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INTRODUCTION TO THE SPECIAL ISSUE ON MULTI-AGENT SYSTEMS: METHODOLOGIES, TOOLS AND APPLICATIONS

Dear SCPE readers,

Autonomous agents are software entities that are capable of independent action in open, unpredictable environments. Agent technologies include models, frameworks, platforms, methodologies and tools for developing agent systems. Agents and multi-agent systems are currently applied in diverse domains that require complex problem solving, e.g. e-business, e-learning, e-government, e-health, social networks, risk management, planning, distributed computing, simulation, optimization, games etc.

This special issue collects papers on applications of agent-based systems in various fields (resource management, interaction protocols, decision support systems). Four of the papers included in this issue are extended versions of papers presented at some conferences and workshops related to sofware agents: WASA 2012 - 2nd Workshop on Applications of Software Agents, WIMS 2012 - International Conference on Web Intelligence, Mining and Semantics, IDC 2012 - 6th International Symposium on Intelligent Distributed Computing. Even if the papers included in this issue address different problems and use different technologies, all of them rely on concepts, paradigms and techniques specific to agent-based modelling.

The first paper proposes a technique, based on swarm intelligence, for self-organization of data centres servers in order to reduce the power demand. In the proposed approach, each server is modelled by an intelligent agent, member of a decentralized swarm of cooperating entities. The simulation results show an increase of the hardware utilization ratio and a decrease of the power consumption.

The second paper is related with the *Agent in Grid* project aiming to integrate Grid and agent-based systems. The paper proposes a strategy for multi-attribute negotiations within an agent-based Grid resource management system.

The third paper presents a formal framework based on agents for designing and verification of interaction protocols. The agent-based system has been designed to enable interoperability and cross-Cloud application management.

The fourth paper reviews the current research an agent-based travel support systems and proposes an algorithm for semantic matchmaking between the user profile and the instances of an ontology.

The fifth paper proposes an architectural pattern in designing scalable intelligent enterprise systems. The proposed pattern has been experimented in eCommerce applications by designing an intelligent and scalable virtual mall.

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