Theme issue: "ubiquitous computing and ambient intelligence"

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The ubiquitous computing (UC) idea envisioned by Weiser in 1991 has recently evolved to a more general paradigm known as Ambient Intelligence (AmI). This vision represents a new generation of user-centred computing environments aiming to find new ways to obtain a better integration of the information technology in everyday life devices and activities. AmI environments are integrated by several autonomous computational devices of modern life ranging from consumer electronics to mobile phones. Ideally, people in an AmI environment will not notice these devices, but they will benefit from the services they provide them. Such devices are aware of the people present in those environments by reacting to their gestures, actions and context. Recently, the interest in Ambient Intelligence Environments has grown considerably due to new challenges posed by society, giving place to new interesting associated research disciplines such as vehicular ad hoc networks (VANET), Ambient Assisted Living (AAL), e-Health, Internet of Things and Home Automation among others.

This theme issue focuses on gathering research results coming from Ambient Intelligence and probably its most promising, socially and commercially speaking, application domain, namely Ambient Assisted Living (AAL). The papers in this issue have been selected from two international conferences held in Valencia in September 2010, namely UCAmI and IWAAL, respectively. The *Symposium of Ubiquitous Computing and Ambient Intelligence* (UC-AmI) has consolidated, in its four editions, as a reference event in Europe and South America, and it is one of the two oldest Ambient Intelligence-specific events. On the other hand, the *International Workshop of Ambient Assisted Living* (IWAAL) is one of the few specific conferences on the topic of Ambient Assisted Living (AAL). AAL is, without doubt, one of the most clear targets of Ubiquitous Computing/Ambient Intelligence since it attempts to solve a real problem, i.e. how the seamless integration of info-communication technologies within homes and residences can enhance elderly people's quality of life and autonomy, thus reducing their need for being institutionalized or aiding them when it happens.

In what follows, a short overview of the papers included classified by their specific topic within AmI is given. Notice that contributions from researchers from Belgium, France, Mexico, Chile and Spain have been compiled in this issue.

Firstly, several works have centred on the application of novel software engineering techniques and middleware to make reality the Ubiquitous Computing vision:

- The paper "A Model-driven Approach for Reusing Tests in Smart Home Systems" by Conejero et al. presents a process to define reusable tests that may be automatically applied to different smart home systems integrated into a whole Model-Driven Development approach.
- The paper "FamiWare: A Family of Event-based Middleware for Ambient Intelligence" by Gámez and Fuentes presents a microkernel plus services

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architecture where the services are composed using a publish/subscribe mechanism based on events.

- In the work "Ambient Contracts" Scholliers et al. propose a novel programming abstraction to deal with the difficulties of creating object compositions connected over unreliable networks.
- The paper "A Design Process Enabling Adaptation in Pervasive Heterogeneous Contexts" by Lezóray et al. analyses the convenience of adopting model-based development methods to enable adaptation of AAL systems while requiring minimal set-up effort.

Secondly, two other papers have focused on the important issue of context-awareness, a very important sub-domain of Ubiquitous Computing, since capturing and modelling user and environment's context, particularly location, is essential to enable more reactive user-aware responsive environments:

- The paper "EDIPS: An Easy to Deploy Indoor Positioning System to Support Loosely-Coupled Mobile Work" by Vera et al. describes a wifi-based system able to support the typical location requirements involved in loosely coupled mobile work.
- The paper "Design and Evaluation of an Ambient Assisted Living System Based on an Argumentative Multi-Agent System" by Muñoz et al. describes a multi-agent solution to tackle the incomplete, sometimes unambiguous, picture of the world, offered by sensors due to inconsistent or unreliable context.

Thirdly, four other works focus on how to enable a more natural human to intelligent object or intelligent environment interaction:

- The paper "Supporting the Strategies to Improve Elders' Medication Compliance by Providing Ambient Aids" by García-Vázquez et al. discusses several natural interaction concepts to enhance the correct ingest of medicines by elderly people.
- The paper "Implicit interaction design for pervasive workflows" by Giner et al. details a design method to indicate how implicit interactions can be orchestrated to support a workflow and its reconfiguration.

- The paper "Awareness Marks: Adaptive Services through User Interactions with Augmented Objects" by Hervás et al. presents a conceptual model to link contextual information with augmented elements acquired from user interactions in an implicit and transparent way.
- The paper "Imhotep: an Approach to User and Device Conscious Mobile Applications" by Almeida et al. describes a framework to easily adapt the applications to the constraints imposed by the user capabilities (sensorial, cognitive and physical capabilities) and device capabilities by providing a repository that will manage the compilation and deployment of applications that include a set of pre-processor directives in the source code.

Finally, one of the selected works deals with the role the new emerging sub-domain of Internet of Things may play on approaching the AAL vision, through ecosystems of intelligently ICT instrumented physical objects:

- The paper "An Internet of Things-based Personal Device for Diabetes Therapy Management in Ambient Assisted Living (AAL)" by Jara et al. depicts a solution based on IoT in order to, on the one hand, support a patient's profile management architecture based on personal RFID tags and, on the other hand, provide global connectivity between the developed patient's personal device and the medical staff application to manage personal health cards, glycemic index information system and patient's web portal.

All in all, this theme issue contains a very interesting collection of research activities of some of the key pillars of Ambient Intelligence, namely middleware support, context-capture and modelling, natural human/environment interaction and smart objects. The editors of this issue hope that you find the works selected very enriching and inspiring towards approaching the Ambient Intelligence vision.