

IEEE INFOCOM 2021 – IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS 2021)

**Virtual Conference
9 – 12 May 2021**

Pages 1-398



**IEEE Catalog Number: CFP2123E-POD
ISBN: 978-1-6654-4714-0**

**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:	CFP2123E-POD
ISBN (Print-On-Demand):	978-1-6654-4714-0
ISBN (Online):	978-1-6654-0443-3

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

DYNAMIC ECONOMIC MODELS FOR MMO MARKETS.....	1
<i>Harald Øverby</i>	
LIGHTWEIGHT AND RELIABLE DECENTRALIZED REWARD SYSTEM USING BLOCKCHAIN.....	7
<i>Jiawei Yuan, Laurent Njilla</i>	
SECURITY VULNERABILITY DETECTION USING DEEP LEARNING NATURAL LANGUAGE PROCESSING.....	13
<i>Noah Ziems, Shaoen Wu</i>	
ANOMALY DETECTION IN SMART HOME NETWORKS USING KALMAN FILTER.....	19
<i>Nasser Alsabilah, Danda B. Rawat</i>	
PERFORMANCE ANALYSIS FOR CORRELATED AOI AND ENERGY EFFICIENCY IN HETEROGENEOUS CR-IOT SYSTEM.....	25
<i>Xiaoyu Hao, Tao Yang, Yulin Hu, Bo Hu</i>	
PERFORMANCE ANALYSIS OF MULTIPATH BGP	33
<i>Jie Li, Shi Zhou, Vasileios Giotsas</i>	
AUTOCEW: AN AUTONOMOUS CYBERSPACE EARLY WARNING FRAMEWORK VIA ENSEMBLE LEARNING.....	39
<i>Qiang Liu, Yifei Gao, Runhao Liu, Jiayao Wang</i>	
JOINT RESOURCE OPTIMIZATION IN TWO-WAY RELAYING ENERGY HARVESTING COGNITIVE SENSOR NETWORK	45
<i>Yuan Gao, Cheng Yang, Weidang Lu, Yiming Wenchen, Yu Zhang, Guoxing Huang, Jiang Cao</i>	
DCQUIC: FLEXIBLE AND RELIABLE SOFTWARE-DEFINED DATA CENTER TRANSPORT.....	51
<i>Lizhuang Tan, Wei Su, Yanwen Liu, Xiaochuan Gao, Wei Zhang</i>	
DECENTRALIZED MAX-MIN RESOURCE ALLOCATION FOR MONOTONIC UTILITY FUNCTIONS.....	59
<i>Shuang Wu, Xi Peng, Guangjian Tian</i>	
AGE OF INFORMATION: AN INDIRECT WAY TO IMPROVE CONTROL SYSTEM PERFORMANCE	65
<i>Onur Ayan, Anthony Ephremides, Wolfgang Kellerer</i>	
SECURITY SERVICE PRICING MODEL FOR UAV SWARMS: A STACKELBERG GAME APPROACH.....	72
<i>Gaurang Bansal, Biplab Sikdar</i>	
ENABLING RANDOM ACCESS IN UNIVERSAL COMPRESSORS.....	78
<i>Rasmus Vestergaard, Qi Zhang, Daniel E. Lucani</i>	
TASK CACHING IN VEHICULAR EDGE COMPUTING	84
<i>Chaogang Tang, Chunsheng Zhu, Xianglin Wei, Qing Li, Joel J. P. C. Rodrigues</i>	

MINIMIZING THE COST OF 5G NETWORK SLICE BROKER.....	90
<i>Ali Gohar, Gianfranco Nencioni</i>	
DATA PRIVACY SECURITY GUARANTEED NETWORK INTRUSION DETECTION SYSTEM BASED ON FEDERATED LEARNING.....	96
<i>Jibo Shi, Bin Ge, Yang Liu, Yu Yan, Shuang Li</i>	
PRIVACY-PRESERVING DECENTRALIZED AGGREGATION FOR FEDERATED LEARNING.....	102
<i>Beomyeol Jeon, S M Ferdous, Muntasir Raihan Rahman, Anwar Walid</i>	
AGE DEBT: A GENERAL FRAMEWORK FOR MINIMIZING AGE OF INFORMATION.....	108
<i>Vishrant Tripathi, Eytan Modiano</i>	
A NOVEL ENERGY AWARE SECURE INTERNET OF DRONES DESIGN: ESIOD.....	114
<i>Sayani Sarkar, Shivanjali Khare, Michael W. Totaro, Ashok Kumar</i>	
TULVCAN: TERAHERTZ ULTRA-BROADBAND LEARNING VEHICULAR CHANNEL- AWARE NETWORKING.....	120
<i>Chia-Hung Lin, Shih-Chun Lin, Erik Blasch</i>	
REINFORCEMENT LEARNING FOR ENERGY-EFFICIENT EDGE CACHING IN MOBILE EDGE NETWORKS.....	126
<i>Hantong Zheng, Huan Zhou, Ning Wang, Peng Chen, Shouzhi Xu</i>	
UAV PLACEMENT AND RESOURCE ALLOCATION FOR MULTI-HOP UAV ASSISTED BACKHAUL SYSTEM.....	132
<i>Yating Dai, Yijun Guo, Jianjun Hao</i>	
ENABLING VIRTUAL NETWORK FUNCTIONS IN NAMED DATA NETWORKING.....	138
<i>Puming Fang, Tilman Wolf</i>	
A PRIVACY-AWARE FRAMEWORK INTEGRATION INTO A HUMAN-IN-THE-LOOP IOT SYSTEM.....	144
<i>Jorge Eduardo Rivadeneira, Jorge Sá Silva, Ricardo Colomo-Palacios, André Rodrigues, José Marcelo Fernandes, Fernando Boavida</i>	
SENSING QUALITY CONSTRAINED PACKET RATE OPTIMIZATION VIA MULTI-UAV COLLABORATIVE COMPRESSION AND RELAY.....	150
<i>Kaitao Meng, Xiaofan He, Deshi Li, Mingliu Liu, Chan Xu</i>	
VMEMCPY: PARALLELIZING MEMORY COPY WITH MULTI-CORE IN THE CLOUD.....	156
<i>Kaixin Lin, Yuguo Li, Dawei Jian, Shengquan Hu, Dingding Li</i>	
A MOBILE EDGE COMPUTING FRAMEWORK FOR TASK OFFLOADING AND RESOURCE ALLOCATION IN UAV-ASSISTED VANETS.....	162
<i>Yixin He, Daosen Zhai, Ruonan Zhang, Jianbo Du, Gagangeet Singh Aujla, Haotong Cao</i>	
IS IT 5G OR NOT? INVESTIGATING DOUBTS ABOUT THE 5G ICON AND NETWORK PERFORMANCE.....	168
<i>Emeka Obiodu, Abdullahi K Abubakar, Nishanth Sastry</i>	
JOINT TRAJECTORY AND POWER OPTIMIZATION FOR ENERGY EFFICIENT UAV COMMUNICATION USING DEEP REINFORCEMENT LEARNING.....	174
<i>Yuling Cui, Danhao Deng, Chaowei Wang, Weidong Wang</i>	

