These are the proceedings of the 8th International Workshop on Multi Agent Systems Technologies (MATES 2010), held during 27–29 September in Leipzig, collocated with the 40th Annual Conference of the Gesellschaft fur Informatik e.V. (GI).

The main aim of the MATES conference series consists in bringing together researchers from around the world and providing a fruitful discussion basis for exchanging ideas and sharing the latest scientific results. Since its inception in 2003, MATES has been collocated with mainstream software engineering conferences like the NetObjectDays as well as with the German Artificial Intelligence Conference (KI) and has thus strived to address the full range of agent research topics from practical applications and tools for agent technology to the theoretical foundations of multi-agent systems. In addition to the broad range of topics covered by MATES, special areas of interest (hot topics) within the field of multi-agent systems have been identified in recent years and have influenced the conferences.

Multi-agent systems are communities of problem-solving entities that can perceive and act upon their environment in order to achieve both their individual goals and their joint goals. The work on such systems integrates many technologies and concepts from artificial intelligence and other areas of computing as well as other disciplines. In recent years, the agent paradigm has gained popularity, due to its applicability to a full spectrum of domains, such as search engines, recommendation systems, educational support, e-procurement, simulation and routing, electronic commerce and trade, etc.

These proceedings feature 18 regular papers (from a total of 34 papers submitted), as well as abstracts of two invited talks, given by Felix Brandt (TU München) and Michal Pechouček (Czech Technical University in Prague).

Felix Brandt considered in his talk Tournament Solutions and Their Applications to Multiagent Decision Making the important problem of decision-making in multiagent systems. There are several broad areas, such as adversarial, collective, or coalitional decision making that have gained interest in the past years. It was shown in the talk how tournament solution concepts, based on binary dominance relations, can be applied. The overview was accompanied by a complexity analysis.

Michal Pechouček talked about Research Challenges in Simulation Aided Design of Complex Multi-Agent Systems, based on joint research with Michal Jacob. In recent years more and more complex systems and infrastructures accompany and interact with us. These systems are based on complex networks with mutual interactions and feedbacks, giving rise to dynamic, non-linear emergent behavior. The following open research challenges were discussed during the talk: (i) automated construction, calibration, and synchronization of the
simulation models, ii) scalability and fidelity of the simulation, (iii) introduction of mixed-mode simulation, and (iv) development and rapid prototyping support.

The regular papers of MATES 2010 have been classified in the following categories/sessions, in the order of their presentation at the conference.

**Models and Specifications:** This session consists of three papers. The first paper, by Inmaculada Ayala, Mercedes Amor, and Lidia Fuentes, “A Model Driven Development of Platform-Neutral Agents,” considers the problem of automatic transformation of software agent designs into implementations for different agent platforms. More specifically, they transform a particular agent metamodel into Malaca.

The second paper, by Mohamed Amin Laouadi, Farid Mokhati, and Hassina Seridi presents “A Novel Formal Specification Approach for Real Time Multi-Agent System Functional Requirements.” The idea is to translate extended AUML diagrams describing RTMAS’ functional requirements into a RT-Maude specification. This approach combines the advantages of the graphical modeling formalism Agent UML and the formal specification language RT-Maude.

The last paper in this session, by Joost Broekens, Maaike Harbers, Koen Hindriks, Karel van den Bosch, Catholijn Jonker, and John-Jules Meyer, “Do You Get It? User-Evaluated Explainable BDI Agents,” was about explaining to humans the behavior of autonomous agents. This is important for e.g., disaster training, tutor and pedagogical systems, agent development and debugging, gaming, and interactive storytelling.

**Trust, Norms, and Reputation:** We have three papers in this session. Miriam Heitz, Stefan König, and Torsten Eymann consider trust and reputation mechanisms in their paper “Reputation in Multi Agent Systems and the Incentives to Provide Feedback.” Many transactions on the Internet are subject to fraud and cheating, so there is a need for incentive mechanisms to get users to report their experiences honestly.

Natalia Criado, Estefania Argente, and Vicent Botti extend BDI architectures by norms in “Normative Deliberation in Graded BDI Agents.” This is done by adding both a recognition and a normative context so that agents can use norms in their decision making.

Roberto Centeno, Holger Billhardt, and Sascha Ossowski treat a similar problem in their paper “Inducing Desirable Behavior through an Incentives Infrastructure”: How can one make sure that heterogenous agents, possibly built on different platforms, act in a certain manner? The authors introduce an incentive infrastructure to formulate agents’ preferences.

