

**2019 IEEE International Conference
on Parallel & Distributed Processing
with Applications, Big Data & Cloud
Computing, Sustainable Computing
& Communications, Social
Computing & Networking
(ISPA/BDCLOUD/SustainCom/SocialCom 2019)**

**Xiamen, China
16-18 December 2019**

Pages 1-830



**IEEE Catalog Number: CFP1952Z-POD
ISBN: 978-1-7281-4329-3**

**Copyright © 2019 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:	CFP1952Z-POD
ISBN (Print-On-Demand):	978-1-7281-4329-3
ISBN (Online):	978-1-7281-4328-6

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Proceedings

**2019 IEEE Intl Conf on Parallel & Distributed
Processing with Applications, Big Data & Cloud
Computing, Sustainable Computing &
Communications, Social Computing & Networking**

**ISPA/BDCloud/SustainCom/
SocialCom 2019**

Xiamen, China
16-18 December 2019



IEEE COMPUTER SOCIETY
**CONFERENCE
PUBLISHING
SERVICES**

Los Alamitos, California
Washington • Tokyo



IEEE
**COMPUTER
SOCIETY**

Proceedings

**2019 IEEE Intl Conf on Parallel & Distributed
Processing with Applications, Big Data & Cloud
Computing, Sustainable Computing &
Communications, Social Computing & Networking**

**ISPA/BDCloud/SustainCom/
SocialCom 2019**

**Xiamen, China
16-18 December 2019**

**2019 IEEE Intl Conf on Parallel
& Distributed Processing with
Applications, Big Data & Cloud
Computing, Sustainable
Computing & Communications,
Social Computing & Networking
(ISPA/BDCloud/SustainCom/SocialCom)
ISPA-BDCloud-SustainCom-
SocialCom 2019**

Table of Contents

Message from General Chairs	xxxvii
Message from Program Chairs	xxxviii
ISPA 2019 Organizing Committee	xxxix
BDCloud 2019 Organizing Committee	xl
SocialCom 2019 Organizing Committee	xli
SustainCom 2019 Organizing Committee	xlii
Program Committee	xliii
Sponsors	xlviii

17th International Symposium on Parallel and Distributed Processing with Applications

Session A: Systems and Architectures

Regular Papers

Differentially Private Auctions for Private Data Crowdsourcing	1
<i>Mingyu Shi (Zhengzhou University of Light Industry), Yu Qiao (Nanjing University), and Xinbo Wang (Peking University)</i>	
An Improved LFM Algorithm Based on Fitness Function and Community Similarity	9
<i>Lingxiao Zhang (Nanjing University of Aeronautics and Astronautics) and Xuefeng Yan (Nanjing University of Aeronautics and Astronautics)</i>	

The Impact of Application Mapping on Non-Random and Random Network Topologies	16
<i>Yao Hu (National Institute of Informatics, Japan) and Michihiro Koibuchi (National Institute of Informatics, Japan)</i>	
Understanding the Performance of In-Network Computing: A Case Study	26
<i>Fan Yang (Institute of Computing Technology, Chinese Academy of Sciences), Zhan Wang (Institute of Computing Technology, Chinese Academy of Sciences), Xiaoxiao Ma (Institute of Computing Technology, Chinese Academy of Sciences), Guojun Yuan (Institute of Computing Technology, Chinese Academy of Sciences), and Xuejun An (Institute of Computing Technology, Chinese Academy of Sciences)</i>	
SwitchAgg: A Further Step Towards In-Network Computing	36
<i>Fan Yang (Institute of Computing Technology, Chinese Academy of Sciences), Zhan Wang (Institute of Computing Technology, Chinese Academy of Sciences), Xiaoxiao Ma (Institute of Computing Technology, Chinese Academy of Sciences), Guojun Yuan (Institute of Computing Technology, Chinese Academy of Sciences), and Xuejun An (Institute of Computing Technology, Chinese Academy of Sciences)</i>	
ExpressPass++: Credit-Efficient Congestion Control for Data Centers	46
<i>Zeji Zhou (National University of Defense Technology), Dezun Dong (National University of Defense Technology), Shan Huang (National University of Defense Technology), and Zihao Wei (National University of Defense Technology)</i>	
Cloud Resource Provision of Competitive Content Providers: Models and Analysis	53
<i>Xiaodong Dong (Tianjin University), Xiaobo Zhou (Tianjin University), Laiping Zhao (Tianjin University), and Keqiu Li (Tianjin University)</i>	
Self-Adaptive Address Mapping Mechanism for Access Pattern Awareness on DRAM	61
<i>Chundian Li (University of Chinese Academy of Sciences, China), Mingzhe Zhang (Institute of Computing Technology, CAS, Beijing, China), Zhiwei Xu (Institute of Computing Technology, CAS, Beijing, China), and Xianhe Sun (Illinois Institute of Technology, USA)</i>	
Dynamic Virtual Machine Number Selection for Processing-Capacity Constrained Workflow Scheduling in Cloud Computing Environments	71
<i>Emmanuel Buggingo (Xiamen University), Wei Zheng (Xiamen University), Defu Zhang (Xiamen University), and Jinjun Chen (Swinburne University of Technology)</i>	
Latency Optimization for Mobile Edge Computing with Dynamic Energy Harvesting	79
<i>Yifei Sun (Guangdong University of Technology, China), Jigang Wu (Guangdong University of Technology, China), Long Chen (Guangdong University of Technology, China), Tonglai Liu (Guangxi Key Laboratory of Cryptography and Information Security, China), Mianyang Yao (Guangdong University of Technology, China), and Weijun Sun (Guangdong University of Technology, China)</i>	
To Shift Tasks or To Shift Energy by ESDs? An Economical Scheduling for Cloud Data Center	84
<i>Chonglin Gu (The Chinese University of Hong Kong, Shenzhen), Yi Chen (The Chinese University of Hong Kong, Shenzhen), Wenyue Li (The Chinese University of Hong Kong, Shenzhen), and Chunyan Liu (Nanjing University of Aeronautics and Astronautics)</i>	

Accurate and Automatic Detection of Oblique RFID-Enabled Objects in Mobile Manner	92
<i>Chuanqing Zhang (Tianjin University), Zijuan Liu (Tianjin University), and Keqiu Li (Tianjin University)</i>	
An Efficient Secure Coded Edge Computing Scheme Using Orthogonal Vector	100
<i>Wei Zhou (Soochow University), Jin Wang (Soochow University), Lingzhi Li (Soochow University), Jianping Wang (City University of Hong Kong), Kejie Lu (University of Puerto Rico at Mayaguez), and Xiaobo Zhou (Tianjin University)</i>	
Feature Reorganization Based Human Activity Recognition in IoT-Enabled Applications	108
<i>Min Zhou (Guangdong University of Technology, China), Ming Tao (Dongguan University of Technology, China), and Pinghua Chen (Guangdong University of Technology, China)</i>	
TaskAlloc: Online Tasks Allocation for Offloading in Energy Harvesting Mobile Edge Computing	116
<i>Songtao Guo (Chongqing University), Qiucen Jiang (Chongqing University), Yifan Dong (Chongqing University), and Quyuan Wang (Chongqing University)</i>	
A Time-Driven Workflow Scheduling Strategy for Reasoning Tasks of Autonomous Driving in Edge Environment	124
<i>Kai Lin (Fujian Normal University), Bing Lin (Fujian Normal University), Xing Chen (Fuzhou University), Yu Lu (Fujian Normal University), Zhigao Huang (Fujian Normal University), and Yuchang Mo (Huaqiao University)</i>	
Green Power Constrained Scheduling for Sequential Independent Tasks on Identical Parallel Machines	132
<i>Laurent Philippe (Université de Franche-Comté), Jean-Marc Nicod (Université de Franche-Comté), Laurent Philippe (Université de Franche-Comté), and Veronika Rehn-Sonigo (Université de Franche-Comté)</i>	
Prediction Method of Energy Consumption Based on Multiple Energy-Related Features in Data Center	140
<i>Yang Liang (Central South University, Changsha, China) and Zhigang Hu (Central South University, Changsha, China)</i>	
Perishable Digital Goods Trading Mechanism for Blockchain- Based Vehicular Network	147
<i>Rui Xi (Sun Yat-sen University, China), Kang Liu (Sun Yat-sen University, China), Shuo Liu (Sun Yat-sen University, China), Wuhui Chen (Sun Yat-sen University, China), and Shenghui Li (Sun Yat-sen University, China)</i>	
Low-Latency Cooperative Computation Offloading for Mobile Edge Computing	155
<i>Xinxiang Zhang (Guangdong University of Technology), Jigang Wu (Guangdong University of Technology), Wenjun Shi (Zhengzhou University of Light Industry), Yalan Wu (Guangdong University of Technology), and Yuqing Miu (Guangxi Key Laboratory of Cryptography and Information Security)</i>	
Game-Based Attack Defense Model to Provide Security for Relay Selection in 5G Mobile Networks	160
<i>Wided Boubakri (Communication Networks and Security research Lab, University of Carthage, Tunisia), Walid Abdallah (Communication Networks and Security research Lab, University of Carthage, Tunisia), and Noureddine Boudriga (Communication Networks and Security research Lab, University of Carthage, Tunisia)</i>	

Asymmetry & Locality-Aware Cache Bypass and Flush for NVM-Based Unified Persistent Memory	168
<i>Yuanchao Xu (Capital Normal University, China), Yuanyuan Xu (Capital Normal University, China), Min Tang (Capital Normal University, China), Liangliang Zhang (Capital Normal University, China), and Yazhu Lan (Institute of Computing Technology, CAS, China)</i>	
Task Offloading and Service Migration Strategies for User Equipments with Mobility Consideration in Mobile Edge Computing	176
<i>Yan Ding (Hunan University, China.), Chubo Liu (Hunan University, China.), Kenli Li (Hunan University, China.), Zhuo Tang (Hunan University, China.), and Keqin Li (Hunan University, China.)</i>	
Tensor Layout Optimization of Convolution for Inference on Digital Signal Processor	184
<i>Xiaoyang Zhang (Institute of Computing Technology, Chinese Academy of Sciences), Junmin Xiao (Institute of Computing Technology, Chinese Academy of Sciences), Xiaobin Zhang (Megvii Technology Co., Ltd.), Zhongzhe Hu (Institute of Computing Technology, Chinese Academy of Sciences), Hongrui Zhu (Institute of Computing Technology, Chinese Academy of Sciences), Zhongbo Tian (Megvii Technology Co., Ltd.), and Guangming Tan (Institute of Computing Technology, Chinese Academy of Sciences)</i>	
Multi-Granularity Power Prediction for Data Center Operations via Long Short-Term Memory Network	194
<i>Ziyu Shen (Nanjing University of Posts and Telecommunications), Xusheng Zhang (Nanjing University of Posts and Telecommunications), Bin Xia (Nanjing University of Posts and Telecommunications), Zheng Liu (Nanjing University of Posts and Telecommunications), and Yun Li (Nanjing University of Posts and Telecommunications)</i>	
Mobility-Aware Resource Allocation in Multi-Access Edge Computing Using Deep Reinforcement Learning ..	202
<i>Najamul Din (Shanghai Jiao Tong University, Shanghai), Haopeng Chen (Shanghai Jiao Tong University, Shanghai), and Daud Khan (Shanghai Jiao Tong University, Shanghai)</i>	
Register before Publishing with Smart Forwarding, Mitigate Content Poisoning Attack in ICN	210
<i>Pengfei Yue (Inner Mongolia University, China), Ru Li (Inner Mongolia University, China), and Bin Pang (Inner Mongolia University, China)</i>	
Intelligent Identification Method for Natural Disasters along Transmission Lines Based on Inter-Frame Difference and Regional Convolution Neural Network	218
<i>Fangrong Zhou (Electric Power Research Institute Yunnan Power Grid Company Ltd.), Junbo Huang (Yunnan Power Grid Co., Ltd. Yunnan, China), Bing Sun (Yunnan Power Grid Co., Ltd. Yunnan, China), Gang Wen (Electric Power Research Institute Yunnan Power Grid Company Ltd.), and Ye Tian (Electric Power Research Institute Yunnan Power Grid Company Ltd.)</i>	

