

Lecture Notes in Artificial Intelligence 2296

Subseries of Lecture Notes in Computer Science

Edited by J. G. Carbonell and J. Siekmann

Lecture Notes in Computer Science

Edited by G. Goos, J. Hartmanis and J. van Leeuwen

Springer

Berlin

Heidelberg

New York

Barcelona

Hong Kong

London

Milan

Paris

Tokyo

Barbara Dunin-Kęplich Edward Nawarecki (Eds.)

From Theory to Practice in Multi-Agent Systems

Second International Workshop of Central and Eastern
Europe on Multi-Agent Systems, CEEMAS 2001
Cracow, Poland, September 26-29, 2001
Revised Papers



Springer

Series Editors

Jaime G. Carbonell, Carnegie Mellon University, Pittsburgh, PA, USA
Jörg Siekmann, University of Saarland, Saarbrücken, Germany

Volume Editors

Barbara Dunin-Kępłicz
Warsaw University
Institute of Informatics
ul. Banacha 2, 02-097 Warsaw, Poland
E-mail: keplicz@mimuw.edu.pl
Edward Nawarecki
University of Mining and Metallurgy
Department of Computer Science
al. Mickiewicza 30, 30-059 Krakow, Poland
E-mail: nawar@agh.edu.pl

Cataloging-in-Publication Data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

From theory to practice in multi-agent systems : revised papers / Second
International Workshop of Central and Eastern Europe on Multi-Agent Systems,
CEEMAS 2001, Cracow, Poland, September 26 - 29, 2001. Barbara Dunin-Kępłicz
;
Edward Nawarecki (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ;
London ; Milan ; Paris ; Tokyo : Springer, 2002
(Lecture notes in computer science ; Vol. 2296 : Lecture notes
in artificial intelligence)
ISBN 3-540-43370-8

CR Subject Classification (1998): I.2.11, C.2.4, D.2, H.5.3, I.2

ISSN 0302-9743

ISBN 3-540-43370-8 Springer-Verlag Berlin Heidelberg New York

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-Verlag. Violations are liable for prosecution under the German Copyright Law.

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

<http://www.springer.de>

© Springer-Verlag Berlin Heidelberg 2002
Printed in Germany

Typesetting: Camera-ready by author, data conversion by PTP-Berlin, Stefan Sossna
Printed on acid-free paper SPIN 10846424 06/3142 5 4 3 2 1 0

Preface

This volume contains the papers selected for presentation at CEEMAS 2001. The workshop was the fourth in a series of international conferences devoted to autonomous agents and multi-agent systems organized in Central-Eastern Europe. Its predecessors were CEEMAS'99 and DAIMAS'97, which took place in St. Petersburg, Russia, as well as DIMAS'95, which took place in Cracow, Poland.

Organizers of all these events made efforts to make them wide-open to participants from all over the world. This would have been impossible without some help from friendly centers in the Czech Republic, England, France, Japan, and The Netherlands.

DIMAS'95 featured papers from 15 countries, while CEEMAS'99 from 18 countries. A total of 61 papers were submitted to CEEMAS 2001 from 17 countries. Out of these papers, 31 were selected for regular presentation, while 14 were qualified as posters.

The motto of the meeting was "Diversity is the core of multi-agent systems". This variety of subjects was clearly visible in the CEEMAS 2001 program, addressing the following major areas of multi-agent systems:

- Organizations and social aspects of multi-agent systems
- Agent and multi-agent system architectures, models, and formalisms
- Communication languages, protocols, and negotiation
- Applications of multi-agent systems
- Agent and multi-agent development tools
- Theoretical foundations of Distributed AI
- Learning in multi-agent systems

The richness of workshop subjects was ensured thanks to the CEEMAS 2001 contributing authors as well as the keynote speakers. We would like to thank Jeffrey Bradshaw (University of West Florida, USA), Toru Ishida (Kyoto University, Japan), Nick Jennings (University of Southampton, UK), Andrzej Skowron (Warsaw University, Poland), and Krzysztof Zieliński (University of Mining and Metallurgy, Poland) for presenting invited talks announcing the most recent trends in multi-agent technology.

Special thanks are due to the members of the Program Committee, aided by auxiliary reviewers, for their professionalism and guidance in the process of selecting papers for the workshop.

Nothing would have been possible without the initiative and dedication of the Organizing Committee at the University of Mining and Metallurgy and the Jagiellonian University.

Finally, we would like to acknowledge the role of the workshop sponsors: the Rectors of the University of Mining and Metallurgy and the Jagiellonian University, as well as AgentLink.

January 2002

Barbara Dunin-Kępicz
Edward Nawarecki

CEEMAS 2001

Second International Workshop of Central and Eastern Europe on Multi-Agent Systems,
Cracow, Poland, 26–29 September 2001

Under the auspices of

JM Rectors of the University of Mining and Metallurgy and Jagiellonian University

Chairpersons

Edward Nawarecki (Poland) *chair*
Barbara Dunin-Keplicz (Poland) *program co-chair*
Yves Demazeau (France) *co-chair*
Vladimir Gorodetski (Russia) *co-chair*

