

Advances in Soft Computing

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

Further volumes of this series can be found on our homepage: springer.com

Mieczysław A. Kłopotek, Sławomir T. Wierżchoń, Krzysztof Trojanowski (Eds.)
Intelligent Information Processing and Web Mining, 2006
ISBN 978-3-540-33520-7

Ashutosh Tiwari, Joshua Knowles, Erel Avineri, Keshav Dahal, Rajkumar Roy (Eds.)
Applications and Soft Computing, 2006
ISBN 978-3-540-29123-7

Bernd Reusch, (Ed.)
Computational Intelligence, Theory and Applications, 2006
ISBN 978-3-540-34780-4

Jonathan Lawry, Enrique Miranda, Alberto Bugarín Shoumei Li, María Á. Gil, Przemysław Grzegorzewski, Olgierd Hryniewicz,
Soft Methods for Integrated Uncertainty Modelling, 2006
ISBN 978-3-540-34776-7

Ashraf Saad, Erel Avineri, Keshav Dahal, Muhammad Sarfraz, Rajkumar Roy (Eds.)
Soft Computing in Industrial Applications, 2007
ISBN 978-3-540-70704-2

Bing-Yuan Cao (Ed.)
Fuzzy Information and Engineering, 2007
ISBN 978-3-540-71440-8

Patricia Melin, Oscar Castillo, Eduardo Gómez Ramírez, Janusz Kacprzyk, Witold Pedrycz (Eds.)
Analysis and Design of Intelligent Systems Using Soft Computing Techniques, 2007
ISBN 978-3-540-72431-5

Oscar Castillo, Patricia Melin, Oscar Montiel Ross, Roberto Sepúlveda Cruz, Witold Pedrycz, Janusz Kacprzyk (Eds.)
Theoretical Advances and Applications of Fuzzy Logic and Soft Computing, 2007
ISBN 978-3-540-72433-9

Katarzyna M. Węgrzyn-Wolska, Piotr S. Szczepaniak (Eds.)
Advances in Intelligent Web Mastering, 2007
ISBN 978-3-540-72574-9

Emilio Corchado, Juan M. Corchado, Ajith Abraham (Eds.)
Innovations in Hybrid Intelligent Systems, 2007
ISBN 978-3-540-74971-4

Marek Kurzynski, Edward Puchala, Michal Wozniak, Andrzej Zolnierak (Eds.)
Computer Recognition Systems 2, 2007
ISBN 978-3-540-75174-8

Van-Nam Huynh, Yoshiteru Nakamori, Hiroakira Ono, Jonathan Lawry, Vladik Kreinovich, Hung T. Nguyen (Eds.)
Interval / Probabilistic Uncertainty and Non-classical Logics, 2008
ISBN 978-3-540-77663-5

Ewa Pietka, Jacek Kawa (Eds.)
Information Technologies in Biomedicine, 2008
ISBN 978-3-540-68167-0

Didier Dubois, M. Asunción Lubiano, Henri Prade, María Angeles Gil, Przemysław Grzegorzewski, Olgierd Hryniewicz (Eds.)
Soft Methods for Handling Variability and Imprecision, 2008
ISBN 978-3-540-85026-7

Juan M. Corchado, Francisco de Paz, Miguel P. Rocha, Florentino Fernández Riverola (Eds.)
2nd International Workshop on Practical Applications of Computational Biology and Bioinformatics (IWPACBB 2008), 2009
ISBN 978-3-540-85860-7

Juan M. Corchado, Sara Rodríguez, James Llinas, José M. Molina (Eds.)
International Symposium on Distributed Computing and Artificial Intelligence 2008 (DCAI 2008), 2009
ISBN 978-3-540-85862-1

Juan M. Corchado, Dante I. Tapia, José Bravo (Eds.)
3rd Symposium of Ubiquitous Computing and Ambient Intelligence 2008, 2009
ISBN 978-3-540-85866-9

Juan M. Corchado, Dante I. Tapia,
José Bravo (Eds.)

