

# Communications in Computer and Information Science

1058

*Commenced Publication in 2007*

Founding and Former Series Editors:

Phoebe Chen, Alfredo Cuzzocrea, Xiaoyong Du, Orhun Kara, Ting Liu,  
Krishna M. Sivalingam, Dominik Ślęzak, Takashi Washio, and Xiaokang Yang

## Editorial Board Members

Simone Diniz Junqueira Barbosa

*Pontifical Catholic University of Rio de Janeiro (PUC-Rio),  
Rio de Janeiro, Brazil*

Joaquim Filipe

*Polytechnic Institute of Setúbal, Setúbal, Portugal*

Ashish Ghosh

*Indian Statistical Institute, Kolkata, India*

Igor Kotenko

*St. Petersburg Institute for Informatics and Automation of the Russian  
Academy of Sciences, St. Petersburg, Russia*

Junsong Yuan

*University at Buffalo, The State University of New York, Buffalo, NY, USA*

Lizhu Zhou

*Tsinghua University, Beijing, China*

More information about this series at <http://www.springer.com/series/7899>

Xiaohui Cheng · Weipeng Jing ·  
Xianhua Song · Zeguang Lu (Eds.)

# Data Science

5th International Conference  
of Pioneering Computer Scientists,  
Engineers and Educators, ICPCSEE 2019  
Guilin, China, September 20–23, 2019  
Proceedings, Part I

*Editors*

Xiaohui Cheng  
Guilin University of Technology  
Guilin, China

Xianhua Song  
Harbin University of Science  
and Technology  
Harbin, China

Weipeng Jing  
Northeast Forestry University  
Harbin, China

Zeguang Lu  
National Academy of Guo Ding  
Institute of Data Science  
Harbin, China

ISSN 1865-0929

ISSN 1865-0937 (electronic)

Communications in Computer and Information Science

ISBN 978-981-15-0117-3

ISBN 978-981-15-0118-0 (eBook)

<https://doi.org/10.1007/978-981-15-0118-0>

© Springer Nature Singapore Pte Ltd. 2019

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

# Preface

As the program chairs of the 5th International Conference of Pioneer Computer Scientists, Engineers and Educators 2019 (ICPCSEE 2019, originally ICYCSEE), it is our great pleasure to welcome you to the proceedings of the conference, which was held in Guilin, China, September 20–23, 2019, hosted by Guilin University of Technology, Guilin University of Electronic Technology, and National Academy of Guo Ding Institute of Data Science. The goal of this conference was to provide a forum for computer scientists, engineers, and educators.

The call for papers of this year's conference attracted 395 paper submissions. After the hard work of the Program Committee, 104 papers were accepted to appear in the conference proceedings, with an acceptance rate of 26.4%. The major topic of this conference was data science. The accepted papers cover a wide range of areas related to Basic Theory and Techniques for Data Science including Mathematical Issues in Data Science, Computational Theory for Data Science, Big Data Management and Applications, Data Quality and Data Preparation, Evaluation and Measurement in Data Science, Data Visualization, Big Data Mining and Knowledge Management, Infrastructure for Data Science, Machine Learning for Data Science, Data Security and Privacy, Applications of Data Science, Case Study of Data Science, Multimedia Data Management and Analysis, Data-Driven Scientific Research, Data-Driven Bioinformatics, Data-Driven Healthcare, Data-Driven Management, Data-Driven eGovernment, Data-Driven Smart City/Planet, Data Marketing and Economics, Social Media and Recommendation Systems, Data-Driven Security, Data-Driven Business Model Innovation, and Social and/or Organizational Impacts of Data Science.

We would like to thank all the Program Committee members, 203 coming from 93 institutes, for their hard work in completing the review tasks. Their collective efforts made it possible to attain quality reviews for all the submissions within a few weeks. Their diverse expertise in each individual research area helped us to create an exciting program for the conference. Their comments and advice helped the authors to improve the quality of their papers and gain deeper insights.

Great thanks should also go to the authors and participants for their tremendous support in making the conference a success.

We thank Dr. Lanlan Chang and Jane Li from Springer, whose professional assistance was invaluable in the production of the proceedings.

Besides the technical program, this year ICPCSEE offered different experiences to the participants. We hope you enjoy the conference proceedings.

June 2019

Xiaohui Cheng  
Rui Mao

# Organization

The 5th International Conference of Pioneering Computer Scientists, Engineers and Educators (ICPCSEE, originally ICYCSEE) 2019 (<http://2019.icpcsee.org>) was held in Guilin, China, during September 20–23 2019, hosted by Guilin university of Technology, Guilin University of Electronic Technology, and National Academy of Guo Ding Institute of Data Science.