**Models, Tools, and Architectures:** In the first paper of this session, “SONAR/OREDI: A Tool for Creation and Deployment of Organization Models” by Michael Köhler-Bußmeier and Endri Deliu, a middleware concept for support of organizational teamwork is discussed using Sonar, a Petri-net based specification formalism for multi-agent organizations.
Christian Hahn, Sven Jacobi, and David Raber in their paper “Enhancing the Interoperability between Multiagent Systems and Service-Oriented Architectures through a Model-Driven Approach” present a model-driven approach for the integration of service-oriented architectures and multi-agent systems and provide a real-world industry scenario showing the relevance of their approach.

The final paper in this session, by Alexander Pokahr, Lars Braubach, and Kai Jander, titled “Unifying Agent and Component Concepts - Jadex Active Components,” discusses a new software concept called active components, a system architecture for them, and an implementation in the Jadex Active Component Infrastructure.

Applications I: There are three papers in this session. The first paper by Ferdi Grootenboers, Mathijs de Weerdt, and Mahdi Zargayouna, titled “Impact of Competition on Quality of Service in Demand Responsive Transit” deals with enhancing the QoS of transportation companies offering demand-responsive transportation. The authors set up a multi-agent environment to simulate the assignment of rides to companies through an auction on QoS and the inserting of rides using an online optimization tool, showing that in this way service can be improved, while costs only increased moderately. Stefano Bromuri, Michael Schumacher, and Kostas Stathis in their contribution “Towards Distributed Agent Environments for Pervasive Healthcare” show how by applying the concept of agent environment, a pervasive GRID can be defined for roaming agents that monitor continuously the health status of patients.

Finally, Adriaan ter Mors, Cees Witteveen, Jonne Zutt, and Fernando Kuipers in their paper “Context-Aware Route Planning” show how conflict resolution in multi-agent traffic applications can be shifted from resolution during plan execution to resolution during the planning phase. They discuss a planning method where each agent is aware of the results of route planning by other agents.

Coordination and Learning: The first contribution is this session is the paper “Social Conformity and Its Convergence for Reinforcement Learning” by Juan A. Garcia-Pardo, Jose Soler, and Carlos Carrascosa. In this paper a social reinforcement mechanism is discussed that allows agents to adapt better to environmental changes. Here, social reinforcement enables an agent to take into account the opinion of other agents on its actions. The convergence of the approach is shown and the authors show that socially aware agents adapt better than traditional agents.

The second paper “Colypan: A peer-to-Peer Architecture for a Project Management Collaborative Learning System” by Hanaa Mazyad and Insaf Tnzefiti-Kerkeni also deals with learning. Here, the authors focus on a project based learning environment where a multi-agent system supported by a peer-to-peer networking infrastructure constitutes a truly collaborative learning environment.

In the third paper titled “Preference Generation for Autonomous Agents,” Umair Rafique and Shell Ying Huang deal with the problem of learning
preferences. They discuss a preference generation method that allows an agent to learn new preferences about an object based on its existing preferences about similar objects.

In the last paper of this session Robert Junges and Franziska Klügl deal with learning in a very general setting. In their paper “Agent Architectures for a Learning-Driven Modeling Methodology in Multiagent Simulation,” they introduce a learning-driven methodology that exploits learning architectures for generating suggestions for agent behavior models based on a given environmental model. They discuss several criteria that such a suitable learning agent architecture must fulfill.

Applications II: We have two papers in this second session about applications of multi-agent systems. First, Juan M. Alberola, Ana Garcia-Fornes, and Agustín Espinosa in their paper “Price Prediction in Sports Betting Markets” discuss an agent approach where an agent participates in the sport market focusing on the task of learning the price movements in order to make predictions of future prices. The agent then tries to identify and learn pattern price movements in order to predict the price movements of new events using an underlying case based reasoning system.

In their paper “Modelling Distributed Network Security in a Petri Net and Agent-Based Approach,” Simon Adameit, Tobias Betz, Lawrence Cabac, Florian Hars, Marcin Hewelt, Michael Köhler-Bußmeier, Daniel Moldt, Dimitri Popov, José Quenum, Axel Theilmann, Thomas Wagner, Timo Warms, and Lars Wüstenberg discuss an approach aiming to provide a novel way of handling and managing distributed network security through the means of agent-based software. Their model is based on the Paose (Petri net-based and agent-oriented software engineering) software development approach of the Herold research project. This project aims to provide a novel way of handling and prototyping distributed network security.

We thank all the authors of submissions for MATES 2010 for submitting papers and for revising their contributions to be included in these proceedings. We are very grateful to the members of the MATES 2010 steering committee, program committee, and the additional reviewers. Their service ensured the high quality of the accepted papers.

A special thank-you goes to the local organizers in Leipzig for their help and support. We are very grateful to them for handling the registration and a very enjoyable social program. A special thank-you to Mrs. Alexandra Gerstner for her continual and enduring support and availability in all organizational matters.

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