Smart Innovation, Systems and Technologies

Volume 211

Series Editors

Robert J. Howlett, Bournemouth University and KES International, Shoreham-by-sea, UK

Lakhmi C. Jain, KES International, Shoreham-by-Sea, UK

The Smart Innovation, Systems and Technologies book series encompasses the topics of knowledge, intelligence, innovation and sustainability. The aim of the series is to make available a platform for the publication of books on all aspects of single and multi-disciplinary research on these themes in order to make the latest results available in a readily-accessible form. Volumes on interdisciplinary research combining two or more of these areas is particularly sought.

The series covers systems and paradigms that employ knowledge and intelligence in a broad sense. Its scope is systems having embedded knowledge and intelligence, which may be applied to the solution of world problems in industry, the environment and the community. It also focusses on the knowledge-transfer methodologies and innovation strategies employed to make this happen effectively. The combination of intelligent systems tools and a broad range of applications introduces a need for a synergy of disciplines from science, technology, business and the humanities. The series will include conference proceedings, edited collections, monographs, handbooks, reference books, and other relevant types of book in areas of science and technology where smart systems and technologies can offer innovative solutions.

High quality content is an essential feature for all book proposals accepted for the series. It is expected that editors of all accepted volumes will ensure that contributions are subjected to an appropriate level of reviewing process and adhere to KES quality principles.

Indexed by SCOPUS, EI Compendex, INSPEC, WTI Frankfurt eG, zbMATH, Japanese Science and Technology Agency (JST), SCImago, DBLP.

All books published in the series are submitted for consideration in Web of Science.

More information about this series at http://www.springer.com/series/8767

Jeng-Shyang Pan · Jianpo Li ·
Oyun-Erdene Namsrai · Zhenyu Meng ·
Miloš Savić
Editors

Advances in Intelligent Information Hiding and Multimedia Signal Processing

Proceeding of the 16th International Conference on IIHMSP in Conjunction with the 13th International Conference on FITAT, November 5–7, 2020, Ho Chi Minh City, Vietnam, Volume 1

Springer

Editors
Jeng-Shyang Pan
College of Computer Science
and Engineering
Shandong University of Science
and Technology
Qingdao, Shandong, China

Oyun-Erdene Namsrai
National University of Mongolia
Ulaanbaatar, Mongolia

Miloš Savić
University of Novi Sad
Novi Sad, Serbia

Jianpo Li
Northeast Electric Power University
Jilin, China

Zhenyu Meng
Fujian University of Technology
Fuzhou, China

ISSN 2190-3018 ISSN 2190-3026 (electronic)
Smart Innovation, Systems and Technologies
ISBN 978-981-33-6419-6 ISBN 978-981-33-6420-2 (eBook)
https://doi.org/10.1007/978-981-33-6420-2

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2021
This work is subject to copyright. All rights are solely and exclusively licensed 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

Conference Organization

Conference Founders

Jeng-Shyang Pan (Shandong University of Science and Technology)
Lakhmi C. Jain (University of Canberra/Bournemouth University)
Keun Ho Ryu (Chungbuk National University/Ton Duc Thang University/Chiang Mai University)
Oyun-Erdene Namsrai (National University of Mongolia)

Honorary Chairs

Le Vinh Danh (Ton Duc Thang University)
Chin-Chen Chang (Feng Chia University)
Lakhmi C. Jain (University of Canberra/Bournemouth University)
Goutam Chakraborty (Iwate Prefectural University)

Advisory Committee

Yanja Dajsuren (Tu/E)
Kebin Jia (Beijing University of Technology)
Li-Hua Li (Chaoyang University of Technology)
Yanjun Peng (Shandong University of Science and Technology)
Ioannis Pitas (Aristotle University of Thessaloniki)
Renjie Song (Northeast Electric Power University)
Yoiti Suzuki (Tohoku University)
Yao Zhao (Beijing Jiaotong University)