3rd Symposium of Ubiquitous Computing and Ambient Intelligence 2008

Editors

Juan M. Corchado
Departamento de Informática y
Automática
Facultad de Ciencias
Universidad de Salamanca
Plaza de la Merced S/N
37008, Salamanca
Spain
E-mail: corchado@usal.es

José Bravo
Universidad de Castilla-La Mancha
Departamento de Tecnologías y
Sistemas de Información (UCLM)
Escuela Superior de Informática
Paseo de la Universidad, s/n
13071, Ciudad Real
Spain
E-mail: Jose.Bravo@uclm.es

Dante I. Tapia
Departamento de Informática y
Automática
Facultad de Ciencias
Universidad de Salamanca
Plaza de la Merced S/N
37008, Salamanca
Spain
E-mail: dantetapia@usal.es

ISBN 978-3-540-85866-9

e-ISBN 978-3-540-85867-6

DOI 10.1007/978-3-540-85867-6

Advances in Soft Computing

ISSN 1615-3871

Library of Congress Control Number: 2008933603

©2009 Springer-Verlag Berlin Heidelberg

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilm or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable for prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, 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.

Typeset & Cover Design: Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed in acid-free paper

5 4 3 2 1 0

springer.com

Preface

The Symposium on Ubiquitous Computing and Ambient Intelligence (UCAmI) began as a workshop held in 2003 in San Sebastián (Spain) under the Spanish Artificial Intelligence Conference. This event gathered 32 attendees and 18 papers were presented. The second edition, already as a Symposium, took place in Granada (Spain) under the first Spanish Computer Science Conference (CEDI). Later, in 2006, a second workshop was celebrated in Ciudad Real and, in 2007; the second Symposium was organized in Zaragoza by the CEDI conference. Now we continue to work on the organization of this event in Salamanca, a beautiful Spanish city.

The European Community and the Sixth and Seventh Framework Programs encourage researchers to explore the generic scope of the AmI vision. In fact, some researchers have a crucial role in this vision. Emile Aarts from Philips describes Ambient Intelligence as "the integration of technology into our environment, so that people can freely and interactively utilize it". This idea agrees with the proposal of Mark Weiser regarding the Ubiquitous Computing paradigm.

The UCAmI community tries to join experts around the world in order to promote collaborations and to put into practice studies for involving people into intelligent environments so that the "Everyday Computing" concept can be a reality. The UCAmI technical program includes 40 papers (31 long paper, 6 short paper and 3 doctoral consortium) selected from a submission pool of 56 papers, from 11 different countries. We thank the excellent work of the local organization members and also from the members of the Program Committee for their excellent reviewing work.

October 2008

Juan M. Corchado
José Bravo
Dante I. Tapia

Organization

General Co-chairs

Juan M. Corchado – University of Salamanca (Spain)
José Bravo – University of Castilla-La Mancha (Spain)
Dante I. Tapia – University of Salamanca (Spain)

Program Committee

José Bravo (Chairman) – University of Castilla-La Mancha (Spain)
Xavier Alamán – Autonomous University of Madrid (Spain)
Emilio S. Corchado – University of Burgos (Spain)
Mariano Alcañiz – Polytechnic University of Valencia (Spain)
Carlos Carrascosa – Polytechnic University of Valencia (Spain)
Cecilio Angulo – Polytechnic University of Catalonia (Spain)
Francisco J. Garijo – Telefónica I+D (Spain)
José M. Molina – University Carlos III of Madrid (Spain)
Francisco J. Ballesteros – Rey Juan Carlos University (Spain)
Yang Cai – Carnegie Mellon University (USA)
Rafael Corchuelo – University of Sevilla (Spain)
Jesús Favela – CICESE (Mexico)
Álvaro Herrero – University of Burgos (Spain)
Marcela Rodríguez – Autonomous University of Baja California (Mexico)
Pablo Vidales – Deutsche Telekom Laboratories (Germany)
Lidia Fuentes – University of Malaga (Spain)
Nuria Oliver – Microsoft Research (USA)
Juan A. Botía – University of Murcia (Spain)
Iñaki Vazquez – University of Deusto (Spain)
Carlos García – University Carlos III of Madrid (Spain)
Victor M. Gonzalez – University of Manchester (UK)
Cristina Pelayo – University of Oviedo (Spain)
Hani Hagrais – University of Essex (UK)
Günter Haring – University of Vienna (Austria)
Lourdes Borrajo – University of Vigo (Spain)
Antonio F. Gómez Skarmeta – University of Murcia (Spain)
Carlos Juiz – University of the Balearic Islands (Spain)
Soraya Kouadri Mostéfaoui – The Open University (UK)

