2016 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery (CyberC 2016)

Chengdu, China
13-15 October 2016
# Welcome to CyberC 2016

Welcome to CyberC 2016. This conference is dedicated to the advancement of cyber-enabled distributed computing and knowledge discovery. It brings together researchers, practitioners, and educators to discuss the latest developments and future directions in these fields.

## Message from the Technical Program Chairs

The Technical Program Chairs are pleased to invite you to participate in CyberC 2016. This event is a platform for sharing knowledge, fostering collaborations, and promoting innovative ideas.

## Message from the Steering Committee Chair

The Steering Committee Chair extends a warm welcome to all attendees. Their leadership ensures the success of the conference, and they are committed to providing a memorable experience for everyone.

## Reviewers

The conference would not be possible without the dedicated efforts of our reviewers. Their feedback is crucial in ensuring the quality of the papers presented at CyberC 2016.

## Keynotes

Keynotes are a highlight of the conference, offering insights from leading experts in the field. They provide valuable perspectives on the direction of research and technology.

## Session 1: Security, Privacy, and Protection

### A New Compile-Time Obfuscation Scheme for Software Protection

_Zhang Yujia and Pang Jianmin_

### Cloud Data Security and Integrity Protection Model Based on Distributed Virtual Machine Agents

_Xiaolong Xu, Guangpei Liu, and Jie Zhu_

### Inferring Phylogenetic Networks of Malware Families from API Sequences

_Jing Liu, Yuan Wang, and Yongjun Wang_

### Privacy Protection of Data Attributes in Cloud Environment

_Xiaolong Xu, Fuqiang Wan, and Yanfei Sun_

### Reviving Android Malware with DroidRide: And How Not To

_Min Huang, Kai Bu, Hanlin Wang, and Kaiwen Zhu_

### Software System for Automatic Reaction to Network Anomalies and in Real Time Data Capturing Necessary for Investigation of Digital Forensics

_Mladen Vukašinovic_

### A Novel Botnet Detection Method Based on Preprocessing Data Packet by Graph Structure Clustering

_Xinling Kong, Yonghong Chen, Hui Tian, Tian Wang, Yiqiao Cai, and Xin Chen_
Cyber Threat Detection and Application Analysis .................................................................46
    Shuangmao Yang, Ji Wang, Jing Zhang, and Hao Li

**Session 2: Access Control, Authentication, Key, Privacy, and Security**

A Dynamic Reseeding DRBG Based on SRAM PUFs .............................................................50
    Shuai Chen and Bing Li

A Lattice-Based Access Control Model for Social Networks .....................................................54
    Yingjun Zhang, Kai Chen, Yuling Liu, and Yifeng Lian

A Novel Design of Pipeline MDC-FFT Processor Based on Various Memory
Access Mechanism .....................................................................................................................62
    Jinjiang Yang, Dongming Zhang, Yu Gong, and Bo Liu

Access Control Model Based on Role and Attribute and Its Implementation .............................66
    Hui Qi, Xiong Luo, Xiaojianqiang Di, Jingqin Li, Huamin Yang, and Zhengang Jiang

A LEAP PLUS Key Management Scheme with Sliding Time Interval ......................................72
    Weifeng Lu and Siguang Chen

A Dynamic Access Control Policy Based on Hierarchical Description ........................................76
    Dao-jun Han, Ling Gong, and Fen Qin

Network Boundary and Protection ...........................................................................................81
    Haitao Yang and Jian Zhang

A Particle Filter-Based Approach for Effectively Detecting Low-Rate Denial
of Service Attacks .....................................................................................................................86
    Zhijun Wu, Jun Jiang, and Meng Yue

**Session 3: Algorithm, Mobile Services, Distributed Systems, and Scalability**

An Effective Hybrid Algorithm for Fast Mining Frequent Itemsets ...........................................91
    Qin Qibing and Tan Long

FIM Algorithm for Multi-Source Heterogeneous Information in Power Grid
Intelligent Dispatching ..............................................................................................................96
    Yirong Wang, Wenwei Chen, Runze Wu, and Zili Liu

MS2: NAND-Flash SSD-Based Multi-Layered Storage Management System ............................100
    Hyeunjee Kim, Hoonha Choi, Youngwook Kim, and Jaechun No

