Studies in Computational Intelligence

Volume 642

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Recent Developments in Intelligent Information and Database Systems

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Preface

More than three decades of research in intelligent information and database systems has principally led from theory to new practical developments. Research issues on big data to gain and share knowledge is probably the most significant example of this. The other example concerns system integrity issues. The industry needs to address these issues through applications focusing on long-term integrity and operational reliability. The complexity of modern information and database systems requires a deep understanding of old issues and the adoption of new insights and experiences to the development of such systems.

Fortunately, recent years have seen remarkable progress on both intelligent information and database systems. These systems invariably involve complex, data-intensive and resource-consuming tasks, which often carry heavy losses in terms of cost in the event of failure. They have regained attention because in many cases large-scale and long-lived applications have to be updated and several new methods have to be developed. Some of the most important of these updates and developments include increased attention to the integration of artificial intelligence, multimedia, social media and database technologies towards the next generation computer systems and services.

The main objective of this book is to contribute to the development of the intelligent information and database systems with the essentials of current knowledge, experience and know-how. Over the last decade new roles for these systems have been discovered, particularly their role as social data and service integrator. Understanding and combining data from different sources has now become a standard practice. Also, the use of statistical methods in a large corpus of data is more efficient and therefore more frequent. But there are expected yet more and different roles to be discovered in the near future.

The scope represented here, relevant to the study of intelligent information and database systems, encompasses a wide spectrum of research topics discussed both from the theoretical and the practical points of view. There are fundamental issues such as algorithmics, artificial and computational intelligence, nature-inspired paradigms, ontologies, collective knowledge, natural language processing, image

processing and temporal databases. On the other hand, there are also a number of interdisciplinary topics outside or close to end-user applications. These concern, for example, heterogeneous and distributed databases, social networks, recommendations systems, web services, etc.

This brand-new volume in the well-established “Studies in Computational Intelligence” series provides a valuable compendium of current and potential problems in the field. It contains a selection of 40 chapters based on the original research accepted for the presentation as posters during *the Asian Conference on Intelligent Information and Database Systems (ACIIDS 2016)* held on 14–16 March 2016 in Da Nang, Vietnam. This is the eighth, in the order, conference jointly organized by Wroclaw University of Technology and its partners.

The selected papers to some extent reflect the achievements of scientific teams from 17 countries in five continents, and report on the progress in theory and application of three main areas: Intelligent information systems, intelligent database systems and tools and applications. More precisely, the book is divided into parts related to six primary topics: Part I. Computational Intelligence in Data Mining and Machine Learning, Part II. Ontologies, Social Networks and Recommendation Systems, Part III. Web Services, Cloud Computing, Security and Intelligent Internet Systems, Part IV. Knowledge Management and Language Processing, Part V. Image, Video, Motion Analysis and Recognition and finally, Part VI. Advanced Computing Applications and Technologies. Each part deals with somewhat different aspects. Let us now consider it in more detail. In Part I, we start with the genetic and memetic algorithms, nature-inspired heuristics, cloud computing, clustering-based classifications, deep learning, artificial neural networks and wi-fi networks. Part II deals with behaviour ontologies, P2P social networks, customer management strategies and recommendations systems. Part III contains six papers about web services, secure communications and integrity of private information. The next part covers collective knowledge management, Internet of Things, natural language processing, sentiment analysis and event detection. In Part V, we cover image processing, human motion capturing, humanoid robots, gesture recognition and emotion detection. The volume closes with Part VI. It presents various practical applications of assistive devices for elderly people, biomedical data integration, epidemiological cancer studies, temporal educational databases, location-based service applications, smart electronic wallet, CT image processing, supply chain management and logistics, and learning management systems.

The book will be an excellent resource for researchers, who are working in the merging of artificial intelligence, multimedia, networks and big data technologies, as well as for students who are interested in computer science, computer engineering, management science, ontological engineering and other related fields.