## General Chair

Mei Wang

Guilin University of Technology, China

## Program Chairs

Xiaohui Cheng

Guilin University of Technology, China

Rui Mao

Shenzhen University, China

## Program Co-chairs

XianXian Li

Guangxi Normal University, China

Liang Chang

Guilin University of Electronic Technology, China

Wei Li

Central Queensland University, Australia

Goi Bok Min

Universiti Tunku Abdul Rahman (UTAR), Malaysia

Xiaohua Ke

Guangdong University of Foreign Studies, China

## Organization Chairs

Xiaolian Xie

Guilin University of Technology, China

Yong Ding

Guilin University of Electronic Technology, China

Zhenjun Tang

Guangxi Normal University, China

Donghong Qin

GuangXi University for Nationalities, China

Zeguang Lu

National Academy of Guo Ding Institute  
of Data Science, China

## Organization Co-chairs

Chao Jing

Guilin University of Technology, China

Qin Yang

Guilin University of Technology, China

Yu Wang

Guilin University of Technology, China

Hanying Liu

Guilin University of Technology, China

Shouxue Chen

Guilin University of Technology, China

Jili Chen

Guilin University of Technology, China

Wenpeng Chen	Guilin University of Technology, China
Pinle Qin	North University of China, China
Jianhou Gan	Yunnan Normal University, China
Mingrui Chen	Hainan University, China

## **Publication Chairs**

Hongzhi Wang	Harbin Institute of Technology, China
Guangle Sun	Harbin University of Science and Technology, China

## **Publication Co-chairs**

Weipeng Jing	Northeast Forestry University, China
Xianhua Song	Harbin University of Science and Technology, China
Xie Wei	Harbin University of Science and Technology, China
Guoyong Cai	Guilin University of Electronic Technology, China
Minggang Dong	Guilin University of Technology, China
Canlong Zhang	Guangxi Normal University, China

## **Forum One Chairs**

Fudong Liu	Information Engineering University, China
Feng Wang	RoarPanda Network Technology Co., Ltd., China

## **Forum Two Chairs**

Pinle Qin	Zhongbei University, China
Haiwei Pan	Harbin Engineering University, China

## **Forum Three Chairs**

Jian Wang	RADI, CAS, China
Weipeng Jing	Northeast Forestry University, China

## **Forum Four Chairs**

Liehuang Zhu	Beijing Institute of Technology, China
Yong Ding	Guilin University of Electronic Science and Technology, China

## **Forum Five Chairs**

Junyu Lin	Information Institute of Chinese Academy of Sciences, China
Haofen Wang	Shanghai Leyan Technologies Co. Ltd., China

**Forum Six Chair**

Qiguang Miao

Xidian University, China

**Forum Seven Chair**

Canlong Zhang

Guangxi Normal University, China

**Education Chairs**

Xiaomei Tao

Guilin University of Technology, China

Hui Li

Guangxi University of Technology, China

**Industrial Chairs**

Li'e Wang

Guangxi Normal University, China

Zheng Shan

Information Engineering University, China

**Demo Chairs**

Li Ma

Guilin Medical University, China

Xia Liu

Sanya Aviation and Tourism College, China

**Panel Chairs**

Yun Deng

Guilin University of Technology, China

Rifeng Wang

Guangxi University of Technology, China

Peng Liu

Guangxi Normal University, China

**Post Chair**

Panfeng Zhang

Guilin University of Technology, China

**Expo Chairs**

Chaoquan Chen

Guilin University of Technology, China

Jingli Wu

Guangxi Normal University, China

Jingwei Zhang

Guilin University of Electronic Technology, China

**Registration/Financial Chair**

Chunyan Hu

National Academy of Guo Ding Institute  
of Data Science, China



## ICPCSEE Steering Committee

Jiajun Bu	Zhejiang University, China
Wanxiang Che	Harbin Institute of Technology, China
Jian Chen	ParaTera, China
Wenguang Chen	Tsinghua University, China
Xuebin Chen	North China University of Science and Technology, China
Xiaoju Dong	Shanghai Jiao Tong University, China
Qilong Han	Harbin Engineering University, China
Yiliang Han	Engineering University of CAPF, China
Yinhe Han	Institute of Computing Technology, Chinese Academy of Sciences, China
Hai Jin	Huazhong University of Science and Technology, China
Weipeng Jing	Northeast Forestry University, China
Wei Li	Central Queensland University, Australia
Min Li	Central South University, China
Junyu Lin	Institute of Information Engineering, Chinese Academy of Sciences, China
Yunhao Liu	Michigan State University, China
Zeguang Lu	National Academy of Guo Ding Institute of Data Sciences, China
Rui Mao	Shenzhen University, China
Qi Guang Miao	Xidian University, China
Haiwei Pan	Harbin Engineering University, China
Pinle Qin	North University of China, China
Zhaowen Qiu	Northeast Forestry University, China
Zheng Shan	The PLA Information Engineering University, China
Guanglu Sun	Harbin University of Science and Technology, China
Jie Tang	Tsinghua University, China
Tian Feng	Institute of Software Chinese Academy of Sciences, China
Tao Wang	Peking University, China
Hongzhi Wang	Harbin Institute of Technology, China
Xiaohui Wei	Jilin University, China
lifang Wen	Beijing Huazhang Graphics and Information Co., Ltd., China
Liang Xiao	Nanjing University of Science and Technology, China
Yu Yao	Northeastern University, China
Xiaoru Yuan	Peking University, China
Yingtao Zhang	Harbin Institute of Technology, China
Yunquan Zhang	Institute of Computing Technology, Chinese Academy of Sciences, China
Baokang Zhao	National University of Defense Technology, China

