

2017 IEEE Second International Conference on Data Science in Cyberspace (DSC 2017)

**Shenzhen, China
26-29 June 2017**



**IEEE Catalog Number: CFP17E91-POD
ISBN: 978-1-5386-1601-7**

**Copyright © 2017 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:	CFP17E91-POD
ISBN (Print-On-Demand):	978-1-5386-1601-7
ISBN (Online):	978-1-5386-1600-0

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

2017 IEEE Second International Conference on Data Science in Cyberspace

DSC 2017

Table of Contents

Message from the General Chairs	xiii
Conference Organization	xiv
Program Committee	xv
Reviewers	xxiii

Main Conference: International Conference on Data Science in Cyberspace

Zero-Determinant Strategy for Cooperation Enforcement in Crowdsourcing	1
<i>Yue Miao, Changbing Tang, Jianfeng Lu, and Xiang Li</i>	
Saving Energy on Processor Micro-Architecture Level for Big Data Stream Mobile Computing	7
<i>Zhiguo Liu, Ni Zhang, Qiu Tang, Ningning Song, Zengming Yu, and Hongbin Zhang</i>	
A Multi-modal Hashing Learning Framework for Automatic Image Annotation	14
<i>Jiale Wang and Guohui Li</i>	
SDS2: Secure Data-Sharing Scheme for Crowd Owners in Public Cloud Service	22
<i>You Zhou and Liang-Min Wang</i>	
On Study of Physical-Layer Attack Detection for Large Volumes of Data	30
<i>Ruohan Cao and Yueming Lu</i>	
Spatio-temporal Distribution Pattern of Cable Car Passenger Flow in Panholidays: A Case Study of Huangshan Scenic Area	35
<i>Wenxing Lu and Xiao Wei</i>	
Mining Similarity-Aware Distinguishing Sequential Patterns from Biomedical Sequences	43
<i>Tinghai Pang, Lei Duan, Jesse Li-Ling, and Guozhu Dong</i>	
A Remote Data Integrity Checking Scheme for Big Data Storage	53
<i>Xingyue Chen, Tao Shang, Ilryong Kim, and Jianwei Liu</i>	

Research on Classification Method of High-Dimensional Class-Imbalanced Data Sets Based on SVM	60
<i>Chunkai Zhang, Jianwei Guo, and Junru Lu</i>	
An Approximate Approach to Frequent Itemset Mining	68
<i>Chunkai Zhang, Xudong Zhang, and Panbo Tian</i>	
A Survey on Data Cleaning Methods in Cyberspace	74
<i>Jinlin Wang, Hongli Zhang, Binxing Fang, Xing Wang, and Lin Ye</i>	
A New Approach for Imbalanced Data Classification Based on Minimize Loss Learning	82
<i>Chunkai Zhang, Guoquan Wang, Ying Zhou, and Jiayao Jiang</i>	
Semi-Supervised Collective Matrix Factorization for Topic Detection and Document Clustering	88
<i>Ye Wang, Yanchun Zhang, Bin Zhou, and Yan Jia</i>	
Extracting Sift Keypoints in DCT Domain	98
<i>Chi Fei, Bin Liu, and Nenghai Yu</i>	
EMMBTT: A Novel Event Evolution Model Based on TFxIEF and TDC in Tracking News Streams	102
<i>Pengpeng Zhou, Bin Wu, and Zhen Cao</i>	
Learning Automata Based Approach for Influence Maximization Problem on Social Networks	108
<i>Hao Ge, Jinchao Huang, Chong Di, Jianhua Li, and Shenghong Li</i>	
A Personalized Next-Song Recommendation System Using Community Detection and Markov Model	118
<i>Kan Zhang, Zichao Zhang, Kaigui Bian, Jin Xu, and Jie Gao</i>	
Outsourced Privacy-Preserving C4.5 Algorithm over Arbitrarily Partitioned Databases	124
<i>Ye Li, Zoe L. Jiang, Xuan Wang, S.M. Yiu, and Qing Liao</i>	
DPLK-Means: A Novel Differential Privacy K-Means Mechanism	133
<i>Jun Ren, Jinbo Xiong, Zhiqiang Yao, Rong Ma, and Mingwei Lin</i>	
A Network Coordinate System Constructing Algorithm Based on Optimal Neighbor Nodes	140
<i>Fan Zhao, Jingning Chen, Dengpan Ye, and Xiangyang Luo</i>	
Adaptive Text Steganography by Exploring Statistical and Linguistical Distortion	145
<i>Hu Huanhuan, Zuo Xin, Zhang Weiming, and Yu Nenghai</i>	
Predicting the Popularity of News Based on Competitive Matrix	151
<i>Xiaomeng Wang, Binxing Fang, Hongli Zhang, and XuanYu</i>	
A Method of Emotional Analysis of Movie Based on Convolution Neural Network and Bi-directional LSTM RNN	156
<i>Shudong Li, Zhou Yan, Xiaobo Wu, Aiping Li, and Bin Zhou</i>	

