

Lecture Notes in Artificial Intelligence

6614

Edited by R. Goebel, J. Siekmann, and W. Wahlster

Subseries of Lecture Notes in Computer Science

Peter McBurney Iyad Rahwan
Simon Parsons (Eds.)

Argumentation in Multi-Agent Systems

7th International Workshop, ArgMAS 2010
Toronto, ON, Canada, May 10, 2010
Revised, Selected and Invited Papers

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

Peter McBurney
King's College London, Department of Informatics, Strand Building S6.04
The Strand, London WC2R 2LS, UK
E-mail: peter.mcburney@kcl.ac.uk

Iyad Rahwan
Masdar Institute
P.O. Box 54224, Abu Dhabi, United Arab Emirates
E-mail: irahwan@acm.org

Simon Parsons
City University of New York, Brooklyn College
Department of Computer and Information Science
2900 Bedford Avenue, Brooklyn, NY 11210, USA
E-mail: parsons@sci.brooklyn.cuny.edu

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-21939-9 e-ISBN 978-3-642-21940-5
DOI 10.1007/978-3-642-21940-5
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011929700

CR Subject Classification (1998): I.2, I.2.11, C.2.4, F.4.1, H.4, H.3

LNCS Sublibrary: SL 7 – Artificial Intelligence

© Springer-Verlag Berlin Heidelberg 2011

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

This volume contains revised versions of the papers presented at the seventh edition of the International Workshop on Argumentation in Multi-Agent Systems, (ArgMAS 2010), held in Toronto, Canada, in association with the 9th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS 2010) in May 2010. Previous ArgMAS workshops have been held in New York City, USA (2004), Utrecht, The Netherlands (2005), Hakodate, Japan (2006), Honolulu, USA (2007), Estoril, Portugal (2008) and Budapest, Hungary (2009). The event is now a regular feature on the international calendar for researchers in computational argument and dialectics in multi-agent systems. Toronto will be remembered by many as the ash-cloud workshop, as travel plans for many people were disrupted by ash from the Icelandic volcano, Eyjafjallajökull.

A brief word to explain these topics is in order. Different agents within a multi-agent system (MAS) potentially have differential access to information and different capabilities, different beliefs, different preferences and desires, and different goals. A key aspect of the scientific and engineering study of multi-agent systems therefore has been the development of methods and procedures for identifying, assessing, reconciling, arbitrating between, managing, and mitigating such differences. Market mechanisms and voting procedures are two methods for dealing with these differences. Argumentation is another. Argumentation can be understood as the formal interaction of different arguments for and against some conclusion (e.g., a proposition, an action intention, a preference, etc.). An agent may use argumentation techniques to perform individual reasoning for itself alone, in order to resolve conflicting evidence or to decide between conflicting goals it may have. Two or more agents may also jointly use dialectical argumentation to identify, express and reconcile differences between themselves, by means of interactions such as negotiation, persuasion, inquiry and joint deliberation.

In recent years, formal theories of argument and argument interaction have been proposed and studied, and this has led to the study of computational models of argument. The ArgMAS series of workshops has focused on computational argumentation within the context of agent reasoning and multi-agent systems. The ArgMAS workshops are of interest to anyone studying or applying: default reasoning in autonomous agents; single-agent reasoning and planning under uncertainty; strategic single-agent reasoning in the context of potential competitor actions; and the rational resolution of the different beliefs and intentions of multiple agents within multi-agent systems. There are close links between these topics and other topics within the discipline of autonomous agents and multi-agent systems, particularly: agent communications languages and protocols; game theory; AI planning; logic programming; and human-agent interaction.

The papers in this volume were selected for inclusion in the ArgMAS 2010 workshop following a peer-review process undertaken by anonymous reviewers,

resulting in 14 papers being selected for inclusion in the workshop. We thank all authors who made submissions to ArgMAS 2010, and we thank the members of the Program Committee listed here for their efforts in reviewing the papers submitted. We also thank the two reviewers of the paper submitted by two of the co-editors who undertook their reviews anonymously through a process of indirection, arranged and decided by the third co-editor. As for the 2009 workshop, we tasked official pre-chosen respondents to provide short, prepared critiques to a number of the papers presented at the workshop. This innovation was borrowed from conferences in philosophy, where it is standard, and we found that it works very well. The comments of respondents, who each knew of their assignment ahead of time and so could make a careful reading of their assigned paper, better focused the discussions at the workshop, and led to improvements in the quality of the revised papers later published here. This volume also contains a paper from the invited keynote speaker at the workshop, prominent argumentation-theorist and philosopher David Hitchcock of McMaster University, Hamilton, Ontario, Canada. His talk explored some of the philosophical issues behind decisions over actions, and led to a lively debate at the workshop. We were honored by Professor Hitchcock's participation, and we thank him for giving the keynote address.

As in collections of papers at previous ArgMAS workshops, we have also invited several papers from the main AAMAS Conference of relevance to argumentation in multi-agent systems. There are three invited papers here: a paper by David Grossi entitled "Argumentation in the View of Modal Logic"; a paper by Nabila Hadidi, Yannis Dimopoulos, and Pavlos Moraitis, entitled "Argumentative Alternating Offers"; and a paper by Matthias Thimm and Alejandro J. García entitled, "On Strategic Argument Selection in Structured Argumentation Systems." Apart from Professor Hitchcock's invited paper, papers in this volume are listed alphabetically by first author within three topic areas: Practical Reasoning and Reasoning About Action; Applications; and Theoretical Aspects of Argumentation.

