

## **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

Yves Demazeau, Jörg P. Müller,  
Juan M. Corchado Rodríguez,  
and Javier Bajo Pérez (Eds.)

---

# Advances on Practical Applications of Agents and Multi-Agent Systems

10th International Conference on Practical  
Applications of Agents and Multi-Agent  
Systems

### *Editors*

Yves Demazeau  
Laboratoire d'Informatique de Grenoble  
Centre National de la Recherche Scientifique  
Maison Jean Kuntzmann  
Grenoble  
France

Juan M. Corchado Rodríguez  
Departamento de Informática y Automática  
Facultad de Ciencias  
Universidad de Salamanca  
Salamanca  
Spain

Prof. Dr. Jörg P. Müller  
Institut für Informatik  
Technische Universität Clausthal  
Clausthal-Zellerfeld  
Germany

Javier Bajo Pérez  
Escuela Universitaria de Informática  
Universidad Pontificia de Salamanca  
Salamanca  
Spain

ISSN 1867-5662

e-ISSN 1867-5670

ISBN 978-3-642-28785-5

e-ISBN 978-3-642-28786-2

DOI 10.1007/978-3-642-28786-2

Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2012933124

© Springer-Verlag Berlin Heidelberg 2012

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. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

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.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# Preface

Research on Agents and Multi-Agent Systems has matured during the last decade and many effective applications of this technology are now deployed. An international forum to present and discuss the latest scientific developments and their effective applications, to assess the impact of the approach, and to facilitate technology transfer, has become a necessity.

PAAMS, the International Conference on Practical Applications of Agents and Multi-Agent Systems is the international yearly tribune to present, to discuss, and to disseminate the latest developments and the most important outcomes related to real-world applications. It provides a unique opportunity to bring multidisciplinary experts, academics and practitioners together to exchange their experience in the development and deployment of agents and multi-agent systems.

This volume presents the papers that have been accepted for the 2012 edition of PAAMS. These articles report on the application and validation of agent-based models, methods, and technologies in a number of key application areas, including: Traffic, Transport and Logistics; E-Commerce, Knowledge Management, and Finance; Robotics and Sensory Networks; Energy and Environment; Social Systems; Trust and Security; and Manufacturing and Embedded Systems. Each paper submitted to PAAMS went through a stringent peer review by three members of the international committee composed of 94 internationally renowned researchers from 23 countries. From the 75 submissions received, 12 were selected for full presentation at the conference; another 11 papers were accepted as short presentations. A novelty at the 2012 edition of PAAMS has been the inclusion of a demonstration session featuring innovative and emergent applications of agent and multi-agent systems and technologies in real-world domains. 16 demonstrations were shown, and this volume contains a description of each of them.

We would like to thank all the contributing authors, the members of the Program Committee, the sponsors (IEEE Systems Man and Cybernetics Society Spain, AEPIA - Asociación Española para la Inteligencia Artificial, APPIA - Associação Portuguesa Para a Inteligência Artificial, CNRS - Centre National de

la Recherche Scientifique, AFIA (Association Française pour l'Intelligence Artificielle) and the Organizing Committee for their hard and highly valuable work. Their work has helped to contribute to the success of the PAAMS'12 event. Thanks for your help – PAAMS'12 would not exist without your contribution.

Yves Demazeau  
Jörg P. Müller  
PAAMS'12 Program Co-chairs

Juan M. Corchado Rodríguez  
Javier Bajo  
PAAMS'12 Organizing Co-chairs

# Organization

## General Co-chairs

Yves Demazeau	Centre National de la Recherche Scientifique, France
Jörg P. Müller	Technische Universität Clausthal, Germany
Juan M. Corchado	University of Salamanca, Spain
Javier Bajo	Pontifical University of Salamanca, Spain

## Advisory Board

Frank Dignum	Utrecht University, The Netherlands
Juan Pavón	Universidad Complutense de Madrid, Spain
Michal Pěchouček	Czech Technical University in Prague, Czech Republic

## Program Committee

Carole Adam	University of Grenoble, France
Frederic Amblard	University of Toulouse, France
Francesco Amigoni	Politecnico di Milano, Italy
Luis Antunes	University of Lisbon, Portugal
Javier Bajo	Pontifical University of Salamanca, Spain
Zbigniew Banaszak	Warsaw University of Technology, Poland
Jeremy Baxter	QinetiQ
Olivier Boissier	Ecole Nationale Supérieure des Mines de Saint Etienne, France
Magnus Boman	Royal Institute of Technology, KTH
Juan A. Botía	University of Murcia, Spain
Vicente Botti	Polytechnic University of Valencia, Spain
Lars Braubach	Universität Hamburg, Germany
Sven Brueckner	Jacobs Technology Inc., USA
Valerie Camps	University of Toulouse, France
Longbing Cao	University of Technology Sydney, Australia
Pierre Chevaillier	University of Brest, France
Juan Manuel Corchado	University of Salamanca, Spain
Helder Coelho	University of Lisbon, Portugal
Juan Manuel Corchado	University of Salamanca, Spain
Keith Decker	University of Delaware, USA
Yves Demazeau	Laboratoire d'Informatique de Grenoble, France