Workshop Papers

A Message-Oriented Message Dissemination and Authentication Scheme for Vehicular Ad Hoc Networks	223
<i>Xincheng Li (Yangzhou University, China), Yali Liu (Yangzhou University, China), and Xinchun Yin (Yangzhou University, China)</i>	

Random Label Based Security Authentication Mechanism for Large-Scale UAV Swarm	229
<i>Liangjun Liu (Nanjing University of Aeronautics and Astronautics, China), Hongyan Qian (Nanjing University of Aeronautics and Astronautics, China), and Feng Hu (Nanjing University of Aeronautics and Astronautics, China)</i>	
Physical Layer Security of Digital Front End Based Internet of Things Communication in Power Systems.....	236
<i>Gaopeng Yan (Shanghai Jiao Tong University), Zian Wang (Nanjing University of Posts and Telecommunications), Yongan Qian (Jiangxi Institute of Metrology and Testing), and Yongpeng Wu (Shanghai Jiao Tong University)</i>	
Content Aware Task Scheduling Framework for Mobile Workflow Applications in Heterogeneous Mobile-Edge-Cloud Paradigms: CATSA Framework	242
<i>Abdullah Lakhan (Southeast University China) and Xiaoping Li (Southeast University China)</i>	
Traffic Image Acquisition and Compression Technology in Vehicular Ad Hoc Network	250
<i>Fu Pang (Inner Mongolia University, China) and Xiangyu Bai (Inner Mongolia University, China)</i>	
Robot-Assisted Sensor Relocation for Confident Information Coverage in Wireless Sensor and Robot Networks	256
<i>Lihua Zhu (School of Electrical Engineering, University of South China), Minghua Wang (Cooperative Innovation Center for Nuclear, Fuel Cycle Technology and Equipment), Kaiwu Jiang (School of Electrical Engineering, University of South China), Xianjun Deng (School of Electrical Engineering, University of South China), Lingzhi Yi (Cooperative Innovation Center for Nuclear, Fuel Cycle Technology and Equipment), Xiangbai Liao (School of Electrical Engineering, University of South China), and Chao Wang (School of Electrical Engineering, University of South China)</i>	
Formal Modeling and Verification of Scalable Process-Aware Distributed IoT Applications	263
<i>Rakesh Jain (IBM Almaden Research Center, USA), Rakesh Jain (LIPN, CNRS UMR 7030, Université Paris 13, France), Kais Klai (IBM Almaden Research Center, USA), and Samir Tata (LG Silicon Valley Lab, USA)</i>	
Identifying Interpretable Link Communities with User Interactions and Messages in Social Networks	271
<i>Wei Li (ICNLAB, School of Electronics and Computer Engineering (SECE), Peking University), Meng Qin (ICNLAB, School of Electronics and Computer Engineering (SECE), Peking University), and Kai Lei (ICNLAB, School of Electronics and Computer Engineering (SECE), Peking University)</i>	
A High Efficiency Network Using DAG and Consensus in Blockchain	279
<i>Kaituo Cao (Hangzhou Dianzi University), Fei Lin (Hangzhou Dianzi University), Chaohui Qian (Hangzhou Dianzi University), and Keyu Li (Hangzhou Dianzi University)</i>	
Measuring the Coexistence Competitiveness of ECN- or RTT-Based ExpressPass and TCP in Data Centers	286
<i>Zihao Wei (Computer Science School, National University of Defense Technology, China), Dezun Dong (Computer Science School, National University of Defense Technology, China), Shan Huang (Computer Science School, National University of Defense Technology, China), and Liquan Xiao (Computer Science School, National University of Defense Technology, China)</i>	

Session B: Technologies and Tools

Regular Papers

Data Optimization CNN Accelerator Design on FPGA	294
<i>Wei Hu (Wuhan University of Science and Technology), Shuang Chen (Wuhan University of Science and Technology), Zhenhao Li (Wuhan University of Science and Technology), Tianyi Liu (Wuhan University of Science and Technology), and Yining Li (Wuhan University of Science and Technology)</i>	
DATRA: A Power-Aware Dynamic Adaptive Threshold Routing Algorithm for Dragonfly Network-on-Chip Topology	300
<i>Songwen Pei (University of Shanghai for Science and Technology, China), Jihong Yuan (University of Shanghai for Science and Technology, China), Yanfei Ji (University of Shanghai for Science and Technology, China), and Tianma Shen (University of Shanghai for Science and Technology, China)</i>	
SwiftFabric: Optimizing Fabric Private Data Transaction Flow TPS	308
<i>Mingxuan Li (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China; School of Cyber Security, University of Chinese Academy of Sciences, Beijing, China), Dongdong Huo (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China; School of Cyber Security, University of Chinese Academy of Sciences, Beijing, China), Chao Liu (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China; School of Cyber Security, University of Chinese Academy of Sciences, Beijing, China), Han Wang (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China; School of Cyber Security, University of Chinese Academy of Sciences, Beijing, China), Yazhe Wang (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China), Yu Wang (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China), Ping Zou (Beijing Aerospace Smart Manufacturing Technology Development Co., Ltd, Beijing China), Yandong Li (Beijing Aerospace Smart Manufacturing Technology Development Co., Ltd, Beijing China), and Zhen Xu (Institute of Information Engineering, Chinese Academy of Sciences, Beijing, China)</i>	
Multi-Parameter Performance Modeling Based on Machine Learning with Basic Block Features	316
<i>Meng Hao (Harbin Institute of Technology, China), Weizhe Zhang (Harbin Institute of Technology, China), Yiming Wang (Harbin Institute of Technology, China), Dong Li (University of California, Merced), Wen Xia (Harbin Institute of Technology, China), Hao Wang (Norwegian University of Science and Technology, Norway), and Chen Lou (Harbin Institute of Technology, China)</i>	
The Vessel Tree Segmentation for Retinal Image via Matched Filter Combining Enhanced Frame	324
<i>Heng Dong (Fuzhou Institute of Technology) and Lifang Wei (Fujian Agriculture and Forestry University)</i>	

Cost Efficient Offloading Strategy for DNN-Based Applications in Edge-Cloud Environment	331
<i>Yinhao Huang (Fuzhou University, China), Bing Lin (Fujian Normal University, China), Yongjie Zheng (Fuzhou University, China), Junqin Hu (Fuzhou University, China), Yuchang Mo (Huaqiao University, China), and Xing Chen (Fuzhou University, China)</i>	
Fine-Grained Flow Scheduling in WDM Optical Cut-Through Switches	338
<i>Zheming Zhang (Xiamen University), Weining Dai (Xiamen University), Siying Cheng (Xiamen University), Lisha Chen (Xiamen University), Congren Lin (Xiamen University), and Yuanyuan Yang (Stony Brook University)</i>	
Smart DAG Task Scheduling with Efficient Pruning-Based MCTS Method	348
<i>Kui Liu (Hangzhou Dianzi University), Zhiwei Wu (Hangzhou Dianzi University), Qing Wu (Hangzhou Dianzi University), and Yuxia Cheng (Hangzhou Dianzi University)</i>	
Run Data Run! Re-Distributing Data via Piggybacking for Geo-Distributed Data Analytics	356
<i>Yefei Li (Nanjing University, China), Yibo Jin (Nanjing University, China), Haiyang Chen (State Grid Electric Power Research Institute, China), Wenchao Xi (State Grid Electric Power Research Institute, China), Mingtao Ji (Nanjing University, China), Sheng Zhang (Nanjing University, China), Zhuzhong Qian (Nanjing University, China), and Sanglu Lu (Nanjing University, China)</i>	
Resource-Aware Cache Management for In-Memory Data Analytics Frameworks	364
<i>Zhengyang Zhao (Beijing University of Posts and Telecommunications), Haitao Zhang (Beijing University of Posts and Telecommunications), Xin Geng (Beijing University of Posts and Telecommunications), and Huadong Ma (Beijing University of Posts and Telecommunications)</i>	
Fast Finding Optimal Redundancy to Satisfy Reliability Requirement for Safety-Critical Parallel Applications on Heterogeneous Distributed Automotive Systems	372
<i>Lizan Wang (Xiangtan University, China), Jiang Zhu (Xiangtan University, China), Shujuan Tian (Xiangtan University, China), Tingrui Pei (Xiangtan University, China), Haolin Liu (Xiangtan University, China), and Yinying Li (Xiangtan University, China)</i>	
Personality-Aware VNF Deployment for Profit Maximization	380
<i>Ruiming Yang (East China Normal University, China), Kun Cao (East China Normal University, China), Peijin Cong (East China Normal University, China), Junlong Zhou (Nanjing University of Science and Technology, China), Mingsong Chen (East China Normal University, China), and Tongquan Wei (East China Normal University, China)</i>	
SAED: A Self-Adaptive Encryption and Decryption Architecture	388
<i>Youbing Zhong (Institute of Information Engineering, Chinese Academy of Sciences), Zhou Zhou (Institute of Information Engineering, Chinese Academy of Sciences), Da Li (University of Missouri-Columbia, USA), Meijun Guo (School of Mathematical Sciences, University of Chinese Academy of Sciences), Qingyun Liu (Institute of Information Engineering, Chinese Academy of Sciences), Yang Liu (Institute of Information Engineering, Chinese Academy of Sciences), and Li Guo (Institute of Information Engineering, Chinese Academy of Sciences)</i>	

