Agent-based Computing for Enterprise Collaboration –
Agent-Oriented Workflows and Services

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Abstract

The fourth “Agent-based Computing for Enterprise Collaboration” workshop at WETICE aimed at bringing together researcher in the field of collaboration supported by software agents. This paper briefly discusses the content of the papers as presented by the participating authors. Moreover, there is a summary of the main issues of the concluding discussions.

1. Introduction

The autonomy and intelligence of software agents have greatly enhanced automation in many operational domains. A major benefit of using agents is the ability to assist in the collaboration of humans and software mechanisms, alike.

Agent-enacted collaboration can be extremely helpful in areas such as Computer Supported Collaborative Work, Workflow and Supply Chain Management, Automation in Virtual Enterprises, and Automated Distributed Component Composition. The purpose of this workshop is to explore research where protocols for agent control can benefit these domains of collaboration. We also are interested in work that explores competition among agents that interact.

This workshop on Agent-based Computing for Enterprise Collaboration (ACEC 2006) is a continuation of earlier workshops at WETICE 2003 held in Linz, Austria, at WETICE 2004 held in Modena, Italy, and at WETICE 2006 held in Linköping, Sweden.

ACEC 2006 intends to bring together researchers and practitioners to discuss the key issues, approaches, open problems, innovative applications, and trends in this research area.

This year, the call for papers focused on agent-oriented workflows and services; these two topics have emerged in the past years as relevant to drive research in the field.

In the following section we summarize the papers from the workshop. A common thread in each of these papers is a discussion on how agent capabilities, protocols, and paradigms can be used to address the problems of collaboration. Subsequent section presents the discussions that culminated the forum.

2. Overview of the Papers

The paper “Agent Interaction Protocols And Flexible Agent Interaction in Dynamic Environments” by Usman Wajid and Nikolay Mehandjiev, proposes an approach for flexible agent interactions. The authors start from the consideration that the open and unpredictable nature of agent environments makes unsuitable many design technologies applied in agent systems, such as agent interaction protocols. The proposed approach relies on protocol-free agent interactions to enable flexible operation of agent systems in dynamic open environments. This approach keeps the benefits from interaction protocols, but also enables agents freedom of action and capability to respond to unexpected events in open environments.

The paper “A Multi-Agent Framework to Join DTV and Virtual Communities”, by Federico Bergenti, Lorenzo Lazzari, Agostino Poggi, presents a framework based on agents for integrating the emergent technology of the interactive digital television with new and different types of services. This proposal aims also at supporting the cooperative activities of different kinds of virtual communities. The paper reports two examples of exploitation of the framework in the implementation: in the former is represented by a community game, in which realtime interactions between two DTV users
happen, and the latter is an on-line auction, where the interaction is asynchronous.

The paper “Supporting a territorial emergency scenario with Services and Agents” by Giacomo Cabri, Francesco De Mola, Raffaele Quitadamo, presents a case study in the territorial emergency field and analyzes the pros and cons of the adoption of two paradigms: the Service Oriented Computing (SOC) and Mobile Agents (MA). The two paradigms are compared with regard to different issues, such as configuration, flexibility, support and so on. From these considerations, the authors conclude that agents better suit this scenario, but need still to learn from the emerging SOC paradigm.

The paper “WebService = E + F + I”, by Zakaria Maamar, Djamal Benslimane, Emad Batineh, proposes an approach to define Web services, which is based on the concepts of Environment, Feature, and Interactions. A Web service typically runs in an environment E, where exposes its features F and engages interactions I with peer services. This model has its roots in the agent world, where the three concepts are recognized as basis of the agent paradigm. Moreover, this paper proposes to exploit agents to manage services: the adaptability and flexibility of agents can overcome the limitations of Web services.

The paper “Multi-Dimensional Performance Framework for Enterprise Knowledge Infrastructures”, by Joe Bolinger and Jay Ramanathan, present an agent-based framework in the field of Enterprise Knowledge Infrastructure (EKI). EKI is defined as the phenomenon in which local knowledge emerges during practice. The aim of the framework is to support business-social interactions and monitor their value to accelerate the creation and evolution of practice knowledge.

3. Discussion

Even if we proposed both workflow and services as topics of the ACEC workshop of this year, the accepted papers and the workshop discussion focused mainly the latter.

As expected, agents and (Web) services are considered two interesting technologies: the former, for its high degree of flexibility and adaptability; the latter for its simplicity and efficiency.

The two technologies are currently parallel, but some kind of convergence is desirable, to combine the advantages of both. However, the workshop participants agreed that agents and services must be kept at different levels, and the difficulty is how to exploit them together without flattening them. For instance, a mistake could be the substitution of services with agents, which would make the system more complex even if more flexible. A possible direction, proposed in a paper of the workshop, is letting agents manage services: in this way, the basic simplicity in providing services is preserved, while we can have a higher degree of flexibility and adaptability because agents can rearrange service when needed.

![Figure 1. Agents for services and services for agents](image)

Another interesting issue was the connection between agents and services. In fact, we should consider that in general agents provide services (for users, applications, other agents) and at the same time they exploit existing services (e.g., agent platform services, but not only). Figure 1 sketches this situation. The tuning of services provided and services exploited – perhaps in terms of “kinds” rather than focusing on single services – can lead to the development of effective systems.

After the discussion, the ACEC workshop ended with some future work for researchers:
- Exploring the (possible) convergence of agents and (Web) services;
- Defining which kinds of services are more appropriate for agents and which for Web services;
- Evaluating the proposals of FIPA.

4. Acknowledgements

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