Frank Dignum	Utrecht University, The Netherlands
Virginia Dignum	TU Delft, The Netherlands
Klaus Dorer	DFKI, Germany
Alexis Drogoul	Institut de Recherche pour l Développement, Vietnam
Julie Dugdale	University of Grenoble, France
Edmund Durfee	University of Michigan, USA
Amal Elfallah	University of Paris 6, France
Torsten Eymann	University of Bayreuth, Germany
Maksims Fiosins	Clausthal University of Technology, Germany
Klaus Fischer	DFKI, Germany
Rubén Fuentes	University Computense de Madrid, Spain
Sylvain Giroux	University of Sherbrooke, Canada
Pierre Glize	University of Toulouse, France
Daniela Godoy	ISISTAN, Argentina
Vladimir Gorodetski	University of Saint Petersburg, Russia
Dominic Greenwood	Whitestein Technologies, Switzerland
Olivier Gutknecht	ACM, USA
Kasper Hallenborg	University of Southern Denmark, Denmark
Koen Hindriks	University of Delft, The Netherlands
Benjamin Hirsch	Technical University of Berlin
Martin Hofmann	Lockheed Martin, USA
Tom Holvoet	Catholic University of Leuven, Belgium
Shinichi Honiden	National Institute of Informatics Tokyo, Japan
Jomi Fred Hubner	Universidade Federal de Santa Catarina, Florianopolis
Michael Huhns	University of Southern Carolina, USA
Toru Ishida	University of Kyoto, Japan
Takayuki Ito	Massachusetts Institute of Technology, USA
Michal Jakob	Czech Technical University in Prague, Czech Republic
Catholijn Jonker	Delft University of Technology, Netherlands
Vicente Julian	Polytechnic University of Valencia, Spain
Achilles Kameas	University of Patras, Greece
Takahiro Kawamura	Toshiba, Japan
Matthias Klusch	DFKI, Germany
Franziska Kluegl	University of Örebro, Sweden
Martin Kollingbaum	University of Aberdeen, United Kingdom
Ryszard Kowalczyk	Swinburne University of Technology, Australia
Jaroslav Kozlak	University of Science and Technology in Krakow, Poland
Renato Levy	Intelligent Automation Inc., USA
Adolfo López Paredes	University of Valladolid, Spain
Beatriz López	Universitat de Girona, Spain
Zakaria Maamar	Zayed University, United Arab Emirates
Rene Mandiau	University of Valenciennes, France
Philippe Mathieu	University of Lille, France

Eric Matson	Purdue University, USA
Fabien Michel	University of Reims, France
José M. Molina	Universidad Carlos III de Madrid, Spain
Mirko Morandini	University of Trento, Italy
Jörg P. Müller	Clausthal University of Technology, Germany
Jean-Pierre Muller	CIRAD, France
Peter Novak	Czech Technical University in Prague, Czech Republic
Jeffrey O. Kephart	IBM, USA
Eugenio Oliveira	University of Porto, Portugal
Sascha Ossowski	University of Rey Juan Carlos, Spain
Van Parunak	New Vectors, USA
Juan Pavon	University Computense de Madrid, Spain
Michal Pechoucek	Czech Technical University, Czech Republic
Paolo Petta	University of Vienna, Austria
Michael Pirker	Siemens AG, Germany
Jeremy Pitt	Imperial College of London, United Kingdom
Juan Antonio Rodriguez Aguilar	Artificial Intelligence Research Institute, Spain
Partha S. Dutta	Rolls-Royce, United Kingdom
Silvia Schiaffino	ISISTAN, Argentina
Simon Thompson	British Telecom IIS Research Centre, United Kingdom
Paolo Torroni	University of Bologna, Italy
Rainer Unland	University of Duisburg, Germany
Domenico Ursino	University of Reggio Calabria, Italy
Jacques Verriet	Embedded Systems Institute, The Netherlands
Jiri Vokrinek	Czech Technical University in Prague, Czech Republic
Gerhard Weiss	University of Maastricht, The Netherlands
Danny Weyns	Linnaeus University, Sweden
Niek Wijngaards	Thales, D-CIS lab, The Netherlands
Gaku Yamamoto	IBM, Japan