Ontology-Based Resource Description Model for Internet of Things ....................................105
    Shulong Wang, Yibin Hou, Fang Gao, and Songsong Ma

Predicting Protest Events with Hidden Markov Models ...........................................................109
    Fengcai Qiao and Kedi Chen

Mass Incidents Prediction Based on ID3-SMOTE Algorithm ....................................................115
    Tuo Shi, Xinlei Wei, and Xufen Shao
Session 4: Protocols, Analysis, Social Networks, and Theory

A Scalable Object Detection Framework Based on Embedded Manycore Cluster ..............................................................142

Fang Gao, Zhangqin Huang, Shulong Wang, and Xinrong Ji

A Study of Collaborative Efforts and Proposed Visualizations in Domain-Specific Modeling Environment .................................................................146

Peng Zhang, Sandeep Neema, and Ted Bapty

Comparative Analysis on the Conjunctive and Disjunctive Assumptions for the Belief Rule Base ......................................................................................153

Leilei Chang, Xiaowei Ma, Liuying Wang, and Xiaodong Ling

Analysis of Crime Rate Distribution Based on TPML-WMA ...............................................................................................157

Xinlei Wei, Jinyao Yan, Zheng Chen, and Tuo Shi

Factors Dominating Individuals’ Retweeting Decisions ...............................................................................................161

Juan Shi, Gang Chen, and Kin Keung Lai

Classification of Massive User Load Characteristics in Distribution Network Based on Agglomerative Hierarchical Algorithm ......................................................................................169

Yinglong Diao, Ke-Yan Liu, Lijuan Hu, Dongli Jia, and Weijie Dong

Android Applications Categorization Using Bayesian Classification ...............................................................................................173

Cangzhou Yuan, Shenhong Wei, Yutong Wang, Yue You, and ShangGuan ZiLiang

Spatial Panel Data Analysis on the Effect of Urbanization on Energy Consumption in China ...............................................................................................177

Honglei Niu and Zhiyong Liu

The Influence of Film IP Features on the Box Office ...............................................................................................N/A

Xinran Wang, Xi Feng, and Jianping Chai

Prediction for Air Route Passenger Flow Based on a Grey Prediction Model ...............................................................................................185

Liu Xia, Yang Jie, Chen Lei, and Chen Ming-Rui

Study of Personal Location-Based State Distribution Inference ...............................................................................................191

Tao Ma, Chunlai Ma, and Juan Chen
### Session 5: Big Data and Machine Learning

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Breast Cancer Risk Classification Model Based on the Features Selected by Novel F-Score Index for the Imbalanced Multi-Feature Dataset</td>
<td>198</td>
</tr>
<tr>
<td>Xiaoli Lin, Wei Huangfu, Fei Wang, Liyuan Liu, and Keping Long</td>
<td></td>
</tr>
<tr>
<td>An Improved Classification Algorithm Based on Exposure Pattern</td>
<td>204</td>
</tr>
<tr>
<td>Kaixia Shao and Xiaofeng Zhou</td>
<td></td>
</tr>
<tr>
<td>Deepening Prose Comprehension by Incremental Free Text Conceptual Graph Mining and Knowledge</td>
<td>208</td>
</tr>
<tr>
<td>Amal Babour, Javed I. Khan, and Fatema Nafa</td>
<td></td>
</tr>
<tr>
<td>Entity Hierarchy Construction for Repair Request Records</td>
<td>216</td>
</tr>
<tr>
<td>Jingyu Sun, Xiaomei Zhang, Quan Liu, Liang Ju, and Zhengying Li</td>
<td></td>
</tr>
<tr>
<td>Improve the Performance of Link Prediction Methods in Citation Network by Using H-Index</td>
<td>220</td>
</tr>
<tr>
<td>Yifan Jia and Li Qu</td>
<td></td>
</tr>
<tr>
<td>Discovering Bloom Taxonomic Relationships between Knowledge Units Using Semantic Graph Triangularity Mining</td>
<td>224</td>
</tr>
<tr>
<td>Fatema Nafa, Javed I. Khan, Salem Othman, and Amal Babour</td>
<td></td>
</tr>
<tr>
<td>A Novel Missing-Rate-Oriented Selective Algorithm for Handling Missing Data by Minimizing Imputation</td>
<td>234</td>
</tr>
<tr>
<td>Xing Li, Guolin Li, and Rick Fishbune</td>
<td></td>
</tr>
<tr>
<td>Multi-Source and Heterogeneous Data Integration Model for Big Data Analytics in Power DCS</td>
<td>238</td>
</tr>
<tr>
<td>Wengang Chen, Ruijie Wang, Runze Wu, Liangrui Tang, and Junli Fan</td>
<td></td>
</tr>
</tbody>
</table>

