

# **2022 Tenth International Conference on Advanced Cloud and Big Data (CBD 2022)**

**Guilin, China  
4 – 5 November 2022**



**IEEE Catalog Number: CFP2203Y-POD  
ISBN: 979-8-3503-0972-0**

**Copyright © 2022 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:	CFP2203Y-POD
ISBN (Print-On-Demand):	979-8-3503-0972-0
ISBN (Online):	979-8-3503-0971-3

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

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2022 Tenth International Conference on Advanced Cloud and Big Data (CBD) **CBD 2022**

## Table of Contents

Message from the Conference Chairs .....	xiv
Message from the Program Chairs .....	xv
Organizing Committee .....	xvi
Program Committee .....	xvii
Reviewers .....	xix

### Cloud Computing and Applications I

ColorByte: A Real Time MOT Method Using Fast Appearance Feature Based on ByteTrack .....	1
<i>Lin Shen (Southeast University, China), Mengyang Liu (Southeast University, China), Caishan Weng (Southeast University, China), Jinghui Zhang (Southeast University, China), Fang Dong (Southeast University, China), and Fa Zheng (Southeast University, China)</i>	
Collective Spatial Keyword Query on Time Dependent Road Networks .....	7
<i>Jingtao Xue (Nanjing Normal University School of Computer and Electronic Information, China), Chunyu Wu (Nanjing Normal University School of Computer and Electronic Information, China), Bin Zhao (Nanjing Normal University School of Computer and Electronic Information, China), and Ying Hu (Nanjing Normal University School of Computer and Electronic Information, China)</i>	
TCN-Based Lightweight Log Anomaly Detection in Cloud-edge Collaborative Environment .....	13
<i>Jining Chen (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), Weitu Chong (Guangxi University, China), Siyu Yu (Guangxi University, China), Zhun Xu (Guangxi University Nanning, China), Chaohong Tan (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), and Ningjiang Chen (Guangxi University Nanning, China)</i>	
Research on Cloud Computing load Forecasting Based on LSTM-ARIMA Combined Model .....	19
<i>Xiaomin Liu (Guilin University of Technology, China), Xiaolan Xie (Guilin University of Technology, China), and Qiang Guo (Guilin University of Technology, China)</i>	

Reservoir: Enhance the Burst-flow Tolerance in Datacenter Networks .....	24
<i>Jiaren Yu (National University of Defense Technology, China), Shan Huang (National University of Defense Technology, China), Guoyuan Yuan (National University of Defense Technology, China), and Dezun Dong (National University of Defense Technology, China)</i>	

Multi-Layer Efficient Data Classification Methods for Enterprise Business Applications .....	30
<i>Yazeed AlZahrani (University of Wollongong, Australia; Prince Sattam Bin Abdulaziz University, Saudi Arabia), Jun Shen (University of Wollongong, Australia), and Jun Yan (University of Wollongong, Australia)</i>	

## Cloud Computing and Applications II

DNN Training Optimization with Pipelined Parallel Based on Feature Maps Encoding .....	36
<i>Lijuan Shen (Hohai University, China), Yingchi Mao (Hohai University, China), Zibo Wang (Hohai University, China), Hua Nie (Suma Technology Co. Ltd., China), and Jianxin Huang (Suma Technology Co. Ltd., China)</i>	

Long-Term Workload Forecasting in Grid Cloud Using Deep Ensemble Model .....	42
<i>Jiaang Bao (Southeast University, China), Chao Yang (Bank of Jiangsu, China), Nu Xia (Huawei Technologies Co., Ltd, China), and Dian Shen (Southeast University, China)</i>	

Virtual Network Embedding with Virtual Nodes Ranking and Multi Points Sampling .....	48
<i>Ying Yuan (School of Computer and Communication Engineering, Northeastern University at Qinhuangdao), Yichen Yang (School of Computer and Communication Engineering, Northeastern University at Qinhuangdao), and Cong Wang (School of Computer and Communication Engineering, Northeastern University at Qinhuangdao)</i>	

A Spark-Based Parallel Implementation of Compressed Hyperspectral Image Reconstruction and Anomaly Detection .....	54
<i>Qiliang Zhu (Nanjing University of Science and Technology, China), Yaoqin Zhu (Nanjing University of Science and Technology, China), Jin Sun (Nanjing University of Science and Technology, China), and Zebin Wu (Nanjing University of Science and Technology, China)</i>	

Policy-Based Access Control System for Delta Lake .....	60
<i>Zhe Chen (Southeast University, China), Hangyu Shao (Southeast University, China), Yuping Li (China Information Consulting &amp; Designing Institute CO, LTD, China), Hongru Lu (Nanjing Audit University, China), and Jiahui Jin (Southeast University, China)</i>	