## Organizing Committee

Juan M. Corchado (Chairman)	University of Salamanca, Spain
Javier Bajo (Co-Chairman)	Pontifical University of Salamanca, Spain
Juan F. De Paz	University of Salamanca, Spain
Sara Rodríguez	University of Salamanca, Spain
Dante I. Tapia	University of Salamanca, Spain
Fernando de la Prieta Pintado	University of Salamanca, Spain
Davinia Carolina Zato Domínguez	University of Salamanca, Spain

# Contents

## Keynote

<b>Language Grid Revisited: An Infrastructure for Intercultural Collaboration</b> . . . . .	1
<i>Toru Ishida, Yohei Murakami, Donghui Lin, Masahiro Tanaka, Rieko Inaba</i>	

## Regular Papers

<b>An Agent-Based Community to Manage Urban Parking</b> . . . . .	17
<i>Nesrine Bessghaier, Mahdi Zargayouna, Flavien Balbo</i>	
<b>Cooperative Ant Colony Optimization in Traffic Route Calculations</b> . . . .	23
<i>Rutger Claes, Tom Holvoet</i>	
<b>Using Agent Satisfiability to Identify and Explain Interactions among Independent Greenhouse Climate Control Requirements</b> . . . . .	35
<i>Jan Corfixen Sørensen, Bo Nørregaard Jørgensen, Yves Demazeau</i>	
<b>A Multi-Agent System for Industrial Fault Detection and Repair</b> . . . . .	47
<i>Vincenzo Bevar, Stefania Costantini, Arianna Tocchio, Giovanni De Gasperis</i>	
<b>A Virtual Selling Agent Which Is Proactive and Adaptive</b> . . . . .	57
<i>Fabien Delecroix, Maxime Morge, Jean-Christophe Routier</i>	
<b>A BDI Model for Component and Service-Based Systems: Self-OSGi</b> . . .	67
<i>Mauro Dragone</i>	
<b>Replicating Hofstede’s Cultured Negotiation</b> . . . . .	73
<i>João Graça, Helder Coelho</i>	

<b>Toward a Spatially-Centered Approach to Integrate Heterogeneous and Multi-scales Urban Component Models</b> . . . . .	81
<i>Ines Hassoumi, Christophe Lang, Nicolas Marilleau, Moncef Temani, Khaled Ghedira, Jean Daniel Zucker</i>	
<b>Combination of an Evolutionary Approach and Multi-agent Coalition in a Co-modal Transport System</b> . . . . .	87
<i>Karama Jeribi, Hinda Mejri, Hayfa Zgaya, Slim Hammadi</i>	
<b>Towards Parallel Real-Time Trajectory Planning</b> . . . . .	99
<i>Štěpán Kopřiva, David Šišlák, Michal Pěchouček</i>	
<b>Situation Patterns in Multi-Agent Systems for Solving Transportation Problems</b> . . . . .	109
<i>Jarostaw Koźlak, Sebastian Pisarski, Małgorzata Żabińska</i>	
<b>Traffic Behavioral Simulation in Urban and Suburban – Representation of the Drivers’ Environment</b> . . . . .	115
<i>Feirouz Ksontini, Stéphane Espié, Zahia Guessoum, René Mandiau</i>	
<b>Automated Generation of Various and Consistent Populations in Multi-Agent Simulations</b> . . . . .	127
<i>Benoit Lacroix, Philippe Mathieu</i>	
<b>An Applied Agent-Based Model for Path-Planning on a Mobile Device</b> . . . . .	139
<i>Teresa A. Shanklin, Benjamin Loulier, Eric T. Matson, J. Eric Dietz</i>	
<b>Virtual Customers in an Agent World</b> . . . . .	147
<i>Philippe Mathieu, David Panzoli, Sébastien Picault</i>	
<b>Non-invasive Estimation of Stress in Conflict Resolution Environments</b> . . . . .	153
<i>Paulo Novais, Davide Carneiro, Marco Gomes, José Neves</i>	
<b>A JaCaMo-Based Governance of Machine-to-Machine Systems</b> . . . . .	161
<i>Camille Persson, Gauthier Picard, Fano Ramparany, Olivier Boissier</i>	
<b>Evaluation of a Multi-Agent System for the Evolving of Domain Ontologies from Texts</b> . . . . .	169
<i>Zied Sellami, Valérie Camps</i>	
<b>Multitarget Flocking for Constrained Environments</b> . . . . .	181
<i>Armando Serrato Barrera, A. López-López, Gustavo Rodríguez Gómez</i>	
<b>Emotional Decision Making in Large Crowds</b> . . . . .	191
<i>Alexei Sharpanskykh, Kashif Zia</i>	

