Agent-Oriented Software Engineering Challenges for Ubiquitous and Pervasive Computing Workshop

Ubiquitous Computing (UC) deals with providing globally available services and resources in network by giving users the ability to access services anytime and irrespective to their location. The main objective of Pervasive Computing (PC) is to provide spontaneous services created on the fly by mobiles that interact by ad hoc connections. To develop ubiquitous and pervasive services and applications, new engineering methodologies and software architectures that involve many dynamically interacting software agents are required.

The final workshop program consists of excellent contributions and offers a wide range view of research issues dealing with ubiquitous computing, pervasive computing, multi-agent systems, mobile agent and service discovery systems.

In ubiquitous and pervasive computing, service discovery plays a fundamental role, and its automation is essential to design adaptive applications to the availability and number of nearby services and to users mobility and contexts. Haddad and Kheddouci classify the different dynamic virtual topologies in ad hoc networks and discuss their advantages in implementing service oriented applications in terms of discovery, advertisement and location.

Revero et al. paper shed a light on a challenging issue that is the implementation of natural interaction systems. They present a paper on interaction models that deals with the circumstantial aspects. This paper puts an emphasis on the implementation of a natural interaction system with a multi-agent approach. Several examples are given through the paper to illustrate the proposed approach.

The paper presented by El-Hachimi and Benani aims to use the mobile agent paradigm to implement a service-oriented platform to deliver services, in particular by establishing a point to multipoint tree for deploying virtual private LAN service over MPLS while taking into account the quality of service.

The paper presented by Dridi deals with providing users real-time and appropriate information that suits their locations and contexts. A realistic application related to public transportation planning is considered to implement such ubiquitous information system.

Context-aware computing is a key issue when dealing with ubiquitous and pervasive applications. The main challenge concerns the formal modeling and representation of the real world, such as location information, and the design of adaptive reasoning mechanisms. Roxin et al. present spatial models for location-based applications. The privileged application domain considered concerns intelligent vehicles and pervasive road networks.

One of the most challenges in ubiquitous computing is the building of scalable and efficient secure service discovery systems. Nait-Sidi-Moh et al. presents an agent-based solution that meets the automatic computerized contracts for negotiating and controlling services access in service discovery systems. In addition the signature process to be controlled is modelled by Petri net tool to analyse the proposed protocol.

Ubiquitous and pervasive environments require Multi-agent Systems (MAS) with self-organizing, self-adaptive and emergence capabilities to cope with dynamically changing context environments such as computing contexts and user contexts are required. Bakhouya
and Gaber present Propitient Multi-agent Systems (PMAS) that are such systems with the ability to self-organize in order to adapt towards the most appropriate agent organization and interaction structures according to unpredictable changes in the environment.