhammad Ali Imran, Zhi Chen</i> | |
| MAINTAINING INFORMATION FRESHNESS IN POWER-EFFICIENT STATUS UPDATE SYSTEMS..... | 31 |
| <i>Parisa Rafiee, Peng Zou, Omur Ozel, Suresh Subramaniam</i> | |
| MUTUAL AUTHENTICATION AND AUTHORIZED DATA ACCESS BETWEEN FOG AND USER BASED ON BLOCKCHAIN TECHNOLOGY..... | 37 |
| <i>M. Arun, S. Balamurali, Bharat S. Rawal, Qiang Duan, R. Lakshmana Kumar, Balusamy Balamurugan</i> | |
| CERBERUS: PRIVACY-PRESERVING COMPUTATION IN EDGE COMPUTING..... | 43 |
| <i>Dilu Zhang, Lei Fan</i> | |
| BOTTLENECK-AWARE COFLOW SCHEDULING WITHOUT PRIOR KNOWLEDGE | 50 |
| <i>Libin Liu, Hong Xu, Chengxi Gao, Peng Wang</i> | |
| REVENUE-SHARING BASED COMPUTATION-RESOURCE ALLOCATION FOR MOBILE BLOCKCHAIN..... | 56 |
| <i>Yuan Wu, Xu Xu, Liping Qian, Bo Ji, Zhiguo Shi, Weijia Jia</i> | |
| COOPERATIVE GAME MODEL OF DELEGATION COMPUTING: VERIFIER SEPARATED FROM CALCULATORS..... | 62 |
| <i>Duo Zhang, Youliang Tian, Linjie Wang, Sheng Gao, Jianfeng Ma</i> | |
| U-ASG: A UNIVERSAL METHOD TO PERFORM ADVERSARIAL ATTACK ON AUTOENCODER BASED NETWORK ANOMALY DETECTION SYSTEMS..... | 68 |
| <i>Chenming Yang, Liang Zhou, Hui Wen, Yue Wu</i> | |
| IDENTIFICATION OF ENCRYPTED VIDEO STREAMING BASED ON DIFFERENTIAL FINGERPRINTS..... | 74 |
| <i>Hua Wu, Zhenhua Yu, Guang Cheng, Shuyi Guo</i> | |
| RNBG: A RANKING NODES BASED IP GEOLOCATION METHOD | 80 |
| <i>Chong Liu, Xiangyang Luo, Fuxiang Yuan, Fenlin Liu</i> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| A FRAMEWORK FOR BANDWIDTH AND LATENCY GUARANTEED SERVICE IN NEW IP NETWORK | 85 |
| <i>Lin Han, Yingzhen Qu, Lijun Dong, Richard Li</i> | |
| P4NIS: IMPROVING NETWORK IMMUNITY AGAINST EAVESDROPPING WITH PROGRAMMABLE DATA PLANES | 91 |
| <i>Gang Liu, Wei Quan, Nan Cheng, Ning Lu, Hongke Zhang, Xuemin Shen</i> | |
| ADAPTIVE VIDEO STREAMING USING DYNAMIC NDN MULTICAST IN WLAN | 97 |
| <i>Fan Wu, Wang Yang, Ju Ren, Feng Lyu, Xiaojie Ding, Yaoxue Zhang</i> | |
| A VIEW-INVARIANT FEATURE LEARNING MODEL FOR CROSS-VIEW SECURITY AUTHENTICATION IN MOBILE SMART DEVICES | 103 |
| <i>Ao Li, Xin Liu, Qiang Guan, Deyun Chen, Guanglu Sun</i> | |
| ENTERPRISE MOBILE DEVICE MANAGEMENT REQUIREMENTS AND FEATURES..... | 109 |
| <i>Hina Batool, Ammar Masood</i> | |
| A CONVOLUTIONAL NEURAL NETWORK-BASED RF FINGERPRINTING IDENTIFICATION SCHEME FOR MOBILE PHONES..... | 115 |
| <i>Sheng Wang, Linning Peng, Hua Fu, Aiqun Hu, Xinyu Zhou</i> | |
| COMPREHENSIVE DETECTION OF VULNERABLE PERSONAL INFORMATION LEAKS IN ANDROID APPLICATIONS | 121 |
| <i>Nattanon Wongwiwatchai, Phannawhat Pongkham, Kunwadee Sripanidkulchai</i> | |
| A DYNAMIC RESOURCE ALLOCATION SCHEME IN VEHICULAR COMMUNICATIONS..... | 127 |
| <i>Akinsola Akinsanya, Manish Nair, Yijin Pan, Jiangzhou Wang</i> | |
| RESOURCE ALLOCATION IN DRONE-ASSISTED EMERGENCY COMMUNICATION SYSTEMS..... | 132 |
| <i>Tianqi Chen, Jian He, Huiling Zhu, Lin Cai, Peng Yue, Jiangzhou Wang</i> | |
| INTELLIGENT UAV BASED FLEXIBLE 5G EMERGENCY NETWORKS: FIELD TRIAL AND SYSTEM LEVEL RESULTS | 138 |
| <i>Yuan Gao, Jiang Cao, Ping Wang, Junsong Yin, Ming He, Ming Zhao, Mugen Peng, Su Hu, Yunchuan Sun, Jing Wang, Shaochi Cheng, Yang Guo, Yanchang Du, Yanxi Cai, Jinhui Huang, Kai Qiu</i> | |
| AN INTEGRATED PLATOON AND UAV SYSTEM FOR 3D LOCALIZATION IN SEARCH AND RESCUE | 144 |
| <i>Hongming Zhang, Li Wang, Aiguo Fei</i> | |
| LATENCY AND RELIABILITY ORIENTED COLLABORATIVE OPTIMIZATION FOR MULTI-UAV AIDED MOBILE EDGE COMPUTING SYSTEM | 150 |
| <i>Xiangwang Hou, Zhiyuan Ren, Jingjing Wang, Shuya Zheng, Hailin Zhang</i> | |
| DUAL CHANNEL PER-PACKET LOAD BALANCING FOR DATACENTERS | 157 |
| <i>Cong Xu, Tingqiu Yuan, Haibo Zhang, Tao Huang, Feilong Tang</i> | |
| PREDICTING TRAFFIC DEMAND MATRIX BY CONSIDERING INTER-FLOW CORRELATIONS..... | 165 |
| <i>Kaihui Gao, Dan Li, Li Chen, Jinkun Geng, Fei Gui, Yang Cheng, Yue Gu</i> | |
| MFBBR: AN OPTIMIZED FAIRNESS-AWARE TCP-BBR ALGORITHM IN WIRED-CUM-WIRELESS NETWORK..... | 171 |
| <i>Minghan Jia, Weifeng Sun, Zun Wang, Yaohua Yan, Hongyu Qin, Kelong Meng</i> | |

| | |
|----------------------------------------------------------------------------------------------------------------------|-----|
| A CONCURRENT WEIGHTED COMMUNICATION SCHEME FOR BLOCKCHAIN TRANSACTION..... | 177 |
| <i>Jiao Li, Li Chen</i> | |
| TOWARDS BLOCKCHAIN-BASED REPUTATION-AWARE FEDERATED LEARNING..... | 183 |
| <i>Muhammad Habib Ur Rehman, Khaled Salah, Ernesto Damiani, Davor Svetinovic</i> | |
| NETWORK FLOW BASED IOT BOTNET ATTACK DETECTION USING DEEP LEARNING..... | 189 |
| <i>S. Sriram, R. Vinayakumar, Mamoun Alazab, Soman Kp</i> | |
| BLOCKCHAIN-BASED E-WASTE MANAGEMENT IN 5G SMART COMMUNITIES..... | 195 |
| <i>Amit Dua, Akash Dutta, Nishat Zaman, Neeraj Kumar</i> | |
| NLC: NATURAL LIGHT COMMUNICATION USING SWITCHABLE GLASS | 201 |
| <i>Changshuo Hu, Dong Ma, Mahbub Hassan, Wen Hu</i> | |
| SMART USER PAIRING FOR MASSIVE MIMO ENABLED INDUSTRIAL IOT COMMUNICATIONS | 207 |
| <i>Jingjie Zong, Shuangzhi Li, Di Zhang, Gangtao Han, Xiaomin Mu, Ali Kashif Bashir, Joel J. P. C. Rodrigues</i> | |
| SECURE BACKSCATTER COMMUNICATIONS IN MULTI-CELL NOMA NETWORKS: ENABLING LINK SECURITY FOR MASSIVE IOT NETWORKS..... | 213 |
| <i>Wali Ullah Khan, Ju Liu, Furqan Jameel, Muhammad Toaha Raza Khan, Syed Hassan Ahmed, Riku Jäntti</i> | |
| BIND: BLOCKCHAIN-BASED FLOW-TABLE PARTITIONING IN DISTRIBUTED MULTI-TENANT SOFTWARE-DEFINED NETWORKS | 219 |