Min Zhu  
Liehuang Zhu

Sichuan University, China  
Beijing Institute of Technology, China

## ICPCSEE 2019 Program Committee Members

### Program Committee Area Chairs

Wanxiang Che	Harbin Institute of Technology, China
Cheng Feng	Northeast Forestry University, China
Min Li	Central South University, China
Fudong Liu	State Key Laboratory of Mathematical Engineering Advanced Computing, China
Zeguang Lu	National Academy of Guo Ding Institute of Data Science, China
Rui Mao	Shenzhen University, China
Qiguang Miao	Xidian University, China
Haiwei Pan	Harbin Engineering University, China
Qin Pinle	North University of China, China
Zheng Shan	State Key Laboratory of Mathematical Engineering Advanced Computing, China
Guanglu Sun	Harbin University of Science and Technology, China
Hongzhi Wang	Harbin Institute of Technology, China
Yuzhuo Wang	Harbin Institute of Technology, China
Xiaolan Xie	Guilin University of Technology, China
Yingtao Zhang	Harbin Institute of Technology, China

### Program Committee Members

Chunyu Ai	University of South Carolina Upstate, USA
Zhipeng Cai	Georgia State University, USA
Richard Chbeir	LIUPPA Laboratory, France
Zhuang Chen	Guilin University of Electronic Technology, China
Vincenzo Deufemia	University of Salerno, Italy
Minggang Dong	Guilin University of Technology, China
Longxu Dou	Harbin Institute of Technology, China
Pufeng Du	Tianjin University, China
Zherui Fan	Xidian University, China
Yongkang Fu	Xidian University, China
Shuolin Gao	Harbin Institute of Technology, China
Daohui Ge	Xidian University, China
Yingkai Guo	National University of Singapore, Singapore
Meng Han	Georgia State University, USA
Meng Han	Kennesaw State University, USA
Qinglai He	Arizona State University, USA
Tieke He	Nanjing University, China
Zhixue He	North China Institute of Aerospace Engineering, China

Tao He	Harbin Institute of Technology, China
Yutai Hou	Harbin Institute of Technology, China
Xu Hu	Xidian University, China
Kuan Huang	Utah State University, USA
Hekai Huang	Harbin Institute of Technology, China
Cun Ji	Shandong Normal University, China
Xiaoyan Jiang	Shanghai University of Engineering Science, China
Wanchun Jiang	Central South University, China
Xin Jin	Beijing Electronic Science and Technology Institute, China
Chao Jing	Guilin University of Technology, China
Wei Lan	Guangxi University, China
Mingzhao Li	RMIT University, Australia
Wei Li	Georgia State University, USA
Yunan Li	Xidian University, China
Hongdong Li	Central South University, China
Xiangtao Li	Northeast Normal University, China
Xia Liu	Sanya Aviation Tourism College, China
Yarong Liu	Guilin University of Technology, China
Shuaiqi Liu	Tianjin Normal University, China
Yan Liu	Harbin Institute of Technology, China
Jin Liu	Central South University, China
Yijia Liu	Harbin Institute of Technology, China
Zeming Liu	Harbin Institute of Technology, China
Mingming Lu	Central South University, China
Junwei Luo	Henan Polytechnic University, China
Zhiqiang Ma	Inner Mongolia University of Technology, China
Chenggang Ma	Northwestern Polytechnical University, China
Xiangda Qi	Xidian University, China
Libo Qin	Research Center for Social Computing and Information Retrieval, China
Chang Ruan	Central South University, China
Yingshan Shen	South China Normal University, China
Meng Shen	Xidian University, China
Feng Shi	Central South University, China
Yuanyuan Shi	Xi'an University of Electronic Science and Technology, China
Xiaoming Shi	Harbin Institute of Technology, China
Shoubao Su	Jinling Institute of Technology, China
Dechuan Teng	Harbin Institute of Technology, China
Vicenc Torra	Högskolan i Skövde, Sweden
Qingshan Wang	Hefei University of Technology, China
Wenfeng Wang	Chinese Academy of Sciences, China
Shaolei Wang	Harbin Institute of Technology, China
Yaqing Wang	Xidian University, China
Yuxuan Wang	Harbin Institute of Technology, China