Task Decomposition and Parallelization Planning for Automotive Power-Train Applications	398
<i>Zijun Han (Oakland University), Guangzhi Qu (Oakland University), Bo Liu (Beijing University of Technology), and Feng Zhang (China University of Geosciences)</i>	
Multi-Resource Fair Allocation for Compositied Services in Edge Micro-Clouds	405
<i>Tongyu Guo (Beijing University of Posts and Telecommunications), Haitao Zhang (Beijing University of Posts and Telecommunications), Han Huang (Beijing University of Posts and Telecommunications), Jianli Guo (Science and Technology on Communication Networks Laboratory), and Chenze He (Science and Technology on Communication Networks Laboratory)</i>	
A Ciphertext Policy Attribute Based Signcryption Scheme with Secure and Flexible Key Evolving	413
<i>Hanshu Hong (Nanjing University of Posts and Telecommunications), Xiaokang Zhou (Faculty of Data Science, Shiga University), Bing Hu (Nanjing University of Posts and Telecommunications), and Zhixin Sun (Nanjing University of Posts and Telecommunications)</i>	
Fast, Dynamic and Robust Byzantine Fault Tolerance Protocol for Consortium Blockchain	419
<i>Anping Song (Shanghai University, China), Jing Wang (Shanghai University, China), Wenjing Yu (Shanghai University, China), Yi Dai (Shanghai University, China), and Hongtao Zhu (Shanghai University, China)</i>	
An Improved Quantum Genetic Algorithms and Application for DDoS Attack Detection	427
<i>Changqing Gong (Shenyang Aerospace University), Tongyao Shi (Shenyang Aerospace University), Ming Mu (Shenyang Aerospace University), Liang Zhao (Shenyang Aerospace University), Abdullah Gani (University of Malaya), and Han Qi (Shenyang Aerospace University)</i>	
A Conflict Detection Method for IPv6 Time-Based Firewall Policy	435
<i>Xue Zhang (School of Computer Science and Technology, Nanjing Normal University), Yi Yin (School of Computer Science and Technology, Nanjing Normal University), Wei Liu (School of Computer Science and Technology, Nanjing Normal University), Zhizhen Peng (School of Computer Science and Technology, Nanjing Normal University), Guoqiang Zhang (School of Computer Science and Technology, Nanjing Normal University), Yun Wang (School of Computer Science and Engineering, Southeast University), Yuichiro Tateiwa (Department of Computer Science and Engineering, Nagoya Institute of Technology), and Naohisa Takahashi (Department of Computer Science and Engineering, Nagoya Institute of Technology)</i>	
Buffer Management for Identifying Crypto-Ransomware Attack in Environment with No Semantic Information	443
<i>Joon-young Paik (Computer Science and Technology, Tiangong University), Joong-Hyun Choi (Department of Computer Science & Engineering, Chungnam National University), Rize Jin (Computer Science and Technology, Tiangong University), Jianming Wang (Computer Science and Technology, Tiangong University), and Eun-Sun Cho (Department of Computer Science & Engineering, Chungnam National University)</i>	

Fault-Tolerant Cycle Embedding into 3-Ary n-Cubes with Structure Faults	451
<i>Weibei Fan (Nanjing University of Posts and Telecommunications), Yang Wang (Nanjing University of Posts and Telecommunications), Jing Sun (Nanjing University of Posts and Telecommunications), Zhijie Han (Henan University), Peng Li (Nanjing University of Posts and Telecommunications), and Ruchuan Wang (Nanjing University of Posts and Telecommunications)</i>	
Using Resource Use Data and System Logs for HPC System Error Propagation and Recovery Diagnosis	458
<i>Edward Chuah (The Alan Turing Institute & The University of Warwick), Arshad Jhumka (The University of Warwick & The Alan Turing Institute), Samantha Alt (Intel Corporation), J.J. Villalobos (Rutgers University), Joshua Fryman (Intel Corporation), William Barth (Texas Advanced Computing Center), and Manish Parashar (Rutgers University)</i>	
Indoor Fingerprinting Positioning Based on the Least Anticipation Loss	468
<i>Ayong Ye (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University), Jianfei Shao (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University), Yiqing Diao (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University), Lingyu Meng (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University), Jiaomei Zhang (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University), and Li Xu (Fujian Provincial Key Lab of Network Security and Cryptology Mathematics and Informatics Department Fujian Normal University)</i>	
A Variable Batch Size Strategy for Large Scale Distributed DNN Training	476
<i>Zhongzhe Hu (Institute of Computing Technology, Chinese Academy of Sciences), Junmin Xiao (Institute of Computing Technology, Chinese Academy of Sciences), Zhongbo Tian (Megvii Technology Co., Ltd.), Xiaoyang Zhang (Institute of Computing Technology, Chinese Academy of Sciences), Hongrui Zhu (Institute of Computing Technology, Chinese Academy of Sciences), Chengji Yao (Megvii Technology Co., Ltd.), Ninghui Sun (Institute of Computing Technology, Chinese Academy of Sciences), and Guangming Tan (Institute of Computing Technology, Chinese Academy of Sciences)</i>	
An Intelligent Parallel Hybrid Algorithm for Multi-Objective Multi-Period Portfolio Selection Models with Fuzzy Random Returns	486
<i>Chen Li (University of Chinese Academy of Sciences, China), Yulei Wu (University of Exeter, UK), Zhonghua Lu (Computer Network Information Center, Chinese Academy of Sciences, China), and Yonghong Hu (Central University of Finance and Economics, China)</i>	
A Versatile Acceleration Framework for Machine Learning Algorithms	493
<i>Xianfeng Li (Peking University Shenzhen Graduate School, China) and Yuanxun Wang (Peking University Shenzhen Graduate School, China)</i>	
Ratio and Partition are Revealed in Proposed Graph on Reduced Collatz Dynamics	501
<i>Wei Ren (China University of Geosciences (Wuhan), China)</i>	

swMD: Performance Optimizations for Molecular Dynamics Simulation on Sunway Taihulight	511
<i>Kun Li (Institute of Computing Technology, Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), Shigang Li (ETH Zurich, Switzerland), Bei Wang (Peking University, China), Yifeng Chen (Peking University, China), and Yunquan Zhang (Institute of Computing Technology, Chinese Academy of Sciences, China)</i>	
CUDA Optimization Method for Activation Function in Convolution Operation	519
<i>Lubin Feng (College of Computer Science and Engineering, Shandong University of Science and Technology), Dulei Zheng (College of Computer Science and Engineering, Shandong University of Science and Technology), and Jianzhi Yu (College of Computer Science and Engineering, Shandong University of Science and Technology)</i>	
Parallel Computation of Division over GF(2 ⁿ) Covering Divide-by-Zero Based on Tile Assembly Model	526
<i>Yongnan Li (People's Public Security University of China) and Limin Xiao (School of Computer Science and Engineering, Beihang University, Beijing)</i>	
Improvement of Quantum Genetic Algorithms and Application of DDoS Attack Detection	534
<i>Changqing Gong (School of Computer Science Shenyang Aerospace University, China), Tongyao Shi (School of Computer Science Shenyang Aerospace University, China), Ming Mu (School of Computer Science Shenyang Aerospace University, China), Liang Zhao (School of Computer Science Shenyang Aerospace University, China), Abdullah Gani (University of Malaya, Malaysia), and Han Qi (School of Computer Science Shenyang Aerospace University, China)</i>	

Workshop Papers

The Quantum Shor Algorithm Simulated on FPGA	542
<i>Xin Zhang (State Key Laboratory of High-End Server & Storage Technology, China), YaQian Zhao (State Key Laboratory of High-End Server & Storage Technology, China), RenGang Li (State Key Laboratory of High-End Server & Storage Technology, China), XueLei Li (State Key Laboratory of High-End Server & Storage Technology, China), ZhenHua Guo (State Key Laboratory of High-End Server & Storage Technology, China), XiaoMin Zhu (State Key Laboratory of High-End Server & Storage Technology, China), and Gang Dong (State Key Laboratory of High-End Server & Storage Technology, China)</i>	
Gdarts: A GPU-Based Runtime System for Dataflow Task Programming on Dependency Applications	547
<i>Mingfan Li (University of Science and Technology of China, Hefei, China), Qingcai Jiang (University of Science and Technology of China, Hefei, China), Han Lin (University of Science and Technology of China, Hefei, China), and Hong An (University of Science and Technology of China, Hefei, China)</i>	
Fast Schedule Tensor Computation on GPU with High Data Reuse and Device Utilization	553
<i>Yuxiang Zhang (University of Science and Technology of China) and Yu Zhang (University of Science and Technology of China)</i>	

Single Image Super-Resolution Reconstruction of Enhanced Loss Function with Multi-GPU Training	559
<i>Jianqiang Huang (Department of Computer Technology and Application, Qinghai University), Kaili Li (Department of Computer Technology and Application, Qinghai University), and Xiaoying Wang (Department of Computer Technology and Application, Qinghai University)</i>	
Evaluation of TSN Dynamic Configuration Model for Safety-Critical Applications	566
<i>Maryam Pahlevan (University of Siegen), Jonas Schmeck (University of Siegen), and Roman Obermaisser (University of Siegen)</i>	
Scheduling Multiple Workflows with Time Constraints onto Cloud Computing Resources	572
<i>Wei Zheng (Xiamen University), Lin Shen (Xiamen University), Emmanuel Bugingo (Xiamen University), and Dongzhan Zhang (Xiamen University)</i>	
Workload-Aware Scheduling for Data Analytics upon Heterogeneous Storage	580
<i>Zhuzhong Qian (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), Yuan Gao (NARI Research Institute, NARI Group Corporation(State Grid Electric Power Research Institute), Nanjing ; System R&D Center, NARI Technology Co. Ltd., Nanjing ; State Key Laboratory of Smart Grid Protection and Control, NARI Group Corporation, Nanjing), Mingtao Ji (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), Hui Peng (NARI Research Institute, NARI Group Corporation(State Grid Electric Power Research Institute), Nanjing ; System R&D Center, NARI Technology Co. Ltd., Nanjing ; State Key Laboratory of Smart Grid Protection and Control, NARI Group Corporation, Nanjing), Peng Chen (NARI Research Institute, NARI Group Corporation(State Grid Electric Power Research Institute), Nanjing ; System R&D Center, NARI Technology Co. Ltd., Nanjing ; State Key Laboratory of Smart Grid Protection and Control, NARI Group Corporation, Nanjing), Yibo Jin (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China), and Sanglu Lu (State Key Laboratory for Novel Software Technology, Nanjing University, Nanjing, China)</i>	
List Scheduling Algorithm Based on Pre-Scheduling for Heterogeneous Computing	588
<i>Yi Zhao (University of Chinese Academy of Sciences, China; Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China), Suzhi Cao (Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China), and Lei Yan (Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China)</i>	
RPMSF: A Novel Replica Placement Method Inspired by Self-Similarity Propagation of Plants	596
<i>Xingjia Yuan (South China University of Technology) and Yuelong Zhao (South China University of Technology)</i>	
CSF: An Efficient Parallel Deduplication Algorithm by Clustering Scattered Fingerprints	602
<i>Hao Fan (Tianjin University of Technology), Guangping Xu (Tianjin University of Technology), Yi Zhang (Tianjin University of Technology), Liming Yuan (Tianjin University of Technology), and Yanbing Xue (Tianjin University of Technology)</i>	

Improving Security Data Access Control for Multi-Authority Cloud Storage	608
<i>Jian Wang (Chongqing University, China), Kehua Wu (Chongqing Ecological Environment Bureau, China), Chunxiao Ye (Chongqing University, China), Xiaofeng Xia (Chongqing University, China), and Fei Ouyang (Chongqing University, China)</i>	
DDM: A Demand-Based Dynamic Mitigation for SMT Transient Channels	614
<i>Yue Zhang (Institute of Information Engineering, Chinese Academy of Sciences), Ziyuan Zhu (Institute of Information Engineering, Chinese Academy of Sciences), and Dan Meng (Institute of Information Engineering, Chinese Academy of Sciences)</i>	
Convolutional Neural Network with Character Embeddings for Malicious Web Request Detection	622
<i>Jiahong Wu (Guangdong University of Technology), Zhenguo Yang (Guangdong University of Technology), Lingni Guo (Guangdong University of Technology), Yong Li (Guangdong University of Technology), and Wenyin Liu (Guangdong University of Technology)</i>	
Fault Detection and Diagnosis in HVAC Systems Using Diagnostic Multi-Query Graphs	628
<i>Nadra Tabassam (University of Siegen, Germany), Sarah Amin (University of Siegen, Germany), and Roman Obermaisser (University of Siegen, Germany)</i>	
A Privacy-Preserving and Robust Reputation System Based on Blockchain	634
<i>Shuai Sun (Northeastern University), Yuan Liu (Northeastern University), and Guibing Guo (Northeastern University)</i>	
Model Checking for the Goal-Feedback-Result Pattern in ROS	640
<i>Wei Wei (Capital Normal University, China), Xiaojuan Li (Capital Normal University, China), Yong Guan (Capital Normal University, China), Rui Wang (Capital Normal University, China), Qian Lu (Capital Normal University, China), and Jie Zhang (Beijing University of ChemicalTechnology)</i>	
MIC-THPCM: MIC-Based Heterogeneous Parallel Optimization for Axial Compressor Rotor	646
<i>Yu Lei (Xi'an Jiaotong University, China), Xingjun Zhang (Xi'an Jiaotong University, China), Li Han (Xi'an Jiaotong University, China), Xiaoshe Dong (Xi'an Jiaotong University, China), and Jingbo Li (Xi'an Jiaotong University, China)</i>	
i2Graph: An Incremental Iterative Computation Model for Large Scale Dynamic Graphs	654
<i>Zhuo Tang (College of Computer Science and Electronic Engineering, Hunan University), Mengsi He (College of Computer Science and Electronic Engineering, Hunan University), Li Yang (College of Computer and Communication Engineering, Changsha University of Science and Technology), and Zhongming Fu (College of Computer Science and Electronic Engineering, Hunan University)</i>	
Performance Comparison of GPU-Accelerated Fast Motion Estimation Method	660
<i>Pengcheng Chen (Southwest Petroleum University, China), Bo Peng (Southwest Petroleum University, China), Anxin Zou (Chongqing Electric Power Company, China), and Luwen Xu (Chongqing Electric Power Company, China)</i>	