| <i>Ayan Mondal, Sudip Misra</i> | |
| DECOP: DECENTRALIZED NETWORK OPERATIONS IN SOFTWARE DEFINED NETWORKING USING BLOCKCHAIN..... | 225 |
| <i>Ephraim Moges, Tao Han</i> | |
| PROOF-OF-BALANCE: GAME-THEORETIC CONSENSUS FOR CONTROLLER LOAD BALANCING OF SDN | 231 |
| <i>Siyi Liao, Jun Wu, Jianhua Li, Ali Kashif Bashir</i> | |
| ON THE DESIGN OF BLOCKCHAIN-BASED ACCESS CONTROL SCHEME FOR SOFTWARE DEFINED NETWORKS | 237 |
| <i>Durbadal Chattaraj, Sourav Saha, Basudeb Bera, Ashok Kumar Das</i> | |
| USER ASSOCIATION IN HYBRID UAV-CELLULAR NETWORKS FOR MASSIVE REAL-TIME IOT APPLICATIONS | 243 |
| <i>Parisa Foroughi, Hamzeh Beyranvand, Maurice Gagnaire, Sawsan Al Zahr</i> | |
| ODOB: ONE DRONE ONE BLOCK-BASED LIGHTWEIGHT BLOCKCHAIN ARCHITECTURE FOR INTERNET OF DRONES..... | 249 |
| <i>Maninderpal Singh, Gagangeet Singh Aujla, Rasmeet Singh Bali</i> | |
| VAHAK: A BLOCKCHAIN-BASED OUTDOOR DELIVERY SCHEME USING UAV FOR HEALTHCARE 4.0 SERVICES..... | 255 |
| <i>Rajesh Gupta, Arpit Shukla, Parimal Mehta, Pronaya Bhattacharya, Sudeep Tanwar, Sudhanshu Tyagi, Neeraj Kumar</i> | |

| | |
|-------------------------------------------------------------------------------------------------------------------------|-----|
| A BLOCKCHAIN-BASED FRAMEWORK FOR DRONE-MOUNTED BASE STATIONS IN TACTILE INTERNET ENVIRONMENT | 261 |
| <i>Vikas Hassija, Vikas Saxena, Vinay Chamola</i> | |
| A FLEXIBLE HIERARCHICAL NETWORK ARCHITECTURE WITH VARIABLE-LENGTH IP ADDRESS | 267 |
| <i>Jifan Tang, Wanli Zhang, Xiangyang Gong, Guangpeng Li, Delei Yu, Ye Tian, Bowen Liu, Lei Zhao</i> | |
| A NEW APPROACH TO A SERVICE ORIENTED INTERNET PROTOCOL | 273 |
| <i>Sheng Jiang, Guangpeng Li, Brian E. Carpenter</i> | |
| UCIP: USER CONTROLLED INTERNET PROTOCOL | 279 |
| <i>Morteza Kheirkhah, Truong Khoa Phan, Xinpeng Wei, David Griffin, Miguel Rio</i> | |
| A DATA FORWARDING MECHANISM BASED ON DEEP REINFORCEMENT LEARNING FOR DETERMINISTIC NETWORKS | 285 |
| <i>Yuhong Li, Peng Zhang, Yingchao Zhou, Di Jin</i> | |
| INBLOCK4: BLOCKCHAIN-BASED ROUTE ORIGIN VALIDATION | 291 |
| <i>Stefano Angieri, Marcelo Bagnulo, Alberto García-Martínez, Bingyang Liu, Xinpeng Wei</i> | |
| THE PROBABILITY DISTRIBUTION OF THE AOI IN QUEUES WITH INFINITELY MANY SERVERS | 297 |
| <i>Yoshiaki Inoue</i> | |
| AVERAGE AGE OF INFORMATION IN A MULTI-SOURCE M/M/1 QUEUEING MODEL WITH LCFS PRIORITIZED PACKET MANAGEMENT | 303 |
| <i>Mohammad Moltafet, Markus Leinonen, Marian Codreanu</i> | |
| ANTI-AGING SCHEDULING IN SINGLE-SERVER QUEUES: A SYSTEMATIC AND COMPARATIVE STUDY | 309 |
| <i>Zhongdong Liu, Liang Huang, Bin Li, Bo Ji</i> | |
| AGE-OPTIMAL SCHEDULING FOR HETEROGENEOUS TRAFFIC WITH TIMELY-THROUGHPUT CONSTRAINT | 317 |
| <i>Jingzhou Sun, Zhiyuan Jiang, Sheng Zhou, Zhisheng Niu</i> | |
| AGE-ENERGY TRADEOFF IN FADING CHANNELS WITH PACKET-BASED TRANSMISSIONS | 323 |
| <i>Haitao Huang, Deli Qiao, M. Cenk Gursoy</i> | |
| IS THE PACKETIZED TRANSMISSION EFFICIENT? AN AGE-ENERGY PERSPECTIVE | 329 |
| <i>Mangang Xie, Jie Gong, Xiao Ma</i> | |
| AGE-ENERGY REGION IN WIRELESS POWERED COMMUNICATION NETWORKS | 334 |
| <i>Haina Zheng, Ke Xiong, Pingyi Fan, Zhangdui Zhong, Khaled Ben Letaief</i> | |
| WIFI OVER VLC USING COTS DEVICES | 340 |
| <i>Piotr Gawlowicz, Elnaz Alizadeh Jarchlo, Anatolij Zubow</i> | |
| ADAPTIVE CNN-BASED PRIVATE LTE SOLUTION FOR FAIR COEXISTENCE WITH WI-FI IN UNLICENSED SPECTRUM | 346 |
| <i>Merkebu Girmay, Vasilis Maglogiannis, Dries Naudts, Jaron Fontaine, Adnan Shahid, Eli De Poorter, Ingrid Moerman</i> | |

| | |
|------------------------------------------------------------------------------------------------------------------------|-----|
| AN EXPERIMENTAL EVALUATION OF LOW LATENCY CONGESTION CONTROL FOR MMWAVE LINKS | 352 |
| <i>Ashutosh Srivastava, Fraida Fund, Shivendra S. Panwar</i> | |
| ADAPTIVE ADVERSARIAL ATTACK ON SCENE TEXT RECOGNITION | 358 |
| <i>Xiaoyong Yuan, Pan He, Xiaolin Lit, Dapeng Wu</i> | |
| IMAGE TRANSLATION WITH ATTENTION MECHANISM BASED ON GENERATIVE ADVERSARIAL NETWORKS..... | 364 |
| <i>Yu Lu, Ju Liu, Xueyin Zhao, Xiaoxi Liu, Weiqiang Chen, Xuesong Gao</i> | |
| SPARSER: SECURE NEAREST NEIGHBOR SEARCH WITH SPACE-FILLING CURVES | 370 |
| <i>Siqin Fang, Sean Kennedy, Chenggang Wang, Boyang Wang, Qingqi Pei, Xuefeng Liu</i> | |
| HIDECHAIN: A USER-CENTRIC SECURE EDGE COMPUTING ARCHITECTURE FOR HEALTHCARE IOT DEVICES | 376 |
| <i>Rabeya Bosri, Abdur Razzak Uzzal, Abdullah Al Omar, Md Zakirul Alam Bhuiyan, Mohammad Shahriar Rahman</i> | |
| A SOLUTION FOR STATE CONFLICTS OF SMART CONTRACT IN INTERACTION WITH NON-BLOCKCHAIN..... | 382 |
| <i>Hong Su, Bing Guo, Yan Shen, Tao Li, Chaoxia Qing, Zhen Zhang</i> | |
| CHAINIDE 2.0: FACILITATING SMART CONTRACT DEVELOPMENT FOR CONSORTIUM BLOCKCHAIN..... | 388 |
| <i>Xiao Wu, Han Qiu, Shuyi Zhang, Gerard Memmi, Keke Gai, Wei Cai</i> | |
| EDGE EMERGENCY DEMAND RESPONSE CONTROL VIA SCHEDULING IN CLOUDLET CLUSTER | 394 |
| <i>Zhaoyan Song, Ruiting Zhou, Shihan Zhao, Shixin Qin, John C. S. Lui, Zongpeng Li</i> | |
| MEM: A MULTI-STAGED EVICTION MECHANISM OF FLOWTABLE FOR SOFTWARE-DEFINED DATACENTERS | 400 |
| <i>Wei Feng, Wan Tang, Ximin Yang, Lu Liu</i> | |
| RESOURCE ALLOCATION IN MEC-ENABLED VEHICULAR NETWORKS: A DEEP REINFORCEMENT LEARNING APPROACH | 406 |
| <i>Guoping Tan, Huipeng Zhang, Siyuan Zhou</i> | |
| COMBINING LORAWAN AND A NEW 3D MOTION MODEL FOR REMOTE UAV TRACKING | 412 |