A UAV BASED MULTI-HOP D2D NETWORK FOR DISASTER MANAGEMENT.....	180
<i>Sayanti Ghosh, Abhijit Bhowmick, Sanjay Dhar Roy, Sumit Kundu</i>	
P2PNIC: HIGH-SPEED PACKET FORWARDING BY DIRECT COMMUNICATION BETWEEN NICS.....	186
<i>Yukito Ueno, Ryo Nakamura, Yohei Kuga, Hiroshi Esaki</i>	
DESIGN AND TESTBED EXPERIMENTS OF PUBLIC BLOCKCHAIN-BASED SECURITY FRAMEWORK FOR IOT-ENABLED DRONE-ASSISTED WILDLIFE MONITORING.....	192
<i>Ankush Mitra, Basudeb Bera, Ashok Kumar Das</i>	
A FEDERATED MACHINE LEARNING PROTOCOL FOR FOG NETWORKS	198
<i>Fotis Foukalas, Athanasios Tziouvaras</i>	
A LIGHTWEIGHT DATA SHARING SCHEME WITH RESISTING KEY ABUSE IN MOBILE EDGE COMPUTING.....	204
<i>Jianhong Zhang, Menglong Wu, Qijia Zhang, Chenggen Peng</i>	
DRONE-MAP: A NOVEL AUTHENTICATION SCHEME FOR DRONE-ASSISTED 5G NETWORKS.....	210
<i>Tejasvi Alladi, Vishnu Venkatesh, Vinay Chamola, Nitin Chaturvedi</i>	
TOPOLOGY-THEORETIC APPROACH TO ADDRESS ATTRIBUTE LINKAGE ATTACKS IN DIFFERENTIAL PRIVACY	216
<i>Jincheng Wang, Zhuohua Li, John C. S. Lui, Mingshen Sun</i>	
INCREMENTAL LEARNING BASED RADIO FREQUENCY FINGERPRINT IDENTIFICATION USING INTELLIGENT REPRESENTATION.....	222
<i>Mingqian Liu, Jiakun Wang, Cheng Qian</i>	
ROBOT BEHAVIOR-BASED USER AUTHENTICATION FOR MOTION-CONTROLLED ROBOTIC SYSTEMS.....	228
<i>Long Huang, Zhen Meng, Zeyu Deng, Chen Wang, Liying Li, Guodong Zhao</i>	
ENTERING WATCH DOGS*: EVALUATING PRIVACY RISKS AGAINST LARGE-SCALE FACIAL SEARCH AND DATA COLLECTION	234
<i>Bahadir Durmaz, Erman Ayday</i>	
LEARNING COFLOW ADMISSIONS.....	240
<i>Asif Hasnain, Holger Karl</i>	
EXPERIMENTAL ANALYSIS OF CROSS-LAYER SENSING FOR PROTOCOL-AGNOSTIC PACKET BOUNDARY RECOGNITION.....	246
<i>Maxwell McManus, Zhangyu Guan, Elizabeth Serena Bentley, Scott Pudlewski</i>	
OPAR: OPTIMIZED PREDICTIVE AND ADAPTIVE ROUTING FOR COOPERATIVE UAV NETWORKS.....	252
<i>Mohammed Gharib, Fatemeh Afghah, Elizabeth Bentley</i>	
REMOTE TRACKING OF DYNAMIC SOURCES UNDER SUBLINEAR COMMUNICATION COSTS	258
<i>Jihyeon Yun, Atilla Eryilmaz, Changhee Joo</i>	
AUTOMATED FAST-FLUX DETECTION USING MACHINE LEARNING AND GENETIC ALGORITHMS.....	264
<i>Sachin Rana, Ahmet Aksoy</i>	