General Chairs

Pham Van Huy (Ton Duc Thang University)
Jong Yun Lee (Chungbuk National University)
Chin-Feng Lee (Chaoyang University of Technology)
Jianpo Li (Northeast Electric Power University)
Oyun-Erdene Namsrai (National University of Mongolia)

Program Chairs

Le Anh Cuong (Ton Duc Thang University)
Suvdaa Batsuuri (National University of Mongolia)
Nipon Teera-Umpon (Chiang Mai University)
Ling Wang (Northeast Electric Power University)
Ching-Yu Yang (National Penghu University of Science and Technology)

Publication Chairs

Hoang Van Dung (Ton Duc Thang University)
Zhenyu Meng (Fujian University of Technology)
Jeng-Shyang Pan (Fujian University of Technology)
Keun Ho Ryu (Ton Duc Thang University/Chungbuk National University/Chiang Mai University)

Special Session Chairs

Aziz Nasridinov (Chungbuk National University)
Yongjun Piao (Nankai University)

Special Track Co-chairs

Track 1: Technologies for Next Generation Network Environments
Tsu-Yang Wu (Shandong University of Science and Technology)
Huynh Ngoc Tu (Ton Duc Thang University)

Track 2: Intelligent for Manufacturing
Kuo-Chi Chang (Fujian University of Technology)

Yuh-Chung Lin (Fujian University of Technology)
Kai-Chun Chu (National Central University)

Track 3: Pattern Recognition and Computational Intelligence
Quoc-Tao Ngo (Vietnam Institute of Information Technology of Vietnamese Academy of Science and Technology)
Huu-Quynh Nguyen (Thuyloi University)
Truong-Giang Ngo (University of Manage and Technology)

Track 4: Wireless Networks and Its Application
Ling Wang (Northeast Electric Power University)
Jianpo Li (Northeast Electric Power University)

Track 5: Data Mining and Applications in Biology and Medicine
Xun Jin (Tianjin Medical University)
Yongjun Piao (Nankai University)

Track 6: Big Data and Its Applications
Young-Ho Park (Sookmyung Women's University)
Aziz Nasridinov (Chungbuk National University)

Track 7: Intelligent Services and Data Management
Kwang Woo Nam (Kunsan National University)
Seong Ho Lee (Electronics and Telecommunications Research Institute)

Track 8: Medical Informatics and Big Data
Hyo Soung Cha (National Cancer Center)
Kwang Sun Ryu (National Cancer Center)

Track 9: Statistical Analysis and Data Mining
Oyun-Erdene Namsrai (National University of Mongolia)
Erdenebileg Batbaatar (Chungbuk National University)

Track 10: Deep Learning For Intelligent Systems
Le Anh Cuong (Ton Duc Thang University)

Electronic Media Chairs

Ganbat Baasantseren (National University of Mongolia)
Erdenebileg Batbaatar (Chungbuk National University)
Vu Dinh Hong (Ton Duc Thang University)
Jieming Yang (Northeast Electric Power University)

Finance Chairs

Truong Dinh Tu (Ton Duc Thang University)
Meijing Li (Shanghai Maritime University)
Khishigsuren Davagdorj (Chungbuk National University)

Local Organization Chairs

Tran Trong Dao (Ton Duc Thang University)
Dang Minh Thang (Ton Duc Thang University)
Duong Huu Phuc (Ton Duc Thang University)

