

# **2015 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery (CyberC 2015)**

**Xi'an, China  
17 – 19 September 2015**



**IEEE Catalog Number: CFP1527I-POD  
ISBN: 978-1-4673-9201-3**

# 2015 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery

## CyberC 2015

### Table of Contents

Preface.....	xii
Message from the Steering Committee Chair.....	xiv
Message from the Technical Program Chairs.....	xv
Program Committee.....	xvi
Reviewers.....	xix
Keynotes.....	xxv

---

#### Session 1: Security, Encryption, and Reliability

A Chaos-Based Hash Function .....	1
<i>Qi Wu</i>	
A Novel Implementation of a Hash Function Based on XML DOM Parser .....	5
<i>Dandan Yang, Zhiqiang Wei, and Yongquan Yang</i>	
Kernel Malware Core Implementation: A Survey .....	9
<i>XiangYu Li, Yi Zhang, and Yong Tang</i>	
Simulation of the Users' Email Behavior Based on BP-BDI Model.....	16
<i>Yu Sheng, Jiang Rong, and Wang Xiang</i>	
A Hierarchical Framework of Security Situation Assessment for Information System .....	23
<i>Yiyang Jia, Hanyan Wu, and Dongxing Jiang</i>	
XSS Vulnerability Detection Using Optimized Attack Vector Repertory .....	29
<i>Xiaobing Guo, Shuyuan Jin, and Yaxing Zhang</i>	
A 4-Dimensional Discrete Chaotic System and Application in Image Encryption with Avalanche Effects .....	37
<i>Shujie Yang, Lequan Min, and E. Chen</i>	
Advanced Classification Lists (Dirty Word Lists) for Automatic Security Classification .....	44
<i>Paal E. Engelstad, Hugo Hammer, Anis Yazidi, and Aleksander Bai</i>	

Analysis of Time-Dependencies in Automatic Security Classification .....	54
<i>Paal E. Engelstad, Hugo Hammer, Anis Yazidi, and Aleksander Bai</i>	

## **Session 2: Authentication, Key, Privacy, and Security**

A Mixed Encryption Algorithm Used in Internet of Things Security Transmission System .....	62
<i>Mingyuan Xin</i>	
Recovery of Evidence and the Judicial Identification of Electronic Data Based on ExFAT .....	66
<i>Ma Guofu, Wang Zixian, and Cheng Yusi</i>	
A CIM System for Use in the UCWW .....	72
<i>Ivan Ganchev, Zhanlin Ji, Mairtin O'Droma, and Chenxu Dai</i>	
Application and Management of Cybersecurity Measures for Protection and Control .....	76
<i>Dennis Holstein, T.W. Cease, and Maik G. Seewald</i>	
Android Malware Detection Based on Static Analysis of Characteristic Tree .....	84
<i>Qi Li and Xiaoyu Li</i>	
The Multilinear Maps Based Certificateless Aggregate Signcryption Scheme .....	92
<i>Han Yiliang and Chen Fei</i>	
Randomized Ring-Partition Fingerprinting with Dithered Lattice Vector Quantization .....	100
<i>Cheolkon Jung and Lihui Cao</i>	
A “Dynamic Tunnel” Defense Mechanism Based on GTP Protocol .....	104
<i>Zhang Qing and Liu Caixia</i>	

## **Session 3: Distributed Architecture, System, and Applications**

An Application of Horizontal and Vertical Integration in Cyber-Physical Production Systems .....	110
<i>Qiong Liu, Junming Chen, Yuanquan Liao, Egon Mueller, David Jentsch, Frank Boerner, and Mingliang She</i>	
A Decentralized Load Balancing Architecture for Cache System .....	114
<i>Mengjing Song, Hui Li, and Hao Wu</i>	
Probabilistic Event Processing with Negation Operators in Cyber Physical Systems .....	120
<i>Na Mao and Jie Tan</i>	
Transformer Fault Diagnosis Algorithm Based on Entropy-Weighting Information Bottleneck Method .....	127
<i>HongXing Lu, YangDong Ye, and Gang Chen</i>	
Data Driven Condition Monitoring of Wind Power Plants Using Cluster Analysis .....	131
<i>Peng Li, Jens Eickmeyer, and Oliver Niggemann</i>	

A New Method for Processing and Application of Wide Area Measurement Big Data in a Power System .....	137
<i>Dunwen Song, Boying Wen, Xuetao Yang, Yubao Gu, Shiquan Wei, and Shiyong Ma</i>	

