# Contents

Cost Reduction for Data Allocation in Heterogenous Cloud Computing
Using Dynamic Programming .................................................. 1  
*Hui Zhao, Meikang Qiu, Keke Gai, Jie Li, and Xin He*

Minimizing Bank Conflict Delay for Real-Time Embedded Multicore
Systems via Bank Mapping ..................................................... 12  
*Zhihua Gan, Mingquan Zhang, Zhimin Gu, Jizan Zhang, and Hai Tan*

A Hybrid Algorithm Based on Particle Swarm Optimization and Ant
Colony Optimization Algorithm ............................................... 22  
*Junliang Lu, Wei Hu, Yonghao Wang, Lin Li, Peng Ke, and Kai Zhang*

Understanding Networking Capacity Management in Cloud Computing ... 32  
*Haihui Zhao, Yaoguang Qi, Hongwei Du, Ningning Wang,  
Guofu Zhang, Hailong Lu, and Wenbao Liu*

Cloud Learning Community of Engineering Drawing ..................... 42  
*Fenna Zhang, Yaoguang Qi, Long Pan, Yong Yang, Hao Zhang,  
and Yao Yao*

Energy Saving Method for On-Chip Data Bus Based on Bit Switching
Activity Perception with Multi-encoding .................................... 51  
*Mingquan Zhang, Zhihua Gan, Zhimin Gu, and Jizan Zhang*

A Novel PSO Based Task Scheduling Algorithm for Multi-core Systems ... 62  
*Jia Tian, Wei Hu, Yonghao Wang, Lin Li, Peng Ke, and Kai Zhang*

Artificial Bee Colony Algorithm with Hierarchical Groups for Global
Numerical Optimization ....................................................... 72  
*Laizhong Cui, Yanli Luo, Genghui Li, and Nan Lu*

An Buffering Optimization Algorithm for Cooperative Mobile Service ... 86  
*Lei Hu, Huan Shen, Qingsong Shi, Jiajia Xu, Wei Hu, and Peng Ke*

SDN Protocol Analysis with Process Algebra Method ....................... 95  
*Chen Fu and Fu Bing*