Program Committee

Stanisław Ambroszkiewicz (Poland)	Jean-Luc Koning (France)
Magnus Boman (Sweden)	Abder Koukam (France)
Hans-Dieter Burkhard (Germany)	Vladimir Marik (Czech Republic)
Cristiano Castelfranchi (Italy)	Pierre Massotte (France)
Krzysztof Cetnarowicz (Poland)	Antoni Mazurkiewicz (Poland)
Pierre Deschizeaux (France)	John W. Perram (Denmark)
Grzegorz Dobrowolski (Poland)	Lech Polkowski (Poland)
Aldo Dragoni (Italy)	Joel Quinqueton (France)
Love Ekenberg (Sweden)	Leszek Rutkowski (Poland)
Mariusz Flasiński (Poland)	Robert Schaefer (Poland)
Adina M. Florea (Romania)	Carles Sierra (Spain)
Piotr Gmytrasiewicz (USA)	Andrzej Skowron (Poland)
Adam Grzech (Poland)	Alexander Smirnov (Russia)
Gregory O'Hare (Ireland)	Vilem Srovnal (Czech Republic)
Wiebe van der Hoek (The Netherlands)	Vadim Stefanuk (Russia)
Toru Ishida (Japan)	József Vancza (Hungary)
Nick Jennings (UK)	Rineke Verbrugge (The Netherlands)

Auxiliary reviewers

Markus Hannebauer (Germany), Marek Kisiel-Dorohinicki (Poland),
Igor Kotenko (Russia), Johan Kummeneje (Sweden), Xudong Luo (UK),
Mirjam Minor (Germany), Sebastian Müller (Germany), Kay Schröter (Germany)

Sponsored by

AgentLink, European Commission's IST-funded Network of Excellence for Agent-Based Computing

Table of Contents

Invited Papers

Approximate Reasoning by Agents <i>A. Skowron</i>	3
Network Services in Context of Pervasive Mobile Internet <i>K. Zieliński</i>	15

Regular Papers

On BAN Logics for Industrial Security Protocols <i>N. Agray, W. van der Hoek, E. de Vink</i>	29
A Concept of Agent Language in Agentspace <i>S. Ambroszkiewicz, T. Nowak, D. Mikulowski, L. Rozwadowski</i>	37
Agent's Adaptivity – Some Aspects of Theoretical Foundations of a Neural Agent Training Process <i>A. Bielecki</i>	47
Mobie: Personalized Automated Recharge of Prepaid Mobile Phones <i>J. Burgett, S. Hussain, C.M. Jonker, A. Razaq, K. Silz</i>	54
A Formal Specification of M-Agent Architecture <i>K. Cetnarowicz, P. Gruer, V. Hilaire, A. Koukam</i>	62
Multi-agent System for Flexible Manufacturing Systems Management <i>K. Cetnarowicz, J. Koźlak</i>	73
Motivational Attitudes of Agents: On Desires, Obligations, and Norms <i>F. Dignum, D. Kinny, L. Sonenberg</i>	83
On Commitments, Roles, and Obligations <i>M. Fasli</i>	93
Automata-Based Multi-agent Model as a Tool for Constructing Real-Time Intelligent Control Systems <i>M. Flasiński</i>	103
Rascal – A Resource Manager for Multi Agent Systems in Smart Spaces <i>K. Gajos</i>	111
Software Development Kit for Multi-agent Systems Design and Implementation <i>V. Gorodetski, O. Karsayev, I. Kotenko, A. Khabalov</i>	121

VIII Table of Contents

Formal Semantics for Behavioural Substitutability of Agent Components: Application to Interaction Protocols <i>N. Hameurlain</i>	131
A Modelling Environment for Mind and Matter Aspects of Intentional Behaviour <i>C.M. Jonker, J. Treur, W.C.A. Wijngaards</i>	141
Temporal Languages for Simulation and Analysis of the Dynamics within an Organisation <i>C.M. Jonker, J. Treur, W.C.A. Wijngaards</i>	151
Syntactic Pattern Recognition-Based Agents for Real-Time Expert Systems <i>J. Jurek</i>	161
Learning User Preferences in Multi-agent System <i>A. Kiss, J. Quinqueton</i>	169
Towards Requirements Analysis for Autonomous Agent Behaviour <i>S.W. de Lioncourt, M. Luck</i>	179
Messages, Clock, and Gravitation <i>A. Mazurkiewicz, D. Wróblewski</i>	187
An Improved Q-Learning Algorithm Using Synthetic Pheromones <i>N. Monekosso, P. Remagnino, A. Szarowicz</i>	197
Organisations in the Particular Class of Multi-agent Systems <i>E. Nawarecki, M. Kisiel-Dorohinicki, G. Dobrowolski,</i>	207
UML for Behavior-Oriented Multi-agent Simulations <i>C. Oechslein, F. Klügl, R. Herrler, F. Puppe</i>	217
Robot Disassembly Process Using Multi-agent System <i>A. Pavliska, V. Srovnal</i>	227
CPlanT: An Acquaintance Model-Based Coalition Formation Multi-agent System <i>M. Pechoucek, V. Marik, J. Barta</i>	234
Efficient Model Checking of Causal-Knowledge Protocols <i>W. Penczek</i>	242
Volcano, a Vowels-Oriented Multi-agent Platform <i>P.-M. Ricordel, Y. Demazeau</i>	253
Model of Cooperation in Multi-agent Systems with Fuzzy Coalitions <i>J.C. Romero Cortés, L.B. Sheremetov</i>	263
Learning Collective Behaviour from Local Interactions <i>N. Sabouret, J.-P. Sansonnet</i>	273
MAS Oriented Patterns <i>S. Sauvage</i>	283

Multi-agent Architecture for Knowledge Fusion from Distributed Sources <i>A. Smirnov, M. Pashkin, N. Chilov, T. Levashova</i>	293
Universal Formal Model of Collective Intelligence and Its IQ Measure <i>T. Szuba</i>	303
A Programming Language for Coordinating Group Actions <i>W. de Vries, F.S. de Boer, K.V. Hindriks, W. van der Hoek, J.-J.C. Meyer</i>	313
Optimization of Resource Allocation in Distributed Production Networks <i>O. Zaikin, A. Dolgui, P. Korytkowski</i>	322
Utility-Based Role Exchange <i>X. Zhang, H. Hexmoor</i>	332
Author Index	341