| <i>Federico Mason, Federico Chiariotti, Martina Capuzzo, Davide Magrin, Andrea Zanella, Michele Zorzi</i> | |
| RESILIENT HYBRID SATCOM AND TERRESTRIAL NETWORKING FOR UNMANNED AERIAL VEHICLES..... | 418 |
| <i>Pareesh Saxena, Thomas Dreibholz, Harald Skinnemoen, Özgü Alay, M. A. Vazquez-Castro, Simone Ferlin, Guray Acar</i> | |
| APP-NET: A HYBRID NEURAL NETWORK FOR ENCRYPTED MOBILE TRAFFIC CLASSIFICATION..... | 424 |
| <i>Xin Wang, Shuhui Chen, Jinshu Su</i> | |
| AUTOMATED TRAFFIC ENGINEERING IN SDWAN: BEYOND REINFORCEMENT LEARNING..... | 430 |
| <i>Libin Liu, Li Chen, Hong Xu, Hua Shao</i> | |

| | |
|-------------------------------------------------------------------------------------------------------------------|-----|
| FASTSCALE: FAST SCALING OUT OF NETWORK FUNCTIONS | 436 |
| <i>Xiang Chen, Yuxin Chen, Qun Huang, Haifeng Zhou, Dong Zhang, Chunming Wu, Junchi Xing</i> | |
| PREDICTION OF TWITTER TRAFFIC BASED ON MACHINE LEARNING AND DATA ANALYTICS | 443 |
| <i>Fuyou Li, Zitian Zhang, Yunpeng Zhu, Jie Zhang</i> | |
| STATISTICAL QOS PROVISIONING BASED CACHING PLACEMENT FOR D2D COMMUNICATIONS BASED EMERGENCY NETWORKS | 449 |
| <i>Jianguo Wang, Wenchi Cheng, Hailin Zhang</i> | |
| GREEN COGNITIVE INTERNET OF THINGS WITH SELF SUPPLY OF ENERGY AND SPECTRUM IN EMERGENCY COMMUNICATIONS | 455 |
| <i>Xin Liu, Xueyan Zhang</i> | |
| RAT-NHP: RADIO ACCESS TECHNOLOGY SELECTION BASED ON N-HOP PREDICTION | 460 |
| <i>Weifeng Sun, Guanghao Zhang, Yuankui Zhang, Chi Lin</i> | |
| SECURITY ENHANCEMENT AND EVALUATION FOR NOISE AGGREGATION OVER WIRELESS FADING CHANNELS | 466 |
| <i>Yu Liu, Qinghe Du</i> | |
| CONNECTING FLYING BACKHAULS OF DRONES TO ENHANCE VEHICULAR NETWORKS WITH FIXED 5G NR INFRASTRUCTURE | 472 |
| <i>Philippe Jacquet, Dalia Popescu, Bernard Mans</i> | |
| ENERGY MINIMIZATION FOR MEC-ENABLED CELLULAR-CONNECTED UAV: TRAJECTORY OPTIMIZATION AND RESOURCE SCHEDULING | 478 |
| <i>Zhaohua Lv, Jianjun Hao, Yijun Guo</i> | |
| PAGING GROUP SIZE DISTRIBUTION FOR MULTICAST SERVICES IN 5G NETWORKS | 484 |
| <i>Olga Vikhrova, Sara Pizzi, Antonella Molinaro, Giuseppe Araniti</i> | |
| BLOCKCHAIN-ENABLED SDN FOR SECURING FOG-BASED RESOURCE-CONSTRAINED IOT | 490 |
| <i>Sudip Misra, Pallav Kumar Deb, Nidhi Pathak, Anandarup Mukherjee</i> | |
| BS-IOT: BLOCKCHAIN BASED SOFTWARE DEFINED NETWORK FRAMEWORK FOR INTERNET OF THINGS | 496 |
| <i>Lei Liu, Wei Feng, Chen Chen, Yuru Zhang, Dapeng Lan, Xiaoming Yuan, Sahil Vashisht</i> | |
| NON-COOPERATIVE GAME TO BALANCE ENERGY AND SECURITY IN RESOURCE CONSTRAINED IOT NETWORKS | 502 |
| <i>Syed Bilal Hussain Shah, Lei Wang, Prakasha Reddy, Anil Carie</i> | |
| BLOCKCHAIN TECHNOLOGY AND NEURAL NETWORKS FOR THE INTERNET OF MEDICAL THINGS | 508 |
| <i>Dawid Polap, Gautam Srivastava, Alireza Jolfaei, Reza M. Parizi</i> | |
| BLOCKCHAIN BASED SECURE IOT DATA SHARING FRAMEWORK FOR SDN-ENABLED SMART COMMUNITIES | 514 |
| <i>Ying Gao, Yijian Chen, Hongliang Lin, Joel J. P. C. Rodrigues</i> | |
| D-S BASED FUSION METHOD FOR AGAINST MALICIOUS NODES IN WIRELESS SENSOR NETWORKS | 520 |
| <i>Qiao Tian, Pengwan Qin, Meiyu Wang, Yang Liu</i> | |

| | |
|---------------------------------------------------------------------------------------------------------------|-----|
| LOCATION-AIDED SECURE TRANSMISSION FOR UPLINK MASSIVE MIMO SYSTEM AGAINST FULL-DUPLEX JAMMER | 526 |
| <i>Zhexian Shen, Kui Xu</i> | |
| SECURITY ANALYSIS OF LTE-V2X AND A PLATOONING CASE STUDY | 532 |
| <i>Pengfei Zhu, Konglin Zhu, Lin Zhang</i> | |
| FOUNTAIN-CODING-AIDED SECURE DELIVERY VIA CROSS-LOCKING BETWEEN PAYLOAD DATA AND CONTROL INFORMATION | 538 |
| <i>Hanxun Ren, Qinghe Du, Yijie Ou, Pinyi Ren</i> | |
| BIG DATA ANALYTICS BASED SHORT TERM LOAD FORECASTING MODEL FOR RESIDENTIAL BUILDINGS IN SMART GRIDS | 544 |
| <i>Inam Ullah Khan, Nadeem Javaid, C. James Taylor, Kelum A. A. Gamage, Xiandong Ma</i> | |
| LOG ANALYTICS IN HPC: A DATA-DRIVEN REINFORCEMENT LEARNING FRAMEWORK | 550 |
| <i>Zhengping Luo, Tao Hou, Tung Thanh Nguyen, Hui Zeng, Zhuo Lu</i> | |
| HANDLING DEVICE HETEROGENEITY IN WI-FI BASED INDOOR POSITIONING SYSTEMS | 556 |
| <i>Yongyong Wei, Rong Zheng</i> | |
| THE FEASIBILITY OF NOMA IN C-V2X | 562 |
| <i>Zhenhui Situ, Ivan Wang-Hei Ho, Yun Hou, Peiya Li</i> | |
| NO-DEALER: BYZANTINE FAULT-TOLERANT RANDOM NUMBER GENERATOR..... | 568 |
| <i>Mikhail Krasnoselskii, Grigorii Melnikov, Yury Yanovich</i> | |
| SPERAX: AN APPROACH TO DEFEAT LONG RANGE ATTACKS IN BLOCKCHAINS | 574 |
| <i>Yongge Wang, Jingwen Sun, Xin Wang, Yunchuan Wei, Hao Wu, Zhou Yu, Gillian Chu</i> | |
| TERMINATOR: AN EFFICIENT AND LIGHT-WEIGHT FAULT LOCALIZATION FRAMEWORK | 580 |
| <i>Yuxing Li, Hu Zheng, Chengqiang Huang, Ke Pei, Jinghui Li, Longbo Huang</i> | |
| DYNAMIC DEPLOYMENT MODEL FOR LARGE-SCALE COMPUTE-INTENSIVE CLUSTERS* | 586 |
| <i>Yunpeng Cao, Haifeng Wang, Shuqing He</i> | |
| CONSISTENT USER-TRAFFIC ALLOCATION AND LOAD BALANCING IN MOBILE EDGE CACHING..... | 592 |
| <i>Lemei Huang, Sheng Cheng, Yu Guan, Xinggong Zhang, Zongming Guo</i> | |
| ACTIVE LEARNING-BASED CLASSIFICATION IN AUTOMATED CONNECTED VEHICLES..... | 598 |
| <i>Alaa Awad Abdellatif, Carla Fabiana Chiasserini, Francesco Malandrino</i> | |
| ENERGY-AWARE ALLOCATION OF GRAPH JOBS IN VEHICULAR CLOUD COMPUTING-ENABLED SOFTWARE-DEFINED IOV | 604 |
| <i>Minghui Liwang, Zhibin Gao, Seyyedali Hosseinalipour, Huaiyu Dai, Xianbin Wang</i> | |