There are several people whose help has been invaluable in the preparation of this volume. First of all, on behalf of the Steering Committee, the Program Committee and the Organizing Committee we would like to thank all participants, among others, computer scientists, mathematicians, engineers, logicians and other researchers who found it worthwhile to travel to Da Nang from around the world, and who prepared first-rate contributions to these publications. Warm thanks are

also due to the referees who reviewed the chapters with remarkable expertise and engagement. We express a special gratitude to Prof. Janusz Kacprzyk, the editor of this series, and Dr. Thomas Ditzinger from Springer for their interest and support of our project.

Our last but not least observation is that the rise of new generation systems and services is leading to profound changes in overall world functioning. In particular, the Internet is undergoing a transition from the global network to the permanent interconnection between human beings and everyday devices equipped with ubiquitous intelligence. It opens tremendous opportunities for a large number of novel applications that promise to improve the quality of our lives.

We sincerely hope that this volume will be a valuable reference work in your study and research, and you enjoy reading it.

March 2016

Dariusz Król
Lech Madeyski
Ngoc Thanh Nguyen

Contents

Part I Computational Intelligence in Data Mining and Machine Learning

Cryptanalysis of SDES Using Genetic and Memetic Algorithms	3
Kamil Dworak, Jakub Nalepa, Urszula Boryczka and Michal Kawulok	
Admission Control and Scheduling Algorithms Based on ACO and PSO Heuristic for Optimizing Cost in Cloud Computing	15
Ha Nguyen Hoang, Son Le Van, Han Nguyen Maue and Cuong Phan Nhat Bien	
A Novel Clustering-Based 1-NN Classification of Time Series Based on MDL Principle	29
Vo Thanh Vinh and Duong Tuan Anh	
Efficient Subsequence Join Over Time Series Under Dynamic Time Warping	41
Vo Duc Vinh and Duong Tuan Anh	
Multi-Instrumental Deep Learning for Automatic Genre Recognition.	53
Mariusz Kleć	
A Multiple Kernels Interval Type-2 Possibilistic C-Means.	63
Minh Ngoc Vu and Long Thanh Ngo	
Application of Artificial Neural Networks in Condition Based Predictive Maintenance	75
Jiri Krenek, Kamil Kuca, Pavel Blazek, Ondrej Krejcar and Daniel Jun	
Long Term Analysis of the Localization Model Based on Wi-Fi Network.	87
Rafał Górak and Marcin Luckner	

Part II Ontologies, Social Networks and Recommendation Systems

Specific Behavior Recognition Based on Behavior Ontology	99
Ngoc Q. Ly, Anh M. Truong and Hanh V. Nguyen	

A New Method for Transforming TimeER Model-Based Specification into OWL Ontology.	111
Toan Van Nguyen, Hoang Lien Minh Vo, Quang Hoang and Hanh Huu Hoang	

Peer to Peer Social Network for Disaster Recovery.	123
Duy Tai Nguyen, Pham Tran Vu and Quang Tran Minh	

Impact of Information System-Based Customer Relationship Management Strategy, Social Media Interaction on Customer Perception, Satisfaction, Loyalty, Corporate Image and Purchase Intention to XYZ Cellular Customers in Samarinda City	133
Wick Indiyarto and Harisno	

Lexical Matching-Based Approach for Multilingual Movie Recommendation Systems	149
Xuan Hau Pham, Jason J. Jung and Ngoc Thanh Nguyen	

Part III Web Services, Cloud Computing, Security and Intelligent Internet Systems

Analyzing and Conceptualizing Monitoring and Analytics as a Service for Grain Warehouses	161
Tien-Dung Cao and Hong-Linh Truong	

Review of Current Web Service Retrieval Methods	173
Adam Czyszczoń and Aleksander Zgrzywa	

Intelligent Secure Communications Between Systems	183
Azahara Camacho, Pablo C. Cañizares and Mercedes G. Merayo	

TooKie: A New Way to Secure Sessions.	195
Péter Vörös and Attila Kiss	

Surface of Articular Cartilage Extraction Using Fuzzy C-means Segmentation	209
Jan Kubicek, Iveta Bryjova, Marek Penhaker, Michal Kodaj and Martin Augustynek	