## **Session 4: Algorithms, Theory, and Protocols**

Resource Optimization Strategy in Optical Grid Supporting Multi-channel Transmission .....	141
<i>Gao Huimin, Wang Yongzhou, Wang Liang, and Wang Guomin</i>	
A Fast Parallel Genetic Algorithm for Graph Coloring Problem Based on CUDA .....	145
<i>Buhua Chen, Bo Chen, Hongwei Liu, and Xuefeng Zhang</i>	
A Collocation Method for Weakly Singular Fredholm Integral Equation .....	149
<i>Xiao-Ya Lv and Wei-Hua Luo</i>	
Asymmetric Slepian-Wolf Coding Design with Spatially Coupled LDPC Convolutional Codes .....	152
<i>Shumin Tu</i>	
Generalized Stability Theorem for Non-autonomous Differential Equation with Application .....	156
<i>Mei Zhang, Lequan Min, and Xiuping Yang</i>	
Graph-Based Method for Detecting Occupy Protest Events Using GDELT Dataset .....	164
<i>Fengcai Qiao, Pei Li, Jingsheng Deng, Zhaoyun Ding, and Hui Wang</i>	
The Relation of Energy-Consumption and the Population of People .....	169
<i>HongLiang Liang and HongYan Cui</i>	
A Hybrid Model for Experts Finding in Community Question Answering .....	176
<i>Hai Li, Songchang Jin, and Shudong LI</i>	
Distributed Self-Diagnosis Algorithm for VoIP Service over IMS Network .....	186
<i>Jingxian Lu, Christophe Dousson, and Francine Krief</i>	
Voting Based Seeding Algorithm for Overlapping Community Detection .....	192
<i>Yanmei Hu, Kaiyang Hu, Bo Yang, Nan Zhang, and Xiaohui Gu</i>	

## **Session 5: Big Data Algorithm**

Network User Interest Pattern Mining Based on Entropy Clustering Algorithm .....	200
<i>Changda Xu, Shuoying Chen, and Jing Cheng</i>	
Aggregation Encoding: Reducing Network Traffic for Big Data Erasure-Coded Storages .....	205
<i>Jing Zhang, Shanshan Li, Xiangke Liao, and Xiaodong Liu</i>	
A Topic Detection Method Based on Microblog Weight .....	209
<i>Kaijie Guo and Liang Shi</i>	
TSM: Efficient Thermal and Server Management for Greening Data Centers .....	213
<i>Jianxiong Wan, Gefei Zhang, Limin Liu, and Ran Zhang</i>	

Feature Extraction Algorithm and Optimization for Mass TV Audience .....	217
<i>Fan Zhang, Zheng Chen, and Jinyao Yan</i>	
An Improved Parallel Algorithm of Genetic Programming Based on the Framework of MapReduce .....	221
<i>Zhang Song, Ma Jun, Zhao Yang-Yang, and Liu Qiong</i>	
Hadoop Job Scheduling Based on Mixed Ant-Genetic Algorithm .....	226
<i>Xiaofei Huang, Hui Zhou, and Wei Wu</i>	
A Big Data Online Cleaning Algorithm Based on Dynamic Outlier Detection .....	230
<i>Yinglong Diao, Ke-Yan Liu, Xiaoli Meng, Xueshun Ye, and Kaiyuan He</i>	
Mining High Utility Itemsets over Uncertain Databases .....	235
<i>Yuqing Lan, Yang Wang, Yanni Wang, Shengwei Yi, and Dan Yu</i>	
Semi-supervised Bi-dictionary Learning Using Smooth Representation-Based Label Propagation .....	239
<i>Meng Jian and Cheolkon Jung</i>	
A Semi-Supervised Machine Learning Method for Chinese Patent Effect Annotation .....	243
<i>Xu Chen and Na Deng</i>	

## **Session 6: Big Data Analytical and Cloud**

An Overview of Event Extraction from Twitter .....	251
<i>Jingsheng Deng, Fengcai Qiao, Hongying Li, Xin Zhang, and Hui Wang</i>	
A Deep Learning Method Combined Sparse Autoencoder with SVM .....	257
<i>Yao Ju, Jun Guo, and Shuchun Liu</i>	
Understanding User Behavior in Large Scale Internet Video Service .....	261
<i>Yawei He, Anming Wei, Wenhui Zhang, and Hui Xiao</i>	
Empirical Study on Alignment of Cloud Computing in Enterprises .....	268
<i>Shao Mingxing, Peng Long, and Fan Yanan</i>	
An Improved Information Gain Feature Selection Algorithm for SVM Text Classifier .....	273
<i>Jiamin Xu and Hong Jiang</i>	
Modeling and Analysis the Evolution of Herding Behavior in Public Opinion Propagation .....	277
<i>Li Yong, Li Li, and Zou Kai</i>	
Research on Spreading Mechanism of Network Rumors Based on Potential Energy .....	282
<i>Wang Li, Liu Fengming, Yang Rongrong, and Sun Wenxing</i>	
Data Deduplication Mechanism for Cloud Storage Systems .....	286
<i>Xiaolong Xu and Qun Tu</i>	
Analysis of Energy Consumption of Deduplication in Storage Systems .....	295
<i>Yizhou Yan and Wenjun Wu</i>	