Program Committee

Mohamed Ezzeldin A.Bashir (A'lsharqiyah University)
Tom Arbuckle (University of Limerick)
Sansanee Auephanwiriyakul (Chiang Mai University)
Khuyagbaatar Batsuren (National University of Mongolia)
Suvdaa Batsuuri (National University of Mongolia)
Enkhtuul Bukhsuren (National University of Mongolia)
Erwin Bonsma (Philips)
Eun-Jong Cha (Chungbuk National University)
Hyo Soung Cha (National Cancer Center)
Basabi Chakraborty (Iwate Prefectural University)
Goutam Chakraborty (Iwate Prefectural University)
Jeong Hee Chi (Konkuk University)
Young Sung Cho (Information Research Company)
Lodoiravsal Choimaa (National University of Mongolia)
Anour Dafaalla (City College)
Garmaa Dangaasuren (National University of Mongolia)
Dang Minh Thang (Ton Duc Thang University)
Nan Ding (Dalian University of Technology)
Razvan Dinu (Philips)
Duong Huu Phuc (Ton Duc Thang University)
Sang Hun Han (Hangil Software)
Herman Hartmann (University of Groningen)
Hoang Do Thanh Tung (Vietnam Institute of Information Technology of Vietnamese Academy of Science and Technology)
Hoang Van Dung (Ton Duc Thang University)
Bu Hyun Hwang (Chonnam National University)

Jeong Hee Hwang (Namseoul University)
Jeong Kyeong Ja (Chungchung University)
Purev Jaimai (National University of Mongolia)
Seon-Phil Jeong (United International College)
Wanchang Jiang (Northeast Electric Power University)
Ohyun Jo (Chungbuk National University)
Kwang Su Jung (National Institute of Health)
Byungchul Kim (Baekseok University)
Kyung-Ah Kim (Chungbuk National University)
Yang-Mi Kim (Chungbuk National University)
Taeil Kwon (Bigsun Co. Ltd)
Le Anh Cuong (Ton Duc Thang University)
Le Van Vang (Ton Duc Thang University)
Bum Ju Lee (Korea Institute of Oriental Medicine)
Eunji Lee (Soongsil University)
Heon Gyu Lee (Gaion Company)
Jong Yun Lee (Chungbuk National University)
Sanghyuk Lee (Xi'an Jiaotong-Liverpool University)
Yongmi Lee (Chungbuk National University)
Dingkun Li (Shanghai Tongji University)
Jianpo Li (Northeast Electric Power University)
Meijing Li (Shanghai Maritime University)
Peipei Li (Van andel Institute)
Gang Liu (Xidian University)
Ran Ma (Shanghai University)
Bayarpurev Mongolyn (National University of Mongolia)
Tsendsuren Munkhdalai (Microsoft Research)
Kwang Woo Nam (Kunsan National University)
Aziz Nasridinov (Chungbuk National University)
Goce Naumoski (Bizzsphere)
Oyun-Erdene Namsrai (National University of Mongolia)
Nguyen Chi Thien (Ton Duc Thang University)
Incheon Paik (The University of Aizu)
Hyun Woo Park (National Cancer Center)
Pham Van Huy (Ton Duc Thang University)
Minghao Piao (Chungbuk National University)
Yongjun Piao (Nankai University)
Gouchol Pok (Pai Chai University)
Keun Ho Ryu (Ton Duc Thang University/Chungbuk National University/Chiang Mai University)
Kwangsun Ryu (National Cancer Center)
Supatra Sahaphong (Ramkhamhaeng University)
Eun-Young Shin (Chungbuk National University)
Jung Hoon Shin (Chunbuk National University)
Moon Sun Shin (Konkuk University)

Ho Sun Shon (Chungbuk National University)
Weifeng Su (Bnu-Hkbu United International College)
Tran Thanh Phuoc (Ton Duc Thang University)
Truong Dinh Tu (Ton Duc Thang University)
Nipon Theera-Umpon (Chiang Mai University)
Vo Hoang Anh (Ton Duc Thang University)
Vu Dinh Hong (Ton Duc Thang University)
Vu Thi Hong Nhan (Vietnam National University, Hanoi)
Jingdong Wang (Northeast Electric Power University)
Ling Wang (Northeast Electric Power University)
Eunjoo Yang (National Institute of Health)
Bold Zagd (National University of Mongolia)
Tiehua Zhou (Northeast Electric Power University)
Xinxin Zhou (Northeast Electric Power University)

