Recent years have seen growing research interests in multi-agent systems. More and more contemporary technological challenges require distributed dynamical systems as a solution paradigm. Multi-agent systems are considered to be an excellent solution for these challenges of today’s society, including electronic markets, robots, sensor systems, etc. As agent-based systems get larger and more complex, there is a compelling need for agents to learn and adapt to their dynamic environments. Indeed, how to control, coordinate and optimize adaptive multi-agent systems is one of the emerging multi-disciplinary research areas today. Such systems are often deployed in real-world situations with stochastic environments where agents have limited perception and communication capabilities. Furthermore, in a number of distributed domains without centralized control, different agents will have different behaviours, capabilities, learning strategies, etc. There is a pressing need, then, to both, study and develop the convergence of multiple learners using the same learning scheme as well as understand the emergent dynamics of multiple learners with varying learning schemes.

Whereas research in machine learning involving single agents is as old as the field of computational intelligence itself, interest in studying the techniques for and dynamics of multiple concurrent learners began around mid 1990’s. To encourage discussion and research on these issues, a workshop on “Adaptation and Learning in Multi-agent Systems” was organized in association with IJCAI-95 in Montreal, Canada. Since then a number of workshops and symposia have been held on the topic and several journal special issues have also been published. It is particularly heartening for us to note that research papers on agent and multi-agent learning are a regular feature in most major AI and machine learning conferences including AAAI, IJCAI, ICML, AAMAS, NIPS, etc. Several satellite workshops, focusing on this topic, have also been organized in conjunction with these premier international conferences, with ALAg 2007 as a most recent highlight at an AAMAS conference. ALAg 2007 has been organized with the idea of bringing these workshops into some explicitly organized form. Concurrently, the Adaptive Learning Agents and Multi-agent Systems (ALAMAS) workshop has established as a series in Europe with yearly editions starting from 2001. The focus here was also on different facets of learning and adaptation in the multi-agent world. In 2008 the two workshop series joint into one workshop “ALAg&ALAMAS” held at the AAMAS in May 2008 in Estoril (Portugal). This workshop was very successful with a high number of submissions. Also for 2009 and 2010 joint workshops at the respective AAMAS conferences in Budapest and Toronto are planned. At the same time a
steering committee has emerged and a webpage of this community will soon be launched. The goal was and is to strengthen the agent learning community by combining these parallel efforts into one workshop and giving them a unique platform for presentation and exchange of ideas. In this special issue you find a selection of five revised papers from the 2008 workshop demonstrating the high standards and broad scope of its submissions.

**SUMMARY OF CONTRIBUTION TO THIS SPECIAL ISSUE**

In the first paper, S. Ariau, L. Padgham, S. Sardina and S. Sen present a method for improving plans of BDI agents using Decision Tree Learning. Their approach analyses and modifies the context conditions for avoiding failures in the future, based on the agent’s previous experience. The authors show that such a learning-based enhancement of BDI agents is especially useful in non-deterministic environments.

The second paper “A Step-by-Step Implementation of a Hybrid USD/JPY Trading Agent” is an example of the successful application of learning agents in economic systems. R. P. Barbosa and O. Belo show how they developed an agent for trading autonomously in the currency market. The paper focuses on the price prediction mechanisms that the agent relied on for making decisions about when and how much to trade. The agent was actually participating in the currency market for almost one and a half year realizing some astonishing profit.

M. Grzes and D. Kudenko improve the performance of learning of reinforcement learning agents when function approximation is used for representing the agents’ value function. They propose to use mixed resolutions for the approximations: a coarser resolution for guiding the learning process, a finer resolution for obtaining the final high quality result.

Y. Guo, A. Zeman and R. Li illustrate how reinforcement learning can be used to cope with multiple goals in energy demand management: They present a framework of learning agents that optimize for price and system stability concurrently controlling fluctuations in the highly dynamic energy markets from the requirement point of view.

The final contribution by P. Mukherjee, S. Sen and S. Airiau analyses the emergence of norms which are essential for coordination in larger societies of autonomous agents. In a social learning framework the authors compare the effect of different configurations of biased agents on the entire population’s convergence to a consistent norm.

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Karl Tuyls, Franziska Klügl and Sandip Sen
ALAMAS&ALAg 2008 Co-Chairs