### Session 6: Big Data and Cloud Computing

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Cloud Computing Platform for Data Analysis Based on R Cluster</td>
<td>243</td>
</tr>
<tr>
<td>Yiming Tong, Zeyu Zhong, Dianzheng Fu, Yang Fu, and Shuai Li</td>
<td></td>
</tr>
<tr>
<td>Research on Multi-Objective Bus Route Planning Model Based on Taxi GPS Data</td>
<td>249</td>
</tr>
<tr>
<td>Shuo Lei, Zexi Li, Binglin Wu, and Haiquan Wang</td>
<td></td>
</tr>
<tr>
<td>Research Service Discovery Mechanism Based on Route Optimization of Big Data Service</td>
<td>256</td>
</tr>
<tr>
<td>Cheng Xu and Zhang Yu-Shi</td>
<td></td>
</tr>
<tr>
<td>Machine Learning Techniques for SIM Box Fraud Detection</td>
<td>N/A</td>
</tr>
<tr>
<td>Mhair Kashif and Sajid Bashir</td>
<td></td>
</tr>
<tr>
<td>A Logistic Regression Based Approach for Software Test Management</td>
<td>268</td>
</tr>
<tr>
<td>Yue Zhou and Jinyao Yan</td>
<td></td>
</tr>
</tbody>
</table>
Session 7: Resource, Monitoring, Control, and Performance

A Cluster-Based Resource Allocation Strategy with Energy Harvesting in Dense Small-Cell Networks .................................................303
Liang Xu, Yuming Mao, Supeng Leng, Guanhua Qiao, and Quanxin Zhao

An Improved Ant Colony Optimization Algorithm for Improving Cloud Resource Utilization ............................................................311
Nie Qingbin and Li Pinghua

An Implementation and Optimization of Lattice Boltzmann Method Based on the Multi-Node CPU+MIC Heterogeneous Architecture .................................................................315
Peng Tang, Anping Song, Zhixiang Liu, and Wu Zhang

Cache-Aware Spatial Indices on Chip Multi-Processors: Limitations and Opportunities ........................................................................321
Minhui Lv and Wei Xiong

Minimizing Energy Consumption for Embedded Multicore Systems Using Cache Configuration and Task Mapping .........................................................328
ZhiHua Gan, Mingquan Zhang, Zhimin Gu, and Jizan Zhang

Implementing VoIP Voice Communication System Based on Soft-Switch Technology ........................................................................335
Chnhui Yuan and Hongli Zhao

Operational Reliability Evaluation Method Based on Big Data Technology .........................................................................................341
Lijuan Hu, Ke-Yan Liu, Yinglong Diao, Xiaoli Meng, and Wanxing Sheng

A Complex Shortwave Transmitting Equipment Monitoring System Based on Completeness ..................................................................345
Luo Yong and Gao Jun

Real-Time Vehicle Wireless Remote Positioning and Monitoring System Based on GPRS Network and Beidou ........................................350
Xianlian Zhang and Minhui Wang
Session 8: Smart Sensor Networks

Modeling POI Transition Network of Human Mobility ................................................................. 364
  Chao Fan, Junxuan Huang, Dan Yang, and Zhihai Rong

A Quasi-Dynamic Video Conference Resource Backup Strategy Based on Cloud ................................ 368
  Xinzhi Xu, Guochun Li, Qiaomu Wang, Zhou Yuan, and Mingbao Fan

Research and Implementation of Resource Scheduling Mechanisms Based on Software Defined Security ........................................................................................................ 372
  Zelang Wang, Guochu Shou, Yihong Hu, and Zhigang Guo

Research and Implementation of Hierarchical Control of Large Scale Video Conference Based on Conference Management System ...................................................... 377
  Zhou Yuan, Guochun Li, Qiaomu Wang, Xinzhi Xu, and Tao Wen