| CACHING POPULAR AND FRESH IOT CONTENTS AT THE EDGE VIA NAMED DATA NETWORKING | 610 |
| <i>Marica Amadeo, Giuseppe Ruggeri, Claudia Campolo, Antonella Molinaro, Giuseppe Mangiullo</i> | |

| | |
|---------------------------------------------------------------------------------------------------------------------|-----|
| A MULTI-PROPERTY METHOD TO EVALUATE TRUST OF EDGE COMPUTING BASED ON DATA DRIVEN CAPSULE NETWORK..... | 616 |
| <i>Chenghan Jia, Kai Lin, Jing Deng</i> | |
| DISTRIBUTED INTELLIGENCE EMPOWERED DATA AGGREGATION AND DISTRIBUTION FOR MULTI-ROBOT COOPERATIVE COMMUNICATION..... | 622 |
| <i>Li Ding, Biao Han, Xiaoyan Wang, Peng Li, Baosheng Wang</i> | |
| PERFORMANCE ANALYSIS OF UAV-ASSISTED BACKHAUL SOLUTIONS IN THZ ENABLED HYBRID HETEROGENEOUS NETWORK..... | 628 |
| <i>Adil Ali Raja, Muhammad Ali Jamshed, Haris Pervaiz, Syed Ali Hassan</i> | |
| AUTONOMOUS UAV-AIDED MESH WIRELESS NETWORKS..... | 634 |
| <i>Omid Esrafilian, Rajeev Gangula, David Gesbert</i> | |
| MULTI-UAV ASSISTED COMMUNICATION NETWORKS: TOWARDS MAX-MIN SECRECY RATE..... | 641 |
| <i>Yuan Liu, Ke Xiong, Bo Gao, Yu Zhang, Pingyi Fan, Khaled Ben Letaief</i> | |
| UAV-ASSISTED DATA COLLECTION IN WIRELESS POWERED SENSOR NETWORKS OVER MULTIPLE FADING CHANNELS..... | 647 |
| <i>Tharindu D. Ponnimbaduge Perera, Stephan Panic, Dushantha Nalin K. Jayakody, P. Muthuchidambaranathan</i> | |
| A UNIFIED FEDERATED LEARNING FRAMEWORK FOR WIRELESS COMMUNICATIONS: TOWARDS PRIVACY, EFFICIENCY, AND SECURITY..... | 653 |
| <i>Hui Wen, Yue Wu, Chenming Yang, Hancong Duan, Shui Yu</i> | |
| DETECTING AND MITIGATING ARP ATTACKS IN SDN-BASED CLOUD ENVIRONMENT..... | 659 |
| <i>Sixian Sun, Xiao Fu, Bin Luo, Xiaojiang Du</i> | |
| A LOCATION-BASED PATH PRIVACY PROTECTION SCHEME IN INTERNET OF VEHICLES..... | 665 |
| <i>Haili Yu, Guangshun Li, Junhua Wu, Xinrong Ren, Jiabin Cao</i> | |
| DRONE-ASSISTED EDGE COMPUTING: A GAME-THEORETICAL APPROACH..... | 671 |
| <i>F. Busacca, L. Galluccio, S. Palazzo</i> | |
| A REAL-TIME FRAMEWORK FOR TRUST MONITORING IN A NETWORK OF UNMANNED AERIAL VEHICLES..... | 677 |
| <i>Mahsa Keshavarz, Alireza Shamsoshoara, Fatemeh Afghah, Jonathan Ashdown</i> | |
| TRAJECTORY OPTIMIZATION OF FLYING ENERGY SOURCES USING Q-LEARNING TO RECHARGE HOTSPOT UAVS..... | 683 |
| <i>Sayed Amir Hoseini, Jahan Hassan, Ayub Bokani, Salil S. Kanhere</i> | |
| MAC TRADE-OFFS BETWEEN AGE AND REACHABILITY OF INFORMATION IN VEHICULAR SAFETY APPLICATIONS..... | 689 |
| <i>Xu Wang, Randall A. Berry</i> | |
| WHO SHOULD GOOGLE SCHOLAR UPDATE MORE OFTEN?..... | 696 |
| <i>Melih Bastopcu, Sennur Ulukus</i> | |
| CAN WE IMPROVE INFORMATION FRESHNESS WITH PREDICTIONS IN MOBILE CROWD-LEARNING?..... | 702 |
| <i>Zhengxiong Yuan, Bin Li, Jia Liu</i> | |

| | |
|---------------------------------------------------------------------------------------------------------------------------|-----|
| AOI AND ENERGY CONSUMPTION ORIENTED DYNAMIC STATUS UPDATING IN CACHING ENABLED IOT NETWORKS..... | 710 |
| <i>Chao Xu, Xijun Wang, Howard H. Yang, Hongguang Sun, Tony Q. S. Quek</i> | |
| DEEP REINFORCEMENT LEARNING FOR FRESH DATA COLLECTION IN UAV-ASSISTED IOT NETWORKS..... | 716 |
| <i>Mengjie Yi, Xijun Wang, Juan Liu, Yan Zhang, Bo Bai</i> | |
| EFFICIENT VULNERABILITY DETECTION BASED ON ABSTRACT SYNTAX TREE AND DEEP LEARNING..... | 722 |
| <i>Hantao Feng, Xiaotong Fu, Hongyu Sun, He Wang, Yuqing Zhang</i> | |
| FIDELITY LEAKAGES: APPLYING MEMBERSHIP INFERENCE ATTACKS TO PREFERENCE DATA..... | 728 |
| <i>Pierre Danhier, Clément Massart, François-Xavier Standaert</i> | |
| DETECTING ANOMALIES IN ENCRYPTED TRAFFIC VIA DEEP DICTIONARY LEARNING..... | 734 |
| <i>Junchi Xing, Chunming Wu</i> | |
| MULTI-SCALE LEARNING BASED MALWARE VARIANT DETECTION USING SPATIAL PYRAMID POOLING NETWORK | 740 |
| <i>S. Sriram, R. Vinayakumar, V. Sowmya, Mamoun Alazab, K. P. Soman</i> | |
| BUILDING AN AUTHENTIC AND ETHICAL KEYWORD SEARCH BY APPLYING DECENTRALISED (BLOCKCHAIN) VERIFICATION | 746 |
| <i>M. Poongodi, Mounir Hamdi, Vijayakumar Varadarajan, Bharat S. Rawal, Ma Maode</i> | |
| TEE-BASED MUTUAL PROOFS OF TRANSMISSION SERVICES IN DECENTRALIZED SYSTEMS..... | 754 |
| <i>Lifeng Liu, Jian Li, Tim Tingqiu Yuan</i> | |
| GEMINI-CHAIN: A REGULATABLE DIGITAL CURRENCY MODEL BASED ON BLOCKCHAIN..... | 760 |
| <i>Jianyi Zhang, Pengju Li, Zhili Xu, Anqi Wang, Jin Liu, Zhiqiang Wang</i> | |
| TOWARDS IN-BAND TELEMETRY FOR SELF DRIVING WIRELESS NETWORKS..... | 766 |
| <i>Prabhu Janakaraj, Pinyarash Pinyoanuntapong, Pu Wang, Minwoo Lee</i> | |
| END-TO-END DELAY PREDICTION BASED ON TRAFFIC MATRIX SAMPLING..... | 774 |
| <i>Filip Krasniqi, Jocelyne Elias, Jérémie Leguay, Alessandro E. C. Redondi</i> | |
| A NOVEL METHODOLOGY FOR THE AUTOMATED DETECTION AND CLASSIFICATION OF NETWORKING ANOMALIES | 780 |
| <i>Mohamed Moulay, Rafael Garcia Leiva, Pablo J. Rojo Maroni, Javier Lazaro, Vincenzo Mancuso, Antonio Fernandez Anta</i> | |
| WINETSENSE: SENSING AND ANALYSIS MODEL FOR LARGE-SCALE WIRELESS NETWORKS..... | 787 |
| <i>Nikita Trivedi, Bighnaraj Panigrahi, Hemant Kumar Rath</i> | |
| QUICKWALK: QUICK TRUST ASSESSMENT FOR VEHICULAR SOCIAL NETWORKS..... | 793 |
| <i>Ziyi Shen, Shuyu He, Qing Yang</i> | |
| PROTECTING PRIVACY FROM AERIAL PHOTOGRAPHY: STATE OF THE ART, OPPORTUNITIES, AND CHALLENGES..... | 799 |