Committee Secretaries

Tsatsral Amarbayasgalan (Chungbuk National University)
Enkhtuul Bukhsuren (National University Of Mongolia)
Dung Cam Quang (Ton Duc Thang University)
Wenqiang Liu (Northeast Electric Power University)
Huilin Zheng (Chungbuk National University)

Preface

Welcome to the 16th International Conference on Intelligent Information Hiding and Multimedia Signal Processing (IIH-MSP 2020) in conjunction with the 13th International Conference on Frontiers of Information Technology, Applications and Tools (FITAT 2020) held in Ho Chi Minh City on November 5–7, 2020. IIH-MSP 2020 and FITAT 2020 are technically co-sponsored by Ton Duc Thang University in Vietnam, Shandong University of Science and Technology in China, Northeast Electric Power University in China, Chungbuk National University in South Korea, National University of Mongolia in Mongolia, and Fujian University of Technology in China. Both conferences aim to bring together researchers, engineers, and policymakers to discuss the related techniques, to exchange research ideas, and to make friends.

We received a total of 238 submissions. Finally, 126 papers are accepted after the review process. The keynote speeches are kindly provided by Prof. Nipon Theera-Umpon (Chiang Mai University) on "A.I. in biomedicine," Prof. Ho Tu Bao (Emeritus of JAIST) on "learning from medical data," Prof. Junbao Li (Harbin Institute of Technology) on "embedded artificial intelligence," and Prof. Limsoon Wong (National University of Singapore) on "some opinion and advice on machine learning in population-based genomic medicine."

We would like to thank the authors for their tremendous contributions. We would also express our sincere appreciation to the reviewers, program committee members, and the local committee members for making both conferences successful. Especially, our special thanks go to Prof. Keun Ho Ryu and Prof. Jeng-Shyang Pan for the efforts and contribution from them to make IIH-MSP 2020 and FITAT 2020 possible. Finally, we would like to express special thanks for Ton Duc Thang University, Shandong University of Science and Technology, Northeast Electric Power University, Chungbuk National University, National University of Mongolia, Chaoyang University of Technology, Fujian Provincial Key Lab of Big Data Mining and Applications,

and Institute of Artificial Intelligence, and Fujian University of Technology for their generous support in making IIH-MSP 2020 and FITAT 2020 possible.

Qingdao, China — Jeng-Shyang Pan
Jilin, China — Jianpo Li
Ulaanbaatar, Mongolia — Oyun-Erdene Namsrai
Fuzhou, China — Zhenyu Meng
Novi Sad, Serbia — Miloš Savić
October 2020

Contents

Modeling and Simulation for Battery Energy Storage System Participating in Power System Frequency Modulation Based on Power System Analysis Software Package 1
Pengcheng Cao, Peiqiang Li, Peidong Sun, Zhongkai Zhang, and Kuo-Chi Chang

CNN Character Recognition Model for 3D Integral Image Character 9
Zorig Badarch, Battogtokh Jigjidsuren, Nomin-Erdene Dalkhaa, and Ganbat Baasantseren

Using Virtual Machines in Computer Networking Class 16
S. Batbayar, Oyun-Erdene Namsrai, Sh. Bat-Ulzii, and N. Munkhtsetseg

Usability Evaluation of Mobile Luxury Brand Websites Based on the Analytic Hierarchy Process 24
Wen Qi and Paite Yang

Study of Low-Cost-Based Smart Home Control Using IoT Powered by Photovoltaic Cells 32
Shoaib Ahmad, Kuo-Chi Chang, Tien-Wen Sung, Kai-Chun Chu, Yu-Wen Zhou, Abdalaziz Altayeb Ibrahim Omer, Governor David Kwabena Amesimenu, and Fu-Hsiang Chang

