

Lecture Notes in Artificial Intelligence 7455

Subseries of Lecture Notes in Computer Science

LNAI Series Editors

Randy Goebel

University of Alberta, Edmonton, Canada

Yuzuru Tanaka

Hokkaido University, Sapporo, Japan

Wolfgang Wahlster

DFKI and Saarland University, Saarbrücken, Germany

LNAI Founding Series Editor

Joerg Siekmann

DFKI and Saarland University, Saarbrücken, Germany

Iyad Rahwan Wayne Wobcke Sandip Sen
Toshiharu Sugawara (Eds.)

PRIMA 2012: Principles and Practice of Multi-Agent Systems

15th International Conference
Kuching, Sarawak, Malaysia, September 3-7, 2012
Proceedings

 Springer

Series Editors

Randy Goebel, University of Alberta, Edmonton, Canada
Jörg Siekmann, University of Saarland, Saarbrücken, Germany
Wolfgang Wahlster, DFKI and University of Saarland, Saarbrücken, Germany

Volume Editors

Iyad Rahwan
Masdar Institute of Science and Technology
P.O. Box 54224, Abu Dhabi, United Arab Emirates
E-mail: irahwan@masdar.ac.ae

Wayne Wobcke
University of New South Wales, School of Computer Science and Engineering
Sydney NSW 2052, Australia
E-mail: wobcke@cse.unsw.edu.au

Sandip Sen
University of Tulsa, Tandy School of Computer Science
Rayzor Hall, 3155 East 5th Place, Tulsa, OK 74104, USA
E-mail: sandip-sen@utulsa.edu

Toshiharu Sugawara
Waseda University, Department of Computer Science and Engineering
3-4-1 Okubo, Shinjuku, Tokyo 169-8555, Japan
E-mail: sugawara@waseda.jp

ISSN 0302-9743

e-ISSN 1611-3349

ISBN 978-3-642-32728-5

e-ISBN 978-3-642-32729-2

DOI 10.1007/978-3-642-32729-2

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012944271

CR Subject Classification (1998): I.2.11, I.2.6, I.2.8, D.2, K.4.4, H.3.4, H.5.3, J.2

LNCS Sublibrary: SL 7 – Artificial Intelligence

© Springer-Verlag Berlin Heidelberg 2012

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, re-use of illustrations, recitation, broadcasting, reproduction on microfilms 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 to 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.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

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

Preface

PRIMA, the International Conference on Principles and Practice of Multi-Agent Systems, aims to be the premier forum for work contributing to the practice of engineering intelligent agent and multi-agent systems. The overarching objectives are to improve understanding of agent technology, identify and promote emerging application areas, encourage theoretical work that can be readily applied in practical settings, and increase uptake of agent technology by industry.

PRIMA 2012, the 15th International Conference on Principles and Practice of Multi-Agent Systems, was held in Kuching, Sarawak, Malaysia, during September 3–7, 2012. The conference was hosted by MIMOS Berhad, and co-located with PRICAI 2012 (12th Pacific Rim International Conference on Artificial Intelligence), DC 2012 (DCMI International Conference on Dublin Core and Metadata Applications) and PKAW 2012 (Pacific Rim Knowledge Acquisition Workshop).

PRIMA 2012 received 42 submissions from 18 countries, of which 17 (40%) were accepted as full papers for inclusion in the proceedings. Submissions were subject to a rigorous review process: papers were reviewed by three members of the Programme Committee, authors could then provide a “rebuttal” to these reviews, after which Senior Programme Committee members coordinated discussion on the papers to provide a recommendation.

We would first like to thank all those who submitted papers to PRIMA 2012. Special thanks to the Programme Committee members for their detailed reviews completed in a timely manner, and the Senior Programme Committee for their considered judgements and recommendations on the papers. We are confident that this process has resulted in a high quality diverse conference programme. Thanks also to EasyChair for the use of their conference management system to facilitate this complex process and the preparation of these proceedings.

PRIMA 2012 featured two invited talks, from Michael Wellman (“Empirical Game-Theoretic Analysis for Practical Strategic Reasoning”) and Elisabeth André (“Pathways Towards More Empathetic Human-Agent Interactions: Synergies and Challenges”), which were both widely appreciated.