ITSY: INITIAL TRIGGER-BASED PFC DEADLOCK DETECTION IN THE DATA PLANE	270
<i>Xinyu Crystal Wu, T. S. Eugene Ng</i>	
LPDBN: A PRIVACY PRESERVING SCHEME FOR DEEP BELIEF NETWORK	278
<i>Yong Zeng, Tong Dong, Qingqi Pei, Jiale Liu, Jianfeng Ma</i>	
MONITORING VIDEO RESOLUTION OF ADAPTIVE ENCRYPTED VIDEO TRAFFIC BASED ON HTTP/2 FEATURES	284
<i>Hua Wu, Xin Li, Guang Cheng, Xiaoyan Hu</i>	
BUILDING AN INFORMATION-CENTRIC AND LORA-BASED SENSING PLATFORM FOR IOT	290
<i>Anthony Dowling, Yaoqing Liu, Lauren Huie, Kang Chen</i>	
SECURE DECENTRALIZED ACCESS CONTROL POLICY FOR DATA SHARING IN SMART GRID	296
<i>Yadi Ye, Leyou Zhang, Wenting You, Yi Mu</i>	
RESOURCE-AWARE SERVICE FUNCTION CHAIN DEPLOYMENT IN CLOUD-EDGE ENVIRONMENT	302
<i>Hao Li, Xin Li, Zhuzhong Qian, Xiaolin Qin</i>	
SPECTRAL GRAPH THEORY BASED RESOURCE ALLOCATION FOR IRS-ASSISTED MULTI-HOP EDGE COMPUTING	308
<i>Huilian Zhang, Xiaofan He, Qingqing Wu, Huaiyu Dai</i>	
A NETWORK INTRUSION DETECTION METHOD BASED ON CNN AND CBAM	314
<i>Yang Liu, Jian Kang, Yiran Li, Bin Ji</i>	
A CLOUD-EDGE-TERMINAL COLLABORATIVE SYSTEM FOR TEMPERATURE MEASUREMENT IN COVID-19 PREVENTION	320
<i>Zheyi Ma, Hao Li, Wen Fang, Qingwen Liu, Bin Zhou, Zhiyong Bu</i>	
INTEREST USERS CUMULATIVELY IN YOUR ADS: A NEAR OPTIMAL STUDY FOR WI- FI ADVERTISEMENT SCHEDULING	326
<i>Wanru Xu, Xiaochen Fan, Tao Wu, Yue Xi, Panlong Yang, Chang Tian</i>	
PREDICTING THROUGHPUT OF CLOUD NETWORK INFRASTRUCTURE USING NEURAL NETWORKS	332
<i>Derek Phanekham, Suku Nair, Nageswara Rao, Mike Truty</i>	
QOS-AWARE CONTROLLER AND HYPERVISOR PLACEMENT IN VSDN-ENABLED 5G NETWORKS FOR TIME-CRITICAL APPLICATIONS	338
<i>Deborsi Basu, Abhishek Jain, Uttam Ghosh, Raja Datta</i>	
SECURE SHARING OF SPATIO-TEMPORAL DATA THROUGH NAME-BASED ACCESS CONTROL	344
<i>Laqin Fan, Lan Wang</i>	
TRUST-BASED MODEL FOR SECURING VEHICULAR NETWORKS AGAINST RSU ATTACKS	351
<i>Aljawharah Alnasser, Hongjian Sun</i>	
TRANSFERABLE ADVERSARIAL DEFENSE BY FUSING RECONSTRUCTION LEARNING AND DENOISING LEARNING	357
<i>Song Gao, Shaowen Yao, Ruidong Li</i>	

TRADING PRIVACY THROUGH RANDOMIZED RESPONSE.....	363
<i>Mohammad Mahdi Khalili, Iman Vakili</i>	
QUALITY ASSESSMENT OF VANETS-SUPPORTED VIDEO DISSEMINATION OF CRITICAL URBAN EVENTS	369
<i>Everaldo Andrade, Fernando Matos, Paulo D. Maciel, Michele Nogueira, Aldri Santos</i>	
REAL-TIME PACKET LOSS DETECTION FOR TCP AND UDP BASED ON FEATURE- SKETCH	375
<i>Hua Wu, Ya Liu, Guang Cheng, Xiaoyan Hu</i>	
DA-WDGN: DRONE-ASSISTED WEED DETECTION USING GLCM-M FEATURES AND NDIRT INDICES	381
<i>Gunasekaran Raja, Kapal Dev, Nisha Deborah Philips, S. A. Mohamed Suhaib, M. Deepakraj, Ramesh Krishnan Ramasamy</i>	
EFFICIENT IMMERSIVE SURVEILLANCE OF INACCESSIBLE REGIONS USING UAV NETWORK	387
<i>Anuj Bist, Chetna Singhal</i>	
ADAPTIVE FEDERATED DROPOUT: IMPROVING COMMUNICATION EFFICIENCY AND GENERALIZATION FOR FEDERATED LEARNING	393
<i>Nader Bouacida, Jiahui Hou, Hui Zang, Xin Liu</i>	
ACTRACKER: A FAST AND EFFICIENT ATTACK INVESTIGATION METHOD BASED ON EVENT CAUSALITY	399
<i>Erteng Hu, Anmin Fu, Zhiyi Zhang, Linjie Zhang, Yantao Guo, Yin Liu</i>	
SECRET KEY GENERATION SCHEME BASED ON GENERATIVE ADVERSARIAL NETWORKS IN FDD SYSTEMS.....	405
<i>Zongyue Hou, Xinwei Zhang</i>	
CAN AOI AND DELAY BE MINIMIZED SIMULTANEOUSLY WITH SHORT-PACKET TRANSMISSION?.....	411
<i>Jie Cao, Xu Zhu, Yufei Jiang, Zhongxiang Wei</i>	
A FIRST LOOK AT THE NETWORK TURBULENCE FOR GOOGLE STADIA CLOUD- BASED GAME STREAMING	417
<i>Xiaokun Xu, Mark Claypool</i>	
POI RECOMMENDATION WITH FEDERATED LEARNING AND PRIVACY PRESERVING IN CROSS DOMAIN RECOMMENDATION.....	422
<i>Li-E Wang, Yihui Wang, Yan Bai, Peng Liu, Xianxian Li</i>	
TOWARDS SECURE COMMUNICATION IN CR-VANETS THROUGH A TRUST-BASED ROUTING PROTOCOL	428
<i>Sharmin Akter, Mohammad Shahriar Rahman, Md Zakirul Alam Bhuiyan, Nafees Mansoor</i>	
DEEP REINFORCEMENT LEARNING FOR INTELLIGENT CLOUD RESOURCE MANAGEMENT	434
<i>Zhi Zhou, Ke Luo, Xu Chen</i>	
DISASTER-RESILIENT SERVICE FUNCTION CHAIN EMBEDDING BASED ON MULTI- PATH ROUTING.....	440
<i>Sixu Cai, Fen Zhou, Zonghua Zhang, Ahmed Meddahi</i>	