| <i>Bin Jiang, Jiachen Yang, Houbing Song</i> | |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------|-----|
| QUANTITATIVE ANALYSIS ON SOURCE-LOCATION PRIVACY FOR WIRELESS SENSOR NETWORKS..... | 805 |
| <i>Di Tang, Jian Gu, Weijia Han, Xiao Ma</i> | |
| AN IMPROVED SHAPLEY VALUE BENEFIT DISTRIBUTION MECHANISM IN COOPERATIVE GAME OF CYBER THREAT INTELLIGENCE SHARING..... | 810 |
| <i>Weiqliang Xie, Xiao Yu, Yuqing Zhang, He Wang</i> | |
| IMPROVING BGP CONVERGENCE WITH FED4FIRE+ EXPERIMENTS | 816 |
| <i>Mattia Milani, Marco Nesler, Michele Segata, Luca Baldesi, Leonardo Maccari, Renato Lo Cigno</i> | |
| LOGICAL PEERING FOR INTERDOMAIN NETWORKING ON TESTBEDS..... | 824 |
| <i>Yuanjun Yao, Qiang Cao, Paul Ruth, Mert Cevik, Cong Wang, Jeff Chase</i> | |
| IMPLEMENTING SFA SUPPORT ON AN ESTABLISHED HPC-FLAVORED TESTBED: LESSONS LEARNED | 830 |
| <i>Luke Bertot, Lucas Nussbaum, David Margery</i> | |
| AN EXPERIMENTAL STUDY ON MICROSERVICES BASED EDGE COMPUTING PLATFORMS | 836 |
| <i>Qian Qu, Ronghua Xu, Seyed Yahya Nikouei, Yu Chen</i> | |
| MITIGATING DOS ATTACKS IN IOT EDGE LAYER TO PRESERVE QOS TOPICS AND NODES' ENERGY..... | 842 |
| <i>Floriano De Rango, Mauro Tropea, Peppino Fazio</i> | |
| E-ALPHA: EDGE-BASED ASSISTED LIVING PLATFORM FOR HOME CARE..... | 848 |
| <i>Gianluca Aloï, Giancarlo Fortino, Raffaele Gravina, Pasquale Pace, Claudio Savaglio</i> | |
| IOT EVENT CLASSIFICATION BASED ON NETWORK TRAFFIC | 854 |
| <i>Batyr Charyyev, Mehmet Hadi Gunes</i> | |
| TRI-BLOCKCHAIN BASED INTELLIGENT VEHICULAR NETWORKS | 860 |
| <i>Madhusudan Singh</i> | |
| AI-POWERED BLOCKCHAIN - A DECENTRALIZED SECURE MULTIPARTY COMPUTATION PROTOCOL FOR IOV | 865 |
| <i>Gunasekaran Raja, Yelisetty Manaswini, Gaayathri Devi Vivekanandan, Harish Sampath, Kapal Dev, Ali Kashif Bashir</i> | |
| LIGHTWEIGHT AUTHENTICATION PROTOCOL FOR INTER BASE STATION COMMUNICATION IN HETEROGENEOUS NETWORKS..... | 871 |
| <i>Gaurang Bansal, Vinay Chamola</i> | |
| ENERGY EFFICIENT MODE SELECTION SCHEME FOR WIRELESS POWERED D2D COMMUNICATIONS WITH NOMA UNDERLAYING UAV | 877 |
| <i>Ishan Budhiraja, Neeraj Kumar, Sudhanshu Tyagi, Quoc-Viet Pham, Sudeep Tanwar</i> | |
| SMART ANTENNA-BASED MULTI-HOP HIGHLY-ENERGY-EFFICIENT DSA APPROACH TO DRONE-ASSISTED BACKHAUL NETWORKS FOR 5G | 883 |
| <i>Dingde Jiang, Zhihao Wang, Zhihan Lv, Wenpan Li</i> | |
| ON THE DESIGN OF SECURE COMMUNICATION FRAMEWORK FOR BLOCKCHAIN- BASED INTERNET OF INTELLIGENT BATTLEFIELD THINGS ENVIRONMENT | 888 |
| <i>Mohammad Wazid, Ashok Kumar Das, Sachin Shetty, Joel J. P. C. Rodrigues</i> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------|-----|
| SECURE UAV COMMUNICATION NETWORKS VIA FRIENDLY JAMMING AND BANDWIDTH ALLOCATION | 894 |
| <i>Huilian Zhang, Xiaofan He, Huaiyu Dai</i> | |
| LEARNING FEATURES OF BRAIN NETWORK FOR ANOMALY DETECTION | 900 |
| <i>Jiaxin Liu, Wei Zhao, Ye Hong, Sheng Gao, Xi Huang, Yingjie Zhou</i> | |
| A NOVEL SSVEP-BASED BRAIN-COMPUTER INTERFACE USING JOINT FREQUENCY AND SPACE MODULATION | 906 |
| <i>Zhenyu Wang, Honglin Hu, Xianfu Chen, Ting Zhou, Tianheng Xu</i> | |
| IMPROVING AGE OF INFORMATION IN RANDOM ACCESS CHANNELS | 912 |
| <i>Doga Can Atabay, Elif Uysal, Onur Kaya</i> | |
| OPTIMAL SAMPLING COST IN WIRELESS NETWORKS WITH AGE OF INFORMATION CONSTRAINTS | 918 |
| <i>Emmanouil Fountoulakis, Nikolaos Pappas, Marian Codreanu, Anthony Ephremides</i> | |
| A NON-COOPERATIVE MULTIPLE ACCESS GAME FOR TIMELY UPDATES | 924 |
| <i>Sneihil Gopal, Sanjit K. Kaul, Rakesh Chaturvedi, Sumit Roy</i> | |
| AGE-OF-INFORMATION DEPENDENT RANDOM ACCESS FOR MASSIVE IOT NETWORKS | 930 |
| <i>He Chen, Yifan Gu, Soung-Chang Liew</i> | |
| MINIMIZING THE AGE OF SYNCHRONIZATION IN POWER-CONSTRAINED WIRELESS NETWORKS WITH UNRELIABLE TIME-VARYING CHANNELS | 936 |
| <i>Qining Zhang, Haoyue Tang, Jintao Wang</i> | |
| GAME OF AGES | 942 |
| <i>Kumar Saurav, Rahul Vaze</i> | |
| AGE OF INFORMATION MINIMIZATION IN FADING MULTIPLE ACCESS CHANNELS | 948 |
| <i>Rajshekhhar Vishweshwar Bhat, Rahul Vaze, Mehul Motani</i> | |
| EXPLORING APPROACHES TO THE MANAGEMENT OF PHYSICAL, VIRTUAL, AND SOCIAL SENSORS | 954 |
| <i>Ngombo Armando, José Marcelo Fernandes, André Rodrigues, Jorge Sá Silva, Fernando Boavida</i> | |
| MIGRATING TO SDN FOR MOBILE CORE NETWORKS: A DYNAMIC AND GLOBAL PERSPECTIVE | 960 |
| <i>Xiaole Li, Hongyun Zheng, Yuchun Guo</i> | |
| POINT-OF-INTEREST RECOMMENDATION BASED ON GEOGRAPHICAL INFLUENCE AND EXTENDED PAIRWISE RANKING | 966 |
| <i>Chang Su, Jin Wang, Xianzhong Xie</i> | |
| USING NLP AND MACHINE LEARNING TO DETECT DATA PRIVACY VIOLATIONS | 972 |
| <i>Paulo Silva, Carolina Gonçalves, Carolina Godinho, Nuno Antunes, Marilia Curado</i> | |
| PRIVACY-PRESERVING DATA AGGREGATION FOR BIG DATA IN FINANCIAL INSTITUTIONS | 978 |
| <i>Hongning Li, Jiexiong Chen, Le Wang, Qingqi Pei, Hao Yue</i> | |
| AN IOT DATA SHARING PRIVACY PRESERVING SCHEME | 984 |
| <i>Yan Sun, Lihua Yin, Zhe Sun, Zhihong Tian, Xiaojiang Du</i> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------|------|
| A BLOCKCHAIN-BASED TRADING PLATFORM FOR BIG DATA | 991 |
| <i>Shuli Zheng, Lixuan Pan, Donghui Hu, Meng Li, Yuqi Fan</i> | |
| SECURITY OF MEDICAL CYBER-PHYSICAL SYSTEMS: AN EMPIRICAL STUDY ON IMAGING DEVICES | 997 |
| <i>Zhiqiang Wang, Pingchuan Ma, Xiaoxiang Zou, Jianyi Zhang, Tao Yang</i> | |
| SECURE SMART HOME SYSTEMS: A BLOCKCHAIN PERSPECTIVE..... | 1003 |
| <i>Liuqing Yang, Xiao-Yang Liu, Wenbo Gong</i> | |