We would like to thank MIMOS Berhad, and especially Dickson Lukose, for the enormous effort involved in organizing the three co-located conferences and associated workshops, not least in dealing with several organizing committees.

Finally, we would like to acknowledge the Sarawak Convention Bureau, the Special Interest Group on Multi-Agent and Cooperative Computation of the Japan Society for Software Science and Technology, the University of Tulsa and the University of New South Wales for financial support.

September 2012

Iyad Rahwan
Wayne Wobcke
Sandip Sen
Toshiharu Sugawara

Organization

PRIMA 2012 was hosted by MIMOS Berhad, and was held in Kuching, Sarawak, Malaysia, during September 3–7, 2012.

Conference Committee

General Co-chairs

Sandip Sen	University of Tulsa, USA
Toshiharu Sugawara	Waseda University, Japan

Program Committee Co-chairs

Iyad Rahwan	Masdar Institute, UAE and MIT, USA
Wayne Wobcke	University of New South Wales, Australia

Local Arrangements Chairs

Dickson Lukose	MIMOS Berhad, Malaysia
Cheah Wai Shiang	Universiti Malaysia Sarawak, Malaysia

Workshop Chairs

Sherief Abdallah	British University in Dubai, UAE and University of Edinburgh, UK
Hiroimitsu Hattori	Kyoto University, Japan

Tutorial Chair

Edith Elkind	Nanyang Technological University, Singapore
--------------	---

Publicity Chairs

Jacob Crandall	Masdar Institute, UAE and MIT, USA
Koen Hindriks	Delft University of Technology, The Netherlands

Sponsorship Chairs

Longbing Cao	University of Technology, Sydney, Australia
Matthias Klusch	DFKI Saarbruecken, Germany
Sarvapali Ramchurn	University of Southampton, UK
Jie Zhang	Nanyang Technological University, Singapore

Senior Program Committee

Carlos Chesñevar	Universidad Nacional del Sur, Argentina
Stephen Cranefield	University of Otago, New Zealand
Frank Dignum	Utrecht University, The Netherlands
Guido Governatori	NICTA, Australia
Katsutoshi Hirayama	Kobe University, Japan
Kate Larson	University of Waterloo, Canada
Rey-Long Liu	Tzu Chi University, Taiwan
Alessio Lomuscio	Imperial College London, UK
Andrea Omicini	Alma Mater Studiorum - Università di Bologna, Italy
Adrian Pearce	University of Melbourne, Australia
Jeremy Pitt	Imperial College London, UK
David Pynadath	University of Southern California, USA
Alex Rogers	University of Southampton, UK
Paolo Torroni	Alma Mater Studiorum - Università di Bologna, Italy

Program Committee

Francesco Belardinelli (UK)	Churn-Jung Liao (Taiwan)
Guido Boella (Italy)	Jyi-Shane Liu (Taiwan)
Ioana Boureanu (Switzerland)	Maite López-Sánchez (Spain)
Gauvain Bourgne (Japan)	Xudong Luo (China)
Stefano Bromuri (Switzerland)	Sunilkumar Manvi (India)
Nils Bulling (Germany)	Shigeo Matsubara (Japan)
Dídac Busquets (UK)	Toshihiro Matsui (Japan)
Arthur Carvalho (Canada)	Nicolas Maudet (France)
Shih-Fen Cheng (Singapore)	Felipe Meneguzzi (Brazil)
Maria Chli (UK)	Tsunenori Mine (Japan)
Amit Chopra (Italy)	Ambra Molesini (Italy)
Hoa Khanh Dam (Australia)	Yohei Murakami (Japan)
Mehdi Dastani (The Netherlands)	Yuu Nakajima (Japan)
Yves Demazeau (France)	Hideyuki Nakanishi (Japan)
Virginia Dignum (The Netherlands)	Brendan Neville (UK)
Christopher Geib (UK)	Mariusz Nowostawski (New Zealand)
Aditya Ghose (Australia)	Nir Oren (UK)
Greg Hines (UK)	Wojciech Penczek (Poland)
Reiko Hishiyama (Japan)	Duy Hoang Pham (Vietnam)
Wan-Rong Jih (Taiwan)	Hongyang Qu (UK)
Ozgur Kafali (Turkey)	Franco Raimondi (UK)
Yasuhiko Kitamura (Japan)	Alessandro Ricci (Italy)
Rama Kota (UK)	Juan Rodríguez-Aguilar (Spain)
Kazuhiro Kuwabara (Japan)	Antonino Rotolo (Italy)
Ho-Pun Lam (Australia)	Michael Rovatsos (UK)
Joao Leite (Portugal)	Yuko Sakurai (Japan)