New Pseudorandom Number Generators from Block Ciphers	162
<i>Ping Zhang, Honggang Hu, Xianjun Hu, and Xiaolong Yang</i>	
Attribute-Based Encryption with Multi-keyword Search	172
<i>Runhe Li, Dong Zheng, Yinghui Zhang, Haonan Su, Menglei Yang, and Pengzhen Lang</i>	
An Expressive Hidden Access Policy CP-ABE	178
<i>Fawad Khan, Hui Li, Liangxuan Zhang, and Jian Shen</i>	
A Sensitive Information Protection Scheme in Named Data Networking Using Attribute-Based Ring-Signcryption	187
<i>Tao Feng and Ningning Liu</i>	
Efficient, Verifiable and Privacy Preserving Decentralized Attribute-Based Encryption for Mobile Cloud Computing	195
<i>Maoxu Lyu, Xuejun Li, and Hui Li</i>	
Multi-authority Attribute-Based Encryption Access Control Scheme with Hidden Policy and Constant Length Ciphertext for Cloud Storage	205
<i>Fan Yundong, Wu Xiaoping, and Wang Jiasheng</i>	
A Novel Contributory Cross-Domain Group Password-Based Authenticated Key Exchange Protocol with Adaptive Security	213
<i>Liehuang Zhu, Cong Guo, Zijian Zhang, Wei Fu, and Rixin Xu</i>	
A Fully Secure Verifiable and Outsourced Decryption Ranked Searchable Encryption Scheme Supporting Synonym Query	223
<i>Yaqian Kang and Zhenhua Liu</i>	
SRAM: A State-Aware Risk Assessment Model for Intrusion Response	232
<i>Fenghua Li, Fangxin Xiong, Chao Li, Lihua Yin, Guozhen Shi, and Boxiu Tian</i>	
A Conditional Probability Computation Method for Vulnerability Exploitation Based on CVSS	238
<i>Hua Zhang, Fang Lou, Yunsheng Fu, and Zhihong Tian</i>	
A Framework to Construct Knowledge Base for Cyber Security	242
<i>Huaijun Shang, Rong Jiang, Aiping Li, and Wei Wang</i>	
IBF: Interval-Based Fingerprinting for Secret Access Control and Flow Monitoring	N/A
<i>Yue-Bin Luo, Bao-Sheng Wang, Xiao-Feng Wang, and Bo-Feng Zhang</i>	
Building Endgame Data set to Improve Opponent Modeling Approach	255
<i>Zhang Jiajia and Liu Hong</i>	
Cyberspace-Oriented Access Control: Model and Policies	261
<i>Fenghua Li, Zifu Li, Weili Han, Ting Wu, Lihua Chen, and Yunchuan Guo</i>	
ISLUS: An Immediate and Safe Live Update System for C Program	267
<i>Zhikun Chen and Weizhong Qiang</i>	
A Reputation-Based Resilient and Recoverable P2P Botnet	275
<i>Jie Yin, Xiang Cui, and Ke Li</i>	

Mining Users' Important Locations and Semantics on Cellular Network Data	283
<i>Yupeng Tuo, Xiaochun Yun, and Yongzheng Zhang</i>	
Ensemble of Time-Invariant Convolutional LDPC Codes with Moderate Rates	N/A
<i>Liwei Mu</i>	
ITM-LB: An Improved Traffic Matrix-Based Load Balancing Routing Algorithm	298
<i>Weidong Lin and Chi Zhang</i>	
A Secure NFC-Based User Authentication Scheme in the IOT Era	N/A
<i>Si Chen, Qiuyun Lyu, Yuhong Ma, and Qiuhua Wang</i>	
FgDetector: Fine-Grained Android Malware Detection	311
<i>Dongfang Li, Zhaoguo Wang, Lixin Li, Zhihua Wang, Yucheng Wang, and Yibo Xue</i>	
Analysis of Android Malware Family Characteristic Based on Isomorphism of Sensitive API Call Graph	319
<i>Hao Zhou, Wei Zhang, Fengqiong Wei, and Yunfang Chen</i>	
Research on Online Learning of Radar Emitter Recognition Based on Hull Vector	328
<i>Weigang Zhu, Meng Li, and Chuangzhan Zeng</i>	
Cloud-Based Lightweight RFID Mutual Authentication Protocol	333
<i>Kai Fan, Qi Luo, Hui Li, and Yintang Yang</i>	

