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Engineering Societies in the Agents World IV

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Revised Selected and Invited Papers

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Preface

The fourth international workshop, "Engineering Societies in the Agents World" (ESAW 2003) was a three-day event that took place at the end of October 2003. After previous events in Germany, the Czech Republic, and Spain, the workshop crossed the Channel, to be held at the premises of Imperial College, London.

The steady increase in the variety of backgrounds of contributing scientists, fascinating new perspectives on the topics, and number of participants, bespeaks the success of the ESAW workshop series. Its idea was born in 1999 among members of the working group on "Communication, Coordination, and Collaboration" of the first lease of life of the European Network of Excellence on Agent-Based Computing, AgentLink, out of a critical discussion about the general mindset of the agent community. At that time, we felt that proper considerations of systemic aspects of agent technology deployment, such as acknowledgement of the importance of the social and environmental perspectives, were sorely missing: a deficiency that we resolved should be addressed directly by a new forum.

A first focal point was the vision that to tackle the issues inherently connected to the emergent complexity of multi-agent systems (MAS) it would be inevitable to introduce the notion of a *society of agents* as a first-class entity in the modeling and engineering of MAS. In particular, paying attention to software infrastructure as a location to provide intelligence in MAS, and the notion of social intelligence drove the first ESAW workshop, co-located with ECAI 2000 in Berlin. ESAW 2001, held in Prague together with the by now renowned European Agent Systems Summer School (ACAI'01), reinforced the line of research relating to the design of agent society and underlined further the necessity for methodologies to properly guide the increasingly popular use of social and cognitive concepts in agent theories and technologies. The third workshop in Madrid took advantage of co-location with the workshop series on Cooperative Information Agents (CIA 2002) to set itself apart and gain further in identity by opening up to a yet a wider range of contributing technologies, while maintaining its central focus on theoretical and methodological aspects applied by this direction of research.

ESAW 2003 was the first workshop neither connected to nor co-located with any other scientific event. Even so, the stand-alone workshop proved the most vivid and rich one to date: this stands to testify, on the one hand, that the community aggregating around ESAW is by now sufficiently large and mature to sustain an autonomous scientific event, and, on the other hand, that the original intent to define and extend this community beyond the traditional (and already outdated) borders of computer engineering has definitely been met. Following the tradition of this workshop, the structure of the event developed around a few main themes constituting the pivotal elements of the sessions, as well as

two invited talks that provided further topics of high relevance and prompted stimulating discussions.

In particular, the sessions addressed the following themes over the three days of the workshop:

- *Agent-Oriented Software Engineering and Formal Methods.* Two sessions covered methodological aspects of AOSE as well as formal methods in the analysis and planning of agent systems.
- *MAS Protocols and Interaction Management.* This session hosted presentations and discussions on communication and coordination between agents, focusing in particular on social aspects.
- *MAS Organization and Workflow.* Presentations in this session concentrated on organizational aspects, as well as related technologies and applications.
- *MAS Architectures, Cooperation and Teamwork.* In this session we discussed agent architectures, team and coalition formation, and economies of interaction in agent societies.
- *Artificial Intelligence Techniques in MAS.* This session covered more traditional (in a certain sense) topics in MAS research, such as planning and collective forms of intelligence.
- *Agent Society Dynamics and Engineering.* This session developed a series of notions from as heterogeneous backgrounds as sociology, political philosophy, and organizational theories, to serve as sources for foundational concepts for agent societies and their construction.
- *Agent Applications: Services, User Modeling, and E-Commerce.* In this session, different applications of agent technologies were presented, including user profiling, intelligent and dynamic service integration, and the realization of models of trust.

Two invited presentations rounded off the program in a most worthy manner. Dr. André P. Meyer, of the Command & Control and Simulation group of the Dutch TNO FEL, spoke about "Privacy-Aware Mobile Agents: Protecting Privacy by Modeling Social Behavior in Open Systems of Software Agents," examining the problem of privacy in open systems where a multitude of different MAS may interact. The presentation by Dr. Jean-Pierre Müller, now senior researcher at the French LIRMM, entitled "Emergence of Collective Behavior; Simulation and Social Engineering," examined the different notions of emergent behavior in complex systems and the correlation with concepts such as agent orientated and environment oriented programming. Techniques discussed in the analysis phase have been applied to resource management tasks – in particular, social engineering and ecological modeling.

It is useful to underline how the tradition of ESAW differs from other scientific workshops: here, the selection process includes the very meeting event, to which in particular the typical borderline paper submissions are also invited: The workshop allows the presenters to utilize the open atmosphere of discussion (promoted as much as possible by the organizers) to get their own innovative contributions into focus and make them stand out as deserved, whilst, at the same time, offering the organizers in their role as curators of the event the

possibility to catalyze and encourage original approaches and judge individual efforts in a more comprehensive way. The constructive quality of the workshop – in particular, of this most recent event – thus contrasts decidedly with the dry and meticulous climate that all too often characterises analogous events, and it thereby promotes a typically broader and more collaborative scientific development of presented work.

The complete range of contributions that were collected in the working notes of the event are available online – along with the presentation slides – at the ESAW 2003 workshop site. The present post-proceedings continue the series published with Springer-Verlag (ESAW 2000: LNAI 1972, ESAW 2001: LNAI 2203, and ESAW 2002: LNAI 2577). This volume contains reworked and extended versions of selected papers and also includes contributions by the two invited speakers.

The organizers gratefully acknowledge financial support granted by the following institutions:

- Polo Scientifico-Didattico di Cesena, Università degli Studi di Bologna
- Imperial College London
- the Austrian Society for Artificial Intelligence (ÖGAI)
- Whitestein Technologies

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The next ESAW workshop is scheduled to be hosted in France by the University of Toulouse in October 2004, with Marie-Pierre Gleizes, Andrea Omicini, and Franco Zambonelli as organizers. We look forward to an ever broader and larger attendance, an even more lively interaction, and a still higher level of originality and innovation.

April 2004

Andrea Omicini
Paolo Petta
Jeremy Pitt

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