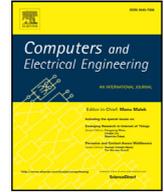




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## Editorial

# Introduction to the special section on pervasive computing



After nearly two decades of its introduction, pervasive computing has gained much popularity. The first perspective was to provide services in an anytime/anyplace paradigm [1]. Today, most of the elementary services such as Internet, email, billing, mobile games, etc. are provided via smartphones in this manner, thanks to the ubiquitous infrastructure as well as mobile computational devices. However, the other goal, which is invisibility, is far from today's reality. The invisibility idea indicates an environment in which services have interweaved so tightly in people's life that have disappointed from their vision.

The main tool for realizing invisibility is "context awareness". It helps applications to analyze and predict users' situation and requirements, and provide services, accordingly. Context, from its initial definitions [2,3] that was mainly bounded to personal information, has been extended to other domains such as urban [4], social [5], healthcare and gamification [6,7], etc. Although these extensions enable context-aware services in all aspects of people's life, they have complicated the development of the related context-aware systems. In fact, a context-aware system gathers, models, and processes contextual information [8] and hence, extending context to various domains makes these functionalities much harder.

This special issue aims at investigating new trends in pervasive computing. It contains extended versions of four selected papers, out of 13 submissions, presented at the "Fourth International workshop on pervasive and context aware middleware" (PerCAM2014) and "Third International conference on context-aware systems and applications" (ICCASA2014). Following, is an overview of the selected papers.

Context processing has become a challenging issue as a result of the extension of context to new domains. In this regard, context modeling as the most basic process has attracted much research over the past decade. Accurate modeling of context plays an important role in the correct detecting context-switches and reacting accordingly. In this context, the paper titled "A smart system to manage the context evolution in the cultural heritage domain" by Francesco Piccialli and Angelo Chianese presents a context model for cultural heritage domain. The model exploits a graph structure and is able to represent and manage the evolution of the context through its instances.

Quality of context is an important parameter that should be considered in the context modeling procedure. The lack of quality of context may lead to the weak performance of pervasive computing applications. The majority of the proposed context managers do not support quality of context assessment. In this regard, the paper titled "A model-driven approach for quality of context in pervasive systems" by José Ramon Hoyos, Jesus J Garcia-Molina, Juan A Botia, and Davy Preuveneers proposes an extension to MLContext for modeling quality of context. MLContext is a textual domain-specific language for context modeling. The authors insert a basic set of quality of context constructs to MLContext. They also provide external function calls for determining the quality of context requirements.

Today, social network is regarded as an important domain of pervasive computing and many context-aware social applications have been developed. They affect all aspects of people's life. However, privacy and security are the main challenges for adopting these applications. The conventional solution is to block all requests from unknown applications to sensitive information. The paper titled "A risk evaluation approach for authorization decisions in social pervasive applications" by Amr Ali-Eldin, Jan van den Berg, and Hesham A Ali considers the problem of predicting security risks in pervasive social networks. It proposes a risk management scheme that exploits the interaction of users as well as other entities for security risk predictions.

In the pervasive computing environment, many providers offer context-aware services that could confuse the consumers in choosing the appropriate service. For this, users specify the minimum quality of service parameters. Dynamic inclusion and exclusion of servers complicates this process in P2P pervasive environments. Moreover, the network of a pervasive environment consists of elementary networking devices such as sensors, mobile phones, and actuators that is far from

capabilities of a dedicated network. The paper titled “Server selection schemes for service-oriented computing in mobile pervasive environment” by Bikash Choudhury, Subhrabrata Choudhury, and Animesh Dutta proposes a set of server selection schemes that try to minimize the system-wide resource utilization. At first, the authors formulate the problem as a distributed constraint optimization problem and solve it by Fast-max-sum algorithm to attain the optimal values. Therefore, they propose a client-centric scheme for service selection to maximize the overall resource utilization.

The guest editors would like to thank the authors for their contributions, the reviewers for their help, the Editor-in-Chief, Prof Malek for his support, and the staff of the Computer and Electrical Engineering Journal for their cooperation and efforts.

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