Tony Savarimuthu (New Zealand)
Murat Sensoy (UK)
Mei Si (USA)
Guillermo Simari (Argentina)
Insu Song (Australia)
Sebastian Stein (UK)
Gita Sukthankar (USA)
Birna van Riemsdijk
(The Netherlands)

Leon van der Torre (Luxembourg)
Wamberto Vasconcelos (UK)
Serena Villata (France)
Merixell Vinyals (Italy)
Gerhard Weiss (The Netherlands)
Leelani Wickramasinghe (Australia)
Stefan Witwicki (Portugal)
Feng Wu (China)
Neil Yorke-Smith (Lebanon)

Additional Reviewers

Siqi Chen (The Netherlands)
Christos Dimitrakakis (Switzerland)
Alejandro Garcia (Argentina)
Ana Carolina Olivera (Argentina)

David Sanderson (UK)
Julia Schaumeier (UK)
Luciano Tamargo (Argentina)

Table of Contents

Foundations

Coalitional Public Announcement Games	1
<i>Thomas Ágotnes and Hans van Ditmarsch</i>	
Probabilistic Model Checking Multi-agent Behaviors in Dispersion Games Using Counter Abstraction	16
<i>Jianye Hao, Songzheng Song, Yang Liu, Jun Sun, Lin Gui, Jin Song Dong, and Ho-fung Leung</i>	
Debugging Is Explaining	31
<i>Koen V. Hindriks</i>	

Auctions and Negotiation

An Efficient Negotiation Protocol to Achieve Socially Optimal Allocation	46
<i>Jianye Hao and Ho-fung Leung</i>	
Reassignment-Based Strategy-Proof Mechanisms for Interdependent Task Allocation	61
<i>Ayman Ghoneim</i>	
Mechanism for Robust Procurements	77
<i>Yingqian Zhang and Sicco Verwer</i>	
Auction-Based Strategies for the Open-System Patrolling Task	92
<i>Cyril Poulet, Vincent Corruble, and Amal El Fallah Seghrouchni</i>	

Coalition Formation and Teamwork

A Decentralized Multi-agent Algorithm for the Set Partitioning Problem	107
<i>Gerrit Anders, Florian Siefert, Jan-Philipp Steghöfer, and Wolfgang Reif</i>	
Two-Sided Parameter Learning of Role Selections for Efficient Team Formation	122
<i>Dai Hamada and Toshiharu Sugawara</i>	
Distributed Search Method with Bounded Cost Vectors on Multiple Objective DCOPs	137
<i>Toshihiro Matsui, Marius Silaghi, Katsutoshi Hirayama, Makoto Yokoo, and Hiroshi Matsuo</i>	

Norms and Institutions

Analysis of Opinion Spread through Migration and Adoption in Agent Communities 153
Feyza Merve Hafızoğlu and Sandip Sen

From Green Norms to Policies – Combining Bottom-Up and Top-Down Approaches 168
Bastin Tony Roy Savarimuthu, Lam-Son Lê, and Aditya Ghose

An Adaptive Witness Selection Method for Reputation-Based Trust Models 184
Han Yu, Zhiqi Shen, and Bo An

Provision and Appropriation of Common-Pool Resources without Full Disclosure 199
Jeremy Pitt and Julia Schaumeier

Applications

Effect of Anticipatory Stigmergy on Decentralized Traffic Congestion Control 214
Takayuki Ito, Ryo Kanamori, Jun Takahashi, Ivan Marsa Maestre, and Enrique de la Hoz

Modeling a Surveillance Network Based on Unit Disk Graph Technique – Application for Monitoring the Invasion of Insects in Mekong Delta Region 228
Viet Xuan Truong, Hiep Xuan Huynh, Minh Ngoc Le, and Alexis Drogoul

Author Index 243