Wei Wei	Xi'an Jiaotong University, China
Haoyang Wen	Harbin Institute of Technology, China
Huaming Wu	Tianjin University, China
Bin Wu	Institute of Information Engineering, Chinese Academy of Sciences, China
Yue Wu	Xidian University, China
Min Xian	Utah State University, USA
Wentian Xin	Xidian University, China
Qingzheng Xu	National University of Defense Technology, China
Yang Xu	Harbin Institute of Technology, China
Yu Yan	Harbin Institute of Technology, China
Cheng Yan	Central South University, China
Shiqin Yang	Xidian University, China
Jinguo You	Kunming University of Science and Technology, China
Lei Yu	Georgia Institute of Technology, USA
Xiaoyi Yu	Peking University, China
Yue Yue	SUTD, Singapore
Boyu Zhang	Utah State University, USA
Wenjie Zhang	The University of New South Wales, Australia
Jin Zhang	Beijing Normal University, China
Dejun Zhang	China University of Geosciences, China
Zhifei Zhang	Tongji University, China
Shigeng Zhang	Central South University, China
Mengyi Zhang	Harbin Institute of Technology, China
Yongqing Zhang	Chengdu University of Information Technology, China
Xiangxi Zhang	Harbin Institute of Technology, China
Meiyang Zhang	Southwest University, China
Zhen Zhang	Xidian University, China
Peipei Zhao	Xidian University, China
Bo Zheng	Harbin Institute of Technology, China
Jiancheng Zhong	Central South University, China
Yungang Zhu	Jilin University, China
Bing Zhu	Central South University, China

# Contents – Part I

## Data Mining

Benign Strategy for Recommended Location Service Based on Trajectory Data . . . . .	3
<i>Jing Yang, Peng Wang, and Jianpei Zhang</i>	
Interest-Forgetting Markov Model for Next-Basket Recommendation. . . . .	20
<i>Jinghua Zhu, Xinxing Ma, Chenbo Yue, and Chao Wang</i>	
Attention Neural Network for User Behavior Modeling . . . . .	32
<i>Kang Yang and Jinghua Zhu</i>	
Method for Extraction and Fusion Based on KL Measure . . . . .	42
<i>Zuocong Chen</i>	
Evaluation of Scholar's Contribution to Team Based on Weighted Co-author Network. . . . .	52
<i>Xinmeng Zhang, Xinguang Li, Shengyi Jiang, Xia Li, and Bolin Xie</i>	
Community Evolution Based on Tensor Decomposition. . . . .	62
<i>Yuxuan Liu, Guanghui Yan, Jianyun Ye, and Zongren Li</i>	
A Content-Based Recommendation Framework for Judicial Cases. . . . .	76
<i>Zichen Guo, Tieke He, Zemin Qin, Zicong Xie, and Jia Liu</i>	
Collaboration Filtering Recommendation Algorithm Based on the Latent Factor Model and Improved Spectral Clustering . . . . .	89
<i>Xiaolan Xie and Mengnan Qiu</i>	

## Database

Hadoop + Spark Platform Based on Big Data System Design of Agricultural Product Price Analysis and Prediction by HoltWinters . . . . .	103
<i>Yun Deng, Yan Zhu, Qingjun Zhang, and Xiaohui Cheng</i>	
Oracle Bone Inscriptions Big Knowledge Management and Service Platform . . . . .	124
<i>Jing Xiong, Qingju Jiao, Guoying Liu, and Yongge Liu</i>	
Meteorological Sensor Data Storage Mechanism Based on TimescaleDB and Kafka . . . . .	137
<i>Liqun Shen, Yuansheng Lou, Yong Chen, Ming Lu, and Feng Ye</i>	

