Advances in Intelligent Systems and Computing

Volume 453

Series editor

Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland
e-mail: kacprzyk@ibspan.waw.pl

About this Series

The series "Advances in Intelligent Systems and Computing" contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

The publications within "Advances in Intelligent Systems and Computing" are primarily textbooks and proceedings of important conferences, symposia and congresses. They cover significant recent developments in the field, both of a foundational and applicable character. An important characteristic feature of the series is the short publication time and world-wide distribution. This permits a rapid and broad dissemination of research results.

Advisory Board

Chairman

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India
e-mail: nikhil@isical.ac.in

Members

Rafael Bello, Universidad Central "Marta Abreu" de Las Villas, Santa Clara, Cuba
e-mail: rbellop@uclv.edu.cu

Emilio S. Corchado, University of Salamanca, Salamanca, Spain
e-mail: escorchado@usal.es

Hani Hagras, University of Essex, Colchester, UK
e-mail: hani@essex.ac.uk

László T. Kóczy, Széchenyi István University, Győr, Hungary
e-mail: koczy@sze.hu

Vladik Kreinovich, University of Texas at El Paso, El Paso, USA
e-mail: vladik@utep.edu

Chin-Teng Lin, National Chiao Tung University, Hsinchu, Taiwan
e-mail: ctlin@mail.nctu.edu.tw

Jie Lu, University of Technology, Sydney, Australia
e-mail: Jie.Lu@uts.edu.au

Patricia Melin, Tijuana Institute of Technology, Tijuana, Mexico
e-mail: epmelin@hafsamx.org

Nadia Nedjah, State University of Rio de Janeiro, Rio de Janeiro, Brazil
e-mail: nadia@eng.uerj.br

Ngoc Thanh Nguyen, Wroclaw University of Technology, Wroclaw, Poland
e-mail: Ngoc-Thanh.Nguyen@pwr.edu.pl

Jun Wang, The Chinese University of Hong Kong, Shatin, Hong Kong
e-mail: jwang@mae.cuhk.edu.hk

More information about this series at http://www.springer.com/series/11156

Thanh Binh Nguyen · Tien Van Do
Hoai An Le Thi · Ngoc Thanh Nguyen
Editors

Advanced Computational Methods for Knowledge Engineering

Proceedings of the 4th International Conference on Computer Science, Applied Mathematics and Applications, ICCSAMA 2016, 2–3 May, 2016, Vienna, Austria

Springer

Editors
Thanh Binh Nguyen
International Institute for Applied Systems Analysis (IIASA)
Laxenburg
Austria

Tien Van Do
Department of Networked Systems and Services
Budapest University of Technology and Economics
Budapest
Hungary

Hoai An Le Thi
Laboratory of Theoretical and Applied Computer Science (LITA), UFR MIM
University of Lorraine
Ile du Saulcy, Metz
France

Ngoc Thanh Nguyen
Institute of Informatics
Wrocław University of Technology
Wrocław
Poland

ISSN 2194-5357 ISSN 2194-5365 (electronic)
Advances in Intelligent Systems and Computing
ISBN 978-3-319-38883-0 ISBN 978-3-319-38884-7 (eBook)
DOI 10.1007/978-3-319-38884-7

Library of Congress Control Number: 2016938661

© Springer International Publishing Switzerland 2016
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, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG Switzerland

Preface

This volume contains papers presented at the 4th *International Conference on Computer Science, Applied Mathematics and Applications* (ICCSAMA 2016) held on 2–3 May 2016 in Vienna, Austria. The conference is co-organized by International Institute for Applied Systems Analysis (IIASA), Austria, in cooperation with Department of Information Systems (Wrocław University of Technology, Poland), Laboratory of Theoretical and Applied Computer Science LITA (Lorraine University, France), Analysis, Design and Development of ICT systems Laboratory, Budapest University of Technology and Economics, Hungary and IEEE SMC Technical Committee on Computational Collective Intelligence.