DASH+: Download Multiple Video Segments with Stream Multiplexing of QUIC .....	66
<i>Changjiang Cui (Nanjing University of Science and Technology, China), Yifei Lu (Nanjing University of Science and Technology, China), Shuren Li (Nanjing University of Science and Technology, China), Jingqi Li (Nanjing University of Science and Technology, China), and Zeqi Ruan (Nanjing University of Science and Technology, China)</i>	

# Machine Learning & Data Mining I

A Knowledge Graph-Based Interactive Recommender System Using Reinforcement Learning .....	73
<i>Ruoxi Sun (University of Wollongong, Australia), Jun Yan (University of Wollongong, Australia), and Fenghui Ren (University of Wollongong, Australia)</i>	
Wb-MSF: A Large-Scale Multi-Source Information Diffusion Dataset for Social Information Diffusion Prediction .....	79
<i>Zhen Wu (Soochow University, China), Jingya Zhou (Soochow University, China), Jie Wang (Soochow University, China), and Xigang Sun (Soochow University, China)</i>	
Efficient Online and Privacy-Preserving Medical Pre-Diagnosis Based on Growing Learning Vector Quantization .....	85
<i>Xiao Zheng (Anhui University of Technology, China; Institute of Artificial Intelligence, Hefei Comprehensive National Science Center, China; Anhui Engineering Research Center for Intelligent Applications and Security of Industrial Internet, China), Qiuyue Zhang (Anhui University of Technology, China; Anhui Engineering Research Center for Intelligent Applications and Security of Industrial Internet, China), Xuan Tang (Anhui University of Technology, China; Anhui Engineering Research Center for Intelligent Applications and Security of Industrial Internet, China), Xiujun Wang (Anhui University of Technology, China; Anhui Engineering Research Center for Intelligent Applications and Security of Industrial Internet, China), and Chunlai Du (North China University of Technology, China)</i>	
Efficient and Effective Expert Finding Based on Community Search: A Demonstration .....	91
<i>Chengyu Du (Hangzhou Dianzi University, China), Xiaoxuan Gou (Hangzhou Dianzi University, China), Yuxiang Wang (Hangzhou Dianzi University, China), and Xiaoliang Xu (Hangzhou Dianzi University, China)</i>	
A Semantic Segmentation Method for High-Resolution Remote Sensing Images Based on Encoder-Decoder .....	98
<i>Jingyu Yang (Lanzhou Jiaotong University, China), Liang Zhao (Lanzhou Jiaotong University, China), Jianwu Dang (Lanzhou Jiaotong University, China), Yangping Wang (Lanzhou Jiaotong University, China), Biao Yue (Lanzhou Jiaotong University, China), and Zongliang Gu (Lanzhou Jiaotong University, China)</i>	
Unsupervised Semantic Segmentation with Feature Enhancement for Few-shot Image Classification .....	104
<i>Xiang Li (Hohai University, China), Zhuoming Xu (Hohai University, China), Qi Xu (Hohai University, China), and Yan Tang (Hohai University, China)</i>	
Weighted Fuzzy Clustering Algorithm Based on Max-Min Distance Criterion and Jeffrey Divergence .....	110
<i>Hailan Wang (Guilin University of Technology, China), Xiaolan Xie (Guilin University of Technology, China), Jili Chen (Guilin University of Technology, China), and Yarong Liu (Guilin University of Technology, China)</i>	