Cost Optimization Strategy for Long-Term Storage of Scientific Workflow . . .	148
<i>Zaibing Lv, Cheng Zhang, and Futian Wang</i>	
Optimal Overbooking Mechanism in Data Plan Sharing . . . . .	158
<i>Yaxin Zhao, Guangsheng Feng, Bingyang Li, Chengbo Wang, and Haibin Lv</i>	
Survey of Data Value Evaluation Methods Based on Open Source Scientific and Technological Information . . . . .	172
<i>Xiaolin Wang, Cheng Dong, Wen Zeng, Zhen Xu, and Junsheng Zhang</i>	
<b>Network</b>	
Credible Routing Scheme of SDN-Based Cloud Using Blockchain . . . . .	189
<i>Qin Qiao, Xinghua Li, Yunwei Wang, Bin Luo, Yanbing Ren, and Jianfeng Ma</i>	
Integrated Multi-featured Android Malicious Code Detection . . . . .	207
<i>Qing Yu and Hui Zhao</i>	
Computation Offloading Algorithms in Mobile Edge Computing System: A Survey . . . . .	217
<i>Zhenyue Chen and Siyao Cheng</i>	
Wireless Communication Signal Strength Prediction Method Based on the K-nearest Neighbor Algorithm . . . . .	226
<i>Zhao Chen, Ning Xiong, Yujue Wang, Yong Ding, Hengkui Xiang, Chenjun Tang, Lingang Liu, Xiuqing Zou, and Decun Luo</i>	
Prediction Model for Non-topological Event Propagation in Social Networks . . . . .	241
<i>Zitu Liu, Rui Wang, and Yong Liu</i>	
Experimental Research on Internet Ecosystem and AS Hierarchy . . . . .	253
<i>Lv Ting, Donghong Qin, and Lina Ge</i>	
Speed-Grading Mobile Charging Policy in Large-Scale Wireless Rechargeable Sensor Networks . . . . .	264
<i>Xianhao Shen, Hangyu Xu, and Kangyong Liu</i>	
<b>Security</b>	
Solar Radio Burst Automatic Detection Method for Decimetric and Metric Data of YNAO . . . . .	283
<i>Guowu Yuan, Menglin Jin, Zexiao Cui, Gaifang Luo, Guoliang Li, Hongbing Dai, and Liang Dong</i>	

Internet Web Trust System Based on Smart Contract. . . . .	295
<i>Shaozhuo Li, Na Wang, Xuehui Du, and Aodi Liu</i>	
Destructive Method with High Quality and Speed to Counter Information Hiding . . . . .	312
<i>Feng Liu, Xuehu Yan, and Yuliang Lu</i>	
Defence Against Adversarial Attacks Using Clustering Algorithm. . . . .	323
<i>Yanbin Zheng, Hongxu Yun, Fu Wang, Yong Ding, Yongzhong Huang, and Wenfen Liu</i>	
A Privacy-Preserving TPA-aided Remote Data Integrity Auditing Scheme in Clouds . . . . .	334
<i>Meng Zhao, Yong Ding, Yujue Wang, Huiyong Wang, Bingyao Wang, and Lingang Liu</i>	
Relation Extraction Based on Dual Attention Mechanism. . . . .	346
<i>Xue Li, Yuan Rao, Long Sun, and Yi Lu</i>	
Analysis and Defense of Network Attacking Based on the Linux Server . . . .	357
<i>Dapeng Lang, Wei Ding, Yuhua Xiang, and Xiangyu Liu</i>	
Anti-quantum Cryptography Scheme Based on the Improvement of Cubic Simple Matrix and LRPC Code . . . . .	373
<i>Zhong Wang and Yiliang Han</i>	
Survey on Blockchain Incentive Mechanism. . . . .	386
<i>Jiyue Huang, Kai Lei, Maoyu Du, Hongting Zhao, Huafang Liu, Jin Liu, and Zhuoyun Qi</i>	
Blockchain-Based Secure Authentication Scheme for Medical Data Sharing . . . . .	396
<i>Xu Cheng, Fulong Chen, Dong Xie, Hui Sun, Cheng Huang, and Zhuoyun Qi</i>	
Encryption Algorithm Based NTRU in Underwater Acoustic Networks . . . . .	412
<i>Chunyan Peng and Xiujuan Du</i>	
Knowledge-Enhanced Bilingual Textual Representations for Cross-Lingual Semantic Textual Similarity . . . . .	425
<i>Hsuehkuang Lu, Yixin Cao, Hou Lei, and Juanzi Li</i>	
Predicting the Hot Topics with User Sentiments . . . . .	441
<i>Qi Guo, Jinhao Shi, Yong Liu, and Xiaokun Li</i>	
Research on Cross-Language Retrieval Using Bilingual Word Vectors in Different Languages . . . . .	454
<i>Yulong Li and Dong Zhou</i>	