Design of Combined Cycle Gas Turbine and IoT in Production Electricity from KIVU Lake Methane Gas 41
Joram Gakiza, Kuo-Chi Chang, Kai-Chun Chu, Hsiao-Chuan Wang, Governor David Kwabena Amesimenu, Shoaib Ahmad, Shamim MdObaydul Haque, and Fu-Hsiang Chang

An Implementation of Ionic-Based Hybrid Mobile Application for Controlling Bluetooth Low-Energy-Based Humidifier Device 50
Dongoh Jung, Khongorzul Munkhbat, Jong Yun Lee, and Keun Ho Ryu

Study of Assessing the Stability of Rwanda's Power System from Big Data Based on Power Generation 57
Gilbert Shyirambere, Kuo-Chi Chang, Kai-Chun Chu, Hsiao-Chuan Wang, AbdalazizAltayeb Ibrahim Omer, Governor David Kwabena Amesimenu, and Fu-Hsiang Chang

Image Feature Detection and Clustering for UAV Multiple Obstacles Avoidance 66
Baohua Zhao, Tien-Wen Sung, and Xin Zhang

Sentiment Analysis for Mongolian Tweets with RNN 74
Orgilbat Ariunaa and Zoljargal Munkhjargal

Thin Point Light Source Display 82
Nomin-Erdene Dalkhaa, Bymba-Ochir Chagnaadorj, Choijamts Namsraijaw, and Ganbat Baasantseren

Dynamic Token Distribution Model for Privacy Protection of Mobile Users 92
Tie Hua Zhou, Kai Tai Gao, Yu Lu, and Ling Wang

Cascading Fault Prevention of Power Grid Based on Key Power Generation Nodes 99
Kuo-Chi Chang, Jie Luo, Hui-Qiong Deng, Qin-Bin Li, Rong-Jin Zheng, and Pei-Qiang Li

Optimal Power Generation Output Considering Cascading Failure 106
Hui-Qiong Deng, Jie Luo, Qin-Bin Li, Rong-Jin Zheng, Pei-Qiang Li, and Kuo-Chi Chang

A Survey of Common IOT Communication Protocols and IOT Smart-X Applications of 5G Cellular 114
Kai-Chun Chu, Elias Turatsinze, Kuo-Chi Chang, Yu-Wen Zhou, Fu-Hsiang Chang, and Ming-Tsung Wang

Study of Thermal Power Plant's Intelligent Fire Detection and Suppression System Via Wireless Sensor Network and Carbon Capture and Storage Technology 123
Kuo-Chi Chang, Governor David Kwabena Amesimenu, Tien-Wen Sung, Kai-Chun Chu, Fu-Hsiang Chang, Hsiao-Chuan Wang, Tsui-Lien Hsu, and Ming-Tsung Wang

Game-Theoretic Decision-Making Analysis on Antivirus 133
Sang-Hoon Lee and Tae-Sung Kim

A New JPEG Encryption Scheme Using Adaptive Block Size 140
Peiya Li, Jiale Meng, and Zefan Sun

Study of Smart Decorating Machine on Cake Patten 148
Shi-Jie Jiang, Kuo-Chi Chang, Hong-Jiang Wang, Kai-Chun Chu, Hsiao-Chuan Wang, and Fu-Hsiang Chang

Study of Advanced Low-Cost Smart Prepaid Electricity Meter Using Arduino and GSM 160
Abdalaziz Altayeb Ibrahim Omer, Kuo-Chi Chang, Hui-Qiong Deng, Kai-Chun Chu, Governor David Kwabena Amesimenu, Yu-Wen Zhou, and Fu-Hsiang Chang

Study of Integrating the Data Fusion Method for Reducing and Preventing Road Accidents Occur at Blackspots Places in Third World Countries 169
Kai-Chun Chu, Gilbert Shyirambere, Kuo-Chi Chang, Hsiao-Chuan Wang, Governor David Kwabena Amesimenu, Fu-Hsiang Chang, and Shoaib Ahmad

