

# Preface

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## 1. This issue

Pervasive systems often consist of humans, robots and smart components which cooperate in performing different tasks. In these systems, a rich symbolic representation facilitates the interaction with humans as information arrives. In particular, when robots are involved, information that is available in the system is of multimodal nature as multiple sensors and actuators are involved. A multi-agent system in charge of assigning semantic meanings to the data and events can enhance the interaction of the pervasive system with the human users. The paper “**Tangible Ambient Intelligence with Semantic Agents in Daily Activities**” by Dourlens et al. proposes such semantic agents applied to interactive robots in a home application. Different robots in charge of various tasks serve as sensing and actuating interfaces with the human occupant, and a hierarchical data and decision fusion architecture is devised to support the processes involved.

Ergonomic characteristics of the furniture used by humans have gained importance recently as they directly relate to various health and comfort aspects. The increased interest in sleep ergonomics is supported by its presumed influence on the development and maintenance of low back pain and sleep problems, two public health issues with important implications on the wellness and productivity of humans. The paper “**Smart control of spinal alignment through active adjustment of mechanical bed properties during sleep**”

by Verhaert et al. presents an autonomous bed system that actively controls bed properties during sleep in order to optimize spinal alignment in different postures. Continuous mattress indentation measurements are used as input of the control system. This results in an optimized spinal alignment during sleep by adapting mechanical bed characteristics according to the sleep posture of the user. According to the study reported in the paper, the concept of an actively controlled bed system, adjusting itself to behavioral aspects of sleep, seems to be a promising aid to promote better sleep by dynamically optimizing the sleep environment.

Activity recognition remains as an interesting yet challenging problem in smart environments. Many approaches based on different sensory data have been examined for classifying observed activity into a set of target events. In monitoring children, activity classes typically consist of various mobility types such as crawling, toddling, rolling, climbing, and walking. The paper “**Physical Activity Recognition using a Single Triaxial Accelerometer and a Barometric Sensor for Baby and Child Care in a Home Environment**” by Nam and Park proposes the use of a tri-axial accelerometer and a barometric sensor attached to the body of a child for classifying different mobility patterns. The paper examines the performance of a number of classifiers applied to the features extracted from the sensed data.

Wireless sensor networks have been traditionally designed and used as independent and separate networks in charge of collecting information from a target area of interest. As a variety of sensors may be deployed in a typical building-scale application, each type forming a network of data collection and processing, interaction and coordination between the different networks of sensors can enhance the operation of the entire application. The paper “**Performance**

**Optimization of Multiple Interconnected Heterogeneous Sensor Networks via Collaborative Information Sharing**” by Pal et al. examines the interaction options between different sensor networks to improve their performance by utilizing reports shared between them. The approach is based on taking into account all relevant information for making the best decision locally by each network, aiming to reduce energy consumption and to increase the sensing quality of individual sensor networks.

## 2. Upcoming issues

The next issue of JAISE will be a Thematic Issue on *Design* to be published in September 2013, followed by a regular issue in November.

More information on the call for papers to the future thematic issues is available on the webpage of JAISE at: <http://jaise-journal.org/>