Advances in Intelligent Systems and Computing 185

Editor-in-Chief

Prof. Janusz Kacprzyk
Systems Research Institute
Polish Academy of Sciences
ul. Newelska 6
01-447 Warsaw
Poland
E-mail: kacprzyk@ibspan.waw.pl

For further volumes:
http://www.springer.com/series/11156

Mykola Pechenizkiy and Marek Wojciechowski (Eds.)

New Trends in Databases and Information Systems

Springer

Editors
Mykola Pechenizkiy
Department of Computer Science
Eindhoven University of Technology
Eindhoven
The Netherlands

Marek Wojciechowski
Institute of Computing Science
Poznan University of Technology
Poznan
Poland

ISSN 2194-5357
ISBN 978-3-642-32517-5
DOI 10.1007/978-3-642-32518-2
Springer Heidelberg New York Dordrecht London

e-ISSN 2194-5365
e-ISBN 978-3-642-32518-2

Library of Congress Control Number: 2012943846

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

Database and information systems technologies have been rapidly evolving in several directions over the past years. New types and kinds of data, new types of applications and information systems to support them raise diverse challenges to be addressed. The so-called big data challenge, streaming data management and processing, social networks and other complex data analysis, including semantic reasoning into information systems supporting for instance trading, negotiations, and bidding mechanisms are just some of the emerging research topics. This volume contains papers contributed by six workshops and the Ph.D. Consortium associated with the ADBIS 2012 conference that report on the recent developments and an ongoing research in the aforementioned areas.

The 16th East-European Conference on Advances in Databases and Information Systems (ADBIS 2012) was held on September 17–21, 2012 in Poznan, Poland. The main objective of the ADBIS series of conferences is to provide a forum for the dissemination of research accomplishments and to promote interaction and collaboration between the database and information systems research communities from Central and East European countries and the rest of the world. The general idea behind the workshops and the Ph.D. Consortium was to collect contributions from various subdomains of the broad research areas of databases and information systems, representing new trends in these two important areas. Each of the events complementing the main ADBIS conference had its own international program committee, whose members served as the reviewers of papers contributed to the corresponding part of this volume.

ADBIS Workshop on GPUs in Databases (GID 2012) was chaired by Witold Andrzejewski (Poznan University of Technology, Poland), Krzysztof Kaczmarski (Warsaw University of Technology, Poland), and Tobias Lauer (Jedox AG, Germany). The motivation behind the workshop was an observation that while other application domains strongly benefit from utilizing the Graphics Processing Units (GPUs) to increase the performance of processing, database-related applications and algorithms do not get enough attention. The main goal of GID 2012 was to fill this gap. Members of the workshop's Program Committee were: Amitava Datta (University of Western Australia, Commonwealth of Australia), Jarosław Gramacki

(University of Zielona Góra, Poland), Bingsheng He (Nanyang Technological University, Singapore), Ming Ouyang (University of Louisville, USA), John D. Owens (University of California, Davis, USA), Krzysztof Stencel (Warsaw University of Technology, Poland), and Paweł Wojciechowski (Poznan University of Technology, Poland).

Mining Complex and Stream Data (MCSD'12) was chaired by Jerzy Stefanowski (Poznan University of Technology, Poland) and Dominik Ślęzak (University of Warsaw & Infobright Inc., Poland). The aim of this workshop was introducing new algorithmic foundations and application aspects of mining real world difficult data with a particular focus on the emerging domain of stream data mining and mining large volumes of data having a complex structure. The Program Committee of MCDS'12 consisted of the following members: Jan Bazan (University of Rzeszów, Poland), Petr Berka (University of Economics, Prague, Czech Republic), Albert Bifet (University of Waikato, New Zealand), Michelangelo Ceci (University of Bari, Italy), Alfredo Cuzzocrea (ICAR-CNR & University of Calabria, Italy), Simon Fischer (Rapid-I GmbH, Dortmund, Germany), Mohamed Gaber (University of Portsmouth, UK), Jerzy Grzymała-Busse (University of Kansas, USA), Rudolf Kruse (Otto-von-Guericke University, Magdeburg, Germany), Marzena Kryszkiewicz (Warsaw University of Technology, Poland), Stan Matwin (University of Ottawa, Canada), Ernestina Menasalvas (Technical University of Madrid, Spain), Mikołaj Morzy (Poznan University of Technology, Poland), Hung Son Nguyen (The University of Warsaw, Poland), Zbigniew Raś (University of North Carolina, Charlotte, USA), Alexey Tsymbal (Siemens AG, Erlangen, Germany), Michał Woźniak (Wrocław University of Technology, Poland), and Indre Zliobaite (Bournemouth University, UK). The reviewing process was also supported by Dariusz Czerski (IPI PAN at Warsaw, Poland), Piotr Sobolewski (Wrocław University of Technology, Poland), and Gianvito Pio (University of Bari, Italy).