The Status Prediction of Physical Machine in IaaS Cloud Environment .....	302
<i>Qingxin Xia, Yuqing Lan, and Limin Xiao</i>	

Bayesian Analysis of Mixture Normal Model via Equi-Energy Sampler and Improved Metropolis-Hastings Algorithm .....	306
<i>Wei Shao, Guoqing Zhao, and Feifei Shao</i>	

## **Session 7: Image, Monitoring, Control, and Performance**

Optimized Gray-Scale Image Watermarking Algorithm Based on DWT-DCT-SVD and Chaotic Firefly Algorithm .....	310
<i>Huailin Dong, Mingyuan He, and Ming Qiu</i>	

Concurrency Analysis and Implementation of SAR Imaging Algorithm Oriented to Hybrid Storage System .....	314
<i>Jing Du, Fujiang Ao, Sai Sui, and Huabing Wang</i>	

Combining Visual Saliency and Pattern Masking for Image Steganography .....	320
<i>Lihui Cao and Cheolkon Jung</i>	

Real-Time Depth-Image-Based Rendering on GPU .....	324
<i>Zengzeng Sun and Cheolkon Jung</i>	

Survey on Image Saliency Detection Methods .....	329
<i>Ma Runxin, Yu Yang, and Yue Xiaomin</i>	

Performance Evaluations of Graph Spectra on Evolving Systems .....	339
<i>Bo Jiao, Yuan-Ping Nie, Jing Du, Ying Zhou, Cheng-Dong Huang, and Xun-Long Pang</i>	

Comparison Between Controllers of Polynomial Fuzzy Control System .....	343
<i>Xiaodong Zhang, Hugang Han, and Yuki Higaki</i>	

Video Minor Motion Magnification System for Telemedicine .....	350
<i>Yi Zhang and Tao Yang</i>	

Performance-Conscious Reconfiguration Structure for Large-Scale Coarse-Grained Reconfigurable System .....	354
<i>Bo Liu, Yu Gong, Rui-he Wang, and Yang Liu</i>	

Impacts of Road Grade on Fuel Consumption of Light Vehicles by Use of Google Earth DEM .....	360
<i>Yanni Wang, Xiaoping Du, Haitao Yu, Jian Huang, and Yonghao Li</i>	

RESTful Web Service Matching Based on WADL .....	364
<i>Yang Xue, Chunhong Zhang, and Yang Ji</i>	

## **Session 8: Smart Sensor Networks**

Wireless Sensors in Farmland Environmental Monitoring .....	372
<i>Juan Xu, Jianjun Zhang, Xuehui Zheng, Xing Wei, and Jianghong Han</i>	

An Algorithm to Generate Data Linkages of Linked Sensor Data .....	380
<i>Lin-Na Cuan, Yi-Min Shi, Guan-Yu Li, Xue-Hua Wu, and Ning Liu</i>	