Unsupervised Pre-training Classifier Based on Restricted Boltzmann
Machine with Imbalanced Data ............................................... 102  
*Xiaoyang Fu*
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Secure Homomorphic Encryption Algorithm over Integers for Data</td>
<td>111</td>
</tr>
<tr>
<td>Jyh-Haw Yeh</td>
<td></td>
</tr>
<tr>
<td>Big Data Management the Mass Weather Logs</td>
<td>122</td>
</tr>
<tr>
<td>Hao Wu</td>
<td></td>
</tr>
<tr>
<td>Application of a Parallel FSM Parsing Algorithm for Web Engines</td>
<td>133</td>
</tr>
<tr>
<td>Xin Ren, Jiong Zhang, Ying Li, and Jianwei Niu</td>
<td></td>
</tr>
<tr>
<td>PTrack: A RFID-based Tracking Algorithm for Indoor Randomly Moving</td>
<td>144</td>
</tr>
<tr>
<td>Targets</td>
<td></td>
</tr>
<tr>
<td>Gang Feng, Jian-qiang Li, Chengwen Luo, and Zhong Ming</td>
<td></td>
</tr>
<tr>
<td>Predicting the Change of Stock Market Index Based on Social Media</td>
<td>154</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>Rui Ma and Honghao Zhao</td>
<td></td>
</tr>
<tr>
<td>Human Activity Recognition Based on Smart Phone’s 3-Axis Acceleration</td>
<td>163</td>
</tr>
<tr>
<td>Sensor</td>
<td></td>
</tr>
<tr>
<td>Shubin Cai, Zhiguang Shan, Tian Zeng, Jianfei Yin, and Zhong Ming</td>
<td></td>
</tr>
<tr>
<td>Bug Analysis of Android Applications Based on JPF</td>
<td>173</td>
</tr>
<tr>
<td>Libin Wu, Yahui Lu, Jing Qi, Shubin Cai, Bo Deng, and Zhong Ming</td>
<td></td>
</tr>
<tr>
<td>A Genetic-Ant-Colony Hybrid Algorithm for Task Scheduling in Cloud</td>
<td>183</td>
</tr>
<tr>
<td>System</td>
<td></td>
</tr>
<tr>
<td>Zhilong Wu, Sheng Xing, Shubin Cai, Zhijiao Xiao, and Zhong Ming</td>
<td></td>
</tr>
<tr>
<td>A Hybrid Algorithm of Extreme Learning Machine and Sparse Auto-</td>
<td>194</td>
</tr>
<tr>
<td>Encoder</td>
<td></td>
</tr>
<tr>
<td>Yu Lin, Yanchun Liang, Shinichi Yoshida, Xiaoyue Feng, and Renchu Guan</td>
<td></td>
</tr>
<tr>
<td>Bank Card and ID Card Number Recognition in Android Financial APP</td>
<td>205</td>
</tr>
<tr>
<td>Shubin Cai, Jinchun Wen, Honglong Xu, Siming Chen, and Zhong Ming</td>
<td></td>
</tr>
<tr>
<td>Mining Association Rules from a Dynamic Probabilistic Numerical Data</td>
<td>214</td>
</tr>
<tr>
<td>Using Estimated-Frequent Uncertain-Itemsets</td>
<td></td>
</tr>
<tr>
<td>Bin Pei, Fenmei Wang, and Xiuzhen Wang</td>
<td></td>
</tr>
<tr>
<td>An Optimized Scheme of Mel Frequency Cepstral Coefficient for Multi-sensor Sign Language Recognition</td>
<td>224</td>
</tr>
<tr>
<td>Nana Wang, Zhiyuan Ma, Yichen Tang, Yi Liu, Ying Li, and Jianwei Niu</td>
<td></td>
</tr>
<tr>
<td>Security and Privacy Issues: A Survey on FinTech</td>
<td>236</td>
</tr>
<tr>
<td>Keke Gai, Meikang Qiu, Xiaotong Sun, and Hui Zhao</td>
<td></td>
</tr>
</tbody>
</table>
Multi-sensor System Calibration Approach Based on Forward-Model and Inverse-Model. ................................................................. 248
  Xiaojun Tang, Feng Zhang, Hailin Zhang, Junhua Liu,
and Yuntao Liang

A Virtual Communication Strategy for Smart Photovoltaic Generation Systems ................................................................. 256
  Jing Yang, Hui Liao, Jing Chen, Yang Yu, and Yi Wang

Hybrid One-Class Collaborative Filtering for Job Recommendation ................................................................. 267
  Miao Liu, Zijie Zeng, Weike Pan, Xiaogang Peng, Zhiguang Shan,
and Zhong Ming

Learning Quality Evaluation of MOOC Based on Big Data Analysis ................................................................. 277
  Zihao Zhao, Qiangqiang Wu, Haopeng Chen, and Chengcheng Wan

QoS-Driven Frequency Scaling for Energy Efficiency and Reliability of Static Web Servers in Software-Defined Data Centers ................................................................. 287
  Lihang Gong, Zhenhua Wang, Haopeng Chen, and Delin Liu

Making Cloud Storage Integrity Checking Protocols Economically Smarter ................................................................. 297
  Fei Chen, Xinyu Xiong, Taoyi Zhang, Jianqiang Li, and Jianyong Chen

$E^3$: Efficient Error Estimation for Fingerprint-Based Indoor Localization System ................................................................. 307
  Chengwen Luo, Jian-qiang Li, and Zhong Ming

Attribute-Based and Keywords Vector Searchable Public Key Encryption ................................................................. 317
  Huiwen Wang, Jianqiang Li, Yanli Yang, and Zhong Ming

PADS: A Reliable Pothole Detection System Using Machine Learning ................................................................. 327
  Jinting Ren and Duo Liu

A Quantitative Approach for Memory Fragmentation in Mobile Systems ................................................................. 339
  Yang Li, Duo Liu, Jingyu Zhang, and Linbo Long

A DDoS Detection and Mitigation System Framework Based on Spark and SDN ................................................................. 350
  Qiao Yan and Wenyao Huang