The aim of ICCSAMA 2016 is to bring together leading academic scientists, researchers and scholars to discuss and share their newest results in the fields of computer science, applied mathematics and their applications. After the peer-review process, 20 papers by authors from Algeria, Austria, France, Germany, Greece, Georgia, Hungary, Italy, Malaysia, Spain, Turkey and Vietnam have been selected for including in these proceedings. The presentations of 19 have been partitioned into five sessions: *Advanced Optimization Methods and Their Applications, Models for ICT applications, Topics on discrete mathematics, Data Analytic Methods* and *Applications and Feature Extraction.*

The clear message of the proceedings is that the potentials of computational methods for knowledge engineering and optimization algorithms are to be exploited, and this is an opportunity and a challenge for researchers. It is observed that the ICCSAMA 2013, 2014 and 2015 clearly generated a significant amount of interaction between members of both computer science and applied mathematics communities. The intensive discussions have seeded future exciting development at the interface between computational methods, optimization and engineering.

The works included in these proceedings can be useful for researchers, Ph.D. and graduate students in optimization theory and knowledge engineering fields. It is the hope of the editors that readers can find many inspiring ideas and use them to their research. Many such challenges are suggested by particular approaches and models presented in the proceedings.

We would like to thank all authors, who contributed to the success of the conference and to this book. Special thanks go to the members of the Steering and Program Committees for their contributions to keeping the high quality of the selected papers. Cordial thanks are due to the Organizing Committee members for their efforts and the organizational work.

Finally, we cordially thank Springer for support and publishing this volume.

We hope that ICCSAMA 2016 significantly contributes to the fulfilment of the academic excellence and leads to greater success of ICCSAMA events in the future.

May 2016

Thanh Binh Nguyen
Tien Van Do
Hoai An Le Thi
Ngoc Thanh Nguyen

ICCSAMA 2016 Organization

General Chair

Nguyen Thanh Binh, International Institute for Applied Systems Analysis (IIASA)
Nguyen Ngoc Thanh, Wrocław University of Technology, Poland

General Co-chairs

Le Thi Hoai An, Lorraine University, France
Tien Van Do, Budapest University of Technology and Economics, Hungary

Program Chairs

Pham Dinh Tao, INSA Rouen, France
Le Nguyen-Thinh, Humboldt-Universität zu Berlin, Germany

Doctoral Track Chair

Nguyen Anh Linh, Warsaw University, Poland

Organizing Committee

Marcos Carmen, International Institute for Applied Systems Analysis (IIASA)

Steering Committee

Nguyen Thanh Binh, International Institute for Applied Systems Analysis (IIASA), Austria (Co-chair)
Nguyen Ngoc Thanh, Wrocław University of Technology, Poland (Co-Chair)
Le Thi Hoai An, Lorraine University, France (Co-chair)
Tien Van Do, Budapest University of Technology and Economics, Hungary (Co-chair)
Pham Dinh Tao, INSA Rouen, France
Nguyen Hung Son, Warsaw University, Poland
Nguyen Anh Linh, Warsaw University, Poland
Tran Dinh Viet, Slovak Academy of Sciences, Slovakia

Program Committee

Attila Kiss, Eötvös Loránd University, Budapest
Bui Alain, Université de Versailles-St-Quentin-en-Yvelines, France
Bui Minh-Phong, Eötvös Loránd University, Budapest
Ha Quang Thuy, Vietnam National University, Vietnam
Le Nguyen-Thinh, Humboldt Universität zu Berlin, Germany
Le Thi Hoai An, Lorraine University, France
Ngo Van Sang, University of Rouen, France
Nguyen Anh Linh, Warsaw University, Poland
Nguyen Benjamin, University of Versailles Saint-Quentin-en-Yvelines, France
Nguyen Duc Cuong, International University VNU-HCM, Vietnam
Nguyen Hung Son, Warsaw University, Poland
Nguyen Ngoc Thanh, Wrocław University of Technology, Poland
Nguyen Thanh Binh, International Institute for Applied Systems Analysis (IIASA), Austria
Nguyen Viet Hung, Laboratory of Computer Sciences Paris 6, France
Pham Cong Duc, University of Pau and Pays de l'Adour, France
Pham Dinh Tao, INSA Rouen, France
Sztrik János, Debrecen University, Hungary
Tien Van Do, Budapest University of Technology and Economics, Hungary
Tran Dinh Viet, Slovak Academy of Sciences, Slovakia
Tran Quoc-Binh, Debrecen University, Hungary

