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Paul Davidsson Brian Logan
Keiki Takadama (Eds.)

Multi-Agent and Multi-Agent-Based Simulation

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Revised Selected Papers

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Jaime G. Carbonell, Carnegie Mellon University, Pittsburgh, PA, USA
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Volume Editors

Paul Davidsson
Blekinge Institute of Technology
Department of Systems and Software Engineering
37225 Ronneby, Sweden
E-mail: Paul.Davidsson@bth.se

Brian Logan
University of Nottingham
School of Computer Science and IT
Jubilee Campus, Wollaton Road, Nottingham NG8 1BB, UK
E-mail: bsl@cs.nott.ac.uk

Keiki Takadama
Tokyo Institute of Technology
Interdisciplinary Graduate School of Science and Engineering
Dept. of Computational Intelligence and Systems Science
4259 Nagatsuta-cho, Midori-ku, Yokohama, 226-8502 Japan
E-mail: keiki@dis.titech.ac.jp

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Preface

This volume presents revised and extended versions of selected papers presented at the Joint Workshop on Multi-Agent and Multi-Agent-Based Simulation, a workshop federated with the 3rd International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS 2004), which was held in New York City, USA, July 19–23, 2004. The workshop was in part a continuation of the International Workshop on Multi-Agent-Based Simulation (MABS) series. Revised versions of papers presented at the four previous MABS workshops have been published as volumes 1534, 1979, 2581, and 2927 in the Lecture Notes in Artificial Intelligence series.

The aim of the workshop was to provide a forum for work in both applications of multi-agent-based simulation and the technical challenges of simulating large multi-agent systems (MAS). There has been considerable recent progress in modelling and analyzing multi-agent systems, and in techniques that apply MAS models to complex real-world systems such as social systems and organizations. Simulation is an increasingly important strand that weaves together this work. In high-risk, high-cost situations, simulations provide critical cost/benefit leverage, and make possible explorations that cannot be carried out in situ:

- Multi-agent approaches to simulating complex systems are key tools in interdisciplinary studies of social systems. Agent-based social simulation (ABSS) research simulates and synthesizes social behavior in order to understand real social systems with properties of self-organization, scalability, robustness, and openness.
- In the MAS community, simulation has been applied to a wide range of MAS research and design problems, from models of complex individual agents employing sophisticated internal mechanisms to models of large-scale societies of relatively simple agents which focus more on the interactions between agents.
- For the simulation community, MAS-based approaches provide a new way of organizing and managing large-scale simulations, e.g., Grid-based simulations, and agent simulation presents a challenging new domain requiring the development of new theory and techniques.

The workshop concerned agent simulation construed broadly, from multi-agent approaches to simulating complex systems, to the simulation of part or all of a multi-agent system and the hard technical issues of multi-agent simulation itself. Contemporary directions in both MABS and MAS research present significant challenges to existing simulation tools and methods, such as concepts and tools for modelling complex social systems and environments; scalability (to thousands or millions of large-grain agents); heterogeneity of simulation components and modelled agents; visualization and steering of simulation behavior;

validation of models and results; human-in-the-loop issues; and more. The workshop provided a forum for social scientists, agent researchers and developers, and simulation researchers to assess the current state of the art in the modelling and simulation of social systems and MAS, identify where existing approaches can be successfully applied, learn about new approaches, and explore future research challenges.

We are very grateful to the workshop participants who engaged enthusiastically in the discussions at the workshop, as well as to the authors' engagement in the second round of review and revision of the papers. We would like to thank Franco Zambonelli, the AAMAS 2004 workshop chair, for having selected the workshop among a large number of high-class proposals. We are also grateful to Nick Jennings and Milind Tambe, the AAMAS 2004 general chairs, for having organized such an excellent conference. Particularly, we would like to express our gratitude to Simon Parsons and Elizabeth Sklar, the AAMAS 2004 local organization chairs, for arranging the infrastructure of the workshop.

Finally, we thank Alfred Hofmann and his team at Springer for giving us the opportunity to continue to disseminate the results of the workshop to a broader audience.

Paul Davidsson, Brian Logan, and Keiki Takadama

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