An Improved Programming Model for Thread-Level Speculation	666
<i>Bin Liu (Northwest A&F University, China), Hao Yang (Northwest A&F University, China), Li Yuancheng (Xi'an University of Science and Technology, China), Li Yuxiang (Henan University of Science and Technology, China), Niu Dangdang (Northwest A&F University, China), and Lv Zhiming (Northwest A&F University, China)</i>	
Collaborative Filtering Algorithm Based on Rating Prediction and User Characteristics	673
<i>Na Song (Qilu University of Technology), Qin Lu (Qilu University of Technology), and Zhihao Zhang (Qilu University of Technology)</i>	
Distributed Parallelizability Analysis and Optimization of Legacy Code in Cloud Migration	679
<i>Junfeng Zhao (College of Computer Science Inner Mongolia University ;Inner Mongolia Engineering Laboratory for Cloud Computing and Service Software, China), Ziyang Qin (College of Computer Science Inner Mongolia University, China), and Hongji Yang (Department of Informatics University of Leicester, England)</i>	
A Distributed Content Placement Strategy Based on Popularity for ICN	685
<i>Yingqi Li (Inner Mongolia University, China), Ru Li (Inner Mongolia University, China), and Meiju Yu (Inner Mongolia University, China)</i>	

Session C: Applications

Regular Papers

Attitude Tracking Control for Rigid-Body Aircraft System Based on Neural Network with Bounded Disturbance Environment	690
<i>Qiping Wang (Fujian Agriculture And Forestry University), Ning Zhou (Fujian Agriculture And Forestry University), Riqing Chen (Fujian Agriculture And Forestry University), and Yan Hu (Fujian Agriculture And Forestry University)</i>	
Parallel Stochastic Portfolio Search for Constraint Solving	697
<i>Ke Liu (Brandenburg university of technology cottbus-senftenberg, Germany), Sven Löffler (Brandenburg university of technology cottbus-senftenberg, Germany), and Petra Hofstedt (Brandenburg university of technology cottbus-senftenberg, Germany)</i>	
An Optimization Method of WebP Images Lossy Compression Algorithm for FPGAs	705
<i>Yaqian Zhao (Inspur Electronic Information Industry Co., Ltd, China), Zhenhua Guo (Inspur Electronic Information Industry Co., Ltd, China), Baoyu Fan (Inspur Electronic Information Industry Co., Ltd, China), Kai Gao (Inspur Electronic Information Industry Co., Ltd, China), Li Wang (Inspur Electronic Information Industry Co., Ltd, China), and Fang Cao (Inspur Electronic Information Industry Co., Ltd, China)</i>	
Probabilistic Linguistic VIKOR Method Based on TODIM for Reliable Participant Selection Problem in Mobile Crowdsensing	712
<i>Chao Huang (Fujian Normal University, China), Mingwei Lin (Fujian Normal University, China), and Riqing Chen (Fujian Agriculture and Forestry University, China)</i>	

LearnedCache: A Locality-Aware Collaborative Data Caching by Learning Model	718
<i>Wenlong Ma (Institute of Computing Technology Chinese Academy of Sciences, Beijing, China; University of Chinese Academy of Sciences, Beijing, China), Yuqing Zhu (Institute of Computing Technology Chinese Academy of Sciences, Beijing, China), Sa Wang (Institute of Computing Technology Chinese Academy of Sciences, Beijing, China), and Yungang Bao (Institute of Computing Technology Chinese Academy of Sciences, Beijing, China; University of Chinese Academy of Sciences, Beijing, China)</i>	
Towards a Latin-Square Search Engine	727
<i>Wenxiu Fang (Nankai University, China), Rebecca J. Stones (Nankai University, China), Trent G. Marbach (Nankai University, China), Gang Wang (Nankai University, China), and Xiaoguang Liu (Nankai University, China)</i>	
HEE-Sketch: an Efficient Sketch for Sliding-Window Frequency Estimation over Skewed Data Streams	736
<i>Shuhao Sun (Peking University, China), Jingwei Zheng (Peking University, China), and Dagang Li (Peking University, China)</i>	
Feature Selection Algorithm Based on Sparse Score and Correlation Analysis	744
<i>Xue Shanliang (Nanjing University of Aeronautics and Astronautics), Cheng Sijia (Nanjing University of Aeronautics and Astronautics), Li Mengying (Nanjing University of Aeronautics and Astronautics), and Yuan Yong (Nanjing University of Aeronautics and Nanjing Chenguang Group Co.)</i>	
A Robust Adversarial Reinforcement Framework for Reading Comprehension	752
<i>Fengcheng Yuan (University of Chinese Academy of Sciences, China), Zheng Lin (Chinese Academy of Sciences, China), Yue Geng (University of Chinese Academy of Sciences, China), Weiping Wang (Chinese Academy of Sciences, China), and Gang Shi (Chinese Academy of Sciences, China)</i>	
A Multi-Task Service Recommendation Model Considering Dynamic and Static QoS	760
<i>Mingyu Li (Qilu University of Technology), Qin Lu (Qilu University of Technology), Mingge Zhang (Qilu University of Technology), and Xinmei Liang (Qilu University of Technology)</i>	
DCIGAN: A Distributed Class-Incremental Learning Method Based on Generative Adversarial Networks	768
<i>Hongtao Guan (National University of Defense Technology, China), Yijie Wang (National University of Defense Technology, China), Xingkong Ma (National University of Defense Technology, China), and Yongmou Li (National University of Defense Technology, China)</i>	
Ensuring Query Completeness in Outsourced Database Using Order-Preserving Encryption	776
<i>Ning Shen (Department of Computer Science, Boise State University, USA), Jyh-haw Yeh (Department of Computer Science, Boise State University, USA), Chien-Ming Chen (College of Computer Science and Engineering, Shandong University of Science and Technology, China), Yeh-Cheng Chen (Department of Computer Science, University of California at Davis, USA), and Yunpeng Zhang (Department of Information and Logistics Technology, University of Houston-Main Campus, USA)</i>	

Reducing Style Overfitting for Character Recognition via Parallel Neural Networks with Style to Content Connection	784
<i>Wei Tang (State Key Laboratory of Information Security, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences; Institute of Information Engineering, Chinese Academy of Sciences), Yiwen Jiang (State Key Laboratory of Information Security, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences; Institute of Information Engineering, Chinese Academy of Sciences), Neng Gao (Institute of Information Engineering, Chinese Academy of Sciences), Ji Xiang (Institute of Information Engineering, Chinese Academy of Sciences), Jiahui Shen (Institute of Information Engineering, Chinese Academy of Sciences), Xiang Li (State Key Laboratory of Information Security, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences; Institute of Information Engineering, Chinese Academy of Sciences), and Yijun Su (State Key Laboratory of Information Security, Chinese Academy of Sciences; School of Cyber Security, University of Chinese Academy of Sciences; Institute of Information Engineering, Chinese Academy of Sciences)</i>	
MMNR: A Network Representation Framework Based on Multi-View Motif Fusion	792
<i>Jingjing Xu (Institute of Information Engineering, Chinese Academy of Sciences, China), Aimin Yu (Institute of Information Engineering, Chinese Academy of Sciences, China), Lijun Cai (Institute of Information Engineering, Chinese Academy of Sciences, China), and Dan Meng (Institute of Information Engineering, Chinese Academy of Sciences, China)</i>	
A Data Fusion and Data Cleaning System for Smart Grids Big Data	802
<i>Zhining Lv (Shenzhen Power Supply Bureau), Wei Deng (Shenzhen Power Supply Bureau), Zhihan Zhang (Shenzhen Power Supply Bureau), Ningxuan Guo (Huanan Industrial Technology Research Institute of Zhejiang University), and Gangfeng Yan (Huanan Industrial Technology Research Institute of Zhejiang University)</i>	
DiffusionGAN: Network Embedding for Information Diffusion Prediction with Generative Adversarial Nets	808
<i>Wei Zhuo (School of Digital Media, Jiangnan University), Yanan Zhao (School of Digital Media, Jiangnan University), Qianyi Zhan (School of Digital Media, Jiangnan University), and Yuan Liu (School of Digital Media, Jiangnan University)</i>	
Blockchain-Based Incentive Announcement System for Internet of Vehicles	817
<i>Yang Yang (Fuzhou University, China), Jialiang Chen (Fuzhou University, China), Xianghan Zheng (Fuzhou University, China), Ximeng Liu (Fuzhou University, China), Wenzhong Guo (Fuzhou University, China), and Hairong Lv (Fuzhou University, China)</i>	
An Online Face Clustering Algorithm for Face Monitoring and Retrieval in Real-Time Videos	825
<i>Ye Cai (ShenZhen University) and HaiYang Gan (ShenZhen University)</i>	