TIMELY TRACKING OF INFECTION STATUS OF INDIVIDUALS IN A POPULATION.....	447
<i>Melih Bastopcu, Sennur Ulukus</i>	
COMPUTING-AIDED UPDATE FOR INFORMATION FRESHNESS IN THE INTERNET OF THINGS	454
<i>Minghao Fang, Xijun Wang, Chao Xu, Howard H. Yang, Tony Q. S. Quek</i>	
TASK PARTITIONING AND USER ASSOCIATION FOR LATENCY MINIMIZATION IN MOBILE EDGE COMPUTING NETWORKS	461
<i>Mingjie Feng, Marwan Krunz, Wenhan Zhang</i>	
SPA: HARNESSING AVAILABILITY IN THE AWS SPOT MARKET.....	467
<i>Walter Wong, Aleksandr Zavodovski, Lorenzo Corneo, Nitinder Mohan, Jussi Kangasharju</i>	
A NOVEL NEGATIVE AND POSITIVE SELECTION ALGORITHM TO DETECT UNKNOWN MALWARE IN THE IOT.....	473
<i>Hadeel Alrubayyi, Gokop Goteng, Mona Jaber, James Kelly</i>	
COMBATING DISTANCE LIMITATION IN SUB-TERAHERTZ FREQUENCY BAND FOR PHYSICAL LAYER SECURITY IN UAV COMMUNICATIONS	479
<i>Abdulaziz Alali, Danda B. Rawat</i>	
INTERMITTENT STATUS UPDATING THROUGH JOINT SCHEDULING OF SENSING AND RETRANSMISSIONS	485
<i>Omur Ozel, Parisa Rafiee</i>	
TIMELY TRANSMISSIONS USING OPTIMIZED VARIABLE LENGTH CODING	491
<i>Ahmed Arafa, Richard D. Wesel</i>	
QOE-AWARE ASSIGNMENT AND SCHEDULING OF VIDEO STREAMS IN HETEROGENEOUS CELLULAR NETWORKS.....	497
<i>Adita Kulkarni, Anand Seetharam</i>	
ZERO TRUST USING NETWORK MICRO SEGMENTATION.....	503
<i>Nabeel Sheikh, Mayur Pawar, Victor Lawrence</i>	
A LIGHTWEIGHT RESIDUAL NETWORKS FRAMEWORK FOR DDOS ATTACK CLASSIFICATION BASED ON FEDERATED LEARNING	509
<i>Qin Tian, Cheng Guang, Chen Wenchao, Wu Si</i>	
MEASUREMENT ANALYSIS OF CO-OCCURRENCE DEGREE OF WEB OBJECTS	515
<i>Noriaki Kamiyama, Kouki Sakurai, Akihiro Nakao</i>	
THE AGE OF CORRELATED FEATURES IN SUPERVISED LEARNING BASED FORECASTING	521
<i>Md Kamran Chowdhury Shisher, Heyang Qin, Lei Yang, Feng Yan, Yin Sun</i>	
UAV-ASSISTED 5G/6G NETWORKS: JOINT SCHEDULING AND RESOURCE ALLOCATION BASED ON ASYNCHRONOUS REINFORCEMENT LEARNING	529
<i>Helin Yang, Jun Zhao, Jiangtian Nie, Neeraj Kumar, Kwok-Yan Lam, Zehui Xiong</i>	
TOWARD AUTOMATICALLY GENERATING PRIVACY POLICY FOR SMART HOME APPS	535
<i>Youqun Li, Yichi Zhang, Haojin Zhu, Suguo Du</i>	

ADVERSARIAL MACHINE LEARNING FOR INFERRING AUGMENTED CYBER AGILITY PREDICTION	542
<i>Eric Muhati, Danda B. Rawat</i>	
IPV6 FLOW-LABEL BASED APPLICATION AWARE ROUTING IN SDNS	548
<i>Aniruddha Kushwaha, Naveen Bazard, Ashwin Gumaste</i>	
AUTONOMOUS MAINTENANCE IN IOT NETWORKS VIA AOI-DRIVEN DEEP REINFORCEMENT LEARNING	554
<i>George Stamatakis, Nikolaos Pappas, Alexandros Fragkiadakis, Apostolos Traganitis</i>	
USING DYNAMIC ANALYSIS TO AUTOMATICALLY DETECT ANTI-ADBLOCKER ON THE WEB	561
<i>Jingxue Sun, Ting Yang, Zhiqiu Huang, Wengjie Wang, Yuqing Zhang</i>	
A SYSTEM FOR DETECTING THIRD-PARTY TRACKING THROUGH THE COMBINATION OF DYNAMIC ANALYSIS AND STATIC ANALYSIS	567
<i>Jingxue Sun, Zhiqiu Huang, Ting Yang, Wengjie Wang, Yuqing Zhang</i>	
FREQUENCY-AWARE TRAJECTORY AND POWER CONTROL FOR MULTI-UAV SYSTEMS	573
<i>Jason Ma, Michael H. Ostertag, Dinesh Bharadia, Tajana S. Rosing</i>	
MACHINE LEARNING TOOLKIT FOR SYSTEM LOG FILE REDUCTION AND DETECTION OF MALICIOUS BEHAVIOR	579
<i>Ralph P. Ritchey, Richard Perry</i>	
INTELLIGENT GATEWAY PLACEMENT IN SATELLITE-TERRESTRIAL INTEGRATED NETWORK	581
<i>Cui-Qin Dai, Qinqin Yang, Jinsong Wu, Qianbin Chen</i>	
PGA: A PRIORITY-AWARE GENETIC ALGORITHM FOR TASK SCHEDULING IN HETEROGENEOUS FOG-CLOUD COMPUTING	587
<i>Farooq Hoseiny, Sadoon Azizi, Mohammad Shojafar, Fardin Ahmadiazar, Rahim Tafazolli</i>	
GENPATH - A GENETIC MULTI-ROUND PATH PLANNING ALGORITHM FOR AERIAL VEHICLES	593
<i>Novella Bartolini, Andrea Coletta, Gaia Maselli, Mauro Piva, Domenicomichele Silvestri</i>	
TIMELY COMMUNICATION IN FEDERATED LEARNING	599
<i>Baturalp Buyukates, Sennur Ulukus</i>	
EVALUATING CONTACT TRACING APPS FOR PRIVACY PRESERVATION AND EFFECTIVENESS	605
<i>Md Rashed Iqbal Nekvi, Anwar Haque</i>	
VIRTUAL CREDIT FRAMEWORK IN THE REMOTE WORK ERA	611
<i>Yongjin Kim</i>	
SECRECY IN AERIAL NETWORKING: A STOCHASTIC GEOMETRY APPROACH	613
<i>Xian Liu</i>	
RESOURCE ALLOCATION FOR LOW-LATENCY NOMA-V2X NETWORKS USING REINFORCEMENT LEARNING	619
<i>Huiyi Ding, Ka-Cheong Leung</i>	