Design of Sense Amplifier in the High Speed SRAM .....	384
<i>Yong-Peng Tao and Wei-Ping Hu</i>	
A Novel Energy Efficient Coding-Aware Scheme in Wireless Sensor Networks .....	388
<i>Hanxu Zheng, Caihong Kai, Mengqi Yan, and Qinglin Zhao</i>	
An Improved Dynamic Z* Algorithm for Rapid Replanning of Energy-Efficient Paths .....	395
<i>Nuwan Ganganath, Chi-Tsun Cheng, and Chi K. Tse</i>	
Doppler Shift and Height Detection of Obstacle Based on FMCW Radar Sensor .....	399
<i>Zhou Hongping, Liu Quanbo, Chen Dapeng, Chen Wenliang, and Shen Fei</i>	
An Energy-Efficient System of Counteraction Against Attacks in the Mobile Wireless Sensor Networks .....	403
<i>Elena Basan and Oleg Makarevich</i>	
A Real-Time ASL Recognition System Using Leap Motion Sensors .....	411
<i>Kai-Yin Fok, Nuwan Ganganath, Chi-Tsun Cheng, and Chi K. Tse</i>	
Research on the Architecture of Wildlife Observation and Communication System .....	415
<i>Xiaohan Liu, Tao Yang, and Baoping Yan</i>	
Reconfigurable Antenna Based Blind Interference Alignment over Heterogenous Block Fading Channels .....	419
<i>Yubo Li, Min Peng, and Qing Feng Zhou</i>	
A Generalized Robust Chinese Remainder Theorem of Dual-Band Integers for Phase Unwrapping .....	423
<i>Bin Yang and Xinyu Li</i>	
An Algorithm to Generate Data Linkages of Linked Sensor Data .....	430
<i>Lin-Na Cuan, Yi-Min Shi, Guan-Yu Li, Xue-Hua Wu, and Ning Liu</i>	
<b>Session 9: 5G and Wireless Communications</b>	
A Dynamic Allocation Algorithm for Physical Carrier Resource in BBU Pool of Virtualized Wireless Network .....	434
<i>Ganqiang Lu, Caixia Liu, Lingshu Li, and Quan Yuan</i>	
Shaping Filter Design for Faster-than-Nyquist Signaling with Second Order Polynomial Function .....	442
<i>Qimei Chen and Han Zhang</i>	
Joint Resource Allocation for Uplink Virtual MIMO Systems under Elastic MSE Constraint .....	446
<i>Xiaofeng Lu, Shaojun Qiu, Wenna Li, Ya Gao, and Hailin Zhang</i>	
Precoding Schemes for the Gaussian Wire-Tap Channels .....	453
<i>Jun Cheng</i>	
Waveform Design for Tracking Systems .....	458
<i>Xinxi Le</i>	

Channel Adjustment for Performance Enhancement in Wireless Networks .....	463
<i>Yuanyuan Wu, Yu Zhao, and Yunhuai Liu</i>	
A Signal Analysis Design Based on LabVIEW .....	473
<i>Xiangwen Zhai, Minglun Zhang, Xiaonan Bai, and Zhidan Zhang</i>	
An Off-Line Implementation of OFDM in a Visible Light Communication System .....	477
<i>Xiaonan Bai, Minglun Zhang, and Xiangwen Zhai</i>	
A Sleep Scheduling Mechanism Based on Power Law Distribution for Mobile Delay Tolerate Networks .....	481
<i>Yankun Feng, Xiangyu Bai, Na Dang, and Shufang Wang</i>	
 <b>Session 10: SDN/NFV and Cognitive Networks</b>	
Performance of SDN Routing in Comparison with Legacy Routing Protocols .....	491
<i>Hailong Zhang and Jinyao Yan</i>	
High Reliable Routing Protocol Based on the Cross-Layer Constraints of Channel State Association Information for MHWNs .....	495
<i>Li Lou, Jian-Hua Fan, Xiao-Xie Xu, and Yong-Yang Hu</i>	
k -Maximally Disjoint Path Routing Algorithms for SDN .....	499
<i>John Olorunfemi Abe, Hacı Ali Mantar, and Aysegül Gencata Yayimli</i>	
Community Detection Analysis of Heterogeneous Network .....	509
<i>Shuai Du, Kai Niu, Zhiqiang He, and Yuqian Qiao</i>	
QoS Performance Analysis for the Second User in the Overlay Cognitive Radio Networks .....	513
<i>Junbo Hua and Ningning Jiang</i>	
Optimization Algorithm Based on SPSA in Multi-channel Multi-radio Wireless Monitoring Network .....	517
<i>Sheng Ding, Na Xia, Peipei Wang, Shaojie Li, and Yuanxiao Ou</i>	
Wireless Campus Network Design and Optimization Based on OPNET .....	525
<i>Juanjuan Wang, Xiangyu Bai, and Junli She</i>	
Queuing-Theoretical Multi-user Spectrum Sensing and Access in Multi-channel Cognitive Radio Networks .....	529
<i>Long Zhang, Liusheng Huang, and Hongli Xu</i>	
A RCP-Based Congestion Control Protocol in Named Data Networking .....	538
<i>Kai Lei, Chaojun Hou, Lihua Li, and Kuai Xu</i>	
An Inverse Problem in Wireless Mesh Network .....	542
<i>Mohammad S. Khan, Anup Kumar, and Bin Xie</i>	
MR-Verifier: Verifying Open Flow Network Properties Based on MapReduce .....	548
<i>Yi Liu, Cheng Lei, and Hongqi Zhang</i>	
 <b>Author Index</b> .....	 556