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Gerhard Weiß (Ed.)

# Distributed Artificial Intelligence Meets Machine Learning

## Learning in Multi-Agent Environments

ECAI'96 Workshop LDAIS
Budapest, Hungary, August 13, 1996
ICMAS'96 Workshop LIOME
Kyoto, Japan, December 10, 1996
Selected Papers

Springer

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# Preface

The intersection of distributed artificial intelligence and machine learning constitutes a relatively young but important area of research that has received steadily increasing attention in the past years. The reason for this attention is largely based on the insight that the complexity of the systems studied in distributed artificial intelligence often makes it extremely difficult or even impossible to correctly and completely specify their behavioral repertoires and their dynamics. It is therefore broadly agreed that these systems should be equipped with the ability to learn, that is, to improve their future performance on their own. This book documents current and ongoing developments in the area of learning in distributed artificial intelligence systems.

The book contains selected, revised, and extended versions of sixteen papers that were first presented at two related workshops held at the Twelfth European Conference on Artificial Intelligence (ECAI-96, Budapest, Hungary, August 11–16, 1996) and the Second International Conference on Multiagent Systems (ICMAS-96, Kyoto, Japan, December 9–13, 1996). These were the ECAI-96 workshop on "Learning in Distributed Artificial Intelligence Systems" (LDAIS) and the ICMAS-96 workshop on "Learning, Interaction, and Organization in Multiagent Environments" (LIOME). Additionally, the book contains the invited talk by Munindar Singh and Michael Huhns presented at the LDAIS workshop and a Reader's Guide. Forty-one papers were submitted to these two workshops, from nine different countries: fifteen from Japan, nine from the USA, five from Germany, four from the UK, two each from Spain, Italy, and Switzerland, and one each from Romania and Sweden. Each paper submitted to the LDAIS or the LIOME workshop was reviewed by at least two experts. Twenty-five of the submitted papers were accepted for presentation at the workshops, and sixteen of them were selected for subsequent publication in this book. The purpose of both workshops was to bring together researchers and practitioners with an active interest in both distributed artificial intelligence and machine learning, and to serve as a forum for discussing existing work, exchanging expertise, and developing new ideas and perspectives. Further information on these workshops and their organization is provided on the following pages.

The papers included in this book reflect the broad spectrum of learning in distributed artificial intelligence systems and the progress made in this area. It is my hope that this book will serve as a valuable source of information and inspiration for the reader, and that it will lead to further development and progress in this fascinating area.

**Acknowledgements.** I would like to thank all the people who contributed to these workshops and thereby made this book possible at all. I am particularly grateful to the committee members of both workshops for their advice and review activities, to the additional reviewers, to Munindar Singh and Michael Huhns for giving an invited talk at the LDAIS workshop, to the speakers for presenting their work, to the workshop attendees for their interest, and to the authors

for their willingness to prepare revised and extended versions of their workshop contributions. The LIOME workshop would not have been possible without the commitment and engagement of Hiroshi Ishiguro. Last not least, I am indebt to Alfred Hofmann of Springer-Verlag for his assistance and support during the whole book project.

February 1997 Gerhard Weiß

# Organization of the ECAI-96 Workshop on Learning in Distributed Artificial Intelligence Systems (LDAIS)

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| Thomas Haynes | University of Tulsa, USA |
| Tuomas Sandholm | University of Massachusetts at Amherst, USA |
| Ming Tan | GTE Laboratories Inc., USA |
| Moshe Tennenholtz | Technion - Israel Institute of Technology, Israel |

## Invited Speakers

Munindar Singh (North Carolina State University, USA) and Michael Huhns (University of South Carolina, USA), "Challenges for Machine Learning in Cooperative Information Systems"

# Organization of the ICMAS-96 Workshop on Learning, Interaction and Organization in Multiagent Environments (LIOME)

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