A Relaxation Scheme for TSP-Based 3D Printing Path Optimizer .................................................. 382
  Kai-Yin Fok, Chi-Tsun Cheng, Chi K. Tse, and Nuwan Ganganath

Rapidly Replanning A* ..................................................................................................................... 386
  Nuwan Ganganath, Chi-Tsun Cheng, and Chi K. Tse

Node Localization Algorithm of Wireless Sensor Networks for Large Electrical Equipment Monitoring Application ................................................................................................................ 390
  Qinyin Chen, Y. Hu, and Zhe Chen

Effects of Correlation-Based VM Allocation Criteria to Cloud Data Centers ........................................ 398
  Jing V. Wang, Chi-Tsun Cheng, and Chi K. Tse

Congestion Control Balancing Mechanism Based on Energy-Constraint in Mobile Delay Tolerant Network ................................................................................................................. 402
  Yue Zhang, Xiangyu Bai, Na Dang, Junli She, and Zhichao Song

Methodology of Countering Attacks for Wireless Sensor Networks Based on Trust ................................................. 409
  Alexander Basan, Elena Basan, and Oleg Makarevich

Portable RFID Location System in Security Field ............................................................................. 413
  Aiguo Li and Yongwei Li

LEACH Protocol and Its Improved Algorithm in Wireless Sensor Network ........................................ 418
  Li XingGuo, Wang JunFeng, and Bai LinLin
Session 9: Networks, Wireless Communications, and Mobile Computing

A New Quasi Periodic Triggering Mechanism of Handover under a High Speed Mobile Environment .................................................................423
  Guihua Kang and Hongbo Kang

Blind Recognition of RS Codes Based on Galois Field Fourier Transform ..................................................429
  Xiaokai Zhang, Gang Wu, Bangning Zhang, Daoxing Guo, and Kefeng Guo

Performance of Two Normalized Laplacian Spectral Features on Sampling Algorithms .................................................................434
  Bo Jiao, Xuejun Yuan, Fei Huang, Xunlong Pang, Yican Jin, and Zhe Han

Secure Transmission of Amplify-and-Forward Relay System with Hybrid Sending Signals ..........................................................438
  Bin Yang and Xinyu Li

Analysis of the Propagation Characteristics of Generalized Ridge Waveguides Using 2-D Finite Difference Frequency Domain Method with Sub-Regions Division ..........................................................446
  Liu Jian-Min, Xiang Yu, and Liu Jian-Bin

Ship Scheduling in Inland Waterway Networks Based on Cellular Automata Graph ...............................................................450
  Xiongfei Geng

An Improvement Method of Frequency Offset Estimation Performance in Communication System Carrier Synchronization ......................................454
  Li, Lihua, Li, Renshen, Fu, and Tianhui

Study on Evaluation of Voltage Sag Exposed Areas in Large Scale Complex Distribution Network ............................................................459
  Dongli Jia

Joint Behavior Detection in Wireless Sensing Networks ...............................................................................465
  Yin Min, Jiang Lei, Shen Ye, and Feng Jing

A QoS Opportunistic Routing Based on Directional Transmission for Wireless Sensor Networks .................................................................471
  Ren Duan, Dingyi Fang, and Chengui Zhao

Session 10: SDN/NFV and Cognitive Networks

Optimal Controller Placement Problem in Internet-Oriented Software Defined Network ........................................481
  Bang Zhang, Xingwei Wang, Lianbo Ma, and Min Huang

Application of Virtualization and Software Defined Network in Satellite Network ..................................................489
  Chunfeng Wang and Xiaosong Yu
A Multi-Domain SDN Scalability Architecture Implementation Based on the Coordinate Controller .................................................................494
   Jianglong Wang, Guochu Shou, Yihong Hu, and Zhigang Guo

Application of Software-Defined Network with Software-Based Architecture in Enterprise Data Center ..................................................500
   Kean Yu, Cong Yu, Tingting Wang, Jiang Fan, and Yan Li

Overview of Software Defined Networks: Current Status and Future Trends .............................................................N/A
   Ihab A. Ali

A SDN-Based Dynamic Traffic Scheduling Algorithm .................................................................514
   Hui Ren, Xiaoming Li, Junjie Geng, and Jinyao Yan

Author Index .............................................................................................................................................519