Word Segmentation for Chinese Judicial Documents . . . . .	466
<i>Linxia Yao, Jidong Ge, Chuanyi Li, Yuan Yao, Zhenhao Li, Jin Zeng, Bin Luo, and Victor Chang</i>	
Visual Sentiment Analysis with Local Object Regions Attention . . . . .	479
<i>Guoyong Cai, Xinhao He, and Jiao Pan</i>	
TPOS Tagging Method Based on BiLSTM_CRF Model . . . . .	490
<i>Lili Wang, Ziyang Chen, and Hongwu Yang</i>	
Judicial Case Screening Based on LDA . . . . .	504
<i>Jin Xu, Tiede He, Hao Lian, Jiabing Wan, and Qin Kong</i>	
Evaluation System for Reasoning Description of Judgment Documents Based on TensorFlow CNN . . . . .	518
<i>Mengting He, Zhongyue Li, Yanshu Wei, Jidong Ge, Peitang Ling, Chuanyi Li, Ting Lei, and Bin Luo</i>	
Statute Recommendation Based on Word Embedding . . . . .	534
<i>Peitang Ling, Zian Wang, Yi Feng, Jidong Ge, Mengting He, Chuanyi Li, and Bin Luo</i>	
<b>Machine Learning</b>	
Knowledge Graph Embedding Based on Adaptive Negative Sampling . . . . .	551
<i>Saige Qin, Guanjun Rao, Chenzhong Bin, Liang Chang, Tianlong Gu, and Wen Xuan</i>	
Multi-grained Pruning Method of Convolutional Neural Network . . . . .	564
<i>Zhenzhan Bao, Wanqing Zhou, and Wenbo Zhang</i>	
Donggan Speech Recognition Based on Convolution Neural Networks . . . . .	577
<i>Haiyan Xu, Yuren You, and Hongwu Yang</i>	
Design of Polynomial Fuzzy Neural Network Classifiers Based on Density Fuzzy C-Means and L2-Norm Regularization . . . . .	585
<i>Shaocong Xue, Wei Huang, Chuanyin Yang, and Jinsong Wang</i>	
Pedestrian Detection Method Based on SSD Model . . . . .	597
<i>Xin Li, Xiangao Luo, and Haijiang Hao</i>	
Optimizing Breast Mass Segmentation Algorithms with Generative Adversarial Nets . . . . .	608
<i>Qi Yin, Haiwei Pan, Bin Yang, Xiaofei Bian, and Chunling Chen</i>	
Multiple Music Sentiment Classification Model Based on Convolutional Neural Network . . . . .	621
<i>Jing Yang, Fanfu Zeng, Yong Wang, Hairui Yu, and Le Zhang</i>	



Integrated Navigation Filtering Method Based on Wavelet Neural Network Optimized by MEA Model. . . . .	633
<i>Zhu Tao, Saisai Gao, and Ying Huang</i>	
Survey of Methods for Time Series Symbolic Aggregate Approximation . . . .	645
<i>Lin Wang, Faming Lu, Minghao Cui, and Yunxia Bao</i>	
Multimodal 3D Convolutional Neural Networks for Classification of Brain Disease Using Structural MR and FDG-PET Images. . . . .	658
<i>Kun Han, Haiwei Pan, Ruiqi Gao, Jieyao Yu, and Bin Yang</i>	
Comparative Study of Combined Fault Diagnosis Schemes Based on Convolutional Neural Network. . . . .	669
<i>Mei Li, Zhiqiang Huo, Fabien CAUS, and Yu Zhang</i>	
<b>Author Index . . . . .</b>	<b>683</b>

## Contents – Part II

### Bioinformatics

- Survey on Deep Learning for Human Action Recognition . . . . . 3  
*Zirui Qiu, Jun Sun, Mingyue Guo, Mantao Wang, and Dejun Zhang*

### Natural Language Processing

- Superimposed Attention Mechanism-Based CNN Network for Reading  
Comprehension and Question Answering . . . . . 25  
*Mingqi Li, Xuefei Hou, Jiaoe Li, and Kai Gao*

### Software Engineering

- Empirical Study of Hybrid Optimization Strategy for Evolutionary Testing. . . . 41  
*Chunling Hu, Bixin Li, Xiaofeng Wang, and Gang Lv*

### Graphic Images

- Android Oriented Image Visualization Exploratory Search . . . . . 57  
*Jianquan Ouyang, Hao He, Minnan Chu, Dong Chen,  
and Huanrong Tang*
- Blind Motion Deblurring for Online Defect Visual Inspection. . . . . 74  
*Guixiong Liu, Bodi Wang, and Junfang Wu*
- Fast Nonlocal Diffusion by Stacking Local Filters for Image Denoising. . . . . 90  
*Peng Qiao, Weichu Sun, Yong Dou, and Rongchun Li*
- Relationship Between Tyndall Light Path Attenuation and Concentration  
Based on Digital Image . . . . . 102  
*Cunbo Jiang, Yaling Qin, and Tiantian Zhu*
- Systematic Framework of the All-for-One Tourism Digital Ecosystem . . . . . 110  
*Dian He, Ying Liang, Xiaolong Li, Yao Liu, and Jianglian Liu*
- Multi-focus Image Fusion Combined with CNN and Algebraic  
Multi-grid Method. . . . . 120  
*Ying Huang, Gaofeng Mao, Min Liu, and Yafei Ou*
- Fish Behavior Analysis Based on Computer Vision: A Survey . . . . . 130  
*Yizhi Zhou, Hong Yu, Junfeng Wu, Zhen Cui, and Fangyan Zhang*