## Machine Learning & Data Mining II

Label Enhancement with Sample Correlation via Sparse Representation .....	116
<i>Xiaoqian Zeng (Nanjing Normal University, China), Qin Qin (Nanjing Normal University, China), Chao Tan (Nanjing Normal University, China), and Genlin Ji (Nanjing Normal University, China)</i>	
A Multivariate Time Series Anomaly Detection Model Based on Graph Attention Mechanism in Energy Consumption of Intelligent Buildings .....	122
<i>Zhe Zhang (Suzhou University of Science and Technology, China), Yuhao Chen (Suzhou University of Science and Technology, China), Huixue Wang (Suzhou University of Science and Technology, China), Yunzhe Wang (Suzhou University of Science and Technology, China), Qiming Fu (Suzhou University of Science and Technology, China), and You Lu (Suzhou University of Science and Technology, China)</i>	
A Personalized Scenic Spot Recommendation Algorithm Based on Improved TrustSVD Model .....	128
<i>Yuqun Wu (Lanzhou University of Arts and Science, China), Yongzhong Li (Taizhou Institute of Sci. and Tec.NJUST, China), and Bo Xu (Lanzhou University of Arts and Science, China)</i>	
DC3D: A Video Action Recognition Network Based on Dense Connection .....	133
<i>Xiaofang Mu (Taiyuan Normal University, China), Zhenyu Liu (Taiyuan Normal University, China), Jiaji Liu (Taiyuan Normal University, China), Hao Li (Taiyuan Normal University, China), Yue Li (Tianjin University of Technology, China), and Yikun Li (Massey University, New Zealand)</i>	
Learning Inter-Frame Information for Space-Time Video Super-Resolution .....	139
<i>Zhuo Zhang (Central South University, China), Haifu Guo (Central South University, China), Sheng Ren (Hunan University of Arts and Sciences, China), and Kehua Guo (Central South University, China)</i>	
Text Classification Based on Machine Learning for Tibetan Social Network .....	145
<i>Hui Lv (Lanzhou University, China), Fenfang Li (Lanzhou University, China), Yatao Liang (Lanzhou University, China), La Duo (Northwest Minzu University, China), Jun Shen (University of Wollongong, Australia), Yan Li (Lanzhou University, China), and Qingguo Zhou (Lanzhou University, China)</i>	
OEIS: Knowledge Graph Based Intelligent Search System in Ocean Engineering .....	151
<i>Rui Zhu (Southeast University, P.R.China), Xiaoqing Wu (Southeast University, P.R.China), Yanna Hu (Southeast University, P.R.China), Yize Chen (Nanjing No.9 Middle School, P.R.China), and Bo Liu (Southeast University, P.R.China)</i>	
Autoencoder-Based OFDM for Agricultural Image Transmission .....	157
<i>Dongbo Li (Harbin Institute of Technology, China), Xiangyu Liu (Harbin Institute of Technology, China), Yuxuan Shao (Harbin Institute of Technology, China), Yuchen Sun (Harbin Institute of Technology, China), Siyao Cheng (Harbin Institute of Technology, China), and Jie Liu (Harbin Institute of Technology, China)</i>	

## Machine Learning & Data Mining III

Personalized Tourism Recommendation Algorithm Integrating Tag and Emotional Polarity Analysis .....	163
<i>Peng Yuan (University of Science and Technology Liaoning, China), Qiuxia Chen (Institute of Applied Artificial Intelligence of the Guangdong-Hong Kong-Macao Greater Bay Area, Shenzhen Polytechnic, China), Zhifeng Wang (University of Science and Technology Liaoning, China), and Jinfeng Yang (Institute of Applied Artificial Intelligence of the Guangdong-Hong Kong-Macao Greater Bay Area, Shenzhen Polytechnic, China)</i>	
A Customized Protocol Cluster Analysis Method Based on Reinforcement Learning .....	169
<i>Peiyang Wu (Sichuan University, China), Xiaohui Li (Sichuan University, China), and Junfeng Wang (Sichuan University, China)</i>	
A Batching Method for Complex Emitters Based on Frequency Agility Pattern Mining .....	178
<i>Tian Tian (Nanjing Marine Radar Institute, China), Jianchao Jia (China Academy of Space Technology, China), Ran Jia (Nanjing Marine Radar Institute, China), and Shenggang Yan (Nanjing Marine Radar Institute, China)</i>	
A Staging Prediction Model for COVID-19 Pandemic Under Strong Public Health Interventions ....	184
<i>Qian Huang (Southeast University, China), Jie Ma (Southeast University, China), Zhou Xu (Southeast University, China), Xiaodan Gu (Southeast University, China), and Ming Yang (Southeast University, China)</i>	
A Novel RNN Model with Enhanced Behavior Semantic for Network User Profile .....	190
<i>Ming Li (State Grid Shandong Electric Power Company, China), Xingwang Han (State Grid Shandong Electric Power Company, China), Hua Sheng (State Grid Shandong Electric Power Company, China), Lin Ma (State Grid Shandong Electric Power Company, China), Hanzhang Kong (State Grid Shandong Electric Power Company, China), Weite Liu (State Grid Shandong Electric Power Company, China), and Bo Mao (Nanjing University of Finance and Economics, China)</i>	
TeCNTS: A Robust Collaborative Filtering Recommendation Scheme Based on Time-Effective Close Neighbor Trusted Selection Strategy .....	194
<i>Zhigeng Han (Nanjing Audit University, China), Yuanzhe Fan (Nanjing Audit University, China), Geng Chen (Nanjing Audit University, China), and Ting Zhou (Nanjing Audit University, China)</i>	
Attentional Meta-Path Contrastive Graph Convolutional Networks for Knowledge Concept Recommendation .....	200
<i>Weimei Wang (Yangzhou University, China), Liting Wei (Yangzhou University, Yancheng Teachers University, China), Yun Li (Yangzhou University, China), Yi Zhu (Yangzhou University, China), Bin Li (Yangzhou University, China), and Lejun Zhang (Yangzhou University, China)</i>	
CUDA Acceleration of Worst-Case Execution Time Analysis Based On Model Checking .....	206
<i>WanXin Shang (Chengdu University of Information Technology, China), Tao Wu (Chengdu University of Information Technology, China), Fei Yang (Nuclear Power Institute of China, China), Xi Chen (Southwest Minzu University, China), JingJue Chen (Chengdu University of Information Technology, China), and ZhenXia Yu (Chengdu University of Information Technology, China)</i>	

