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Introduction to the thematic issue

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1. Introduction

This thematic issue addresses the use of intelligent agents in Ambient Intelligence (AmI) and Smart Environments. It focuses on recent developments and experiments with the agent oriented computing paradigm applied both in simulated smart environments as well as in deployments in the real world.

The relevance of agent technology in Ambient Intelligence is well documented in the literature and in this journal in particular. Agents embody Artificial Intelligence techniques which provide them with useful skills, like reasoning, learning capabilities, or coordination techniques. This contributes to augment the diversity of areas where agents may be applied in the context of AmI and smart environments. Agents and Multi-Agent Systems may be used to design human-like agents, to develop intelligent and autonomous software modules, and to represent complex systems where the collaboration and coordination is mandatory.

The papers accepted for this thematic issue illustrate benefits of agent technology to four concrete areas: smart houses, elderly care requirements, museums, and tourism. They can be a helpful aid for AmI researchers willing to explore what agent technology can do for them.

To ensure the papers' quality, they have gone through a strict and rigorous review process passing only four from twelve submissions. These finally selected papers include, amongst others, revised and extended papers submitted to the ISAmI'12 (International Symposium on Ambient Intelligence) event held at the University of Salamanca, Spain in April, 2012.

2. In this thematic issue

The thematic issue starts with a work by Kalra et al. about the advantages of two-stage Markov models in a system for detection of Daily Living Activities through sensors deployed into smart houses. The agent paradigm in this contribution serves to structure the monitoring solution in an agent oriented architecture. This architecture follows a layered approach where some agents, in lower layers, do gather data from sensors while others, in upper layers, do elaborate the activity detection tasks. This intuitive layout of agents allows researchers to focus on the concrete algorithms needed to provide the necessary capabilities, while re-organizing the system constituents in an inexpensive way, if needed.

The contribution from Ruiz-López et al. addresses non-functional requirements modeling in an Ambient Assisted Living system for elderly people. They aim to produce different kinds of implementation architectures using model driven techniques. Part of the contribution deals with the possible translation from a NFR specification to a Multi-Agent System and the relationship between goal oriented requirements and known works about the same topic in the agent literature.

Following, Campillo-Sanchez et al. propose the testing of AmI applications running on mobile platforms within a simulated environment called Ubik-Mobile. Ubik-Mobile is an extension of UbikSim to run simulated smartphones within the environment. They pursue the development of an Augmented Reality application in a museum. The system depends on the Agent Based Social Simulation concept that

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permits to create repeatable experiments were each actor behaves in a deterministic way. For AmI researchers, this kind of agent oriented tools allows working with the system without having to build or rent a living lab. They make developments more affordable.

To conclude, O'Hare, O'Grady and Poslad introduce a thorough evaluation of two agent oriented systems in the tourism domain. The goal is to evaluate the applicability of the agent paradigm for both modeling and realizing services for smart environments. Applicability is measured using SUMI, a commercial method and tool to evaluate user satisfaction through profile analysis and item consensual analysis. SUMI is acknowledged by the ISO 9241-11, a standard for the ergonomic requirements for office work with visual display terminals.

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