

Lecture Notes in Artificial Intelligence

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Preface

This volume is the fifth in a series that started in 2005, collecting papers from the Coordination, Organizations, Institutions and Norms (COIN) Workshops. The papers in this volume are drawn from the three meetings that took place in 2009.

AAMAS

COIN@AAMAS 2009 took place on May 12, 2009, as a satellite event of the 8th International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2009), in Budapest, Hungary. With 35 registered participants, the workshop was an exciting and fruitful gathering where discussions followed the papers presented by an international group of speakers. We had participants from Australia, Italy, The Netherlands, New Zealand, Portugal, Spain, UK and USA, to name a few. Of the 19 submissions, 12 were selected for presentation and, subsequently, 10 were invited to be revised and included in the proceedings.

IJCAI

COIN@IJCAI 2009 took place on July 11, 2009, as a satellite event of the 21st International Joint Conference on Artificial Intelligence (IJCAI 2009), in Pasadena, California, USA. We had 15 submissions, 10 of which were selected for presentation at the workshop. The workshop sessions gave rise to a stimulating and productive gathering with an invited talk from Maarten Sierhuis of NASA entitled “Towards Organization-Aware Multi-Agent Systems,” followed by presentations of accepted papers. An international audience from countries such as Australia, Brazil, India, Canada, Spain, France, UK and USA participated in the workshop. From the 10 presented papers, 6 were invited to be revised and included in the proceedings.

MALLOW

COIN@MALLOW 2009 took place September 7-11, 2009, as one of the federated Multi-Agent Logics, Languages, and Organizations Workshops, in Turin, Italy. The particular theme of this edition of COIN was to explore how the COIN topics are manifested in on-line communities. To this end, Axel Polleres was invited as co-organizer and there was an invited talk by Alexandre Passant entitled “Using Semantics to Improve Corporate Online Communities.” In addition there were nine presentations, comprising five regular papers and four project reports. Of these, four regular papers and one project report were invited to submit revised, extended versions for inclusion in this volume.

The papers in this volume are extended, revised versions of the best papers presented at the three workshops. The result is a balanced collection of high-quality papers that really can be called representative of the field at this moment. For this volume, the papers from the three workshops were re-grouped around three themes: *Building and Managing Organizations*, *Social Norms and Semantics* and *Norms and Reasoning*. We now summarize each of these themes and present a synopsis of the papers in each.

Building and Managing Organizations

The papers in this section address issues covering requirements capture, policy realization and both virtual and mixed human-agent organizations.

1. Boella et al. in “Conditional Dependence Networks in Requirements Engineering,” present a way to extend dependence networks, a graphical notation used in requirements analysis, to represent norms. Moreover, they show how coalitions may be defined with the use of the extended dependence networks.
2. Criado et al. in “A Norm-Based Organization Management System,” describe a platform for virtual organizations that supports norm specification and management, while accommodating (norm) change.
3. van Diggelen et al. in “Implementing Collective Obligations in Human-Agent Teams using KAoS Policies,” explore the relationship between teamwork models and collective obligations and use the scenario of a Mars mission to show how team performance is affected by different teamwork models.
4. Lam et al. in “Building Multi-Agent Systems for Workflow Enactment and Exception Handling,” propose a method for building norm-governed multi-agent systems to enact workflows. The novelty here lies in having the agents use organizational and domain knowledge, combined with task and capability information, to identify appropriate remedial actions when exceptions arise.
5. Hormazabal et al., in “An Approach for Virtual Organizations’ Dissolution,” tackle the problem of examining the conditions under which a virtual organization might be dissolved, by drawing parallels with circumstances that apply in commercial law for real-world organizations. An agent-based simulation is used to explore the particular circumstance of the organizational goals being unachievable and quantifies the benefits of timely dissolution.
6. Urovi and Stathis, in “Playing with Agent Coordination Patterns in MAGE,” introduce the Multi-Agent Game Environment (MAGE), a logic-based framework that uses games as a metaphor for agent activities within an artificial society. They use their approach to specify the coordination patterns required to form a virtual organization in the context a scenario for oil-spill detection.
7. Coutinho et al. in “A Model-Based Architecture for Organizational Interoperability in Open Multiagent Systems,” apply ideas from model-driven software engineering to multi-agent systems by specifying organizational meta-models and model transformations in order to address the problem of how agents can access a particular organizational infrastructure and interpret its underlying model without prior knowledge of the organization.

8. Hübner et al. in “Normative Programming for Organization Management Infrastructures,” propose the Organization Modelling Language to define the organizational function of a system and the capture of organizational properties. This specification is then translated to a simpler normative language, thus avoiding the potential awkwardness — for the human designer — of a purely normative approach.

Social Norms and Semantics

The second part of this volume highlights the theme that was a key topic for the MALLOW workshop, although this thread was also apparent at other meetings earlier in the year. Thus the topics in this section explore the modelling of social attributes and of social structures, both in artificial environments and in virtual worlds that reflect the physical world.