The Research of Ternary Error-Correcting Output Codes Based on Genetic Programming	831
<i>Yifan Liang (School of Informatics of Xiamen University, Xiamen, China), Chang Liu (School of Informatics of Xiamen University, Xiamen, China), Hanrui Wang (Software School of Fudan University, Shanghai, China), and Kunhong Liu (School of Informatics of Xiamen University, Xiamen, China)</i>	
LSOF: Novel Outlier Detection Approach Based on Local Structure	838
<i>Renmin Wang (Chongqing University) and Qingsheng Zhu (Chongqing University)</i>	
Secure and Scalable Multi-Company Management in Enterprise Cloud Storage Broker System	847
<i>Muhammad Ihsan Haikal Sukmana (Hasso Plattner Institute, Germany), Marvin Petzolt (Technische Universität Berlin, Germany), Kennedy Aondona Torkura (Hasso Plattner Institute, Germany), Hendrik Graupner (Hasso Plattner Institute, Germany), Feng Cheng (Hasso Plattner Institute, Germany), and Christoph Meinel (Hasso Plattner Institute, Germany)</i>	
A Vectorization Approach for Graph-Structured Data to Pattern Recognition	857
<i>Lin Sun (Shanghai Jiao Tong University), Haopeng Chen (Shanghai Jiao Tong University), Feng Huang (Boc Financial Technology Company Limited), and Zhiming Li (Boc Financial Technology Company Limited)</i>	
ADCMO: An Anomaly Detection Approach Based on Local Outlier Factor for Continuously Monitored Object.....	865
<i>Shubin Su (Beihang University, China), Limin Xiao (Beihang University, China), Li Ruan (Beihang University, China), Rongbin Xu (Beihang University, China), Shupan Li (Beihang University, China), Zhaokai Wang (Beihang University, China), Qigong He (Beihang University, China), and Wei Li (Beijing Jinhang Computation and Communication Research Institute, China)</i>	
BF-Join: An Efficient Hash Join Algorithm for DRAM-NVM-Based Hybrid Memory Systems	875
<i>Liu Yang (University of Science and Technology of China), Peiquan Jin (University of Science and Technology of China), and Shouhong Wan (University of Science and Technology of China)</i>	
Anomaly Subgraph Mining in Large-Scale Social Networks	883
<i>Shengnan Chen (Shanghai Jiao Tong University), Jianmin Qian (Shanghai Jiao Tong University), Haopeng Chen (Shanghai Jiao Tong University), and Si Liu (Boc Financial Technology Company Limited)</i>	
LSB-Based Visual Image Encryption Scheme in Cloud Environment	891
<i>Sifei Zheng (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Xiaolong Liu (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Riqing Chen (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Shyan-Ming Yuan (Department of Computer Science, National Chiao Tung University), and Chia-Chen Lin (Department of Computer Science and Information Management, Providence University)</i>	

CSIndex: A Coprocessor-Based Classified Secondary Index Mechanism for Efficient HBase Query	897
<i>Zhe Zou (Chongqing University, China), Linjiang Zheng (Chongqing University, China), Dong Xia (Chongqing University, China), Yiwei Chen (Chongqing University, China), Weining Liu (Chongqing University, China), and Yixiong Chen (Chongqing University, China)</i>	
Two Efficient Algorithms for Mining High Utility Sequential Patterns	905
<i>Chuankai Zhang (Harbin Institute of Technology, Shenzhen), Yiwu Zu (Harbin Institute of Technology, Shenzhen), Junli Nie (Harbin Institute of Technology, Shenzhen), and Linzi Du (Harbin Institute of Technology, Shenzhen)</i>	
IAP-Based Self-Learning Real-Time Application Layer DDoS Detection Method on Storm Platform	912
<i>Bin Zhang (PLA SSF IEU, China Henan Key Laboratory of Information Security, China), Zihao Liu (China Electronic Engineering Design Institute, China), and Shuqin Dong (PLA SSF IEU, China Henan Key Laboratory of Information Security, China)</i>	
Dynamic Network Embedding for Link Prediction	920
<i>Yan Cao (Ningbo University), Yihong Dong (Ningbo University), Shaoqing Wu (Ningbo University), Yu Xin (Ningbo University), and Jiangbo Qian (Ningbo University)</i>	
UCWE: A User-Centric Approach for Web Quality of Experience Measurement	928
<i>Xiaohui Zheng (Institute of Computing Technology, University of Chinese Academy of Sciences), Yan Jin1 (Institute of Computing Technology), Xiao Shi1 (Institute of Computing Technology), Yonghao Song1 (Institute of Computing Technology), and Xiaofang Zhao1 (Institute of Computing Technology)</i>	
A Double Non-Negative Matrix Factorization Model for Signed Network Analysis	936
<i>Wei Yu (Tianjin University), Rongjian Mu (Tianjin University), Ying Sun (Tianjin University), Xue Chen (Tianjin University), Wenjun Wang (Tianjin University), and Huaming Wu (Tianjin University)</i>	
Taxi Demand Prediction with LSTM-Based Combination Model	944
<i>Yongxuan Lai (Shenzhen Research Institute, Xiamen University, Shenzhen, China; School of Informatics, Xiamen University, Xiamen, China), Kaixin Zhang (School of Informatics, Xiamen University, Xiamen, China), Junqiang Lin (School of Informatics, Xiamen University, Xiamen, China), Fan Yang (Department of Automation, Xiamen University, Xiamen, China), and Yi Fan (School of Mathematics and Statistics, Qiannan Normal University for Nationalities, Duyun 558000, China)</i>	
OMOPredictor: An Online Multi-Step Operator Performance Prediction Framework in Distributed Streaming Processing	951
<i>Weimin Mu (Institute of Information Engineering, Chinese Academy of Sciences), Zongze Jin (Institute of Information Engineering, Chinese Academy of Sciences), Fan Liu (Institute of Information Engineering, Chinese Academy of Sciences), Weilin Zhu (Institute of Information Engineering, Chinese Academy of Sciences), and Weiping Wang (Institute of Information Engineering, Chinese Academy of Sciences)</i>	

A Deep Temporal Collaborative Filtering Recommendation Framework via Joint Learning from Long and Short-Term Effects	959
<i>Qianqian Ji (University of Chinese Academy of Sciences, Beijing, China), Xiaoyu Shi (Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, China), and Mingsheng Shang (Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, China)</i>	
A Unified Storage System for Whole-Time-Range Data Analytics over Unbounded Data	967
<i>Yijie Shen (Institute of Computing Technology, CAS, Beijing, China), Guangzhong Yao (Institute of Computing Technology, CAS, Beijing, China), Sijie Guo (StreamNative, Beijing, China), Jin Xiong (Institute of Computing Technology, CAS, Beijing, China), and Dejun Jiang (Institute of Computing Technology, CAS, Beijing, China)</i>	
FLOWGAN:Unbalanced Network Encrypted Traffic Identification Method Based on GAN	975
<i>ZiXuan Wang (School of Modern Posts University of Nanjing University of Posts and Telecommunications NanjingChina), Pan Wang (School of Modern Posts University of Nanjing University of Posts and Telecommunications NanjingChina), Xiaokang Zhou (Faculty of Data Science Shiga University Hikone, Japan RIKEN Center for Advanced Intelligence Project Tokyo, Japan), ShuHang Li (School of Modern Posts University of Nanjing University of Posts and Telecommunications NanjingChina), and MoXuan Zhang (Schools of International Education Jinling Institute of Technology NanjingChina)</i>	
Price Prediction of Agricultural Products Based on Wavelet Analysis-LSTM	984
<i>Qinglong Chen (College of Computer and Information Science, Fujian Agriculture and Forestry University, Key Laboratory of Smart Agriculture and Forestry, Fujian Province University), Xiaoyu Lin (College of Computer and Information Science, Fujian Agriculture and Forestry University, Key Laboratory of Smart Agriculture and Forestry, Fujian Province University), Yiwen Zhong (College of Computer and Information Science, Fujian Agriculture and Forestry University, Key Laboratory of Smart Agriculture and Forestry, Fujian Province University), and Ziyang Xie (College of Computer and Information Science, Fujian Agriculture and Forestry University, Key Laboratory of Smart Agriculture and Forestry, Fujian Province University)</i>	
Using Temporal Conceptual Graphs and Neural Networks for Big Data-Based Attack Scenarios Reconstruction	991
<i>Yacine Djemaiel (Communications Networks and Security Research Lab. (CN&S), University of Carthage, Tunisia), Boutheina A. Fessi (Faculty of Economic Sciences and Management, Nabeul, Tunisia), and Noureddine Boudriga (Sup'COM, University of Carthage, Tunisia)</i>	
Dynamic Block Size Adjustment and Workload Balancing Strategy Based on CPU-GPU Heterogeneous Platform	999
<i>Juan Fang (Beijing University of Technology, China), Kuan Zhou (Beijing University of Technology, China), Chen Tan (Beijing University of Technology, China), and Hui Zhao (Engineering Department University of North Texas TX, USA)</i>	
OpenMP4.5-Enabled Large-Scale Heterogeneous Lattice Boltzmann Multiphase Flow Simulations	1007
<i>Chuanfu Xu (NUDT), Xi Wang (NUDT), Dali Li (NUDT), Yonggang Che (NUDT), and Zhenghua Wang (NUDT)</i>	

An Asynchronous Algorithm for Optimizing the Communication Performance	1017
<i>Zhuo Tian (EECS, Peking University), Yifeng Chen (EECS, Peking University), and Lei Zhang (EECS, Peking University)</i>	
A High-Performance Self-Learning Antelopes Migration Algorithm (SAMA) for Global Optimization	1025
<i>Na Lin (Shenyang Aerospace University, China), Luwei Fu (Shenyang Aerospace University, China), Liang Zhao (Shenyang Aerospace University, China), Lu Liu (University of Leicester, UK), and Geyong Min (University of Exeter, UK)</i>	
Accelerating Swap-Based Tabu Search for Solving Maximum Clique Problems on FPGA	1033
<i>Kenji Kanazawa (Faculty of Engineering, Information and Systems University of Tsukuba)</i>	
Underwater Image Enhancement with a Total Generalized Variation Illumination Prior	1041
<i>Zhengjie Zhao (Nanjing University of Information Science and Technology), Yuxiang Dai (Nanjing University of Information Science and Technology), and Peixian Zhuang (Nanjing University of Information Science and Technology)</i>	
A Learning Based Human Interaction Modeling Using Mobile Sensing	1049
<i>Tarun Kulshrestha (Indian Institute of Technology, Roorkee, India), Divya Saxena (The Hong Kong PolyU, Kowloon, Hong Kong), and Rajdeep Niyogi (Indian Institute of Technology, Roorkee, India)</i>	
Utility-Aware Batch-Processing Algorithms for Dynamic Carpooling Based on Double Auction	1059
<i>Jiale Huang (Guangdong University of Technology, China), Jigang Wu (Guangdong University of Technology, China), Long Chen (Guangdong University of Technology, China), and Jiaquan Yan (Guangdong University of Technology, China)</i>	
Multi-Sensor Information Fusion and Machine Learning for High Accuracy Rate of Mechanical Pedometer in Human Activity Recognition	1064
<i>Michael Adjeisah (Donghua University, China), Guohua Liu (Donghua University, China), Douglas Omwenga Nyabuga (Donghua University, China), and Richard Nuetey Nortey (Donghua University, China)</i>	
Mobility-Aware and Data Caching-Based Task Scheduling Strategy in Mobile Edge Computing	1071
<i>Linyao Kang (Hunan University of Science and Technology, China), Bing Tang (Hunan University of Science and Technology, China), Li Zhang (Hunan University of Science and Technology, China), and Lujie Tang (Hunan University of Science and Technology, China)</i>	
Sequence to Sequence Network for Learning Network Representation	1078
<i>Qi Liang (Institute of Information Engineering, Chinese Academy of Sciences School of Cyber Security, University of Chinese Academy of sciences, China), Mei Lin Zhou (Institute of Information Engineering, Chinese Academy of Sciences School of Cyber Security, University of Chinese Academy of sciences Beijing, China), Lu Ma (Institute of Information Engineering, Chinese Academy of Sciences School of Cyber Security, University of Chinese Academy of sciences Beijing, China), Dan Luo (Institute of Information Engineering, Chinese Academy of Sciences School of Cyber Security, University of Chinese Academy of sciences Beijing, China), Peng Zhang (Institute of Information Engineering, Chinese Academy of Sciences School of Cyber Security, University of Chinese Academy of sciences Beijing, China), and Bin Wang (AI Lab Xiaomi Inc Beijing, China)</i>	