## Cloud Security and Privacy I

Realizing Power-Efficient Encryption Communication for Computational RFID Tags .....	212
<i>Yihang Song (University of Electronic Science and Technology of China, P.R. China), Li Lu (University of Electronic Science and Technology of China, P.R. China), Jiqing Gu (University of Electronic Science and Technology of China, P.R. China), and Chong Zhang (University of Electronic Science and Technology of China, P.R. China)</i>	
A Fuzzy Multi-Identity Based Signature .....	219
<i>Yaqiong Guo (State Grid Zhejiang Electric Power Corporation Information &amp; Telecommunication Branch, China), Peng Zhou (State Grid Zhejiang Electric Power Corporation Information &amp; Telecommunication Branch, China), Xin Lu (State Grid Zhejiang Electric Power Corporation Information &amp; Telecommunication Branch, China), Wangshu Sun (State Grid Zhejiang Electric Power Corporation Information &amp; Telecommunication Branch, China), and Jiasai Sun (State Grid Zhejiang Electric Power Corporation Information &amp; Telecommunication Branch, China)</i>	
Semantic Integration Based User Behavior Monitoring Framework in Zero Trust Network .....	224
<i>Yansheng Qu (State Grid Shandong Electric Power Company, China), Hua Huang (State Grid Shandong Electric Power Company, China), Lin Chen (State Grid Shandong Electric Power Company, China), Lina Zhao (State Grid Shandong Electric Power Company, China), Yuxiang Zhao (State Grid Shandong Electric Power Company, China), Jie Zhang (State Grid Shandong Electric Power Company, China), and Bo Mao (Nanjing University of Finance and Economics, China)</i>	
A Novel Firewalls Configure Fault and Its Repair Method .....	228
<i>Penghui Su (Nanjing University of Aeronautics and Astronautics, China), Yan Gao (Chinese Institute of Electronics, China), and Ming Chen (Nanjing University of Aeronautics and Astronautics, China)</i>	
Decentralized Blockchain Network .....	234
<i>Tamara Abdulmunim Abduljabbar (University of Southern Queensland), Xiaohui Tao (University of Southern Queensland), Ji Zhang (University of Southern Queensland), Jianming Yong (University of Southern Queensland), and Xujuan Zhou (University of Southern Queensland)</i>	
The Threat of Distributed Denial-of-Service Attack for User Equipment in 5G Networks .....	240
<i>Danish Khan (University of Southern Queensland, Australia), Xujuan Zhou (University of Southern Queensland, Australia), and Jianming Yong (University of Southern Queensland, Australia)</i>	
Detecting Key Offenders from Crime Incidents via Attributed Heterogeneous Network Learning...	246
<i>Zhe Li (Hubei Engineering University, China), Xiao Jing (Northwestern Polytechnical University, China), Shanshan Cao (Nanjing University, China), Tianfan Zhang (Hubei Engineering University, China), and Zhiang Wu (Nanjing Audit University, China)</i>	