<b>Game Theoretical Adaptation Model for Intrusion Detection System . . .</b>	<b>201</b>
<i>Jan Stiborek, Martin Grill, Martin Rehak, Karel Bartos, Jan Jusko</i>	
<b>Distributed Optimization of Finite Resource Planning for Asynchronous and Non-linear Systems: Application to Power Management . . . . .</b>	<b>211</b>
<i>Rafael J. Valdivieso-Sarabia, Francisco J. Ferrandez-Pastor, Juan M. Garcia-Chamizo</i>	
<b>An Agent Based Trust Management System for Multi-Agent Based Virtual Communities . . . . .</b>	<b>217</b>
<i>Reda Yaich, Olivier Boissier, Gauthier Picard, Philippe Jaillon</i>	
<b>Demo Papers</b>	
<b>An Agent-Based Augmented Reality Demonstrator in the Domestic Energy Domain . . . . .</b>	<b>225</b>
<i>Sebastian Ahrndt, Johannes Fährndrich, Marco Lützenberger, Andreas Rieger, Sahin Albayrak</i>	
<b>Weight Optimization of Aircraft Harnesses . . . . .</b>	<b>229</b>
<i>Stéphanie Combettes, Thomas Sontheimer, Sylvain Rougemaille, Pierre Glize</i>	
<b>A Virtual Selling Agent Which Is Proactive and Adaptive: Demonstration . . . . .</b>	<b>233</b>
<i>Fabien Delecroix, Maxime Morge, Jean-Christophe Routier</i>	
<b>Demonstrator of a Multi-Agent System for Industrial Fault Detection and Repair . . . . .</b>	<b>237</b>
<i>Giovanni De Gasperis, Vincenzo Bevar, Stefania Costantini, Arianna Tocchio, Alessio Paolucci</i>	
<b>Demo: A BDI Model for Component and Service-Based Systems: Self-OSGi . . . . .</b>	<b>241</b>
<i>Mauro Dragone</i>	
<b>Group Coordination for Agent-Oriented Urban Traffic Management . . .</b>	<b>245</b>
<i>Jana Görmer, Jörg P. Müller</i>	
<b>A Driver Ego-Centered Environment Representation in Traffic Behavioral Simulation . . . . .</b>	<b>249</b>
<i>Feirouz Ksontini, Stéphane Espié, Zahia Guessoum, René Mandiau</i>	
<b>ROSACE: Agent-Based Systems for Dynamic Task Allocation in Crisis Management . . . . .</b>	<b>255</b>
<i>Jérôme Lacouture, José Manuel Gascueña, Marie-Pierre Gleizes, Pierre Glize, Francisco J. Garijo, Antonio Fernández-Caballero</i>	

<b>ANTE: Agreement Negotiation in Normative and Trust-Enabled Environments</b> .....	261
<i>Henrique Lopes Cardoso, Joana Urbano, Pedro Brandão, Ana Paula Rocha, Eugénio Oliveira</i>	
<b>Graphical Configuration of Agent-Based Warehouse Management and Control Systems</b> .....	265
<i>Hsuan Lorraine Liang, Jacques Verriet, Roelof Hamberg, Bruno van Wijngaarden</i>	
<b>Introducing ATOM</b> .....	269
<i>Philippe Matheiu, Olivier Brandouy</i>	
<b>An Immersion into a Multi-agent Store Simulation</b> .....	273
<i>Philippe Mathieu, David Panzoli, Sébastien Picault</i>	
<b>Incorporating Stress Estimation into User-Centred Agent-Based Platforms</b> .....	277
<i>Paulo Novais, Davide Carneiro, José Neves</i>	
<b>DYNAMO-MAS: A Multi-Agent System for Building and Evolving Ontologies from Texts</b> .....	283
<i>Zied Sellami, Valérie Camps</i>	
<b>Demonstration of Multitarget Flocking for Constrained Environments</b> .....	287
<i>Armando Serrato Barrera, A. López-López, Gustavo Rodríguez Gómez</i>	
<b>Game Theoretical Adaptation Model for Intrusion Detection System - Demo Paper</b> .....	291
<i>Jan Stiborek, Martin Grill, Martin Rehak, Karel Bartos, Jan Jusko</i>	
<b>Author Index</b> .....	295