OPTIMAL CHANNEL SHARING ASSISTED MULTI-USER COMPUTATION OFFLOADING VIA NOMA.....	625
<i>Tianshun Wang, Yang Li, Yuan Wu, Liping Qian, Lin Bin, Weijia Jia</i>	
AERIAL WIRELESS NETWORKS: PROPOSED SOLUTION FOR COVERAGE OPTIMISATION.....	631
<i>Shadi Eltanani, Ibrahim Ghafir</i>	
AN EMPIRICAL STUDY OF AGEING IN THE CLOUD.....	637
<i>Tanya Shreedhar, Sanjit K. Kaul, Roy D. Yates</i>	
OVER-THE-AIR FEDERATED LEARNING AND NON-ORTHOGONAL MULTIPLE ACCESS UNIFIED BY RECONFIGURABLE INTELLIGENT SURFACE.....	643
<i>Wanli Ni, Yuanwei Liu, Zhaohui Yang, Hui Tian</i>	
ON THE RELIABILITY OF STATE-OF-THE-ART NETWORK TESTBED COMPONENTS	649
<i>Runsen Gong, Weichao Li, Fuliang Li, Yi Wang</i>	
ENABLING LIGHTWEIGHT NETWORK PERFORMANCE MONITORING AND TROUBLESHOOTING IN DATA CENTER.....	651
<i>Qinglin Xun, Weichao Li, Haorui Guo, Yi Wang</i>	
MULTI-UAV-ENABLED AOI-AWARE WPCN: A MULTI-AGENT REINFORCEMENT LEARNING STRATEGY	653
<i>Omar Sami Oubbati, Mohammed Atiquzzaman, Abderrahmane Lakas, Abdullah Baz, Hosam Alhakami, Wajdi Alhakami</i>	
HIGH PRECISION TIME SYNCHRONIZATION ON WI-FI BASED MULTI-HOP NETWORK.....	659
<i>Muhammad Aslam, Wei Liu, Xianjun Jiao, Jetmir Haxhibeqiri, Jeroen Hoebeke, Ingrid Moerman, Esteban Municio, Pedro Isolani, Gilson Miranda, Johann Marquez-Barja</i>	
LARGE-SCALE DETERMINISTIC IP NETWORKS ON CENI.....	661
<i>Shuo Wang, Binwei Wu, Chen Zhang, Yudong Huang, Tao Huang, Yunjie Liu</i>	
OPTIMAL PEAK-MINIMIZING ONLINE ALGORITHMS FOR LARGE-LOAD USERS WITH ENERGY STORAGE	667
<i>Yanfang Mo, Qiulin Lin, Minghua Chen, S. Joe Qin</i>	
OPERA: SCALABLE SIMULATOR FOR DISTRIBUTED SYSTEMS	669
<i>Yahya Hassanzadeh-Nazarabadi, Moayed Haji Ali, Nazir Nayal</i>	
ENGINEERING A LARGE-SCALE TRAFFIC SIGNAL CONTROL: A MULTI-AGENT REINFORCEMENT LEARNING APPROACH	671
<i>Yue Chen, Changle Li, Wenwei Yue, Hehe Zhang, Guoqiang Mao</i>	
QUALITY-AWARE DISTRIBUTED COMPUTATION AND USER SELECTION FOR COST- EFFECTIVE FEDERATED LEARNING	677
<i>Yuxi Zhao, Xiaowen Gong</i>	
C-ITS COMMUNICATIONS USING HETEROGENEOUS WIRELESS TECHNOLOGIES	683
<i>Muhammad Naeem Tahir, Marcos Katz</i>	
ON THE DISTRIBUTION OF ML WORKLOADS TO THE NETWORK EDGE AND BEYOND.....	685
<i>Georgios Drainakis, Panagiotis Pantazopoulos, Konstantinos V. Katsaros, Vasilis Sourlas, Angelos Amditis</i>	