Improve the Detection of Clustered Outliers via Outlier Score Propagation	1085
<i>Yongmou Li (National University of Defense Technology), Yijie Wang (National University of Defense Technology), and Hongtao Guan (National University of Defense Technology)</i>	
Research on Dynamic Graph Layout by Parallel Computing and Markov Process	1092
<i>Shiyang Sheng (Shanghai Jiaotong University, China), Chunyuan Wu (Shanghai Jiaotong University, China), Xiaojun Dong (Shanghai Jiaotong University, China), and Shengtao Chen (Shanghai Jiaotong University)</i>	
SELWasm: A Code Protection Mechanism for WebAssembly	1099
<i>Jian Sun (Nankai University, China), DingYuan Cao (Nankai University, China), XiMing Liu (Nankai University, China), ZiYi Zhao (Nankai University, China), WenWen Wang (University of Georgia, America), XiaoLi Gong (Nankai University, China), and Jin Zhang (Nankai University, China)</i>	
A Web Services Classification Method Based on GCN	1107
<i>Hongfan Ye (School of Computer Science and Engineering, Hunan University of Science and Technology), Buqing Cao (School of Computer Science and Engineering, Hunan University of Science and Technology), Junjie Chen (School of Computer Science and Engineering, Hunan University of Science and Technology), Jianxun Liu (School of Computer Science and Engineering, Hunan University of Science and Technology), Yiping Wen (School of Computer Science and Engineering, Hunan University of Science and Technology), and Jinjun Chen (School of Computer Science and Engineering, Hunan University of Science and Technology)</i>	
Orchestrating Service Function Chains with Joint Resource Optimization in NFV Networks	1115
<i>Zhe Wang (University of Electronic Science and Technology of China), Zhiwei Zhao (University of Electronic Science and Technology of China), Chang Shu (University of Electronic Science and Technology of China), Geyong Min (University of Exeter), Yunpeng Han (University of Electronic Science and Technology of China), and Yuhong Jiang (University of Electronic Science and Technology of China)</i>	
CuckooFlow: Achieving Fast Packet Classification for Virtual OpenFlow Switching by Exploiting Network Traffic Locality	1123
<i>Bing Xiong (Changsha University of Science & Technology), Zhixiong Hu (Changsha University of Science & Technology), Yao Luo (Changsha University of Science & Technology), and Jin Wang (Changsha University of Science & Technology)</i>	
An Integrative Approach to Robust Hand Detection Using CPM-YOLOv3 and RGBD Camera in Real Time .	1131
<i>Muhammad Raza (Shanghai Jiao Tong University, China), Vachiraporn Ketsoi (Shanghai Jiao Tong University, China), and Haopeng Chen (Shanghai Jiao Tong University, China)</i>	

SecFT-SDN: Securing the Flow-Table for Software-Defined Network	1139
<i>Ruibang You (Institute of Information Engineering, Chinese Academy of Sciences, China and School of Cyber Security, University of Chinese Academy of Sciences, China), Bibo Tu (Institute of Information Engineering, Chinese Academy of Sciences, China and School of Cyber Security, University of Chinese Academy of Sciences, China), Zimu Yuan (Institute of Information Engineering, Chinese Academy of Sciences, China), and Jie Cheng (Institute of Information Engineering, Chinese Academy of Sciences, China and School of Cyber Security, University of Chinese Academy of Sciences, China)</i>	
Hand Motion Based Human Computer Interaction Using 3D Convolutional Neural Network	1147
<i>Vachiraporn Ketsoi (Shanghai Jiao Tong University, China), Muhammad Raza (Shanghai Jiao Tong University, China), and Haopeng Chen (Shanghai Jiao Tong University, China)</i>	
Parsing Indoor Scenes from RGB-D Image Using Superpixel and Region Merging	1155
<i>Kai He (Fujian Agriculture and Forestry University, China), Zejun Zhang (Fujian Agriculture and Forestry University, China), Xiong Pan (Fujian Agriculture and Forestry University, China), Changcai Yang (Fujian Agriculture and Forestry University, China), Sheng Yang (Wuyi University), Xiaoliang Lu (MingByte Technology Co., Ltd, China), and Riqing Chen (Fujian Agriculture and Forestry University, China)</i>	
Power Combination Network for Image Classification on Small Samples with Data Loss	1162
<i>Kexin Song (School of Computer Engineering and Science, Shanghai University), Fenglei Yang (School of Computer Engineering and Science, Shanghai University), and Zhuochen Sun (School of Computer Engineering and Science, Shanghai University)</i>	
Image Fusion via Domain and Feature Transfer	1168
<i>Yicheng Yang (Computer Science and Engineering School Wuhan Institute of Technology, Wuhan, China), Huabing Zhou (Computer Science and Engineering School Wuhan Institute of Technology, Wuhan, China), Wei Zhang (Computer Science and Engineering School Wuhan Institute of Technology, Wuhan, China), Changcai Yang (Fujian Agriculture and Forestry University, Fuzhou, China), and Zhenghong Yu (Guangdong Polytechnic of Science and Technology, Zhuhai, China)</i>	
Counting Attention Based on Classification Confidence for Visual Question Answering	1173
<i>Mingqin Chen (Fuzhou University), Yilei Wang (Fuzhou University), Shan Chen (Chongqing University), and Yingjie Wu (Fuzhou University)</i>	

Robust Feature Matching via Two Constraints Interaction	1180
<i>Yizhang Liu (College of Computer and Information Science Fujian Agriculture and Forestry University Fuzhou, China), Yanping Li (College of Computer and Information, Hohai University Nanjing, China), Zheling Xu (International Business Department Fuzhou Melbourne Polytechnic Fuzhou, China), Xiaoliang Lu (MingByte Technology (Qingdao) Co., Ltd), Xin Liu (College of Computer and Information Science Fujian Agriculture and Forestry University Fuzhou, China), Luanyuan Dai (College of Computer and Information Science Fujian Agriculture and Forestry University Fuzhou, China), Xiong Pan (College of Computer and Information Science Fujian Agriculture and Forestry University Fuzhou, China), and Changcai Yang (College of Computer and Information Science Fujian Agriculture and Forestry University Fuzhou, China)</i>	
Robust Feature Matching via Multi-Scale Grid Structure	1187
<i>Yanping Li (College of Computer and Information, Hohai University, Nanjing, China), Qian Huang (College of Computer and Information, Hohai University Nanjing, China), Yizhang Liu (College of Computer and Information Sciences, Fujian Agriculture and Forestry University; Digital Fujian Research Institute of Big Data for Agriculture and Forestry; Fuzhou, China), Yuan Huang (College of Computer and Information, Hohai University, Nanjing, China), and Xiaoqing Sun (College of Computer and Information, Hohai University, Nanjing, China)</i>	
Identification and Prediction of Key Nucleotide Sites Using Machine Learning in Bioinformatics: A Brief Overview	1194
<i>Jianhua Cai (Minjiang University), Leyi Wei (Tianjin University), Kun Zeng (Minjiang University), and Guobao Xiao (Minjiang University)</i>	
Detecting Interest-Factor Influenced Abnormal Evaluation of Teaching via Multimodal Embedding and Priori Knowledge Based Neural Network	1201
<i>Yu Mao (Beijing Institute of Technology), Yifan Zhu (Beijing Institute of Technology), Sifan Zhang (Beijing Institute of Technology), Dexiu Zhang (Minnan Normal University), Fuquan Zhang (Minjiang University), and Xiaozhong Fan (Beijing Institute of Technology)</i>	
An Application Model of GNN in Session Recommendation	1210
<i>Yong Feng (Liaoning University, China), Fuhai Wang (Liaoning University, China), Kai Zhang (Liaoning University, China), Rongbing Wang (Liaoning University, China), and Hongyan Xu (Liaoning University, China)</i>	
Clean-First Adaptive Buffer Replacement Algorithm for NAND Flash-Based Consumer Electronics	1217
<i>Qiongxia Huang (Fujian Agriculture and Forestry University, China), Riqing Chen (Fujian Agriculture and Forestry University, China), Mingwei Lin (Fujian Normal University Fuzhou, China), Changcai Yang (Fujian Agriculture and Forestry University, china), Quan Chen (Fujian Agriculture and Forestry University, china), and Xiaohan Li (Fujian Agriculture and Forestry University, china)</i>	
Research on Intelligent Portrait of Chinese Elderly Based on Big Data and Deep Learning	1224
<i>Hui Long (South China Normal University) and Dingju Zhu (South China Normal University)</i>	

Workshop Papers

- Long-Term Trend Prediction Algorithm Based on Neural Network for Short Time Series 1233
Xin Zexi (Beijing University of Posts and Telecommunications, China), Zhang Haiyang (Beijing University of Posts and Telecommunications, China), and Ma Yue (Beijing University of Posts and Telecommunications, China)
- Statistic Chinese New Word Recognition by Combing Supervised and Unsupervised Learning 1239
Fei Wang (Shenzhen University)
- Network Log Anomaly Detection Based on GRU and SVDD 1244
Shirong Liu (Fujian Normal University, China), Xiong Chen (Fujian Normal University, China), Xingxiong Peng (Fujian Normal University, China), and Ruliang Xiao (Fujian Normal University, China)
- MD5 Encryption Algorithm Enhanced Competitive Swarm Optimizer for Feature Selection 1250
Yanhong Lin (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Shiguo Huang (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Minglin Hong (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Shiting Chen (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Xiaolin Li (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), and Dakun Lin (College of Computer and Information Sciences, Fujian Agriculture and Forestry University)
- Parallelized Top-k Route Search with User's Preferences 1255
Sen Zhang (Sun Yat-Sen University), Youming Ge (Sun Yat-Sen University), Qun Jiang (Sun Yat-Sen University), Haihang Li (Sun Yat-Sen University), and Yubao Liu (Sun Yat-Sen University)
- Aspect Based Sentiment Analysis by Pre-Trained Language Representations 1262
Tianxin Liang (Renmin University of China and BOE Technology Group Co., Ltd), Xiaoping Yang (Renmin University of China), Xibo Zhou (BOE Technology Group Co., Ltd), and Bingqian Wang (BOE Technology Group Co., Ltd)
- Agricultural Product Traceability System Based on Blockchain Technology 1266
Weipeng Xie (Fuzhou University), Xianghan Zheng (Fuzhou University), Xiaoliang Lu (MingByte Technology (Qingdao) Co. Ltd), Xiaowei Lin (MingByte Technology (Qingdao) Co. Ltd), and Xionghui Fan (Fuzhou University)
- Copyright Protection Application Based on Blockchain Technology 1271
Yi Ouyang (Fujian Key Laboratory of Network Computing and Intelligent Information Processing, Fuzhou University), Xianghan Zheng (Fujian Key Laboratory of Network Computing and Intelligent Information Processing, Fuzhou University), Xiaoliang Lu (MingByte Technology (Qingdao) Co. Ltd), Lin Xiaowei (MingByte Technology (Qingdao) Co. Ltd), and Shengyin Zhang (Fujian Key Laboratory of Network Computing and Intelligent Information Processing, Fuzhou University)