| AN NFV MANO ARCHITECTURE WITH A RESOURCE ALLOCATION MECHANISM BASED ON GAME THEORY | 1009 |
| <i>David H. S. Lima, Andre L. L. Aquino, Marilia Curado</i> | |
| TRANSCODING FOR LIVE STREAMING-BASED ON VEHICULAR FOG COMPUTING: AN ACTOR-CRITIC DRL APPROACH..... | 1015 |
| <i>Fang Fu, Yunpeng Kang, Zhicai Zhang, F. Richard Yu</i> | |
| DETECTION OF TEMPORAL COMMUNITIES IN MOBILE SOCIAL NETWORKS | 1021 |
| <i>Mengni Ruan, Huan Zhou, Dawei Li, Xuxun Liu, Qingyong Deng</i> | |
| INTEGRATED DEFENSE MECHANISM BASED ON ATTACK GOALS AGAINST THREE ATTACK STRATEGIES IN SMART GRID | 1027 |
| <i>Wenjie Kang, Peidong Zhu, Xuchong Liu</i> | |
| UNDERWATER JAMMING ATTACKS AS INCOMPLETE INFORMATION GAMES | 1033 |
| <i>Federico Chiariotti, Alberto Signori, Filippo Campagnaro, Michele Zorzi</i> | |
| LETERA: STOCHASTIC BEAM CONTROL THROUGH ESN LEARNING IN TERAHERTZ- BAND WIRELESS UAV NETWORKS..... | 1039 |
| <i>Sabarish Krishna Moorthy, Zhangyu Guan</i> | |
| RAPTOR-LIKE RATELESS SPINAL CODES USING OUTER SYSTEMATIC POLAR CODES FOR RELIABLE DEEP SPACE COMMUNICATIONS..... | 1045 |
| <i>Hao Liang, Aijun Liu, Xinhai Tong, Chao Gong</i> | |
| ET-DEAL: A P2P SMART CONTRACT-BASED SECURE ENERGY TRADING SCHEME FOR SMART GRID SYSTEMS..... | 1051 |
| <i>Aparna Kumari, Arpit Shukla, Rajesh Gupta, Sudeep Tanwar, Sudhanshu Tyagi, Neeraj Kumar</i> | |
| A BLOCKCHAIN-BASED VIRTUAL NETWORK EMBEDDING ALGORITHM FOR SECURE SOFTWARE DEFINED NETWORKING..... | 1057 |
| <i>Haotong Cao, Yue Hu, Qin Wang, Shengchen Wu, Longxiang Yang</i> | |
| BLOCKCHAIN-BASED CONTROLLER RECOVERY IN SDN..... | 1063 |
| <i>Sudip Misra, Kounteya Sarkar, Nurzaman Ahmed</i> | |
| REINFORCEMENT LEARNING FOR SCALABLE AND RELIABLE POWER ALLOCATION IN SDN-BASED BACKSCATTER HETEROGENEOUS NETWORK..... | 1069 |
| <i>Furqan Jameel, Wali Ullah Khan, Muhammad Ali Jamshed, Haris Pervaiz, Qammer Abbasi, Riku Jäntti</i> | |
| MIN-MAX WORST-CASE DESIGN FOR COMPUTATION OFFLOADING IN MULTI-USER MEC SYSTEM..... | 1075 |
| <i>Liping Zhang, Rong Chai, Tiantian Yang, Qianbin Chen</i> | |

| | |
|------------------------------------------------------------------------------------------------------------------------|------|
| INFORMATION CLASSIFICATION STRATEGY FOR BLOCKCHAIN-BASED SECURE SDN IN IOT SCENARIO | 1081 |
| <i>Peiyang Zhang, Fanglin Liu, Neeraj Kumar, Gagangeet Singh Aujla</i> | |
| DEMO: BENCHMARKING LIVE MIGRATION PERFORMANCE OF TWO TRENDY VIRTUALIZATION TECHNOLOGIES | 1087 |
| <i>Roberto Torre, Robert-Steve Schmoll, Florian Kemser, Hani Salah, Ievgenii Tsokalo, Frank H. P. Fitzek</i> | |
| REAL TIME ADAPTIVE NETWORKING USING PROGRAMMABLE 100GBPS NIC ON DATA TRANSFER NODES | 1089 |
| <i>Gauravdeep Shami, Marc Lyonnais, Rodney Wilson</i> | |
| GENIX: A GENI-BASED IXP EMULATION..... | 1091 |
| <i>Shahzeb Mustafa, Prasun Kanti Dey, Murat Yuksel</i> | |
| SDN-ENABLED TRAFFIC ALERT SYSTEM FOR IOV IN SMART CITIES | 1093 |
| <i>Gunasekaran Raja, Priyanka Dhanasekaran, Sudha Anbalagan, Aishwarya Ganapathisubramanian, Ali Kashif Bashir</i> | |
| FEATURES FUSION BASED AUTOMATIC MODULATION CLASSIFICATION USING CONVOLUTIONAL NEURAL NETWORK..... | 1099 |
| <i>Chunsheng Lin, Juanjuan Huang, Sai Huang, Yuanyuan Yao, Xin Guo</i> | |
| SIGNAL RECOGNITION BASED ON FEDERATED LEARNING | 1105 |
| <i>Jibo Shi, Haojun Zhao, Meiyu Wang, Qiao Tian</i> | |
| INSTAGRAM USER BEHAVIOR IDENTIFICATION BASED ON MULTIDIMENSIONAL FEATURES..... | 1111 |
| <i>Hua Wu, Qiuyan Wu, Guang Cheng, Shuyi Guo</i> | |
| OPTIMAL POWER SPLITTING FOR SIMULTANEOUS WIRELESS INFORMATION AND POWER TRANSFER IN MILLIMETER-WAVE NETWORKS..... | 1117 |
| <i>Yihan Liang, Yejun He, Jian Qiao</i> | |
| DEEPAALO: AUTO-ADJUSTING DEMOTION THRESHOLDS FOR INFORMATION- AGNOSTIC COFLOW SCHEDULING..... | 1123 |
| <i>Su Wang, Shuo Wang, Ru Huo, Tao Huang, Jiang Liu, Yunjie Liu</i> | |
| IMPROVING INTER-DOMAIN ROUTING THROUGH MULTI-AGENT REINFORCEMENT LEARNING..... | 1129 |
| <i>Xiaoyang Zhao, Chuan Wu, Franck Le</i> | |
| ONLINE TRAFFIC CLASSIFICATION USING GRANULES | 1135 |
| <i>Pingping Tang, Yuning Dong, Shiwen Mao</i> | |
| LARGE-SCALE AND RAPID FLOW SIZE ESTIMATION FOR IMPROVING FLOW SCHEDULING | 1141 |
| <i>Su Wang, Shuo Wang, Dong Zhou, Yiran Yang, Wenjie Zhang, Tao Huang, Ru Huo, Yunjie Liu</i> | |
| GLIDE AND ZAP Q-LEARNING | 1147 |
| <i>Xiaofan He, Richeng Jin, Huaiyu Dai</i> | |

| | |
|------------------------------------------------------------------------------------------------------------------|------|
| WHEN LESS IS MORE: CORE-RESTRICTED CONTAINER PROVISIONING FOR SERVERLESS COMPUTING..... | 1153 |
| <i>Gaetano Somma, Constantine Ayimba, Paolo Casari, Simon Pietro Romano, Vincenzo Mancuso</i> | |
| REMOVING HUMAN PLAYERS FROM THE LOOP: AI-ASSISTED ASSESSMENT OF GAMING QOE | 1160 |
| <i>German Sviridov, Cedric Beliard, Andrea Bianco, Paolo Giaccone, Dario Rossi</i> | |
| CHARACTERIZING SOCIAL MARKETING BEHAVIOR OF E-COMMERCE CELEBRITIES AND PREDICTING THEIR VALUE..... | 1166 |
| <i>Xiang Li, Yuchun Guo, Ye Sheng, Yishuai Chen</i> | |
| THE GERMAN-SPEAKING TWITTER COMMUNITY REFERENCE DATA SET..... | 1172 |
| <i>Johannes Pflugmacher, Stephan Escher, Jan Reubold, Thorsten Strufe</i> | |
| FOLLOW ME, IF YOU CAN: A FRAMEWORK FOR SEAMLESS MIGRATION IN MOBILE EDGE CLOUD..... | 1178 |
| <i>Tung V. Doan, Zhongyi Fan, Giang T. Nguyen, Hani Salah, Dongho You, Frank H. P. Fitzek</i> | |