Diego Gachet – European University of Madrid (Spain)
Isidro Laso – D.G. Information Society and Media (European Commission)
Diego López de Ipiña – University of Deusto (Spain)
Javier Jaen – Polytechnic University of Valencia (Spain)
Juan Carlos López – University of Castilla-La Mancha (Spain)
Ricardo J. Machado – University of Minho (Portugal)
Juan Pavón – Complutense University of Madrid (Spain)
Óscar Mayora – Create-Net (Italy)
René Meier – Trinity College Dublin (Ireland)
Bruno Baruque – University of Burgos (Spain)
Sergio Ochoa – University of Chile (Chile)
Francisco Moya – University of Castilla-La Mancha (Spain)

Organising Committee

Juan M. Corchado (Chairman) – University of Salamanca (Spain)
Dante I. Tapia (Cochairman) – University of Salamanca (Spain)
Juan F. De Paz – University of Salamanca (Spain)
Sara Rodríguez – University of Salamanca (Spain)
Javier Bajo – University of Salamanca (Spain)
Alberto Saavedra – Tulecom Solutions (Spain)
Óscar García – Tulecom Solutions (Spain)
Ramón Hervás – University of Castilla-La Mancha (Spain)
Aitor Mata – University of Salamanca (Spain)
Rosa Cano – University of Salamanca (Spain)
Cristian Pinzón – University of Salamanca (Spain)

Contents

A Framework for the Reconfiguration of Ubicomp Systems <i>Pau Giner, Carlos Cetina, Joan Fons, Vicente Pelechano</i>	1
HI³ Project: Software Architecture System for Elderly Care in a Retirement Home <i>A. Paz-Lopez, G. Varela, J. Monroy, S. Vazquez-Rodriguez, R.J. Duro</i> . . .	11
An Architecture for Secure Ambient Intelligence Environments <i>Daniel Serrano, Antonio Maña, Pedro Soria-Rodríguez, Ana Piñuela, Athanasios-Dimitrios Sotirious</i>	21
An Architecture for Ambient Intelligent Environments <i>Carlos Ramos</i>	30
A Hardware Based Infrastructure for Agent Protection <i>Antonio Muñoz, Antonio Maña</i>	39
Performance Evaluation of J2ME and Symbian Applications in Smart Camera Phones <i>Celeste Campo, Carlos García-Rubio, Alberto Cortés</i>	48
Extended Bluetooth Naming for Empowered Presence and Situated Interaction with Public Displays <i>Rui José, Francisco Bernardo</i>	57
Infrastructural Support for Ambient Assisted Living <i>Diego López-de-Ipiña, Xabier Laiseca, Ander Barbier, Unai Aguilera, Aitor Almeida, Pablo Orduña, Juan Ignacio Vazquez</i>	66
ALZ-MAS 2.0; A Distributed Approach for Alzheimer Health Care <i>Óscar García, Dante I. Tapia, Alberto Saavedra, Ricardo S. Alonso, Israel García</i>	76

Ambient Assisted Living

*Ricardo Costa, Davide Carneiro, Paulo Novais, Luís Lima,
José Machado, Alberto Marques, José Neves* 86

Quality of Service in Wireless e-Emergency: Main Issues and a Case-Study

Óscar Gama, Paulo Carvalho, J.A. Afonso, P.M. Mendes 95

Sentient Displays in Support of Hospital Work

Daniela Segura, Jesus Favela, Mónica Tentori 103

University Smart Poster: Study of NFC Technology Applications for University Ambient

Irene Luque Ruiz, Miguel Ángel Gómez-Nieto 112

Touching Services: The Tag-NFC Structure

*Gabriel Chavira, Salvador W. Nava, Ramón Hervás, Vladimir Villarreal,
José Bravo, Julio C. Barrientos, Marcos Azuara* 117

Interaction by Contact for Supporting Alzheimer Sufferers

*José Bravo, Carmen Fuentes, Ramón Hervás, Gregorio Casero,
Rocío Gallego, Marcos Vergara* 125

Secure Integration of RFID Technology in Personal Documentation for Seamless Identity Validation

Pablo Najera, Francisco Moyano, Javier Lopez 134

Semantic Model for Facial Emotion to Improve the Human Computer Interaction in AmI