Accelerated Stochastic Variational Inference	1275
<i>Pingbo Hu (Sichuan University, China) and Yang Weng (Sichuan University, China)</i>	
A Dynamic Ensemble Selection Strategy for Improving Error Correcting Output Codes Algorithm	1283
<i>JiaYu Zou (School of Informatics, Xiamen University), KunHong Liu (School of Informatics, Xiamen University), and YeFan Huang (School of Informatics, Xiamen University)</i>	
Boosting Temporal Community Detection via Modeling Community Evolution Characteristics	1291
<i>Wei Yu (Tianjin University, China), Wenjun Wang (Tianjin University, China), Xue Chen (Tianjin University, China), Huamin Wu (Tianjin University, China), Minghu Tang (Qinghai Nationalities University, China), and Yang Yu (Tianjin University, China)</i>	
An Efficient Machine Reading Comprehension Method Based on Attention Mechanism	1297
<i>Wenzhen Jin (Southwest University, Chongqing, China), Guocai Yang (Southwest University, Chongqing, China), and Hong Zhu (Southwest University, Chongqing, China)</i>	
DKDR: An Approach of Knowledge Graph and Deep Reinforcement Learning for Disease Diagnosis	1303
<i>Yuanyuan Jia (Inner Mongolia University), Zhiren Tan (Inner Mongolia University), and Junxing Zhang (Inner Mongolia University)</i>	
Speech Synthesis of Shanghai Dialect Based on DNN and LSTM-RNN	1309
<i>Yuren You (Northwest Normal University), Yun Zhou (Northwest Normal University), Hongwu Yang (Northwest Normal University), Hui Wang (Northwest Normal University), and Lijia Chen (Northwest Normal University)</i>	
A Fast Algorithm for Hiding High Utility Sequential Patterns	1316
<i>Chunkai Zhang (Harbin Institute of Technology, Shenzhen), Yiwen Zu (Harbin Institute of Technology, Shenzhen), Junli Nie (Harbin Institute of Technology, Shenzhen), Linzi Du (Harbin Institute of Technology, Shenzhen), Jingqi Du (Yunnan Electric Power Research Institute (Group) Co., Ltd.), Siyuan Hong (Yunnan Electric Power Research Institute (Group) Co., Ltd.), and Wenping Wu (China Electronics Cyberspace Great Wall Co., Ltd)</i>	
Research on Web Service Selection Based on Improved Skyline Algorithm	1323
<i>Xinmei Liang (Qilu University of Technology), Qin Lu (Qilu University of Technology), and Mingyu Li (Qilu University of Technology)</i>	
Architectural Implications in Graph Processing of Accelerator with Gardenia Benchmark Suite	1329
<i>Yang Zhang (National University of Defense Technology, China), Jie Shen (National University of Defense Technology, China), Zhen Xu (National University of Defense Technology, China), Shikai Qiu (National University of Defense Technology, China), and Xuhao Chen (University of Texas at Austin, USA)</i>	
Prediction of Short-Imminent Heavy Rainfall Based on ECMWF Model	1340
<i>Huosheng Xie (Fuzhou University, China), Wei Xie (Fuzhou University, China), Lidong Wu (Fuzhou University, China), Qing Lin (Fujian Meteorological Bureau, China), Ming Liu (Fujian Meteorological Bureau, China), and Yongjing Lin (Fuzhou University, China)</i>	

Research on Gold ETF Forecasting Based on LSTM	1346
<i>Ziyan Xie (Fujian Agriculture and Forestry University, China), Xiaoyu Lin (Fujian Agriculture and Forestry University, China), Yiwen Zhong (Fujian Agriculture and Forestry University), and Qinglong Chen (Fujian Agriculture and Forestry University, China)</i>	
MDDRSPF: A Model Driven Distributed Real-Time Stream Processing Framework	1352
<i>Yijun Wen (Tsinghua University), Li Zhang (Tsinghua University), and Cheng Wang (Tsinghua University)</i>	
Sequence Data Enhancement Method Based on Knowledge Graph	1359
<i>Huosheng Xie (Fuzhou University), Wenda Chai (Fuzhou University), and Shufeng Lin (Fuzhou University)</i>	
Underwater Image Enhancement Based on Dehazing and Color Correction	1365
<i>Hanyu Li (Nanjing University of Information Science and Technology), Peixian Zhuang (Nanjing University of Information Science and Technology), Wang Wei (Nanjing University of Information Science and Technology), and Jingjing Li (Nanjing University of Information Science and Technology)</i>	
Performance Optimization of High-Performance LINPACK Based on GPU-Centric Model on Heterogeneous Systems	1371
<i>Jiawen Huang (South China University of Technology, China) and Lu Lu (South China University of Technology, China)</i>	
An Efficient Parallel Successive Cancellation List Polar Decoder Based on GPUs	1378
<i>Xin Zhou (National University of Defense Technology, China), Rongchun Li (National University of Defense Technology, China), Shijie Li (National University of Defense Technology, China), Yuntao Liu (National University of Defense Technology, China), and Yong Dou (National University of Defense Technology, China)</i>	
CuPhylo: A CUDA Based Application Program Interface and Library for Phylogenetic Analysis	1386
<i>Mingming Ren (Nankai University, China), Xiaomin Huang (Nankai University, China), Yuyang Gao (Nankai University, China), Gang Wang (Nankai University, China), and Xiaoguang Liu (Nankai University, China)</i>	
An SDN-Based QoS Guaranteed Mechanism for Geospatial Flows	1394
<i>Feilong Huang (College of Cyber Science, Nankai University), Jianzhong Zhang (College of Cyber Science, Nankai University), Jingdong Xu (College of Cyber Science, Nankai University), Yiran Shao (College of Cyber Science, Nankai University), and Lingjun Pu (College of Cyber Science, Nankai University)</i>	

Research on Strategy Optimization of OpenFlow Switch Flow Table Based on "Bus Route" Idea	1402
<i>Zhaohui Ma (School of Computer Science, South China Normal University; Guangdong University of Foreign Studies Guangzhou), Gansen Zhao (School of Computer Science, South China Normal University Guangzhou, China), Chengchuang Lin (School of Computer Science, South China Normal University Guangzhou, China), Haoyu Luo (School of Computer Science, South China Normal University Guangzhou, China), Chunyun Deng (School of Information Science and Technology, Guangdong University of Foreign Studies Guangzhou), Shuangyin Li (School of Computer Science, South China Normal University Guangzhou, China), Qinglan Wu (School of Computer Science, South China Normal University Guangzhou, China), Zefeng Mo (School of Mathematical Sciences, South China Normal University Guangzhou, China), and Zanbo Zhang (School of Statistics and Mathematics, Guangdong University of Finance & Economics, Guangzhou, China)</i>	
Timber Transportation Vehicle Detection Based on SSD-GIoU	1410
<i>Xiaojuan Zhang (Fujian Agriculture and Forestry University), Changying Wang (Fujian Agriculture and Forestry University), Li Cheng (Fujian Agriculture and Forestry University), Shuihan Jiang (Fujian Agriculture and Forestry University), and Junting Qi (Fujian Agriculture and Forestry University)</i>	
A Summarization Generation Method for E-Courseware on the Internet Platform	1416
<i>Gang Cui (College of Computer Science, Inner Mongolia University, Hohhot, China), Yan Wang (College of Computer Science, Inner Mongolia University, Hohhot, China), Hao Yu (College of Computer Science, Inner Mongolia University, Hohhot, China), Hong Liu (College of Computer Science, Inner Mongolia University, Hohhot, China), Shibin Shibin Liang (3The Vocational Qualification Center of Inner Mongolia Autonomous Region Department of Transport, Hohhot, China), and Xiaodong Guo (Bureau of Transportation of Inner Mongolia Autonomous Region, Hohhot, China)</i>	
An Optimizing Algorithm for Deadline Constrained Scheduling of Scientific Workflows in IaaS Clouds Using Spot Instances	1421
<i>Shujin Cao (National University of Defense Technology), Kefeng Deng (National University of Defense Technology), Kaijun Ren (National University of Defense Technology), Xiaoyong Li (National University of Defense Technology), Tengfei Nie (National University of Defense Technology), and Junqiang Song (National University of Defense Technology)</i>	
Small Deep Learning Models for Hand Gesture Recognition	1429
<i>Adam Ahmed Qaid Mohammed (Sichuan University, China), Jiancheng Lv (Sichuan University, China), and Md Sajjatul Islam (Sichuan University, China)</i>	
FUsing Global and Semantic-Part Features with Multiple Granularities for Person Re-Identification	1436
<i>Leyuan Liu (Central China Normal University), Yukang Zhang (Central China Normal University), Jingying Chen (Central China Normal University), and Changxin Gao (Huazhong University of Science and Technology)</i>	

Enhanced Knowledge Distillation for Face Recognition	1441
<i>Hao Ni (University of Electronic Science and Technology of China, China), Jie Shen (University of Electronic Science and Technology of China, China), and Chong Yuan (University of Electronic Science and Technology of China, China)</i>	
An Improved Vehicle Detection Algorithm Based on YOLOV3	1445
<i>Xiaoqing Sun (School of Computer and Information, Hohai University), Qian Huang (School of Computer and Information, Hohai University), Yanping Li (School of Computer and Information, Hohai University), and Yuan Huang (School of Computer and Information, Hohai University)</i>	
TriBHMM: An Energy-Efficient and Latency-Aware Hybrid Main Memory	1451
<i>Hong Zhang (Henan University of Economics and Law) and Xiaojun Wang (Henan University of Economics and Law)</i>	
Low SNR Sonar Image Restoration Based on Mixed Probability Statistical Model in Wavelet Domain	1457
<i>Ping Xia (China Three Gorges University), Qiang Ren (China Three Gorges University), Dong-xia Shi (China Three Gorges University), Bang-jun Lei (China Three Gorges University), Yao-bin Zou (China Three Gorges University), and Guang-zhu Xu (China Three Gorges University)</i>	
The Model of Potential Violation Discovery Based on KNN and Spatio-Temporal Trajectory of Commercial Vehicle	1466
<i>Gang Xu (Inner Mongolia University, China), Xinyue Wang (Dalian University of Technology, China), Xiaodong Guo (Bureau of Transportation of Inner Mongolia Autonomous Region, China), Shibin Liang (The Vocational Qualification Center of the Inner Mongolia Autonomous Region Department of Transport, China), and Fengqi Wei (Inner Mongolia University, China)</i>	
A Novel Architecture of Pedestrian Detection	1472
<i>Wenshu Li (Zhejiang Sci-Tech University, China), Menghui Ruan (Zhejiang Sci-Tech University, China), Xiaoying Guo (Shanxi University, China), Hongyan Wang (Zhejiang Sci-Tech University, China), Hancui Hancui (Zhejiang Sci-Tech University, China), and Yang Han (Zhejiang Sci-Tech University, China)</i>	
A Video Semantic Segmentation Method Based on FCN and Data Argumentation	1478
<i>Yuan Huang (School of Computer and Information, Hohai University), Qian Huang (School of Computer and Information, Hohai University), Qinglong Chen (College of Computer and Information Science, Fujian Agriculture and Forestry University), Yanping Li (School of Computer and Information, Hohai University), and Xiaoqing Sun (School of Computer and Information, Hohai University)</i>	
Medical Image Registration Based on Moving Manifold Regularization	1484
<i>Wei Zhang (Wuhan Institute of Technology, Wuhan, China), Huabing Zhou (Wuhan Institute of Technology, Wuhan, China), Yicheng Yang (Wuhan Institute of Technology, Wuhan, China), Changcai Yang (Fujian Agriculture and Forestry University, FuZhou, China), and Zhenghong Yu (Guangdong Polytechnic of Science and Technology, Zhuhai, China)</i>	