We hope that you enjoy reading this collection.

February 2011

Peter McBurney
Iyad Rahwan
Simon Parsons

Organization

Program Chairs

Peter McBurney	King's College London, UK
Iyad Rahwan	Masdar Institute, Abu Dhabi, UAE
	MIT, USA
Simon Parsons	Brooklyn College, City University of New York, USA

ArgMAS Steering Committee

Antonis Kakas	University of Cyprus, Cyprus
Nicolas Maudet	Université Paris Dauphine, France
Peter McBurney	King's College, London, UK
Pavlos Moraitis	Paris Descartes University, France
Simon Parsons	Brooklyn College, City University of New York, USA
Iyad Rahwan	Masdar Institute, Abu Dhabi, UAE
	MIT, USA
Chris Reed	University of Dundee, UK

Program Committee

Leila Amgoud	IRIT, France
Katie Atkinson	University of Liverpool, UK
Jamal Bentahar	Laval University, Canada
Elizabeth Black	Oxford University, UK
Guido Boella	Università di Torino, Italy
Carlos Chesnevar	Universitat de Lleida, Spain
Frank Dignum	Utrecht University, The Netherlands
Yannis Dimopoulos	University of Cyprus, Cyprus
Sylvie Doutre	IRIT, Toulouse, France
Rogier van Eijk	Utrecht University, The Netherlands
Anthony Hunter	University College, London, UK
Antonis Kakas	University of Cyprus, Cyprus
Nikos Karacapilidis	University of Patras, Greece
Nicolas Maudet	Université Paris Dauphine, France
Peter McBurney	University of Liverpool, UK
Jarred McGinnis	Royal Holloway, University of London, UK
Sanjay Modgil	King's College London, UK

VIII Organization

Pavlos Moraitis	Paris Descartes University, France
Tim Norman	University of Aberdeen, UK
Nir Oren	King's College London, UK
Fabio Paglieri	ISTC-CNR, Rome, Italy
Simon Parsons	City University of New York, USA
Enric Plaza	Spanish Scientific Research Council, Spain
Henri Prade	IRIT, Toulouse, France
Henry Prakken	Utrecht University, The Netherlands
Iyad Rahwan	Masdar Institute, UAE
	MIT, USA
Chris Reed	University of Dundee, UK
Michael Rovatsos	University of Edinburgh, UK
Guillermo Simari	Universidad Nacional del Sur, Argentina
Francesca Toni	Imperial College, London, UK
Leon van der Torre	University of Luxembourg, Luxembourg
Paolo Torroni	Università di Bologna, Italy
Gerard Vreeswijk	Utrecht University, The Netherlands
Douglas Walton	University of Winnipeg, Canada
Simon Wells	University of Dundee, UK
Michael Wooldridge	University of Liverpool, UK

Table of Contents

Part I: Practical Reasoning and Argument about Action

Instrumental Rationality	1
<i>David Hitchcock</i>	
Agreeing What to Do.....	12
<i>Elizabeth Black and Katie Atkinson</i>	
A Formal Argumentation Framework for Deliberation Dialogues	31
<i>Eric M. Kok, John-Jules Ch. Meyer, Henry Prakken, and Gerard A.W. Vreeswijk</i>	
Empirical Argumentation: Integrating Induction and Argumentation in MAS	49
<i>Santiago Ontañón and Enric Plaza</i>	
Arguing about Preferences and Decisions.....	68
<i>T.L. van der Weide, F. Dignum, J.-J.Ch. Meyer, H. Prakken, and G.A.W. Vreeswijk</i>	

Part II: Applications

On the Benefits of Argumentation-Derived Evidence in Learning Policies	86
<i>Chukwuemeka David Emele, Timothy J. Norman, Frank Guerin, and Simon Parsons</i>	
Argumentative Alternating Offers	105
<i>Nabila Hadidi, Yannis Dimopoulos, and Pavlos Moraitis</i>	
On a Computational Argumentation Framework for Agent Societies	123
<i>Stella Heras, Vicente Botti, and Vicente Julián</i>	
Towards a Dialectical Approach for Conversational Agents in Selling Situations.....	141
<i>Maxime Morge, Sameh Abdel-Naby, and Bruno Beaufls</i>	
Reasoning about Trust Using Argumentation: A position paper	159
<i>Simon Parsons, Peter McBurney, and Elizabeth Sklar</i>	

Part III: Theoretical Aspects

An Argument-Based Multi-agent System for Information Integration ... <i>Marcela Capobianco and Guillermo R. Simari</i>	171
Argumentation in the View of Modal Logic <i>Davide Grossi</i>	190
Towards Pragmatic Argumentative Agents within a Fuzzy Description Logic Framework <i>Ioan Alfred Letia and Adrian Groza</i>	209
Dynamic Argumentation in Abstract Dialogue Frameworks <i>M. Julieta Marcos, Marcelo A. Falappa, and Guillermo R. Simari</i>	228
Argumentation System Allowing Suspend/Resume of an Argumentation Line <i>Kenichi Okuno and Kazuko Takahashi</i>	248
Computing Argumentation in Polynomial Number of BDD Operations: A Preliminary Report <i>Yuqing Tang, Timothy J. Norman, and Simon Parsons</i>	268
On Strategic Argument Selection in Structured Argumentation Systems <i>Matthias Thimm and Alejandro J. García</i>	286
Preference-Based Argumentation Capturing Prioritized Logic Programming <i>Toshiko Wakaki</i>	306
Author Index	327