

Advances in Intelligent Systems and Computing

Volume 802

Series Editor

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences,
Warsaw, Poland

Advisory Editors

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India

Rafael Bello Perez, Faculty of Mathematics, Physics and Computing,
Universidad Central de Las Villas, Santa Clara, Cuba

Emilio S. Corchado, University of Salamanca, Salamanca, Spain

Hani Hagras, School of Computer Science & Electronic Engineering,
University of Essex, Colchester, UK

László T. Kóczy, Department of Automation, Széchenyi István University,
Gyor, Hungary

Vladik Kreinovich, Department of Computer Science, University of Texas
at El Paso, El Paso, TX, USA

Chin-Teng Lin, Department of Electrical Engineering, National Chiao
Tung University, Hsinchu, Taiwan

Jie Lu, Faculty of Engineering and Information Technology,
University of Technology Sydney, Sydney, NSW, Australia

Patricia Melin, Graduate Program of Computer Science, Tijuana Institute
of Technology, Tijuana, Mexico

Nadia Nedjah, Department of Electronics Engineering, University of Rio de Janeiro,
Rio de Janeiro, Brazil

Ngoc Thanh Nguyen, Faculty of Computer Science and Management,
Wrocław University of Technology, Wrocław, Poland

Jun Wang, Department of Mechanical and Automation Engineering,
The Chinese University of Hong Kong, Shatin, Hong Kong

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 such as: computational intelligence, soft computing including neural networks, fuzzy systems, evolutionary computing and the fusion of these paradigms, social intelligence, ambient intelligence, computational neuroscience, artificial life, virtual worlds and society, cognitive science and systems, Perception and Vision, DNA and immune based systems, self-organizing and adaptive systems, e-Learning and teaching, human-centered and human-centric computing, recommender systems, intelligent control, robotics and mechatronics including human-machine teaming, knowledge-based paradigms, learning paradigms, machine ethics, intelligent data analysis, knowledge management, intelligent agents, intelligent decision making and support, intelligent network security, trust management, interactive entertainment, Web intelligence and multimedia.

The publications within “Advances in Intelligent Systems and Computing” are primarily 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.

**** Indexing: The books of this series are submitted to ISI Proceedings, EI-Compendex, DBLP, SCOPUS, Google Scholar and Springerlink ****

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

Sigeru Omatu · Mohd Saberi Mohamad ·
Paulo Novais · Enrique Díaz-Plaza Sanz ·
José Alberto García Coria
Editors

Distributed Computing
and Artificial Intelligence,
Special Sessions II,
15th International Conference

Editors

Sigeru Omatu
Hiroshima University
East-Hiroshima, Japan

Paulo Novais
Departamento de Informatica
Universidade do Minho
Braga, Portugal

José Alberto García Coria
Department of Computer Science
University of Salamanca
Salamanca, Spain

Mohd Saberi Mohamad
Department of Software Engineering
Universiti Teknologi Malaysia
Johor, Malaysia

Enrique Díaz-Plaza Sanz
Department of Computer Science,
School of Science
University of Salamanca
Madrid, Madrid, Spain

ISSN 2194-5357

ISSN 2194-5365 (electronic)

Advances in Intelligent Systems and Computing

ISBN 978-3-030-00523-8

ISBN 978-3-030-00524-5 (eBook)

<https://doi.org/10.1007/978-3-030-00524-5>

© Springer Nature Switzerland AG 2020

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 Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The International Conference on Distributed Computing and Artificial Intelligence (DCAI) is an annual forum that brings together ideas, projects, and lessons associated with distributed computing and artificial intelligence, and their application in different areas. Artificial intelligence is changing our society. Its application in distributed environments, such as Internet, electronic commerce, environment monitoring, mobile communications, wireless devices, distributed computing, to mention only a few, is continuously increasing, becoming an element of high added value with social and economic potential, in industry, quality of life and research. These technologies are changing constantly as a result of the large research and technical effort being undertaken in both universities and businesses.