Session W1: International Workshop on Data Visualization

Interactive Network Clustering Layout Method Based on Implicit Connection	339
<i>Huaquan Hu, Lingda Wu, and Ronghuan Yu</i>	
Visualization of Stay Points in Ship Trajectory Data Using the Space-Time Cube	N/A
<i>Wei Deng, Hao Liu, Tuan-Sheng Yang, and Hao Dong</i>	
Visualization Study of High-Dimensional Data Classification Based on PCA-SVM	346
<i>Zhao Zhongwen and Guo Huanghuang</i>	
Auto-Encoder Based for High Spectral Dimensional Data Classification and Visualization	350
<i>Jiang Zhu, Lingda Wu, Hongxing Hao, Xiaorui Song, and Yi Lu</i>	
Research on the Space-Based Integrated Information Network Evolution Model Visualization Methods Based on the Super Network Theory	355
<i>Chengxiang Liu and Wei Xiong</i>	
Research on Multi-resolution Isosurface Extraction Method for 3D Scalar Field	359
<i>Yu Ronghuan, Xie Wei, Wu Lingda, and Hao Hongxing</i>	
Two-Layer Network Visualization for Comprehensive Analysis	363
<i>Yingmei Wei and Xiaolei Du</i>	
Tasks for Visual Analytics in Multilayer Networks	368
<i>Zhang Xitao, Wu Lingda, Hu Huaquan, and Yu Shaobo</i>	

A Movie Summary Generation System	372
<i>Yuxiang Xie, Xidao Luan, Jingmeng He, Lili Zhang, Xin Zhang, and Chen Li</i>	

Session W2: International Workshop on Multi-view Network Fusion and Analysis

Temporal Multi-task Model Framework Using Multi-source Data for Bonds Credit Assessment	376
<i>Jiawei Shi and Xi Zhang</i>	
Social Network Construction of the Role Relation in Unstructured Data Based on Multi-view	382
<i>Lili Zhou, Jinna Lv, and Bin Wu</i>	
Extracting Topics Based on Word2Vec and Improved Jaccard Similarity Coefficient	389
<i>Chunzi Wu and Bai Wang</i>	
Open Relation Extraction Based on Core Dependency Phrase Clustering	398
<i>Chengsen Ru, Shasha Li, Jintao Tang, Yi Gao, and Ting Wang</i>	
The CRFs-Based Chinese Open Entity Relation Extraction	405
<i>Xiaoyang Wu and Bin Wu</i>	

Session W3: International Workshop on Data Security and Privacy in Internet of Things

An Arithmetic View on Generating Necklaces	412
<i>Jiantao Wang</i>	
Mobile Device Management System Based on AOSP and SELinux	417
<i>Xin-long Song and Chung-Huang Yang</i>	
The Efficient Implementation of the Android Kernel with China Standard Cryptographic Algorithm	421
<i>Yu Shi, Dong Zheng, and Chung-Huang Yang</i>	
File-Based Encryption with SM4	426
<i>Chan Gao and Chung-Huang Yang</i>	
Anonymous Fair Exchange Protocol with a Semitrusted Third Party	431
<i>Lijuan Guo, Xuelian Li, Xiaolin Lv, and Juntao Gao</i>	
Verifiable Attribute-Based Multi-keyword Search over Encrypted Cloud Data in Multi-owner Setting	441
<i>Yaqing Fan and Zhenhua Liu</i>	
MSDB: A Massive Sensor Data Processing Middleware for HBase	450
<i>Bowei Liu, Ruizhang Huang, Ting Huang, and Yingying Yan</i>	

Session W4: International Workshop on Privacy for Big Data

Permutation-Based Tweakable On-line Cipher with Improved Security Guarantees	457
<i>Ping Zhang and Honggang Hu</i>	
Time Series Discord Discovery Under Multi-party Privacy Preserving	467
<i>Chunkai Zhang, Haodong Liu, and Ye Li</i>	
Privacy-Preserving Attribute-Based Encryption Supporting Expressive Access Structures	475
<i>Liangxuan Zhang, Hui Li, Yinghui Zhang, and Fawad Khan</i>	
Design and Implementation of the Components of the Symmetric Cryptographic Algorithm	483
<i>Yunfei Ci, Guozhen Shi, Feng Yang, Jiawen Diao, Cuijie Liu, and Weihua Mao</i>	
Privacy Preservation Strategy in Time-Sensitive LBSS	488
<i>Weihaoli, Ben Niu, and Hui Li</i>	
Improving Database Storage Usability with the Cloud-Based Architecture	494
<i>Cuicui Su, Yongzhi Wang, Yulong Shen, Ke Cheng, and Jiawen Ma</i>	