EDGENET: THE GLOBAL KUBERNETES CLUSTER TESTBED.....	691
<i>Berat Can Senel, Maxime Mouchet, Justin Cappos, Olivier Fourmaux, Timur Friedman, Rick McGeer</i>	
KWOLLECT: METRICS COLLECTION FOR EXPERIMENTS AT SCALE.....	693
<i>Simon Delamare, Lucas Nussbaum</i>	
LEVERAGING NOTEBOOKS ON TESTBEDS: THE GRID'5000 CASE.....	699
<i>Luke Bertot, Lucas Nussbaum</i>	
OCTOBOT: AN OPEN-SOURCE ORCHESTRATION SYSTEM FOR A WIDE RANGE NETWORK ACTIVITY GENERATION.....	705
<i>Aris Cahyadi Risdianto, Ee-Chien Chang</i>	
AN OPEN EXPERIMENTAL PLATFORM FOR RANGING, PROXIMITY AND CONTACT EVENT TRACKING USING ULTRA-WIDE-BAND AND BLUETOOTH LOW-ENERGY.....	708
<i>Roudy Dagher, Francois-Xavier Molina, Alexandre Abadie, Nathalie Mitton, Emmanuel Baccelli</i>	
ACHIEVING END-TO-END CONNECTIVITY IN GLOBAL MULTI-DOMAIN NETWORKS.....	714
<i>Esteban Municio, Mert Cevik, Paul Ruth, Johann M. Marquez-Barja</i>	
SUPPORT FOR DIFFERENTIATED AIRTIME IN WIRELESS NETWORKS.....	720
<i>Daniel J. Kulenkamp, Violet R. Syrotiuk</i>	
TACKLING THE LATENCY DIVIDE WITH COPA.....	726
<i>Daisy Roberts, Ashutosh Srivastava, Fraida Fund, Shivendra S. Panwar</i>	
OVERCAST: RUNNING CONTROLLED EXPERIMENTS SPANNING RESEARCH AND COMMERCIAL CLOUDS.....	728
<i>Paul Ruth, Kate Keahey, Mert Cevik, Zhuo Zhen, Cong Wang, Jason Anderson</i>	
TOWARDS USING THE POWDER PLATFORM FOR RF PROPAGATION VALIDATION.....	734
<i>Jose Monterroso, Jacobus Van Der Merwe, Kirk Webb, Gary Wong</i>	
WIMATCH: WIRELESS RESOURCE MATCHMAKING.....	740
<i>Kirk Webb, Sneha Kumar Kasera, Neal Patwari, Jacobus Van Der Merwe</i>	
A CONTROLLED, REPRODUCIBLE, AND EXTENSIBLE EXPERIMENT FOR EVALUATING THE IMPACT OF TOR LATENCY.....	746
<i>Bintia Keita, Ashutosh Srivastava, Fraida Fund, Shivendra S. Panwar</i>	
EVALUATING V2V SECURITY ON AN SDR TESTBED.....	748
<i>Geoff Twardokus, Hanif Rahbari</i>	
BOTM: BASESTATION-ON-THE-MOVE, A RADIO ACCESS NETWORK MANAGEMENT PRIMITIVE.....	751
<i>Aashish Gottipati, Jacobus Van Der Merwe</i>	
SCALING FEDERATED NETWORK SERVICES: MANAGING SLAS IN MULTI-PROVIDER INDUSTRY 4.0 SCENARIOS.....	757
<i>Jorge Baranda, Josep Mangués-Bafalluy, Luca Vettori, Ricardo Martínez, Engin Zeydan</i>	
MULTIPATH IN-BAND NETWORK TELEMETRY.....	759
<i>Yan Zheng, Tian Pan, Yan Zhang, Enge Song, Tao Huang, Yunjie Liu</i>	

VISUALIZATION OF DEEP REINFORCEMENT AUTONOMOUS AERIAL MOBILITY LEARNING SIMULATIONS.....	761
<i>Gusang Lee, Won Joon Yun, Soyi Jung, Joongheon Kim, Jae-Hyun Kim</i>	
DEMONSTRATING A BAYESIAN ONLINE LEARNING FOR ENERGY-AWARE RESOURCE ORCHESTRATION IN VRANS	763
<i>Jose A. Ayala-Romero, Andres Garcia-Saavedra, Xavier Costa-Perez, George Iosifidis</i>	
VXLAN-BASED INT: IN-BAND NETWORK TELEMETRY FOR OVERLAY NETWORK MONITORING	765
<i>Yan Zhang, Tian Pan, Yan Zheng, Enge Song, Tao Huang, Yunjie Liu</i>	
PERFORMANCE EVALUATION OF RADAR AND COMMUNICATION INTEGRATED SYSTEM FOR AUTONOMOUS DRIVING VEHICLES	767
<i>Qixun Zhang, Zhenhao Li, Xinye Gao, Zhiyong Feng</i>	
WIFI DYNOSCOPE: INTERPRETABLE REAL-TIME WLAN OPTIMIZATION	769
<i>Jonatan Krolkowski, Ovidiu Iacobaiea, Zied Ben Houidi, Dario Rossi</i>	
IMPLEMENTATION OF BLOCK-WISE-TURN-REDUCTION METHOD FOR IMAGE RECONSTRUCTION IN ULTRASOUND TRANSMISSION TOMOGRAPHY.....	771
<i>Mariusz Mazurek, Konrad Kania, Tomasz Rymarczyk, Dariusz Wójcik, Tomasz Cieplak, Piotr Golabek</i>	
DEEPMIX: A REAL-TIME ADAPTIVE VIRTUAL CONTENT REGISTRATION SYSTEM WITH INTELLIGENT DETECTION	773
<i>Yongjie Guan, Xueyu Hou, Tao Han, Sheng Zhang</i>	
ADAPTIVE IOT SERVICE CONFIGURATION OPTIMIZATION IN EDGE NETWORKS	775
<i>Mengyu Sun, Zhangbing Zhou, Walid Gaaloul</i>	
AN FPGA-BASED HIGH-THROUGHPUT PACKET CLASSIFICATION ARCHITECTURE SUPPORTING DYNAMIC UPDATES FOR LARGE-SCALE RULE SETS	777
<i>Yao Xin, Wenjun Li, Yi Wang, Song Yao</i>	
RESOURCE ALLOCATION FOR HETEROGENEOUS TRAFFIC WITH POWER CONSUMPTION CONSTRAINTS.....	779
<i>Emmanouil Fountoulakis, Nikolaos Pappas, Anthony Ephremides</i>	
DEEPSAFE: A HYBRID KITCHEN SAFETY GUARDING SYSTEM WITH STOVE FIRE RECOGNITION BASED ON THE INTERNET OF THINGS	781
<i>Lien-Wu Chen, Hsing-Fu Tseng</i>	
DEMO ABSTRACT: A HIL EMULATOR-BASED CYBER SECURITY TESTBED FOR DC MICROGRIDS	783
<i>Mengxiang Liu, Zexuan Jin, Jinhui Xia, Mingyang Sun, Ruilong Deng, Peng Cheng</i>	
POSTER ABSTRACT: A SEMI-SUPERVISED APPROACH FOR NETWORK INTRUSION DETECTION USING GENERATIVE ADVERSARIAL NETWORKS	785
<i>Hyejeong Jeong, Jieun Yu, Wonjun Lee</i>	
APPLICATION-AWARE G-SRV6 NETWORK ENABLING 5G SERVICES	787
<i>Cheng Li, Jianwei Mao, Shuping Peng, Yang Xia, Zhibo Hu, Zhenbin Li</i>	