| JOINT NETWORK SELECTION AND TRAFFIC ALLOCATION IN MULTI-ACCESS EDGE COMPUTING-BASED VEHICULAR CROWDSENSING | 1184 |
| <i>Luning Liu, Luhan Wang, Xiangming Wen</i> | |
| A SCHEDULING STRATEGY FOR REDUCED POWER CONSUMPTION IN MOBILE EDGE COMPUTING | 1190 |
| <i>Juan Fang, Yong Chen, Shuaibing Lu</i> | |
| INCENTIVE MECHANISM DESIGN FOR EDGE-CLOUD COLLABORATION IN MOBILE CROWD SENSING | 1196 |
| <i>Lihan Zhang, Zhuo Li, Xin Chen</i> | |
| A NOVEL SIMULATED ANNEALING BASED ROUTING ALGORITHM IN F-SDNS..... | 1202 |
| <i>Liang Zhao, Areeb Saldin, Jia Hu, Luwei Fu, Junling Shi, Yunchong Guan</i> | |
| DISTRIBUTED DEEP LEARNING-BASED TASK OFFLOADING FOR UAV-ENABLED MOBILE EDGE COMPUTING | 1208 |
| <i>Mithun Mukherjee, Vikas Kumar, Ankit Lat, Mian Guo, Rakesh Matam, Yunrong Lv</i> | |
| UAV NETWORK FOR SURVEILLANCE OF INACCESSIBLE REGIONS WITH ZERO BLIND SPOTS..... | 1213 |
| <i>Nikhil Kumar, Monalisa Ghosh, Chetna Singhal</i> | |
| BIDIRECTIONAL MULTI-TIER COGNITIVE SWARM DRONE 5G NETWORK..... | 1219 |
| <i>Sunil Jacob, Varun G Menon, P. G. Shynu, Shemim K. S. Fathima, Bandana Mahapatra, Saira Joseph</i> | |
| AN UAV ASSISTED MULTI-SENSOR BASED SMART PARKING SYSTEM..... | 1225 |
| <i>Pritom Gogoi, Joy Dutta, Rakesh Matam, Mithun Mukherjee</i> | |
| RSSI OR LQI: INSIGHTS FROM REAL-TIME DEPLOYMENTS FOR UNDERGROUND SENSING AND APPLICATIONS | 1231 |
| <i>Alok Ranjan, H. B. Sahu, Prasant Misra, Yanxiao Zhao, Hui Sun</i> | |
| RFID-BASED VEHICLE LOCALIZATION SCHEME IN GPS-LESS ENVIRONMENTS..... | 1237 |
| <i>Rui Chen, Xiyuan Huang, Wei Liu, Yan Zhou</i> | |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------|------|
| A TDMA PROTOCOL BASED ON DATA PRIORITY FOR IN-VIVO WIRELESS NANOSENSOR NETWORKS | 1242 |
| <i>Juan Xu, Yan Zhang, Yakun Zhao, Jiali Kan, Lin Lin</i> | |
| DEEP REINFORCEMENT LEARNING BASED WIRELESS NETWORK OPTIMIZATION: A COMPARATIVE STUDY | 1248 |
| <i>Kun Yang, Cong Shen, Tie Liu</i> | |
| DEEP REINFORCEMENT LEARNING FOR CONTROLLER PLACEMENT IN SOFTWARE DEFINED NETWORK | 1254 |
| <i>Yiwen Wu, Sipei Zhou, Yunkai Wei, Supeng Leng</i> | |
| MODIFIED-PBIL BASED USER SELECTION FOR MULTI-USER MASSIVE MIMO SYSTEMS WITH MASSIVE CONNECTIVITY | 1260 |
| <i>Jing Jiang, Junyu Chen, Yongbin Xie, Hongjiang Lei, Ling Zheng</i> | |
| DEMO ABSTRACT: HIGH VOLTAGE DISCHARGE EXHIBITS SEVERE EFFECT ON ZIGBEE-BASED DEVICE IN SOLAR INSECTICIDAL LAMPS INTERNET OF THINGS | 1266 |
| <i>Kai Huang, Kailiang Li, Lei Shu, Xing Yang</i> | |
| DEMO ABSTRACT: FINGERLITE: FINGER GESTURE RECOGNITION USING AMBIENT LIGHT | 1268 |
| <i>Miao Huang, Haihan Duan, Yanru Chen, Yanbing Yang, Jie Hao, Liangyin Chen</i> | |
| AN SDR-IN-THE-LOOP CARLA SIMULATOR FOR C-V2X-BASED AUTONOMOUS DRIVING | 1270 |
| <i>Wei Zhang, Siyu Fu, Zixu Cao, Zhiyuan Jiang, Shunqing Zhang, Shugong Xu</i> | |
| DEMO ABSTRACT: CROSS-TECHNOLOGY COMMUNICATION BETWEEN LTE-U/LAA AND WIFI | 1272 |
| <i>Piotr Gawlowicz, Anatolij Zubow, Suzan Bayhan</i> | |
| INCREASING THE DATA RATE FOR REFLECTED OPTICAL CAMERA COMMUNICATION USING UNIFORM LED LIGHT | 1274 |
| <i>Zequn Chen, Runji Lin, Haihan Duan, Yanru Chen, Yanbing Yang, Rengmao Wu, Liangyin Chen</i> | |
| DEMO ABSTRACT: ELASTIC DEPLOYMENT OF ROBUST DISTRIBUTED CONTROL PLANES WITH PERFORMANCE GUARANTEES | 1276 |
| <i>Daniel F. Perez-Ramirez, Rebecca Steinert, Natalia Vesselinova, Dejan Kostic</i> | |
| SENSING AND COMMUNICATION INTEGRATED SYSTEM FOR AUTONOMOUS DRIVING VEHICLES | 1278 |
| <i>Qixun Zhang, Huan Sun, Zhiqing Wei, Zhiyong Feng</i> | |
| DEMO: SEAMLESS MOBILE VIDEO STREAMING IN MULTICAST MULTI-RAT COMMUNICATIONS | 1280 |
| <i>Pavlos Basaras, Stepan Kucera, Kariem Fahmi, Holger Claussen, George Iosifidis</i> | |
| DEMO ABSTRACT: LEVERAGING AI PLAYERS FOR QOE ESTIMATION IN CLOUD GAMING | 1282 |
| <i>German Sviridov, Cedric Beliard, Gwendal Simon, Andrea Bianco, Paolo Giaccone, Dario Rossi</i> | |
| DEMO ABSTRACT: LOOP AVOIDANCE IN COMPUTER NETWORKS USING A MESHED TREE PROTOCOL | 1284 |
| <i>Peter Willis, Nirmala Shenoy, Hrishikesh B Acharya</i> | |

| | |
|-------------------------------------------------------------------------------------------------------------------------------|------|
| DEMO ABSTRACT: AUTOPCT: AN AGILE PROTOCOL CONFORMANCE AUTOMATIC TEST PLATFORM BASED ON EDITABLE EFSM..... | 1286 |
| <i>Zhu Tang, Sudan Li, Peng Xun, Chengsong Wang, Wenping Deng, Baosheng Wang</i> | |
| DEMO ABSTRACT: CLORA-A COVERT CHANNEL OVER LORA PHY | 1288 |
| <i>Ningning Hou, Yuanqing Zheng</i> | |
| DEMO: REAL-TIME EDGE ANALYTICS AND CONCEPT DRIFT COMPUTATION FOR EFFICIENT DEEP LEARNING FROM SPECTRUM DATA..... | 1290 |
| <i>Zaheer Khan, Janne Lehtomäki, Adnan Shahid, Ingrid Moerman</i> | |
| OPENING THE DEEP PANDORA BOX: EXPLAINABLE TRAFFIC CLASSIFICATION | 1292 |
| <i>Cedric Beliard, Alessandro Finamore, Dario Rossi</i> | |
| NEAR OPTIMAL NETWORK-WIDE PER-FLOW MEASUREMENT | 1294 |
| <i>Ran Ben Basat, Gil Einziger, Bilal Tayh</i> | |
| SCALABLE AND INTERACTIVE SIMULATION FOR IOT APPLICATIONS WITH TINYSIM | 1296 |
| <i>Gonglong Chen, Wei Dong, Fujian Qiu, Gaoyang Guan, Yi Gao, Siyu Zeng</i> | |
| POSTER ABSTRACT: PARALLEL VM PLACEMENT WITH PROVABLE GUARANTEES | 1298 |
| <i>Itamar Cohen, Gil Einziger, Maayan Goldstein, Yaniv Sa'Ar, Gabriel Scalosub, Erez Waisbard</i> | |
| MEASUREMENT AND ANALYSIS OF CLOUD USER INTEREST: A GLANCE FROM BITTORRENT | 1300 |
| <i>Lei Ding, Yang Li, Haiyang Wang, Ke Xu</i> | |