Method for Recognition Pneumonia Based on Convolutional Neural Network . . . . .	142
<i>Xin Li, Dongdong Gao, and Haijiang Hao</i>	
Underwater Image Saliency Detection Based on Improved Histogram Equalization . . . . .	157
<i>Zhen Cui, Junfeng Wu, Hong Yu, Yizhi Zhou, and Liang Liang</i>	
Kernelized Correlation Filter Target Tracking Algorithm Based on Saliency Feature Selection . . . . .	166
<i>Minghua Liu, Zhikao Ren, Chuansheng Wang, and Xianlun Wang</i>	
Image Edge Detection Method Based on Ant Colony Algorithm. . . . .	179
<i>Qirong Lu, Qianmin Liang, Jiqiu Chen, and Jiwei Xia</i>	
Biological Network Modeling Based on Hill Function and Hybrid Evolutionary Algorithm . . . . .	186
<i>Sanrong Liu and Haifeng Wang</i>	
Design of Five-Axis Camera Stabilizer Based on Quaternion Untracked Kalman Filtering Algorithm . . . . .	195
<i>Xiaohui Cheng, Yu Zhang, and Dezhi Liu</i>	
Mutual Learning Model for Skin Lesion Classification. . . . .	214
<i>Yanan Wang, Haiwei Pan, Bin Yang, Xiaofei Bian, and Qianna Cui</i>	
<b>System</b>	
Business-Oriented Dynamic Reconfiguration Model of Cloud Computing Network . . . . .	225
<i>Xin Lu, Lifeng Cao, Xuehui Du, and Zhanbing Zhu</i>	
Secure, Efficient and Searchable File System on Distributed Clouds . . . . .	246
<i>Ximing Li, Weizhao Chen, Yubin Guo, Sha Ma, and Qiong Huang</i>	
Design of Landslide Warning System . . . . .	267
<i>Xiaoping Yang, Jixuan Du, Zhaoyu Su, Pubin Nong, Zhirong Qin, and Bailin Chen</i>	
Scheduling Method Based on Backfill Strategy for Multiple DAGs in Cloud Computing . . . . .	278
<i>Zhidan Hu, Hengzhou Ye, and Tianmeizi Cao</i>	
<b>Education</b>	
Study on Evaluation Method of Teaching Quality Based on Cloud Model and D-S Theory . . . . .	293
<i>Jianting Shi, Jun Sun, Jiancai Wang, Jingping Cao, and Chunyuan Liu</i>	

Bottom-Up Teaching Reformation for the Undergraduate Course of Computer Organization and Architecture . . . . .	303
<i>YanJun Shu, Wei Emma Zhang, Yanxin Liu, Chunpei Wang, Jian Dong, Zhan Zhang, Dongxi Wen, and Decheng Zuo</i>	
Education Platform of Congenital Heart Disease Based on Mixed Reality Technology . . . . .	313
<i>Yuwei Ji, Xiangjun Zhang, Hanze Tang, Hao Luo, Shengwei Zhao, Zhaowen Qiu, Qinghua Zhang, Kun Wang, and Liwei Diao</i>	
Construction and Practice of Higher Vocational Colleges' Quality Assurance System Based on Evaluation . . . . .	335
<i>Pingping Song and Binwen Huang</i>	
Research on Teachers' Development from International Perspective. . . . .	352
<i>Tiejun Zhu, Jun Liu, Yue Zheng, Min Ou, and Chengxing Jin</i>	
Research on the Teaching Model of Experimental Virtualization in Digital Logic and Digital System Design Course. . . . .	364
<i>Pan Liu, Qing Wang, Huipeng Chen, Lei Xu, and Yanhang Zhang</i>	
Teaching Reform of Ideological and Political Education in the Course of Electromagnetic Field and Electromagnetic Wave . . . . .	375
<i>Aili Wang, Bo Wang, and Lanfei Zhao</i>	
Application of Grey Correlation Analysis in Physical Fitness Assessment of Higher Vocational Students . . . . .	382
<i>Lei Wang, Yinan Chen, Shijie Cai, and Xia Liu</i>	
Empirical Research on the Status Quo of Teachers of Common Required Courses in Vocational Higher Education Institutions . . . . .	390
<i>Zhipeng Ou, Dan Ren, Yinan Chen, and Mingrui Chen</i>	
Evaluation Model of Teaching Quality Based on Cloud Computing. . . . .	405
<i>Xiaofeng Li and Qiushi Wang</i>	
Study on Digital Exchange Platform of University Information Resources . . .	417
<i>Jiancai Wang, Jianting Shi, Yanjing Cui, and Jiuyang Hou</i>	
Integration of University-Enterprise in Applied Universities . . . . .	422
<i>Jingping Cao and Jiancai Wang</i>	
<b>Application</b>	
Adaptive Flower Pollination Algorithm Based on Chaotic Map. . . . .	433
<i>Yu Li, Juan Zheng, and Yi-ran Zhao</i>	