Study of 2D SubMarine Tracking with Complete Worked Out Example Based on Kalman Filter 178
Kuo-Chi Chang, Joram Gakiza, Kai-Chun Chu, Hsiao-Chuan Wang, Tsui-Lien Hsu, Governor David Kwabena Amesimenu, and Fu-Hsiang Chang

Retina Macular Edema and Age-Related Macular Degeneration Feature Recognition Method Based on the OCT Images 188
Ling Wang, Wen Ce Xie, Tong Li, Yi Min Liu, and Tie Hua Zhou

Gene Expression PPI Network Clustering Analysis Between Endometrial Cancer and Ovarian Cancer 196
Tie Hua Zhou, Wei Jian Pu, Hua Xie, Li Yan Zhang, and Ling Wang

Automatic Identification and Classification Method for Diabetic Retinopathy FFA Image Processing 204
Tie Hua Zhou, Yi Min Liu, Wen Ce Xie, Hong Na Li, and Ling Wang

Emotional Expression Analysis Based on Fine-Grained Emotion Quantification Model Via Social Media 211
Ling Wang, Hang Yu Liu, Wen Long Liang, and Tie Hua Zhou

Fuzhou PM2.5 Prediction and Related Factors Analysis 219
Wen-Ji Zhang, Li-Wen Chen, Yao Zhou, Ri-Jing Zheng, and Kuo-Chi Chang

An Improved Whale Optimization Algorithm and Its Application to Power Generation in Cascade Reservoir 228
Ji-Xiang Lü, Li-Jun Yan, Tien-Szu Pan, Shu-Chuan Chu, Jeng-Shyang Pan, Xian-Kang He, and Kuo-Chi Chang

Prediction of Hypertension Using Deep Autoencoder-Based Feature Representation 238
Hyun Woo Park, Yul Hwangbo, and Keun Ho Ryu

The Prediction Model for High-Risk Patient with Liver Cancer Based on Classification Approaches 246
Kwang Sun Ryu, Ha Ye Jin Kang, Sang Won Lee, Young Ha Hwang, Na Young You, Jae Ho Kim, Kui Son Choi, and Hyo Soung Cha

Improve the Fingerprinting Algorithm Based on Affinity Propagation Clustering to Increase the Accuracy and Speed of Indoor Positioning Systems 253
Binh Ngo Van, Vuong Quang Phuong, and Hoang Do Thanh Tung

Avoid Selection Bias in Observational Study Based on Health Big Data 262
Sang Won Lee, Kwang Sun Ryu, Jae Ho Kim, Na Young You, Ha Ye Jin Kang, Yong Ha Hwang, Kui Son Choi, and Hyo Soung Cha

Caffeine Drinks and the Risk of Cancer: A Review 268
Jae Ho Kim, Kwang Sun Ryu, Sang Won Lee, Na Young You, Ha Ye Jin Kang, Yong Ha Hwang, Kui Son Choi, and Hyo Soung Cha

Association Rule Mining Method to Predict Coronary Artery Disease: KNHANES 2016–2018 274
Na Young You, Kwang Sun Ryu, Jae Ho Kim, Ha Ye Jin Kang, Sang Won Lee, Kui Son Choi, and Hyo Soung Cha

Framework Design of Anti-online Learning Anomie Behavior System 281
Shutang Liu, Jie Xu, Shiji Feng, Youguo Liao, and Junhua Li

Research on Intelligent Scene Generation Based on Unity3D 289
Lingbin Zheng, Menghua Li, Yuxi Gao, Hang Chen, and Fuquan Zhang

A Study of Guide Interpretation of Haihunhou Pavilion in Nanchang in the Age of Artificial Intelligence 298
Jun Tan and Weiwei Zhou