A Formal Passive Testing Approach to Control the Integrity of Private Information in eHealth Systems	221
Azahara Camacho, Mercedes G. Merayo and Manuel Núñez	

Part IV Knowledge Management and Language Processing

Experience-Oriented Knowledge Management for Internet of Things	235
Haoxi Zhang, Cesar Sanin and Edward Szczerbicki	
Solutions of Creating Large Data Resources in Natural Language Processing	243
Huỳnh Công Pháp	
Conference Calls' News Analysis and Stock Price Volatility	255
Jia-Lang Seng, Yi-Hui Wu and Hsiao-Fang Yang	
Lexicon-Based Sentiment Analysis of Facebook Comments in Vietnamese Language	263
Son Trinh, Luu Nguyen, Minh Vo and Phuc Do	
Scoring Explanatoriness of a Sentence and Ranking for Explanatory Opinion Summary	277
Trung Thien Vo, Bac Le and Minh Le Nguyen	
Using Content-Based Features for Author Profiling of Vietnamese Forum Posts	287
Duc Tran Duong, Son Bao Pham and Hanh Tan	
Trigram-Based Vietnamese Text Compression	297
Vu H. Nguyen, Hien T. Nguyen, Hieu N. Duong and Vaclav Snasel	
Big Data Analysis for Event Detection in Microblogs	309
Soumaya Cherichi and Rim Faiz	

Part V Image, Video, Motion Analysis and Recognition

Building 3D Object Reconstruction System Based on Color-Depth Image Sequences	323
Ngoc Quoc Ly, Tai Cong Tan Vu and Thanh Quoc Tac	
Key Frames Extraction from Human Motion Capture Data Based on Hybrid Particle Swarm Optimization Algorithm	335
Xiaojing Chang, Pengfei Yi and Qiang Zhang	
Living Labs for Human Motion Analysis and Synthesis in Shareconomy Model	343
Marek Kulbacki, Kamil Wereszczyński, Jakub Segen, Artur Bąk, Marzena Wojciechowska and Jerzy Paweł Nowacki	
Data-Driven Complex Motion Design for Humanoid Robots	355
Xiaojie Zheng, Pengfei Yi and Qiang Zhang	

Hand Detection and Gesture Recognition Using Symmetric Patterns	365
Hassan Mashad Nemati, Yuantao Fan and Fernando Alonso-Fernandez	
Non Verbal Approach for Emotion Detection	377
Bharati Dixit and Arun Gaikwad	
 Part VI Advanced Computing Applications and Technologies	
Technological Devices for Elderly People with Alzheimer's Disease: A Review Study	389
Blanka Klimova and Petra Maresova	
Integrated System Supporting Research on Environment Related Cancers	399
Wojciech Bensch, Damian Borys, Krzysztof Fajarewicz, Kinga Herok, Roman Jaksik, Marcin Krasucki, Agata Kurczyk, Kamil Matusik, Dariusz Mrozek, Magdalena Ochab, Marcin Pacholczyk, Justyna Pieter, Krzysztof Puszyński, Krzysztof Psiuk-Maksymowicz, Sebastian Student, Andrzej Świerniak and Jarosław Śmieja	
An Efficient Tree-based Rule Mining Algorithm for Sequential Rules with Explicit Timestamps in Temporal Educational Databases	411
Hoang Thi Hong Van, Vo Thi Ngoc Chau and Nguyen Hua Phung	
Design and Implementation of Mobile Travel Assistant	423
Tomas Pochobradsky, Tomas Kozel and Ondrej Krejcar	
Design and Implementation of an Algorithm for System of Exposure Limit in Radiology	433
David Oczka, Marek Penhaker, Lukas Knybel, Jan Kubicek and Ali Selamat	
Application of the Characteristic Objects Method in Supply Chain Management and Logistics	445
Wojciech Sałabun and Paweł Ziemia	
Personalization of Learning Content and Its Structure, Based on Limitations of LMSs	455
Aneta Bartuskova and Ondrej Krejcar	
Author Index	467