## Cloud Security and Privacy II

Space-Efficient Logging for Supply Chain Traceability Based on Blockchain .....	252
<i>Shuang Qiao (University of Science and Technology of China, China), Chenhong Cao (Shanghai University), Haoquan Zhou (The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China), and Wei Gong (The First Affiliated Hospital of USTC, Division of Life Sciences and Medicine, University of Science and Technology of China)</i>	
A Hybrid Attack Graph Analysis Method Based on Model Checking .....	258
<i>Yaogang Ge (Nanjing Forestry University, China), Xiaomeng Shen (Nanjing Forestry University, China), Bingfeng Xu (Nanjing Forestry University, China; Nanjing University of Aeronautics and Astronautics, China), and Gaofeng He (Nanjing University of Posts and Telecommunications, China)</i>	
Scheme of Peer-to-Peer Trade in Multi-Microgrid Based on Blockchain .....	264
<i>Guanjun Zhao (State Grid Jinhua Power Supply Company, China), Lizhong Jia (State Grid Jinhua Power Supply Company, China), Jie Xu (State Grid Jinhua Power Supply Company, China), Chang Liu (State Grid Jinhua Power Supply Company, China), Weijun Hu (State Grid Jinhua Power Supply Company, China), and Chunpei Li (Advanced Innovation Center for Future Blockchain and Privacy Computing &amp; Beihang University, China)</i>	
Analysis Method of Security Critical Components of Industrial Cyber Physical System Based on SysML .....	270
<i>Junjie Zhao (Nanjing Forestry University, China), Bingfeng Xu (Nanjing Forestry University, China; Nanjing University of Aeronautics and Astronautics, China), Xinkai Chen (Nanjing Forestry University, China), Bo Wang (Nanjing Forestry University, China), and Gaofeng He (Nanjing University of Posts and Telecommunications, China)</i>	
The Application of RNN-Based API Data Security Detection in Government Cloud Service .....	276
<i>Jing Wen (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), Chaohong Tan (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), Jining Chen (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), Qin Zhao (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), Sen Li (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China), and Fei Zhou (Joint Innovation Laboratory of Digital GuangXi Smart Infrastructures Guangxi Zhuang Autonomous Region Information Center, China)</i>	

## Edge Computing and Miscellaneous

PEACE: Towards Optimizing Monitoring Utility of Unmanned Aerial Vehicles with Adverse Effect Constraints .....	282
<i>Jingwu Wang (Nanjing University, China), Weijun Wang (Nanjing University, China; University of Goettingen, Germany), Haipeng Dai (Nanjing University, China), Lanlan Li (Nanhang Jincheng College, China), and Guihai Chen (Nanjing University, China)</i>	
IoTPass: IoT Data Management System for Processing Time-Series Data .....	288
<i>Zehua Nie (Peking University), Can Su (Peking University), Yichen Mao (Peking University), and Kaigui Bian (Peking University; National Engineering Laboratory for Big Data Analysis and Application)</i>	
Request-Aware Task Offloading in Mobile Edge Computing via Deep Reinforcement Learning .....	294
<i>Ziwen Sheng (Hohai University, China), Yingchi Mao (Hohai University, China), Jiajun Wang (Hohai University, China), Hua Nie (Suma Technology Co. Ltd., China), and Jianxin Huang (Suma Technology Co. Ltd., China)</i>	
A Kubernetes-Oriented Edge Network Orchestrator for Heterogeneous Environment .....	300
<i>Chenyu Lu (Southeast University, China), Zhaowu Huang (Southeast University, China), Caishan Weng (Southeast University, China), Feng Jiao (China Information Consulting &amp; Designing Institute CO, LTD, China), Xiaolin Guo (Southeast University, China), and Fang Dong (Southeast University, China)</i>	
Device-free Crowd Density Estimation with Off-the-Shelf WiFi Traffic .....	306
<i>Jianwei Liu (Zhejiang University, China), Guozheng Yang (China Zheshang Bank Co., Ltd., China), Cheng Zang (China Zheshang Bank Co., Ltd., China), Jiajun Chen (China Zheshang Bank Co., Ltd., China), Xianming Hu (China Zheshang Bank Co., Ltd., China), Jingzhi Zhang (China Zheshang Bank Co., Ltd., China), Yinghui He (Zhejiang University, China), Jinsong Han (Zhejiang University, China; ZJU-Hangzhou Global Scientific and Technological Innovation Center, China), and Kui Ren (Zhejiang University, China; ZJU-Hangzhou Global Scientific and Technological Innovation Center, China)</i>	
Deep Reinforcement Learning for Task Scheduling in Intelligent Building Edge Network .....	312
<i>Yuhao Chen (Suzhou University of Science and Technology, China), Zhe Zhang (Suzhou University of Science and Technology, China), Huixue Wang (Suzhou University of Science and Technology, China), Yunzhe Wang (Suzhou University of Science and Technology, China), Qiming Fu (Suzhou University of Science and Technology, China), and You Lu (Suzhou University of Science and Technology, China)</i>	
WMLink: Wearable Smart Devices and Mobile Phones Linking Through Passive Sniffing BLE and WiFi Signals .....	318
<i>Naixuan Guo (Yancheng Institute of Technology, China; Southeast University), Zhaofeng Chen (Yancheng Institute of Technology, China), Heyang Xu (Yancheng Institute of Technology, China), Zhechun Zhao (Southeast University, China), Yu Liu (Southeast University, China), and Sen Xu (Yancheng Institute of Technology, China)</i>	

**Author Index** ..... 325