Detection Method for Crowd Abnormal Behavior Based on Long Short-Term Memory Network 305
Bo Meng, Li Wang, and Dong Wei Li

Research of Software Testing Technology Based on Statechart Diagram 314
Cuijuan Chen and Wenru Lin

Research on Intelligent Optimization Method of Grid Communication Server Based on Support Vector Machine 323
Xiaohui Zhu, Lu Ji, Huijing Bi, and Xiaobo Zhao

Research on Optimization Model for Thread Pool Performance on Grid Information Server 332
Xiaobo Zhao, Xiaohui Zhu, Kenan Yi, and Zihang Jia

Network Security Situation Assessment of Power Information System Based on Improved Artificial Bee Colony Algorithm 340
Lifang Gao, Zhihui Wang, Huifeng Yang, Shaoying Wang, Qimeng Li, Shaoyong Guo, and Chao Ma

A Brief Survey on Recent Advances of Object Detection with Deep Learning 348
Ruo-Bin Wang, Dang-Kang Yan, and Lin Xu

Research on the Method of Neural Network Switchgear Portrait Based on Sequence Clustering 357
Yong Wang, Han Liu, Yang Jiao, and Jianfei Chen

Detection of False Data Injection Attack in Power Grid Based on Machine Learning 363
Xiaoli Guo, Shiyuan Wang, Yuhan Sun, Tieli Sun, Li Feng, and Zhexing Jin

Demand Response Strategy Model Based on User Satisfaction 372
Xiaoli Guo, Yuhan Sun, Li Feng, Chaoyang Qu, and Tieli Sun

Low-Complexity MMSE Precoding Based on SSOR Iteration for Large-Scale Massive MIMO Systems 381
Jianpo Li, Saeed I. A. Saeed, Tao Yang, Yan Xie, and Guoge Zhang

Design of Intelligent Substation Communication Network Security Audit System 389
Wenting Wang, Xin Liu, Xiaohong Zhao, Yang Zhao, Rui Wang, and Jianpo Li

Research on Security Auditing Scheme of Intelligent Substation Communication Network 398
Wenting Wang, Guilin Huang, Xin Liu, Hao Zhang, Rui Wang, and Jianpo Li

Design of Radio Frequency Energy Harvesting System 407
Xing Liu, Jihai Yang, Tao Yang, Jun Gao, and Jianpo Li

An Encryption Method of Power Cloud Data Based on *n*-RSA 416
Yong Wang, Qiang Ma, Lei Li, Ti Guan, Yujie Geng, Shuowang Yao, and Jianpo Li

***K*-Means-Based Method for Identifying Characteristics of Wireless Terminal Equipment in Power System** 424
Yueqin Yin, Zhantu Zhang, Huajian Zhang, Shengze Sun, and Jianpo Li

Security Transmission Technology of WSN Based on Trust Management Mechanism in Power System 432
Yong Wang, Lei Li, Qiang Ma, Ti Guan, Yujie Geng, Shici Li, and Jianpo Li

Survey of Attack Detection and Defense Technologies in Wireless Sensor Networks 440
Jianpo Li, Shici Li, Tao Yang, Yan Xie, and Guoge Zhang

A Wireless Hijack Attack on Power Consumption System of Power Metering Automation 448
Xiao Yong, Jin Xin, Feng Junhao, and Zhang Zitong

Research on Real-Time Deformation Measurement of Structural Frame Based on Data Driven 457
Zhou Yan, Jun Weng, and Qing Wang

A Sensor Fusion Method for In-Station Articulation of Train 467
Zhao-Qing Liu, Xing-Yuan Song, Yi-Hao Chen, and Zhen-Ni Yang

Intelligent Fault Diagnosis Using Limited Data Under Different Working Conditions Based on SEflow Model and Data Augmentation 475
Sijue Li, Gaoliang Peng, Daoyong Mao, Zhiyu Zhu, Mengyu Ji, and Yuanhang Chen

