ABSTRACT

Software is becoming present in every aspect of our lives, pushing us inevitably towards a world of ambient computing systems. Multi-agent systems (MAS) are a prominent technology which facilitates modeling and development of large-scale distributed systems. In recent years, software engineering research has focused on methodologies and techniques for improving MAS design and implementation. However, making large MAS dependable is still an open issue. The Fifth Workshop on Software Engineering for Large-Scale Multi-Agent Systems (SELMAS 2006) aims to bring together academic, industrial and commercial communities interested in agent-oriented software engineering topics to discuss the different technologies being defined and used in the development of dependable MAS.

Categories and Subject Descriptors
D.2.m [Software Engineering]: Miscellaneous – agent-oriented design methods.

General Terms
Design, Reliability, Theory and Experimentation.

Keywords
Agent-Oriented Software Engineering, Dependability.

1. MOTIVATION

Software is becoming present in every aspect of our lives, pushing us inevitably towards a world of ambient computing systems. Multi-agent systems (MAS) are a prominent technology which facilitates modeling and development of large-scale distributed systems. MAS are intrinsically constructed as open systems consisting of the large number of cooperating entities. They employ semantically sophisticated interaction protocols as the flexible control layer that binds the pieces together into a reliable system of systems. However, the specific properties of MAS, such as autonomy and self-adaptation behavior, can hinder the satisfaction of dependability requirements if proper techniques are not applied.

Dependability of a computing system is its ability to deliver service that can be justifiably trusted. Large-scale complex systems are becoming far more prevalent, and our society increasingly relies on them. Multi-agent systems may comprise a large number of software agents, which are built with different requirements. Agents may have varied skills and may also be self-interested, unpredictable, and mobile. Thus, the challenges posed by the agent paradigm require the development and refinement of new techniques, practices, and tools that build upon sound engineering principles. Without adequate development techniques and methods to support dependability characteristics such as fault avoidance, fault tolerance, fault removal and fault forecasting, MAS will not be robust, trustworthy, secure, safe and extensible.

There will be a steadily increasing demand for distributed agent-based software systems with substantial scalability and performance requirements, demanding reliability specifications. This is a singular time for dependable distributed systems since the traditional models we use to understand the relationship between a computational process and its environment are changing from the standard deterministic into ones that are more distributed and dynamic.

2. OBJECTIVES

The main objectives of SELMAS 2006 are as follows.

1. To set up working groups that will address methodological aspects involved in developing practices for building dependable multi-agent systems.

2. Understand the issues in the agent technology that improve or hinder the production of large dependable systems.
3. To identify existing software engineering techniques that may be successfully applied to deal with the complexity associated with dependable multi-agent systems.

We intend to develop further the ideas that have been explored in four previous workshops at the ICSE conferences.

3. SCOPE AND TOPICS OF INTEREST

The following issues are considered to be particularly key ones that need to be resolved in order to encourage the development of software engineering techniques that will place value upon the development of dependable multi-agent systems.

- Aspect-oriented techniques to MAS development
- Coordination architectures, infrastructures, and tools
- Dependable agent systems
- Design patterns, design principles, and architectural styles
- Domain-specific languages
- Exception handling and fault-tolerance techniques
- Experiments and case studies
- Formal methods for MAS
- Frameworks and software architectures
- Governance for MAS
- Methodologies for agent-oriented analysis and design
- Mobility and security issues
- Modeling languages
- Ontologies for MAS
- Pitfalls and learned lessons in the construction of large MAS
- Reflective software architectures
- Requirements engineering
- Software development environments
- Software engineering techniques for resource-bounded MAS
- Software reliability engineering
- Testing and metrics
- Trustability issues
- Verification and validation techniques

4. WORKSHOP FORMAT

The workshop is inviting participants to submit position papers of up to seven pages that describe experiences in the development of dependable multi-agent systems as well as other practices in software engineering for agent-oriented development. From these, the Program Committee members and the organizers will select a set of paper presentations to stimulate discussion around the themes. The workshop will also invite keynote speakers and have panel and discussion sessions.

5. PROGRAM COMMITTEE

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- Natasha Alechina, University of Nottingham (UK)
- Carole Berton, IRIT – U. Paul Sabatier Toulouse (France)
- M. Brian Blake, Georgetown University (USA)
- Rafael Bordini, University of Durham (UK)
- Giacomo Cabri, Università di Modena e Reggio Emilia (Italy)
- Jaelson Castro, UFPE (Brazil)
- Mehdi Dastani, Utrecht University (The Netherlands)
- John Debenham, U. Technology, Sydney (Australia)
- Rogerio de Lemos, University of Kent (UK)
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- Chiara Ghidini, ITC-irst (Italy)
- Paolo Giorgini, University of Trento (Italy)
- Mark Greaves, Vulcan, Inc. (USA)
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- Gustavo Rossi, Universidad Nacional de La Plata (Argentina)
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- John Shepherdson, British Telecommunications plc (UK)
- Anand Tripathi, University of Minnesota (USA)
- Danny Weyns, Katholieke Universiteit Leuven (Belgium)
- Michael Winikoff, RMIT University (Australia)

6. WORKSHOP OUTPUTS

All the results obtained by the discussions will be summarized and made electronically available at the workshop website. The aim is to highlight issues that shall become part of a forthcoming research agenda. It is the aim of the organizers to publish a post-workshop book as part of the Lecture Notes in Computer Science series of Springer-Verlag, following the tradition established by the previous SELMAS editions.

For further details, please visit our website:

http://www.teccomm.les.inf.puc-rio.br/selmas2006/