| CONNECTION-BASED PRICING FOR IOT DEVICES: MOTIVATION, COMPARISON, AND POTENTIAL PROBLEMS | 1302 |
| <i>Yi Zhao, Wei Bao, Dan Wang, Ke Xu, Liang Lv</i> | |
| POSTER ABSTRACT: ALWAYS HEADING FOR THE PEAK: LEARNING TO ROUTE WITH DOMAIN KNOWLEDGE | 1304 |
| <i>Jing Chen, Zili Meng, Mingwei Xu</i> | |
| POSTER ABSTRACT: JOINT OPTIMIZATION OF SERVICE FUNCTION CHAIN ELASTIC SCALING AND ROUTING | 1306 |
| <i>Weihan Chen, Zhiliang Wang, Han Zhang, Xia Yin, Xingang Shi, Lei Sun</i> | |
| POSTER ABSTRACT: AN UNSUPERVISED TWO-LAYER MULTI-STEP NETWORK ATTACK DETECTOR | 1308 |
| <i>Su Wang, Zhiliang Wang, Xia Yin, Xingang Shi</i> | |
| POSTER ABSTRACT: TOWARDS AMBIENT BACKSCATTER AS AN ANTI-JAMMING SOLUTION FOR IOT DEVICES..... | 1310 |
| <i>Wonwoo Jang, Wonjun Lee</i> | |
| POSTER ABSTRACT: AN OPEN SOURCE APPROACH TO FIELD TESTING OF WLAN UP TO IEEE 802.11AD AT 60 GHZ USING COMMODITY HARDWARE..... | 1312 |
| <i>Florian Klingler, Fynn Hauptmeier, Christoph Sommer, Falko Dressler</i> | |
| IRS ASSISTED MULTIPLE USER DETECTION FOR UPLINK URLLC NON-ORTHOGONAL MULTIPLE ACCESS | 1314 |
| <i>Lei Feng, Xiaoyu Que, Peng Yu, Wenjing Li, Xuesong Qiu</i> | |

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| POSTER ABSTRACT: ENVIRONMENT-INDEPENDENT ELECTRONIC DEVICE DETECTION USING MILLIMETER-WAVE..... | 1316 |
| <i>Yeming Li, Wei Dong, Yuxiang Lin</i> | |
| ARBITRATING NETWORK SERVICES IN 5G NETWORKS FOR AUTOMOTIVE VERTICAL INDUSTRY | 1318 |
| <i>J. Baranda, J. Mangues-Bafalluy, L. Vettori, R. Martínez, G. Avino, C. F. Chiasserini, C. Puligheddu, C. Casetti, J. Brenes, G. Landi, K. Kondepu, F. Paolucci, S. Fichera, L. Valcarenghi</i> | |
| HURRA! HUMAN-READABLE ROUTER ANOMALY DETECTION..... | 1320 |
| <i>José M. Navarro, Dario Rossi</i> | |
| NFV SERVICE FEDERATION: ENABLING MULTI-PROVIDER EHEALTH EMERGENCY SERVICES | 1322 |
| <i>J. Baranda, J. Mangues-Bafalluy, L. Vettori, R. Martínez, K. Antevski, L. Girletti, C. J. Bernardos, K. Tomakh, D. Kucherenko, G. Landi, J. Brenes, Xi Li, X. Costa-Pérez, F. Ubaldi, G. Imbarlina, M. Gharbaoui</i> | |
| DEMO ABSTRACT: END-TO-END ROOT CAUSE ANALYSIS OF A MOBILE NETWORK..... | 1324 |
| <i>Achille Salauin, Anne Bouillard, Marc-Olivier Buob</i> | |
| DEMO ABSTRACT: NARWHAL: A DASH-BASED POINT CLOUD VIDEO STREAMING SYSTEM OVER WIRELESS NETWORKS | 1326 |
| <i>Jie Li, Cong Zhang, Zhi Liu, Wei Sun, Wei Hu, Qiyue Li</i> | |
| DEMO ABSTRACT: ICRUTCH: A SMARTPHONE-BASED INTELLIGENT CRUTCH FOR SMART HOME APPLICATIONS | 1328 |
| <i>Ke Lin, Siyao Cheng, Jianzhong Li</i> | |
| DEMO ABSTRACT: APN6: APPLICATION-AWARE IPV6 NETWORKING | 1330 |
| <i>Shuping Peng, Jianwei Mao, Ruizhao Hu, Zhenbin Li</i> | |
| PROTOTYPING NOMA CONSTELLATION ROTATION IN WI-FI..... | 1332 |
| <i>Evgeny Khorov, Aleksey Kureev, Ilya Levitsky, Ian F. Akyildiz</i> | |
| DEMO ABSTRACT: CROSS-LAYER AUTHENTICATION BASED ON PHYSICAL CHANNEL INFORMATION USING OPENAIRINTERFACE | 1334 |
| <i>Zhao Zhao, Yanzhao Hou, Xiaosheng Tang, Xiaofeng Tao</i> | |
| WHISPERING TO INDUSTRIAL IOT FOR CONVERGING MULTI-DOMAIN NETWORK PROGRAMMABILITY | 1336 |
| <i>Esteban Municio, Steven Latré, Johann M. Marquez-Barja</i> | |
| DEMO ABSTRACT: ASSESSING MANO PERFORMANCE BASED ON VIM PLATFORMS WITHIN MEC CONTEXT | 1338 |
| <i>Nina Slamnik-Kriještorac, Johann M. Marquez-Barja</i> | |
| DEMO ABSTRACT: SOCIAL MEDIA-DRIVEN UAV SENSING FRAMEWORKS IN DISASTER RESPONSE APPLICATIONS | 1340 |
| <i>Md Tahmid Rashid, Daniel Zhang, Dong Wang</i> | |
| POSTER ABSTRACT: LOCTAG: PASSIVE WIFI TAG FOR ROBUST INDOOR LOCALIZATION VIA SMARTPHONES | 1342 |
| <i>Shengen Wei, Jiankun Wang, Zenghua Zhao</i> | |

| | |
|-----------------------------------------------------------------------------------------------------------------------|------|
| FRACTALS IN THE AIR: UNDER-DETERMINED MODULATION RECOGNITION FOR MIMO COMMUNICATION | 1344 |
| <i>Wei Xiong, Lin Zhang, Maxwell McNeil, Petko Bogdanov, Mariya Zheleva</i> | |
| POSTER ABSTRACT: MODEL AVERAGE-BASED DISTRIBUTED TRAINING FOR SPARSE DEEP NEURAL NETWORKS | 1346 |
| <i>Yuetong Yang, Zhiquan Lai, Lei Cai, Dongsheng Li</i> | |
| POSTER ABSTRACT: ENCRYPTED MALWARE TRAFFIC DETECTION USING INCREMENTAL LEARNING | 1348 |
| <i>Insup Lee, Heejun Roh, Wonjun Lee</i> | |
| RECONSIDERING LEAKAGE PREVENTION IN MAPREDUCE..... | 1350 |
| <i>Xiaoyu Zhang, Yongzhi Wang, Yu Zou</i> | |
| ENFORCING CONTROL FLOW CONFIDENTIALITY WITH SGX | 1352 |
| <i>Yu Zou, Yongzhi Wang, Xiaoyu Zhang</i> | |
| LIGHTWEIGHT NETWORK-WIDE TELEMETRY WITHOUT EXPLICITLY USING PROBE PACKETS | 1354 |
| <i>Tian Pan, Enge Song, Chenhao Jia, Wendi Cao, Tao Huang, Bin Liu</i> | |
| POSTER ABSTRACT: RELAXING NETWORK SELECTION FOR TCP SHORT FLOWS USING SYN DUPLICATION | 1356 |
| <i>Kien Nguyen, Hiroo Sekiya</i> | |
| FEDERATED ROUTING SCHEME FOR LARGE-SCALE CROSS DOMAIN NETWORK | 1358 |
| <i>Yuchao Zhang, Ye Tian, Wendong Wang, Peizhuang Cong, Chao Chen, Dan Li, Ke Xu</i> | |
| ROBUSTNESS ANALYSIS OF NETWORKED CONTROL SYSTEMS WITH AGING STATUS | 1360 |
| <i>Bin Han, Siyu Yuan, Zhiyuan Jiang, Yao Zhu, Hans D. Schotten</i> | |
| POSTER ABSTRACT: A COMPUTATIONAL MODEL-DRIVEN HYBRID SOCIAL MEDIA AND DRONE-BASED WILDFIRE MONITORING FRAMEWORK | 1362 |
| <i>Md Tahmid Rashid, Daniel Zhang, Dong Wang</i> | |
| POSTER ABSTRACT: SUPPRESSING CSI LEAKAGE IN MULTI-USER MIMO NETWORKS VIA PRECODING | 1364 |
| <i>Seoungbin Bae, Youngki Kim, Heejun Roh, Wonjun Lee</i> | |

Author Index