Session W5: International Workshop on Data Science and Web Analytics

A Deep Recurrent Network for Web Server Performance Prediction	500
<i>Jiajun Peng, Zheng Huang, and Jie Cheng</i>	
Joint Dictionary Learning for Person Re-identification	505
<i>Yunlu Xu, Jie Guo, and Zheng Huang</i>	
Review of iOS Malware Analysis	511
<i>Zhu Yixiang and Zhang Kang</i>	
SpongeMPH: A New Multivariate Polynomial Hash Function based on the Sponge Construction	516
<i>Wei jie Li, Guohong Liao, Yamin Wen, and Zheng Gong</i>	
An Adaptive Honeypot Deployment Algorithm Based on Learning Automata	521
<i>Yan Zhang, Chong Di, Zhuoran Han, Yichen Li, and Shenghong Li</i>	
Big Data for Social Media Evaluation: A Case of Wechat Platform Rankings in China	528
<i>Qian Liu, Jingsi Ni, Jing Huang, and Xiaochuan Shi</i>	

Session W6: International Workshop on Cyber-Physical Systems Security & Privacy Workshop

Formal Analysis of Security Properties of Cyber-Physical System Based on Timed Automata	534
<i>Ting Wang, Qi Su, and Tieming Chen</i>	
CPS Information Security Risk Evaluation System Based on Petri Net	541
<i>Yonggui Fu, Jianming Zhu, and Sheng Gao</i>	
A Defense Mechanism Against Location Cheating Attack in Social Network	549
<i>Qing Li, Ayong Ye, and Li Xu</i>	
Evaluating Network Equipment Information Security Based on D-S Evidence Theory and Principal Components Analysis	554
<i>Chao Yuan, Yueming Lu, and Jiefu Gan</i>	
Construction of High-Availability Bank System in Virtualized Environments	561
<i>Huang Neng</i>	
Embedding-Based Feature Extraction Methods for Chinese Sentiment Classification	569
<i>Sheng Zhang, Hui Wang, Xin Zhang, Jiajun Cheng, Pei Li, and Zhaoyun Ding</i>	
Range Queries on Two Column Data	578
<i>Ce Yang, Weiming Zhang, and Nenghai Yu</i>	

Session W7: International Workshop on Big Data Cybersecurity Analytics

CNFL: Categorical to Numerical Feature Learning for Clustering and Classification	585
<i>Eric Golinko, Thomas Sonderman, and Xingquan Zhu</i>	
An Information Security Evaluation Method Based on Entropy Theory and Improved TOPSIS	595
<i>Dongqing Wang, Yueming Lu, and Jiefu Gan</i>	
Analysis of Network Attack and Defense Game with the Average Recovery Time as the Quantitative Indicators of the Payment Function	601
<i>Sun Yang and Xioing Wei</i>	
Implementation and Evaluation of Different Parallel Designs of AES Using CUDA	606
<i>Jianwei Ma, Xiaojun Chen, Rui Xu, and Jinqiao Shi</i>	
Detecting Congestion and Detour of Taxi Trip via GPS Data	615
<i>Junfeng Tu and Yucong Duan</i>	
Framework of Probabilistic Risk Assessment for Security and Reliability	619
<i>Qisi Liu, Liudong Xing, and Chaonan Wang</i>	
Fast Copy-Move Detection of Digital Audio	625
<i>Zihan Liu and Wei Lu</i>	

Session W8: International Workshop on Big Data and Business Analytics

Sentiment Lexical-Augmented Convolutional Neural Networks for Sentiment Analysis	630
<i>Rongchao Yin, Peng Li, and Bin Wang</i>	
A Trusted Power System Network in Electrical Industry	636
<i>Yuan Mengying, Chen Xiangzhou, Wang Yang, and Ding Huixia</i>	
Intelligent Discovery of Notable Product Features by Mining Large Scale Online Reviews	644
<i>Xin Ni, Yinghui Sai, Anning Wang, and Qiang Zhang</i>	
The Influence of Internal Control on Executive Pay-Performance Sensitivity: Based on the Background of the Reform of State-Owned Enterprise in China	650
<i>Xuan Zhang and Liang Zuo</i>	
Data Driven Modeling of Continuous Time Information Diffusion in Social Networks	655
<i>Liang Liu, Bin Chen, Bo Qu, Lingnan He, and Xiaogang Qiu</i>	
Research and Application of the Test Data Visualization	661
<i>Hui Yan, Junfeng Wang, and Chensen Xia</i>	
Author Index	666