Application of Data Analysis in Trend Prediction of Different Crime Types in London. . . . .	445
<i>Dianting Liu, Jingwen Tang, and Chenguang Zhang</i>	
Research on Pedestrian Re-Identification Using CNN Feature and Pedestrian Combination Attribute . . . . .	468
<i>Mengke Jiang, Jinlong Chen, and Baohua Qiang</i>	
Preliminary Study on Interpreting Stock Price Forecasting Based on Tree Regularization of GRU . . . . .	476
<i>Wenjun Wu, Yue Wang, Jiaxiu Fu, Jiayi Yan, Zhiping Wang, Jiaqing Liu, Weifan Wang, and Xiuli Wang</i>	
Simulation Analysis on the Rupture Trend of Intracranial Hemangioma. . . . .	488
<i>Dong Xiang, Yuehua Wang, Yingting Wang, Tianyi Bu, Guangjun Chen, and Minhong Wu</i>	
Target Market Optimal Coverage Algorithm Based on Heat Diffusion Model . . . . .	499
<i>Jinghua Zhu, Yuekai Zhang, and Bochong Li</i>	
Hybrid Model of Time Series Prediction Model for Railway Passenger Flow. . . . .	511
<i>Wei Sha, Shuai Qiu, Wenjun Yuan, and Zhangrong Qin</i>	
Classification Method of Encrypted Traffic Based on Deep Neural Network. . . . .	528
<i>Jing Wan, Libing Wu, Youhua Xia, Jianzong Hu, Zhenchang Xia, Rui Zhang, and Min Wang</i>	
Key Technologies of Traditional Chinese Medicine Traceability Based on Internet of Things. . . . .	545
<i>Lei Yu, Fangliang Huang, Yong Yang, Qunshan Tao, Tongping Shen, and Luyao Zhang</i>	
Study on Measurement of Colloidal Liquid Concentration Based on Tyndall Phenomenon . . . . .	556
<i>Cunbo Jiang, Tiantian Zhu, and Yaling Qin</i>	
Neural Network Model for Classifying the Economic Recession and Construction of Financial Stress Index. . . . .	564
<i>Lujia Shen, Tianyu Du, and Shouling Ji</i>	
Using Augmented Reality Techniques to Simulate Training and Assistance in Electric Power. . . . .	579
<i>Zifeng Tang, Jiyao Deng, Hao Gao, Jiageng Song, Qinlun Li, Peixin Zhang, and Minghui Sun</i>	

Research on the Motion Track of Ocean Towing System . . . . .	590
<i>Jie Yuan, Feng Sun, Guofeng Tang, Zubin Chen, Lingling Zheng, and Xinran Yang</i>	
Using Case Facts to Predict Penalty with Deep Learning . . . . .	610
<i>Yu Li, Tieke He, Ge Yan, Shu Zhang, and Hui Wang</i>	
Integrated Modeling Framework to Guide Novel Insole Designs for Stress Redistribution at the Human Knee Joint. . . . .	618
<i>Yi-Heng Cai and Wen-Ming Chen</i>	
Movie Score Prediction Model Based on Movie Plots . . . . .	626
<i>Hui Xie, Haomeng Wang, Chen Zhao, and Zhe Wang</i>	
Combining Multiple Factors of LightGBM and XGBoost Algorithms to Predict the Morbidity of Double-High Disease . . . . .	635
<i>Yingying Song, Xueli Jiao, Sen Yang, Shuangquan Zhang, Yuheng Qiao, Zhiyong Liu, and Lin Zhang</i>	
Control Emotion Intensity for LSTM-Based Expressive Speech Synthesis . . .	645
<i>Xiaolian Zhu and Liumeng Xue</i>	
License Plate Recognition Model Based on CNN+LSTM+CTC . . . . .	657
<i>Hangming Zhang, Feng Sun, Xiaopu Zhang, and Lingling Zheng</i>	
<b>Author Index . . . . .</b>	<b>679</b>