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Agent-Mediated Knowledge Management

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Preface

In this book, we present a collection of papers around the topic of Agent-Mediated Knowledge Management. Most of the papers are extended and improved versions of work presented at the symposium on Agent-Mediated Knowledge Management held during the AAAI Spring Symposia Series in March 2003 at Stanford University.

The aim of the Agent-Mediated Knowledge Management symposium was to bring together researchers and practitioners of the fields of KM and agent technologies to discuss the benefits, possibilities and added-value of cross-fertilization.

Knowledge Management (KM) has been a predominant trend in business in recent years. Not only is Knowledge Management an important field of application for AI and related techniques, such as CBR technology for intelligent lessons-learned systems, it also provides new challenges to the AI community, like, for example, context-aware knowledge delivery. Scaling up research prototypes to real-world solutions usually requires an application-driven integration of several basic technologies, e.g., ontologies for knowledge sharing and reuse, collaboration support like CSCW systems, and personalized information services. Typical characteristics to be dealt with in such an integration are:

- manifold, logically and physically dispersed actors and knowledge sources,
- different degrees of formalization of knowledge,
- different kinds of (Web-based) services and (legacy) systems,
- conflicts between local (individual) and global (group or organizational) goals.

Agent approaches have already been successfully employed in KM for many partial solutions within the overall picture: agent-based workflow, cooperative information gathering, intelligent information integration, and personal information agents are established techniques in this area. In order to cope with the inherent complexity of a more comprehensive solution, Agent-Mediated Knowledge Management (AMKM) deals with collective aspects of the domain in an attempt to cope with the conflict between the desired order and the actual behavior in dynamic environments. AMKM introduces a social layer that structures the society of agents by defining specific roles and possible interactions between them.

This workshop set the scene for the assessment of the challenges that Agent-Mediated Knowledge Management faces as well as the opportunities it creates. By focusing on agent-mediated interactions, specialists from different disciplines were brought together in a lively and inquisitive environment that provided nice interactions and debates. The main topics for the workshop were:

- collaboration and P2P support,
- agent-based community support,
- agent models for knowledge and organizations,

- context and personalization,
- ontologies and the Semantic Web,
- agents and knowledge engineering.

Besides extended versions of workshop presentations, this volume includes an introductory chapter, and papers originating from the invited talk and from discussion sessions at the symposium. The result is that this volume contains high-quality papers that really can be called representative of the field at this moment.

This volume starts with an introduction to the Agent-Mediated Knowledge Management topic. The paper provides an extended motivation and an overview of research and current developments in the field. The remainder of the volume has been arranged according to the topics listed above.

The first section contains four papers on collaboration and peer-to-peer support. The first paper in this section by Bonifacio et al. proposes a P2P architecture for distributed KM. Graesser et al. discuss the results of a study on the benefits for KM from intelligent interfaces, namely animated conversational agents. The third paper by Guizzardi et al. presents Help&Learn, an agent-based peer-to-peer helpdesk system to support extra-class interactions among students and teachers. The section ends with a paper by Ehrig et al. suggesting a concise framework for evaluation of P2P-based Knowledge Management systems.

The second section contains three papers on agent-based community support. The first paper by Schulz et al. presents a conceptual framework for trust-based agent-mediated knowledge exchange in mobile communities. Kayama and Okamoto examine knowledge management and representation issues for the support of collaborative learning. The last paper in this section, by Moreale and Watt, describes a mailing list tool, based on the concept of a mailing list assistant.

The third section is devoted to agent models for knowledge and organizations. Filipe discusses the coordination and representation of social structures based on using the EDA agent model for normative agents, combined with the notion of an information field. Lawless looks at the fundamental relations between the generation of information and knowledge, with agent organizations, decision-making, trust, cooperation, and competition. The third paper, by Furtado and Machado, describes an AMKM system for knowledge discovery in databases. Hui et al. report on experience using RDF to provide a rich content language for use with FIPA agent toolkits. The paper by Magalhaes and Lucena, describing a multiagent architecture for tool generation for document classification, closes this section.

The fourth section, on context and personalization, starts with a paper by Louçã who presents a multiagent model to support decision-making in organizations. Novak et al. introduce an agent-based approach to semantic exploration and knowledge discovery in large information spaces. The paper by Evans et al. looks at the use of agents to identify and filter relevant context information in information domains. The section ends with a paper by Blanzieri et al., presenting the concept of implicit culture for personal agents in KM.

The fifth section contains four papers that focus on ontologies and the Semantic Web. Cao and Gandon discuss the benefits of societies of agents in a corporate semantic web. Krueger et al. look at ways to fully realize the potential of the Semantic Web, by automatically upgrading information sources with semantic markup. Hassan investigates interfaces to harness knowledge from heterogeneous knowledge assets. Cassin et al. present an architecture for extracting structured information from raw Web pages and describe techniques for extracting ontological meaning from structured information. The paper by Toivonen and Helin presents a DAML ontology for describing interaction protocols. The last paper in this section, by Petrie et al., discusses the benefits of agent technology to the development of Web services.

The last section of the book contains six papers related to agent and knowledge engineering. The first paper, by Furtado et al., studies the relationship between agent technology, knowledge discovery in databases, and knowledge management. The paper by Molani et al. describes an approach to capture strategic dependencies in organizational settings in order to support the elicitation of requirements for KM systems. Bailin and Truszkowski discuss the role of perspective in conflicts in agent communities. The paper by Tacla and Barthès concerns a multiagent system for knowledge management in R&D projects. Pease and Li introduce a system for collaborative open ontology production. Finally, the paper by Doderio et al. describes an agent-based architecture to support knowledge production and sharing.

We want to conclude this preface by extending our thanks to the members of the program committee of the AMKM workshop and to the additional reviewers who carefully read all submissions and provided extensive feedback on all submissions. We also want to thank all authors who were not only willing to submit their papers to our workshop and rework them for this book, but in addition contributed by their lively participation in a spontaneously organized peer review process.

September 2003

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