The Unified Framework of Deep Multiple Kernel Learning for Small Sample Sizes of Training Samples 485
Jing Liu, Tingting Wang, and Yulong Qiao

Quasiconformal Mahalanobis Distance-Based Kernel Mapping Machine Learning for Hyperspectral Data Classification 494
Jing Liu and Yulong Qiao

Research on Time-Delay Estimation of PMSM Driving System Based on RLS Method 502
Zhong-zhen Chen, Dong-wei He, Li-sang Liu, Jian-xing Li, and Kuo-Chi Chang

Cache Learning Method for Terrific Detection of Atrial Fibrillation 512
Mohamed Ezzeldin A. Bashir, Abdul Hakim H. M. Mohamed, Akbar Khanan, Fadi Abdel Muniem Abdel Fattah, Ling Wang, and Keun Ho Ryu

Enhanced the Depth of Integral Image Display by Using Barrier Array 520
Yulian Cao and Ganbat Baasantseren

Author Index 529

About the Editors

Jeng-Shyang Pan received the B.S. degree in Electronic Engineering from the National Taiwan University of Science and Technology, in 1986, the M.S. degree in Communication Engineering from National Chiao Tung University, Taiwan, in 1988, and the Ph.D. degree in Electrical Engineering from the University of Edinburgh, UK, in 1996. He is currently the Professor in Shandong University of Science and Technology. He joined the Editorial Board of Journal of Network Intelligence, the Journal of Computers, and the Chinese Journal of Electronics. His current research interests include soft computing, information security, and signal processing.

Jianpo Li received his B.S., M.S., and Ph.D. from the Department of Communication Engineering, Jilin University, China, in 2002, 2005, and 2008, respectively. In 2008, he joined the School of Information Engineering, Northeast Electric Power University (NEEPU). He was Visiting Scholar with New York University in 2013 and the University of Ottawa in 2016. Now, he is Full Professor and Vice-Dean of the School of Computer Science, NEEPU. He has published more than 70 research papers and has 16 patents. His research interests focus on wireless sensor networks, intelligent signal processing, 5G, and wireless power transmission.

Prof. Dr. Oyun-Erdene Namsrai is Full Professor and Head of the Department of Information and Computer Science at the National University of Mongolia (NUM). In 2008, she received her Ph.D. in Computer Science from Chungbuk National University (CBNU) and in recent years worked as Visiting Professor at the CBNU, Republic of Korea. She has been working as Active Member of the Information Technology Professionals Examination Council (ITPEC) since 2008. Prof. Namsrai has served on numerous Organizing and Program Committees of international conferences such as ICISCA, ICW, ICCS, ICAST, ISPM, MMT, DBMI, and FITAT. Her research interests include core database paradigms and temporal databases, spatiotemporal database, temporal GIS and stream data processing, data structure, knowledgebase information retrieval, database security, data mining, bioinformatics, and biomedical informatics.

Zhenyu Meng received the B.S., M.Phil., and Ph.D. Degrees in Computer Science from Shandong Normal University, Harbin Institute of Technology Shenzhen Graduate School, Harbin Institute of Technology Shenzhen in 2008, 2011, and 2018, respectively. Currently, he is Director of the Institute of Artificial Intelligence, Fujian University of Technology, and Professor in Fujian Key Provincial Key Laboratory of Data Mining and Application, Fujian University of Technology. He also serves as Reviewer of several JCR Q1 SCI journals such as IEEE T EC, IEEE T CYB., INF. SCI., KBS, ASOC, SWEVO, ESWA, IEEE Access, EAAI, and several Chinese SCI journals. His research interest includes evolutionary computation and vehicle navigation.

Miloš Savić is Assistant Professor at the Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad, where he received his B.Sc., M.Sc., and Ph.D. degrees in the field of computer science. His research interests are in the field of complex network analysis, intelligent systems, graph-based machine learning, and scientometrics.