This conference is a stimulating and productive forum where the scientific community can work toward future cooperation in distributed computing and artificial intelligence areas. Nowadays, it is continuing to grow and prosper in its role as one of the premier conferences devoted to the quickly changing landscape of distributed computing, artificial intelligence and the application of AI to distributed systems.

The last edition at its fifteenth DCAI conference held in Toledo, Spain, from June 20 to 22, 2018, involved the exchange of ideas and trends related to distributed computing, artificial intelligence and their application in order to provide efficient solutions to real problems. 15th International Conference on Distributed Computing and Artificial Intelligence's technical program presented both high quality and diversity, with contributions in well-established and evolving areas of research. More than 120 papers were submitted to main and special sessions tracks from over 20 different countries (Algeria, Angola, Austria, Brazil, Colombia, France, Germany, India, Italy, Japan, Netherland, Oman, Poland, Portugal, South Korea, Spain, Thailand, Tunisia, UK, and USA), representing a truly "wide area network" of research activity.

Moreover, DCAI'18 Special Sessions were a very useful tool in order to complement the regular program with new or emerging topics of particular interest to the participating community. Special sessions that emphasize on multidisciplinary and transversal aspects, such as Advances on Demand Response and Renewable

Energy Sources in Smart Grids (ADRESS), AI-driven methods for Multimodal Networks and Processes Modeling (AIMPM), Social Modelling of Ambient Intelligence in Large Facilities (SMAILF), Communications, Electronics and Signal Processing (CESP), Complexity in Natural and Formal Languages (CNFL), Web and Social Media Mining (WASMM), were especially encouraged. A specific session was also organized with the winning works of the IBM Hackathon Cogs for Good held at the headquarters of the Polytechnic University of Valencia, the University of Comillas and the University of Salamanca, organized by IBM.

We thank the sponsors (IBM, Indra, Viewnext, IEEE Systems Man and Cybernetics Society Spain) and the funding supporting of the project “IOTEC: Development of Technological Capacities around the Industrial Application of Internet of Things (IoT)”. 0123_IOTEC_3_E. Project financed with FEDER funds, Interreg Spain-Portugal (PocTep).”

Sigeru Omatu
Mohd Saberi Mohamad
Paulo Novais
Enrique Díaz-Plaza
Jose Alberto García Coria

Contents

Image Analysis for Privacy Assessment in Social Networks	1
Joaquín Taverner, Ramon Ruiz, Elena del Val, Carlos Díez, and Jose Alemany	
Rassel: Robot Assistant for the Elderly	5
Maite Giménez, Jaume Jordán, Javier Palanca, and Jaime Rincon	
Domestic Violence Prevention System	10
Samuel Gallego Chimeno, Joaquín Delgado Fernández, Sergio Márquez Sánchez, Pablo Pueyo Ramón, Óscar Mauricio Salazar Ospina, Marcel Vicente Muñoz, and Aarón González Hernández	
LOWG – Intelligent Monitorization System with Custom Alerts to Avoid the Home Basics Services Related Risk	15
Carlos Peiró González, Jose Eduardo Reinoso Andrade, Alejandro Fuster Baggetro, and Araceli Teruel Domenech	
Design Thinking for Social Challenges	20
Ana Gutiérrez Sanchis	
SiloMAS: A MAS for Smart Silos to Optimize Food and Water Consumption on Livestock Holdings	27
Sergio Marquez, Roberto Casado-Vara, Alfonso González-Briones, Javier Prieto, and Juan M. Corchado	
Intelligent Livestock Feeding System by Means of Silos with IoT Technology	38
Alfonso González-Briones, Roberto Casado-Vara, Sergio Márquez, Javier Prieto, and Juan M. Corchado	

**Cooperative Algorithm to Improve Temperature Control in Recovery
Unit of Healthcare Facilities** 49
Roberto Casado-Vara, Fernando De la Prieta, Sara Rodriguez,
Javier Prieto, and Juan M. Corchado

Author Index 63