Deep Convolutional Network for Citrus Leaf Diseases Recognition	1490
<i>Quan Chen (Fujian Agriculture and Forestry University, China), Xin Liu (Fujian Agriculture and Forestry University, China), Caixia Dong (Fujian Agriculture and Forestry University, China), Tong Tong (Fuzhou University, China), Changcai Yang (Fujian Agriculture and Forestry University, China), Riqing Chen (Fujian Agriculture and Forestry University, China), Tengyue Zou (Fujian Agriculture and Forestry University, China), and Xiaolang Yang (Fuzhou Yinfeng Huinong Technology Service Co., Ltd, China)</i>	
Convolutional Neural Network-Based Approach for Citrus Diseases Recognition	1495
<i>Caixia Dong (Fujian Agriculture and Forestry University, China), Zheling Xu (Fuzhou Melbourne Polytechnic, China), Luanyuan Dai (Fujian Agriculture and Forestry University, China), Weinan Liu (Fujian Agriculture and Forestry University, China), Quan Chen (Fujian Agriculture and Forestry University, China), Yizhang Liu (Fujian Agriculture and Forestry University, China), Changcai Yang (Fujian Agriculture and Forestry University, China), and Tengyue Zou (Fujian Agriculture and Forestry University, China)</i>	
Weighted Feature Pyramid Networks for Object Detection	1500
<i>Xiaohan Li (Fujian Agriculture and Forestry University, China), Taotao Lai (Minjiang University, China), Shuaiyu Wang (Fujian Agriculture and Forestry University, China), Quan Chen (Fujian Agriculture and Forestry University, China), Changcai Yang (Fujian Agriculture and Forestry University, China), Riqing Chen (Fujian Agriculture and Forestry University, China), Jinxun Lin (Fu Jian Shu Bo Xun Information Technology Co., Ltd), and Fu Zheng (Fu Jian Shu Bo Xun Information Technology Co., Ltd)</i>	
An Attention-Based Recommendation Algorithm	1505
<i>Yan Chu (Harbin Engineering University), Shuhao Qi (Harbin Engineering University), Yue Yang (Harbin Engineering University), Chenqi Shan (Harbin Engineering University), Lina Wang (Harbin Engineering University), and Zhengkui Wang (Singapore Institute of Technology)</i>	
A Traceability Method Based on Blockchain and Internet of Things	1511
<i>Xueying Dong (School of Mathematics and Computer, Fuzhou University), Xianghan Zheng (School of Mathematics and Computer, Fuzhou University), Xiaoliang Lu (MingByte Technology (Qingdao) Co. Ltd, Qingdao China), and Xiaowei Lin (MingByte Technology (Qingdao) Co. Ltd, Qingdao China)</i>	
Binary Competitive Swarm Optimizer Algorithm for Feature Selection in Identification of Chinese Fir Family	1519
<i>Shiguo Huang (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Minglin Hong (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Yanhong Lin (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), Xiaolin Li (College of Computer and Information Sciences, Fujian Agriculture and Forestry University), and Dakun Lin (College of Computer and Information Sciences, Fujian Agriculture and Forestry University)</i>	

Posters

Adaptively Extracting Structured Data from Web Pages	1524
<i>Yingnan Guo (Fuzhou University), Jiajun Zhang (Fuzhou University), and Xing Chen (Fuzhou University)</i>	
Class Mapping between Different Versions of Android Applications without Source Code	1526
<i>Xiaona Chen (Fuzhou University), Chuanshumin Hu (Fuzhou University), and Xing Chen (Fuzhou University)</i>	
Self-Adaptive Resource Management Framework for Software Services in Cloud	1528
<i>Haijiang Wang (Fuzhou University, China), Yun Ma (Tsinghua University, China), Xianghan Zheng (Fuzhou University, China), Xing Chen (Fuzhou University, China), and Longkun Guo (Fuzhou University, China)</i>	
User-Scene-Based Recommendation of App Service	1530
<i>Zhenghao Li (Fuzhou University, China), Jiarui Chen (Fuzhou University, China), and Xing Chen (Fuzhou University, China)</i>	

9th IEEE International Conference on Big Data and Cloud Computing/12th IEEE International Conference on Social Computing and Networking / 9th IEEE International Conference on Sustainable Computing and Communications

Regular Papers

Stacked Sparse Auto-Encoder for Deep Clustering	1532
<i>Jinyu Cai (College of Mathematics and Computer Science, Fuzhou university, Fuzhou, China), Shiping Wang (College of Mathematics and Computer Science, Fuzhou university, Fuzhou, China), and Wenzhong Guo (College of Mathematics and Computer Science, Fuzhou university, Fuzhou, China)</i>	
Image Cosegmentation via Cosaliency Guided and Spline Regression	1539
<i>Haiping Xu (Minjiang University), Geng Lin (Minjiang University), and Meiqing Wang (Fuzhou University)</i>	
Pixel-Level Dehazed Image Quality Assessment Based on Dark Channel Prior and Depth	1545
<i>Chuansheng Wang (Information Processing and Intelligent Control Minjiang University Fuzhou, P. R. China; Harbin University of Science and Technology Harbin, P. R. China), Haoyi Fan (Harbin University of Science and Technology Harbin, P. R. China), Hong Zhang (Harbin University of Science and Technology Harbin, P. R. China), and Zuoyong Li (Information Processing and Intelligent Control Minjiang University Fuzhou, P. R. China)</i>	

Saliency Detection Based on Weighted Saliency Probability	1550
<i>Zuoyong Li (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, P.R. China), Taotao Lai (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, P.R. China), and Xiaogen Zhou (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, P.R. China; Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, P.R. China)</i>	
Metropolis-Hastings Random Walk with a Reduced Number of Self-Loops	1556
<i>Toshiki Matsumura (Tokyo Institute of Technology) and Kazuyuki Shudo (Tokyo Institute of Technology)</i>	
Predicting Future Alleviation of Mental Illness in Social Media: An Empathy-Based Social Network Perspective	1564
<i>Yibo Chai (Central University of Finance and Economics), Fengyang Wu (Central University of Finance and Economics), Rui Sun (Central University of Finance and Economics), Zhongliang Zhang (Central University of Finance and Economics), Jie Bao (Central University of Finance and Economics), Runxin Ma (Central University of Finance and Economics), Qizhou Peng (Central University of Finance and Economics), Danqin Wu (Central University of Finance and Economics), Yexing Wan (Shenzhen Corerain Technologies Co. Ltd), and Keyu Li (Central University of Finance and Economics)</i>	
Methods for User Profiling across Social Networks	1572
<i>Rishabh Kaushal (IIIT, Delhi), Vasundhara Ghose (Indira Gandhi Delhi Technical University for Women), and Ponnurangam Kumaraguru (IIIT, Delhi)</i>	
Mining Health Discussions on Suomi24	1580
<i>Moamen Ibrahim (Centre for Machine Vision Research, University of Oulu, Oulu, Finland), Matti Eteläperä (Pepron Software Services Ltd., Oulu, Finland), Sercan Turkmen (Center for Machine Vision Research, University of Oulu, Oulu, Finland), Mina Maged (Center for Machine Vision, University of Oulu, Oulu, Finland), Mourad Oussalah (Research Center for Machine Vision, University of Oulu, Oulu, Finland), and Jouko Miettunen (Research Lifelong Health Research Unit, University of Oulu, Oulu, Finland)</i>	
Facial-Based Personality Prediction Models for Estimating Individuals Private Traits	1586
<i>Raad Bin Tareaf (Hasso-Plattner-Institute, University of Potsdam - Germany), Seyed Ali Alhosseini (Hasso-Plattner-Institute, University of Potsdam - Germany), and Christoph Meinel (Hasso-Plattner-Institute, University of Potsdam - Germany)</i>	
An Internet of Vehicles Intrusion Detection System Based on a Convolutional Neural Network	1595
<i>Ruxiang Peng (Research Institute Of ShangHai, China), Weishi Li (University of Beijing, China), Tao Yang (Research Institute Of ShangHai, China), and Kong Huafeng (University of Wuhan, China)</i>	

Workshop Papers

Modified Image Haze Removal Algorithm Based on Dark Channel Prior	1600
<i>Junpeng Hu (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, China), Zuoyong Li (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, China), and Xinwei Chen (Fujian Provincial Key Laboratory of Information Processing and Intelligent Control, Minjiang University, Fuzhou, China)</i>	
Automatic Text Summarization Based on Transformer and Switchable Normalization	1606
<i>Tao Luo (College of Mathematics and Computer Sciences, Fuzhou University, Fuzhou, China), Kun Guo (College of Mathematics and Computer Sciences, Fuzhou University, Fuzhou, China), and Hong Guo (College of Mathematics and Computer Sciences, Fuzhou University, Fuzhou, China)</i>	
Financial Big Data Hot and Cold Separation Scheme Based on HBase and Redis	1612
<i>Kunhui Li (Fujian Provincial Key Laboratory of Network Computing and Intelligent Information Processing, College of Mathematics and Computer Science, Fuzhou University, Fuzhou, China), Kun Guo (Fujian Provincial Key Laboratory of Network Computing and Intelligent Information Processing, College of Mathematics and Computer Science, Fuzhou University, Fuzhou, China, Key Laboratory of Spatial Data Mining & Information Sharing, Ministry of Education, Fuzhou, China), and Hong Guo (College of Mathematics and Computer Science, Fuzhou University, Fuzhou, China)</i>	
Mixed Word Embedding Method Based on Knowledge Graph Augment for Text Classification	1618
<i>Hongzhong Wang (College of Mathematics and Computer Science, Fuzhou University, Fuzhou, China), Kun Guo (College of Mathematics and Computer Sciences, Fuzhou University, Fuzhou, China), and Zhanghui Liu (College of Mathematics and Computer Sciences, Fuzhou University, Fuzhou, China)</i>	
The Influence of Bandit-Based User Openness Feature on Recommendation Diversity and Accuracy	1624
<i>YuXiang Lin (Fuzhou University, China) and Shaozhen Ye (Fuzhou University, China)</i>	
A Novel Information Diffusion Model Inspired by Particle-Collision Dynamics for Online Social Networks	1629
<i>Zhenche Xia (Northeastern University, China), Zhenhua Tan (Northeastern University, China), Yuling Zhang (Northeastern University, China), Shaocheng Zhang (Liaoning University, China), and Yi Ma (Northeastern University, China)</i>	
Exploration of Quantitative Factors Affecting the Popularity of Users in an Online Community	1635
<i>Matti Eteläperä (University of Oulu, Oulu, Finland; Pepron Software Services, Oulu, Finland) and Mourad Oussalah (University of Oulu, Oulu, Finland)</i>	
Rumor Spreading with Cross Propagation in Multilayer Social Networks	1641
<i>Qiyi Han (Chengdu University), Musong Gu (Chengdu University), Lei You (Chengdu University), and Fang Miao (Chengdu University)</i>	

Finding Potential Empathizers in an Online Mental Health Community: A Deep Graph Embedding Approach 1646

Yibo Chai (Central University of Finance and Economics), Yahu Cong (Central University of Finance and Economics), Rui Sun (Central University of Finance and Economics), Fengyang Wu (Central University of Finance and Economics), Zhongliang Zhang (Central University of Finance and Economics), Yexing Wan (Shenzhen Corerain Technologies Co. Ltd), and Lixin Cui (Central University of Finance and Economics)

Chinese Lexical Based Sentiment Analysis Framework in Meteorology 1652

Yinan Li (Beijing Institute of Technology, China), Fuquan Zhang (Minjiang University, China), Yifan Zhu (Beijing Institute of Technology, China), Sifan Zhang (Beijing Institute of Technology, China), Yu Mao (Beijing Institute of Technology, China), and Zhendong Niu (Beijing Institute of Technology, China)

Author Index