1. Cranefield and Li, in “Monitoring Social Expectations in Second Life,” discuss the formal definition of social expectations in temporal logic and their subsequent on-line monitoring by means of model-checking. The idea is demonstrated through Second Life, where a user can be notified whether their expectations of others have been fulfilled or violated, subject to the limitations of the Linden Scripting Language’s capacity to detect events of (social) significance.
2. Lorini and Verdicchio, in “Towards a Logical Model of Social Agreement for Agent Societies,” formalize the notion of agreement, as a bottom-up counter to the more conventional top-down approach that organizational modelling normally encourages. The key here is to focus on the agreement as the basic building block and to define a modal logic that has agreement as its primitive object and establishes relationships through the concept of preference, hence leading to notions of norms and commitments.
3. Sadedin and Guttman, in “Promotion of Selfish Agents in Hierarchical Organizations,” investigate the hypothesis that agents that misrepresent their achievements for the purpose of promotion will achieve a more influential status in an organization, in contrast to agents that report truthfully. An agent-based simulation is used to explore the consequences for multi-layered organizations over a range of employee populations, the main result being that judgement of individual performance rather than team performance appears to have the effect of promoting selfish behavior.
4. Passant et al. in “SIOC Project: Semantically Interlinked Online Communities,” describe how Semantic Web technologies can be used to express information about the nature, structure and content of on-line communities. The information thus created—and maintained via human-centric social interactions—becomes processable by software agents and can, for example, enable interoperability between applications from the Social Web.
5. Stankovic et al. in “Directing Status Messages to their Audience in Online Communities,” seek ways to govern the delivery of so-called status messages (short text messages usually broadcast to a large audience). The user survey that begins the paper suggests adding the concept of audience to such

messages and follows this with a discussion of the requirements for such a mechanism and how it might be realized by Semantic Web technologies.

6. Sen and Sen, in “Effects of Social Network Topology and Options on Norm Emergence,” study how and when norms emerge in social networks, depending on parameters such as the topology of the network, population size, neighborhood size, and a number of behavior alternatives. The approach outlined can be used to model and to analyze social networks such as those generated by Facebook, Flickr and Digg and, it is posited, to predict how norms emerge and spread in human societies.

Norms and Reasoning

Here we focus on a core topic of the COIN community, namely, norms, exploring the formalization of obligations, how agents make sense of normative environments, handle incomplete information and might regulate themselves.

1. Cardoso and Oliveira, in “Directed Deadline Obligations in Agent-Based Business Contracts,” use temporal logic to formalize directed contractual obligations, as well as a mechanism for flexible deadlines of the obligations. This latter is presented as a lifecycle for directed obligations with temporal restrictions, based on authorizations and implemented by means of a rule-based system.
2. Savarimuthu et al. in “Internal Agent Architecture for Norm Identification,” propose an agent architecture that identifies the norms of a society using a bottom-up approach, in that agents infer norms rather than being told them explicitly. The paper demonstrates how a norm can be inferred by an agent using the proposed architecture, via an illustrative case scenario, in which an agent observes the actions of another and when sanctions occur.
3. Kemmerich, in “Influence of Communication Graph Structures on Pheromone-Based Approaches in the Context of a Partitioning Task Problem,” has the goal of finding a cost-optimal, distance minimizing, and uniform partitioning of an agent set to a set of targets in a two-dimensional world using an ant colony optimization algorithm. In particular it is shown that new pheromone traces are unable to develop in the presence of establish structures. Although the approach is proven non-optimal, it is also shown that the solution quality is high.
4. Salazar et al. in “An Infection-Based Mechanism in Large Convention Spaces,” describe a distributed regulation mechanism to handle emergent social conventions. Intuitively, the size of the convention space should affect emergence and in this paper, it is shown empirically how the problem of finding a common vocabulary enables perfect communication and hence the capacity to handle large convention spaces.
5. Swarup, in “The Classification Game: Complexity Regularization Through Interaction,” shows that if a population of neural network agents is allowed to interact during learning, so as to arrive at a consensus solution to the learning problem, then they can implicitly achieve complexity regularization. This

learning paradigm is called the classification game. Through experimentation, it is shown how low complexity equilibria are selected, leading to better generalization.

6. Serrano and Saugar, in “Dealing with Incomplete Normative States,” put forward a normative framework that enables the specification of incomplete theories and their management through incomplete normative states—identified as ‘pending.’ The framework lets designated agents resolve this category through the speech acts allow and forbid. The proposal is formalized by using the action language K, taking advantage of its support for incompleteness, and subsequently illustrated with some scenarios drawn from the management of university courses.
7. Burgemeestre et al. in “Towards an Architecture for Self-Regulating Agents: A Case Study in International Trade,” use an example of norm-enforcement from the physical world as inspiration for the virtual world, from which they construct an architecture for self-regulating agents derived from BDI. Validation of the approach is demonstrated through a study of the self-certification EU customs regulations.

We are grateful to all the conference organizers who accepted our proposals for COIN workshops and the workshop organizers who together created the fora in which our discussions flourish. We are equally pleased to acknowledge the continuing support of Springer, and Alfred Hofmann in particular, for the annual publication of the COIN workshop series, providing both a research record and a dissemination channel to reach those researchers not able to attend the meetings in person.

March 2010

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