International Workshop on Ontologies meet Advanced Information Systems (OAIS'2012) was chaired by Ladjel Bellatreche (LIAS/ISAE-ENSMA, France) and Yamine Ait Ameur (IRIT-ENSEEIHT, France). The workshop had two main objectives. The first one was to present new and challenging issues in the contribution of ontologies for designing high quality information systems. The second one was to present new research and technological developments that use ontologies all over the life cycle of information systems. The Program Committee members of OAIS'2012 were: Brahim Medjahed (Michigan University, USA), David Taniar (Monash University, Australia), Oscar Romero Moral (Universitat Politècnica de Catalunya), Pascal Hitzler (Wright State University, USA), Carlos Ordonez (Houston University USA), Dickson K.W. Chiu (University of Hong Kong, China), Francesco Guerra (Universita di Modena e Reggio Emilia, Italy), Fernando Silva Parreiras (FUMEC University, Brazil), Dimitris Plexousakis (Crete University, Greece), Leandro Krug Wives (Federal University of Rio Grande do Sul, Brazil), Haridimos Kondylakis (FORTH-ICS and University of Crete, Greece), Reza Akbarinia (INRIA, Montpellier, France), Manolis Koubarakis (National and Kapodistrian University of Athens, Greece), Filipe Mota Pinto (Polytechnic Institute of Leiria, Portugal), Stéphane Jean (LIAS/ISAE-ENSMA, France), Mimoun Malki (Sidi Bel Abbès University,

Algeria), Boufaida Zizette (Constantine University, Algeria), Abdelkamel Tari (Béjaia University, Algeria), Farouk Toumani (Clermont Ferrand University, France), Chantal Reynaud (LRI, Paris, France), Alfredo Cuzzocrea (ICAR-CNR and University of Calabria, Italy), Daniela Grigori (Prism, Versailles University, France), Juan C. Trujillo (University of Alicante, Spain), Zohra Bellahsene (LIRMM, Montpellier, France), Shonali Krishnaswamy (Monash University, Australia), Selma Khouri (LIAS/ISAE-ENSMA, France), Idir Ait Sadoune (Supelec, France), and Simitsis Alkis (HP, USA).

Second Workshop on Modeling Multi-commodity Trade: Data models and processing (MMT'12) was chaired by Eugeniusz Toczyłowski (Warsaw University of Technology, Poland) and Mariusz Kaleta (Warsaw University of Technology, Poland). Its goal was to address the current scientific and technological challenges in information systems supporting the market mechanism, including: semantics issues in trading, architectures of information systems for market mechanisms, incorporating social networks into trade processes, data modeling for negotiations and bidding, as well as market processes modeling and management. The Program Committee of MMT'12 consisted of the following members: Stanisław Ambroszkiewicz (Polish Academy of Sciences, Poland), Costin Badica (University of Craiova, Romania), Janusz Granat (National Institute of Telecommunications, Poland), Przemysław Kazienko (Wrocław University of Technology, Poland), Zbigniew Nahorski (Polish Academy of Science, Poland), Marcin Paprzycki (Polish Academy of Science, Poland), and Adam Wierzbicki (Polish-Japanese Institute of Information Technology, Poland).

1st ADBIS Workshop on Social Data Processing (SDP'12) was chaired by Jaroslav Pokorný (Charles University in Prague, Czech Republic), Athena Vakali (Aristotle University of Thessaloniki, Greece), and Václav Snášel (VSB - Technical University of Ostrava, Czech Republic). The workshop aimed at addressing the research issues associated with online social networks, including the topics of distributed computing, databases, and storage systems as well as modeling professional profiles of objects like workers, specialists, projects, supervisors, etc. The members of the Program Committee of SDP'12 were: Peter Vojtáš (Charles University in Prague, Czech Republic), Kamil Matoušek (Czech Technical University, Czech Republic), Jiří Kubalík (Czech Technical University, Czech Republic), Petr Křemen (Czech Technical University, Czech Republic), Hakim Hacid (Bell Labs, France), Nick Papanikolaou (HP Labs, UK), Myra Spiliopoulou (University of Magdeburg, Germany), Ernestina Menasalvas (Technical University of Madrid, Spain), Maria Augusta Nunes (Federal University of Sergipe, Brazil), Miloš Kudělka (VSB - Technical University of Ostrava, Czech Republic), and Jan Martinovič (VSB - Technical University of Ostrava, Czech Republic).

1st ADBIS Workshop on Social and Algorithmic Issues in Business Support (SAIBS) was chaired by Adam Wojciechowski (Poznan University of Technology, Poland) and Alok Mishra (Atilim University, Turkey). The focus of the workshop was on computational and optimization issues that can be supported by crowd input or social intelligence. Specific goals included addressing the following problems: how far and on which fields business may benefit from utilizing social contribution,

and how computer systems may understand social behavior and support humans in making decisions. The Program Committee of SAIBS consisted of the following members: Ricardo Colomo Palacios (Carlos III University of Madrid, Spain), Arianna D'Ulizia (IRPPS, National Research Council, Rome, Italy), Fernando Ferri (IRPPS, National Research Council, Rome, Italy), Patrizia Grifoni (IRPPS, National Research Council, Rome, Italy), Kyoung Jun Lee (Kyung Hee University, Korea), Mirosław Ochodek (Poznan University of Technology, Poland), Rory O'Connor (Dublin City University, Ireland), Robert Susmaga (Poznan University of Technology, Poland), and Agnieszka Węgrzyn (University of Zielona Góra, Poland).

ADBIS Ph.D. Consortium was established as a forum for Ph.D. students to present their research ideas, confront them with the scientific community, and receive feedback from senior mentors. Ph.D. students at an advanced stage of research were given an opportunity to prepare a paper devoted to their research area with a possibility of sharing their achieved preliminary results. The chairs of the Ph.D. Consortium, responsible for selecting the papers from this category, were Mikołaj Morzy (Poznan University of Technology, Poland) and Alexandros Nanopoulos (Catholic University of Eichstätt-Ingolstadt, Germany).

We would like to thank the authors, the reviewers, and the chairs of the ADBIS 2012 workshops for their work and effort without which assembling this volume would not be possible.

September 2012

Mykola Pechenizkiy
Marek Wojciechowski


allegro group


POZnan
*Miasto know-how


IBM


Microsoft


Roche


TARGIT
business intelligence


SAMSUNG


EDGE SOLUTIONS


itelligence

Contents

Part VII: Ph.D. Consortium