*Isaac Lera, Diana Arellano, Javier Varona, Carlos Juiz,
Ramon Puigjaner* 139

Bridging the Gap between Services and Context in Ubiquitous Computing Environments Using an Effect- and Condition-Based Model

*Aitor Urbietta, Ekain Azketa, Inma Gomez, Jorge Parra,
Nestor Arana* 149

Modeling the Context-Awareness Service in an Aspect-Oriented Middleware for AmI

Lidia Fuentes, Nadia Gámez 159

An Agent-Based Component for Identifying Elders’ At-Home Risks through Ontologies

Marcela D. Rodríguez, Cecilia Curlango, Juan P. García-Vázquez 168

Risk Patient Help and Location System Using Mobile Technologies

Diego Gachet, Manuel de Buenaga, José C. Cortizo, Víctor Padrón 173

ATLINTIDA: A Robust Indoor Ultrasound Location System: Design and Evaluation	
<i>Enrique González, Laura Prados, Antonio J. Rubio, José C. Segura, Ángel de la Torre, José M. Moya, Pablo Rodríguez, José L. Martín</i>	180
Standard Multimedia Protocols for Localization in “Seamless Handover” Applications	
<i>Jorge Parra, Josu Bilbao, Aitor Urbietta, Ekain Azketa</i>	191
Location Based Services: A New Area for the Use of Super-Resolution Algorithms	
<i>Raúl O. González-Pacheco García, Manuel Felipe Cátedra Pérez</i>	201
Developing Ubiquitous Applications through Service-Oriented Abstractions	
<i>J. Antonio García-Macías, Edgardo Avilés-López</i>	210
Flexeo: An Architecture for Integrating Wireless Sensor Networks into the Internet of Things	
<i>Juan Ignacio Vazquez, Aitor Almeida, Iker Doamo, Xabier Laiseca, Pablo Orduña</i>	219
A Mobile Peer-to-Peer Network of CBR Agents to Provide e-Assistance	
<i>Eduardo Rodríguez, Daniel A. Rodríguez, Juan C. Burguillo, Vicente Romo</i>	229
An Ambient Assisted-Living Architecture Based on Wireless Sensor Networks	
<i>Javier Andréu, Jaime Viúdez, Juan A. Holgado</i>	239
HERMES: A FP7 Funded Project towards Computer-Aided Memory Management Via Intelligent Computations	
<i>Jianmin Jiang, Arjan Geven, Shaoyan Zhang</i>	249
Reinforcement Learning of Context Models for a Ubiquitous Personal Assistant	
<i>Sofia Zaidenberg, Patrick Reignier, James L. Crowley</i>	254
An Approach to Dynamic Knowledge Extension and Semantic Reasoning in Highly-Mutable Environments	
<i>Aitor Almeida, Diego López-de-Ipiña, Unai Aguilera, Iker Larizgoitia, Xabier Laiseca, Pablo Orduña, Ander Barbier</i>	265
Learning Accurate Temporal Relations from User Actions in Intelligent Environments	
<i>Asier Aztiria, Juan C. Augusto, Alberto Izaguirre, Diane Cook</i>	274

Advanced Position Based Services to Improve Accessibility <i>Celia Gutierrez</i>	284
PIViTa: Taxonomy for Displaying Information in Pervasive and Collaborative Environments <i>Ramón Hervás, Salvador W. Nava, Gabriel Chavira, Vladimir Villarreal, José Bravo</i>	293
Data Management in the Ubiquitous Meteorological Data Service of the America’s Cup <i>Eduardo Aldaz, Jose A. Mocholi, Glyn Davies, Javier Jaen</i>	302
A Proposal for Facilitating Privacy-Aware Applications in Active Environments <i>Abraham Esquivel, Pablo A. Haya, Manuel García-Herranz, Xavier Alamán</i>	312
People as Ants: A Multi Pheromone Ubiquitous Approach for Intelligent Transport Systems <i>Jorge Sousa, Carlos Bento</i>	321
A System of Cooperation Based on Ubiquitous Environments for Protection against Fires in Buildings <i>Clarissa López, Juan Botia</i>	326
CARM: Composable, Adaptive Resource Management System in Ubiquitous Computing Environments <i>Roberto Morales, Marisa Gil</i>	335
Mobile Habits: Inferring and Predicting User Activities with a Location-Aware Smartphone <i>Andrei Papliatseyeu, Oscar Mayora</i>	343
Author Index	353