Based on Cloud Computing and GIS in the Smart Yellow River Emergency System Design and Its Key Technology Research ................................................................. 359
  Kuan He, Xu Chen, Yuntong Liu, Bo Hu, and Zhimin Zhou

Based on the MapX Automatic Contour Drawing Method and Accuracy Analysis ................................................................. 367
  Kuan He, Dan Zhang, Yuntong Liu, Sa Huang, and Zhimin Zhou
The Function of GIS in the Smart City Construction .......................... 374
  Xu Chen and Kuan He

A Novel PSO-DE Co-evolutionary Algorithm Based
on Decomposition Framework ................................................. 381
  Shaoqiang Yang, Wenjun Wang, Qiuzhen Lin, and Jianyong Chen

Rhythm Authentication Using Multi-touch Technology: A New Method
of Biometric Authentication .................................................. 390
  Nakinthorn Wongnarukane and Pramote Kuacharoen

An Improved Ciphertext-Policy Attribute-Based Encryption Scheme .... 400
  Hua Zheng, Xi Zhang, and Qi Yang

An Information-Centric Architecture for Server Clustering Towards 3D
Data-Intensive Applications .................................................. 412
  Longjiang Li, Jianjun Yang, and Yuming Mao

Efficient Computation for the Longest Common Subsequence with
Substring Inclusion and Subsequence Exclusion Constraints ............... 419
  Xiaodong Wang and Daxin Zhu

An Optimal Algorithm for a Computer Game in Linear Time ............... 429
  Daxin Zhu and Xiaodong Wang

AUDITOR: A Stage-Wise Soft-Error Detection Scheme for Flip-flop
Based Pipelines ................................................................. 439
  Hong Zhang, Ying Li, Hongfeng Sun, and Yanchun Yang

Aggregating Heterogeneous Services in the Smart City: The Practice
in China .......................................................................... 449
  Fangping Li and Bo Li

A Hybrid Memory Hierarchy to Improve Cache Reliability
with Non-volatile STT-RAM .................................................... 459
  Naikuo Chen, Zhilou Yu, and Ruidong Zhao

SOA Reference Architecture: Standards and Analysis ....................... 469
  Yuan Yuan, Bo Li, and Heather Kreger

An Evolutionary Approach for Short-Term Traffic Flow Forecasting
Service in Intelligent Transportation System ................................. 477
  Fan Fei, Shu Li, Wanchun Dou, and Shui Yu

The Production Investigation of DOM Based on Full Digital
Photogrammetric System VirtuoZo ............................................. 487
  Dan Zhang, Kuan He, Xuemin Shi, Zhengpeng Wu, and Hui Zhang
A Congestion Avoidance Algorithm Based on Fuzzy Controlling 495
   Hui Zhang, Dan Zhang, Peng Xu, Yi Wang, and Kuan He

An Efficient Adaptive-ID Secure Revocable Hierarchical Identity-Based
Encryption Scheme 506
   Changji Wang, Yuan Li, Shengyi Jiang, and Jiayuan Wu

Understanding Networking Capacity Management in Cloud Computing 516
   Haokun Jiang and Xiaotong Sun

A PSO-Based Virtual Network Mapping Algorithm
with Crossover Operator 527
   Ying Yuan, Sancheng Peng, Lixin Zhou, Cong Wang, Cong Wan,
   and Hongtao Huang

WiHumidity: A Novel CSI-Based Humidity Measurement System 537
   Xiang Zhang, Rukhsana Ruby, Jinfeng Long, Lu Wang, Zhong Ming,
   and Kaishun Wu

Bike-Sharing System: A Big-Data Perspective 548
   Zhili Jia, Gang Xie, Jerry Gao, and Shui Yu

Process Mining of Event Log from Web Information and Administration
System for Management of Student’s Computer Networks 558
   Radim Dolak, Dominik Musil, and Jan Kolesar

A Virtual Network Embedding Algorithm Based on Hybrid Particle
Swarm Optimization 568
   Cong Wang, Yian Su, Lixin Zhou, Sancheng Peng, Ying Yuan,
   and Hongtao Huang

Research on Content Distribution of P2P VoD with Cloud Assisting 577
   Hongfang Guo and Tingting Ma

Author Index 587