DEMO ABSTRACT: "SEE THE RADIO WAVES" VIA VR AND ITS APPLICATION IN WIRELESS COMMUNICATIONS.....	789
<i>Pan Tang, Jianhua Zhang, Yuxiang Zhang, Yicheng Guan, Pan Qi, Fangyu Wang, Li Yu, Ping Zhang</i>	
DEMONSTRATING PHYSICAL LAYER SECURITY VIA WEIGHTED FRACTIONAL FOURIER TRANSFORM.....	791
<i>Xiaojie Fang, Xinyu Yin, Ning Zhang, Xuejun Sha, Hongli Zhang, Zhu Han</i>	
PEDESTRIAN TRAJECTORY BASED CALIBRATION FOR MULTI-RADAR NETWORK.....	793
<i>Shuai Li, Junchen Guo, Rui Xi, Chunhui Duan, Zhengang Zhai, Yuan He</i>	
VOICE RECOVERY FROM HUMAN SURROUNDINGS WITH MILLIMETER WAVE RADAR.....	795
<i>Yinian Zhou, Awais Ahmad Siddiqi, Jia Zhang, Junchen Guo, Rui Xi, Meng Jin, Zhengang Zhai, Yuan He</i>	
POSTER ABSTRACT: INSECTICIDAL PERFORMANCE SIMULATION OF SOLAR INSECTICIDAL LAMPS INTERNET OF THINGS USING THE NUMBER OF FALLING EDGE TRIGGER.....	797
<i>Xing Yang, Lei Shu, Kai Huang, Kailiang Li, Heyang Yao</i>	
DEMO ABSTRACT: WLAN STANDARD-BASED NON-COHERENT FSO TRANSMISSION OVER 100M INDOOR AND OUTDOOR ENVIRONMENTS.....	799
<i>Jong-Min Kim, Ju-Hyung Lee, Young-Chai Ko</i>	
DEMO: AIML-AS-A-SERVICE FOR SLA MANAGEMENT OF A DIGITAL TWIN VIRTUAL NETWORK SERVICE.....	801
<i>J. Baranda, J. Mangues-Bafalluy, E. Zeydan, C. Casetti, C. F. Chiasserini, M. Malinverno, C. Puligheddu, M. Groshev, C. Guimarães, K. Tomakh, D. Kucherenko, O. Kolodiazhnyi</i>	
A CORE-STATELESS L4S SCHEDULER FOR P4-ENABLED HARDWARE SWITCHES WITH EMULATED HQOS.....	803
<i>Ferenc Fejes, Szilveszter Nádas, Gergo Gombos, Sándor Laki</i>	
OPTIMIZED BGP SIMULATOR FOR EVALUATION OF INTERNET HIJACKS.....	805
<i>Markus Brandt, Haya Shulman</i>	
MONITORING ANDROID COMMUNICATIONS FOR SECURITY.....	807
<i>J. A. Gómez-Hernández, P. García-Teodoro, J. A. Holgado-Terriza, G. Maciá-Fernández, J. Camacho-Pérez, J. M. Noguera-Comino</i>	
POSTER ABSTRACT: BOUNCEBACK - A DDOS ATTACK USING UNSUSPECTING ACCOMPLICES IN THE NETWORK.....	809
<i>Saffana Alshangiti, Mawada Alahmadi, Mohammed Alkhatib, Rashid Tahir, Fareed Zaffar</i>	
A METRIC FOR MACHINE LEARNING VULNERABILITY TO ADVERSARIAL EXAMPLES.....	811
<i>Matthew Bradley, Shengjie Xu</i>	
AGE-CONSTRAINED ENERGY MINIMIZATION IN UAV-ASSISTED WIRELESS POWERED SENSOR NETWORKS: A DQN-BASED APPROACH.....	813
<i>Lingshan Liu, Ke Xiong, Yang Lu, Pingyi Fan, Khaled Ben Letaief</i>	
ACHIEVING VARIABLE 5G UPLINK BANDWIDTH FOR IOT APPLICATIONS.....	815
<i>Yuxiang Lin, Jiamei Lv, Yi Gao, Wei Dong</i>	