Contents

Part I Advanced Optimization Methods and Their Applications

A DC Programming Approach to the Continuous Equilibrium Network Design Problem 3
Thi Minh Tam Nguyen and Hoai An Le Thi

A Method for Reducing the Number of Support Vectors in Fuzzy Support Vector Machine 17
Nguyen Manh Cuong and Nguyen Van Thien

DC Programming and DCA for Transmit Beamforming and Power Allocation in Multicasting Relay Network 29
Hoai An Le Thi, Thi Thuy Tran, Tao Pham Dinh and Alain Gély

Solving an Infinite-Horizon Discounted Markov Decision Process by DC Programming and DCA 43
Vinh Thanh Ho and Hoai An Le Thi

Part II Models for ICT Applications

A Method for Transforming TimeER Model-Based Specification into Temporal XML 59
Quang Hoang, Tinh Van Nguyen, Hoang Lien Minh Vo and Truong Thi Nhu Thuy

Job Scheduling in a Computational Cluster with Multicore Processors 75
Tran Thi Xuan and Tien Van Do

Modeling Multidimensional Data Cubes Based on MDA (Model-Driven Architecture) 85
Truong Dinh Huy, Nguyen Thanh Binh and Ngo Sy Ngoc

Time Series Methods for Synthetic Video Traffic 99
Christos Katris and Sophia Daskalaki

Part III Topics on Discrete Mathematics

A Constraint Solver for Equations over Sequences and Contexts 115
Mariam Beriashvili and Besik Dundua

Hyperpath Centers 129
Mehmet Ali Balcı, Sibel Paşalı Atmaca and Ömer Akgüller

Part IV Data Analytic Methods and Applications

Analysis Techniques for Feedback-Based Educational Systems for Programming 141
Nguyen-Thinh Le

Exploring Drivers of Urban Expansion 153
Anna Shchiptsova, Richard Hewitt and Elena Rovenskaya

The Cropland Capture Game: Good Annotators Versus Vote Aggregation Methods 167
Artem Baklanov, Steffen Fritz, Michael Khachay, Oleg Nurmukhametov and Linda See

The Formal Models for the Socratic Method 181
Nico Huse and Nguyen-Thinh Le

Using Local Weather and Geographical Information to Predict Cholera Outbreaks in Hanoi, Vietnam 195
Nguyen Hai Chau and Le Thi Ngoc Anh

Part V Feature Extraction

Effect of the Text Size on Stylometry—Application on Arabic Religious Texts 215
S. Ouamour, S. Khennouf, S. Bourib, H. Hadjadj and H. Sayoud

Personalized Facets for Faceted Search Using Wikipedia Disambiguation and Social Network 229
Hong Son Nguyen, Hong Phuc Pham, Trong Hai Duong, Thi Phuong Trang Nguyen and Huynh Minh Triet Le

Readiness Measurement Model (RMM): Mathematical-Based Evaluation Technique for the Quantification of Knowledge Acquisition, Individual Understanding, and Interface Acceptance Dimensions of Software Applications on Handheld Devices 243
Amalina F.A. Fadzlah

Triple Extraction Using Lexical Pattern-based Syntax Model 265
Ai Loan Huynh, Hong Son Nguyen and Trong Hai Duong

Using Mathematical Tools to Reduce the Combinatorial Explosion During the Automatic Segmentation of the Symbolic Musical Text 281
Michele Della Ventura

Author Index 295