S2: A SMALL DELTA AND SMALL MEMORY DIFFERENCING ALGORITHM FOR REPROGRAMMING RESOURCE-CONSTRAINED IOT DEVICES	817
<i>Borui Li, Chenghao Tong, Yi Gao, Wei Dong</i>	
A REQUEST SCHEDULING OPTIMIZATION MECHANISM BASED ON DEEP Q-LEARNING IN EDGE COMPUTING ENVIRONMENTS	819
<i>Yaqiang Zhang, Rengang Li, Yaqian Zhao, Ruyang Li</i>	
DECENTRALISED INTERNET INFRASTRUCTURE: SECURING INTER-DOMAIN ROUTING (DEMO).....	821
<i>Miquel Ferriol Galmés, Albert Cabellos-Aparicio</i>	
DETECTING MALICIOUS HOSTS IN SDN THROUGH SYSTEM CALL LEARNING	823
<i>Danai Chasaki, Christopher Mansour</i>	
POSTER ABSTRACT: NEIGHBOR-AWARE QUEUE-BASED RANDOM ACCESS	825
<i>Qian Xia, Wei Wang, Lin Chen, Kang G. Shin, Zhaoyang Zhang</i>	
POSTER ABSTRACT: MMWAVE ON THE ROAD – FIELD TESTING IEEE 802.11AD WLAN AT 60 GHZ	827
<i>Florian Klingler, Max Schettler, Sigrid Dimce, Muhammad Sohaib Amjad, Falko Dressler</i>	
ENSEMBLE MACHINE LEARNING FOR INTRUSION DETECTION IN CYBER-PHYSICAL SYSTEMS	829
<i>Hongwei Li, Danai Chasaki</i>	
MULTI-JOB MULTI-EDGE ALLOCATION IN EDGE COMPUTING ENVIRONMENTS	831
<i>Shihao Li, Weiwei Miao, Zeng Zeng, Lei Wei, Chengling Jiang, Chuanjun Wang, Mingxuan Zhang</i>	
1024-QAM ANALOG WAVEFORM TRANSMISSION OVER A SEAMLESS FIBER-WIRELESS SYSTEM IN W BAND.....	833
<i>Pham Tien Dat, Atsushi Kanno, Naokatsu Yamamoto, Tetsuya Kawanishi</i>	
AN INTERACTIVE AND IMMERSIVE REMOTE EDUCATION PLATFORM BASED ON COMMODITY DEVICES	835
<i>Jiangong Chen, Feng Qian, Bin Li</i>	
SMART CONTRACT-ENABLED LIGHTCHAIN TEST NETWORK	837
<i>Yahya Hassanzadeh-Nazarabadi, Kedar Kshatriya, Öznur Özkasap</i>	
AN NS3-BASED ENERGY MODULE OF 5G NR USER EQUIPMENTS FOR MILLIMETER WAVE NETWORKS.....	839
<i>Argha Sen, Abhijit Mondal, Basabdatta Palit, Jay Jayatheerthan, Krishna Paul, Sandip Chakraborty</i>	
SWIFTS: A DEPENDENCY-AWARE AND RESOURCE EFFICIENT SCHEDULING FOR HIGH THROUGHPUT IN CLOUDS	841
<i>Jinwei Liu, Long Cheng</i>	
SHARING THE SURFACE: RIS-AIDED DISTRIBUTED MECHANISM DESIGN FOR HYBRID BEAMFORMING IN MULTI-CELL MULTI-USER NETWORKS.....	843
<i>Boya Di</i>	
AN EXPERIMENTATION PLATFORM FOR AUTOMATED ASSESSMENT OF MULTIMEDIA SERVICES OVER MOBILE NETWORKS	845
<i>Panagiotis Kostakis, Anastasios-Stavros Charismiadis, Dimitris Tsolkas, Harilaos Koumaras</i>	

MULTI-DOMAIN MEC ORCHESTRATION PLATFORM FOR ENHANCED BACK SITUATION AWARENESS	847
<i>Nina Slamnik-Kriještorac, Girma M. Yilma, F. Zarrar Yousaf, Marco Liebsch, Johann M. Marquez-Barja</i>	
FIND: AN SDR-BASED TOOL FOR FINE INDOOR LOCALIZATION.....	849
<i>Evgeny Khorov, Aleksey Kureev, Vladislav Molodtsov</i>	
A CREDIBLE SERVICE LEVEL AGREEMENT ENFORCEMENT FRAMEWORK FOR 5G EDGE	851
<i>Ramneek, Sangheon Park</i>	
SDR-BASED TESTBED FOR REAL-TIME CQI PREDICTION FOR URLLC	853
<i>Kirill Glinskiy, Aleksey Kureev, Evgeny Khorov</i>	
POSTER ABSTRACT: HIL MEETS COMMODITY HARDWARE – SIMBAR FOR COUPLING IEEE 802.11 RADIO CHANNELS.....	855
<i>Mario Franke, Florian Klingler</i>	
EXPERIMENTING IN A GLOBAL MULTI-DOMAIN TESTBED	857
<i>Esteban Municio, Mert Cevik, Paul Ruth, Johann M. Marquez-Barja</i>	
NOT ALL CONFLICTS ARE CREATED EQUAL: AUTOMATED ERROR RESOLUTION IN RPKI DEPLOYMENTS.....	859
<i>Tomas Hlavacek, Haya Shulman, Michael Waidner</i>	
SSLCHECKER	861
<i>Haya Shulman, Michael Waidner</i>	
FLEX: TRADING EDGE COMPUTING RESOURCES FOR FEDERATED LEARNING VIA BLOCKCHAIN.....	863
<i>Yang Deng, Tao Han, Ning Zhang</i>	
A LIGHTWEIGHT COMPRESSION-BASED ENERGY-EFFICIENT SMART METERING SYSTEM IN LONG-RANGE NETWORK	865
<i>Preti Kumari, Hari Prabhat Gupta, Tanimia Dutta</i>	
PRIVINFERVIS: TOWARDS ENHANCING TRANSPARENCY OVER ATTRIBUTE INFERENCE IN ONLINE SOCIAL NETWORKS.....	867
<i>Hervais Simo, Haya Shulman, Marija Schufrin, Steven Lamarr Reynolds, Jörn Kohlhammer</i>	
IMPROVING ADVERSARIAL ATTACKS AGAINST EXECUTABLE RAW BYTE CLASSIFIERS	869
<i>Justin Burr, Shengjie Xu</i>	
A DEEP LEARNING BASED TRAFFIC FLOW CLASSIFICATION WITH JUST A FEW PACKETS	871
<i>Ashish Gupta, Hari Prabhat Gupta, Tanimia Dutta</i>	
PRIVACY POLICIES OF MOBILE APPS - A USABILITY STUDY	873
<i>Maxim Anikeev, Haya Shulman, Hervais Simo</i>	
A CONSENSUS PROTOCOL WITH DETERMINISTIC FINALITY	875
<i>Yahya Hassanzadeh-Nazarabadi, Sanaz Taheri-Boshrooyeh</i>	

A NETWORK RESOURCE AWARE FEDERATED LEARNING APPROACH USING KNOWLEDGE DISTILLATION	877
<i>Rahul Mishra, Hari Prabhat Gupta, Tanima Dutta</i>	

ENHANCING THE HANDOVER PERFORMANCE IN HETEROGENEOUS HIGH-SPEED RAILWAY COMMUNICATION NETWORKS: A BAYESIAN-BASED METHOD	879
<i>Rui Ma, Ke Xiong, Yang Lu</i>	

Author Index