

Preface

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This issue of JAISE is a regular issue consisting of eight articles. Review of these articles were supervised by our associate editors Albert A. Salah, Asier Aztiria, Tatsuya Nakajima, Jinshi Cui, Jesus Favela, James Dooley, Hans Guesgen, and Victor Zamudio, whom we thank for their work. The back pages of this issue contain information about upcoming events and other related material.

1. This issue

Recent studies indicate that teenagers in many countries are not physically active at an adequate level. Sedentary lifestyle seems to be a cause for the decline in the activity level of the youth; teenagers sit during classes, in their lunch break, and often at home in front of a computer or the television. Many existing intervention approaches try to tackle this problem, mostly by promoting a more physically active lifestyle, and by motivating sports participation. The use of interactive technology has been attempted in the past to encourage activity throughout the day. This technology has to fit in the context of the user's lifestyle, should allow personalized and adapted suggestions for play and activity, and should invite and anticipate new playing styles. The paper **“Playful Persuasion: designing for ambient playful interactions in public spaces”** by Tieben et al. introduces the notion of *ambient play* and presents insights on how to design for ambient playful interactions in public spaces. The article examines the results of ten design case studies, each implemented as an interactive installation and evaluated in situ with teenagers. The paper concludes that playful persuasion which resonates with values, emotions, and activities of the user can influence the user's behavior at least in the short term.

While much research on ubiquitous sensor systems and tele-health devices focuses on detecting sudden critical physiological and behavioural changes in the elderly users, the challenge of predicting changes over time and prompting positive preventative intervention measures for avoidance of severe physical or mental harm has not adequately been addressed by the research community. The paper **“An integrated home-based self-management system to support the well-being of older adults”** by Doyle et al. discusses an experience of designing, deploying and testing an integrated home-based ambient assisted living (AAL) system for older adults, consisting of ambient monitoring, behaviour recognition and feedback to support self-management of wellness. The paper introduces an *orange flag* alert for labeling observations which do not require immediate action, but rather may be indicators that something is changing and thus might require intervention. Through discussing the information obtained via long-term observation of elderly users, the paper also presents evidence that behavioral pattern recognition techniques applied to passive data acquired from a network of low-cost sensors installed in a home can provide prediction of the wellness state of the user.

One of the dimensions of wellness considered in most elderly care applications is the quality of sleep. The sleep time is often reduced in older adults, not due to a reduced need for sleep, but because of a diminished ability to sleep. It has also been shown that sleep disturbances may be indicative of poor health and functional deficits in older adults. Examining the benefits of a portable sleep monitoring technology to measure the duration of sleep and other physiological variables that determine the quality of sleep has been driving research in recent years. The paper **“Non-contact under-mattress sleep monitoring”** by Walsh

and McLoone studies the value of an under mattress pressure sensing sleep monitoring modality that can be seamlessly integrated into existing home environments to provide an unobtrusive data collection method for monitoring long-term changes in sleep patterns and sleep disorders in adults. The paper also compares the results obtained by the pressure sensing method with those based on accelerometers worn as wristbands and of video-based sensing.

The vision of Ambient Intelligence includes the notion that applications deployed in smart environments are aware of their context and can change their behavior according to this context. Despite the importance of context in guiding the operation of intelligent systems, there is still no unified definition of it nor a systematic way to model contextual information and incorporate it into the application. The existing work attempting to enumerate contextual elements are largely fragmented, and the research community has been mainly focusing on individual forms of context as the different parts of system development may benefit from their incorporation. This is understandable as perhaps due to the versatility of challenges that researchers face in the field of AmI, establishing a holistic and systematic methodology to model and use contextual data may have stayed out of scope for most researchers. The paper **“A framework for conceptualizing context for intelligent systems”** by Bauer offers an attempt to developing a cohesive and flexible conceptual framework for conceptualizing context for intelligent systems. As a first attempt, the proposed framework is not intended to replace formal methodologies for context modeling, nor it claims to represent a formal method. It places the conceptualization of context in the creativity phase of system design, assuming that the information is more or less explicitly integrated in all software development process models.

Accidental falls are some of the most common sources of injury among the elderly. A fall is particularly critical when the elderly person is injured and cannot call for help. The problem of fall detection has been mainly addressed by focusing on isolated falls under restricted conditions, while real-life situations call for consideration of many conditions such as the pose and gesture of the user when engaging in various activities of daily life, as well as the contextual conditions. The paper **“Context-based fall detection and activity recognition using inertial and location sensors”** by Gjoreski et al. proposes the use of a combination of body-worn inertial and location sensors for fall detection. The approach incorporates contextual data

such as body accelerations, location and elementary activities deduced from the two sensory modalities to detect a fall.

A common requirement for many AmI applications is the need for a non-intrusive person recognition module able to identify the subjects living or working in a specific environment without asking for their attention or cooperation. In most AmI scenarios, human identification differs from traditional biometric-based recognition applications for several reasons. The acquisition process is often performed while users conduct their normal activities, hence the quality of the acquired images or video may be low. On the other hand, typically the list of possible users is limited, turning the recognition effort into a classification task with limited targets. Finally, in these applications, recognition accuracy is not a critical requirement for many of the services whereas essential constraints are real-time processing and user friendliness. The paper **“On the use of the Kinect sensor for human identification in smart environments”** by Ferrara et al. presents an experimental study on the feasibility of performing biometric recognition in smart environments using Kinect sensors. The method is based on the use of RGB and IR face images and anthropometric measurements obtained from the depth image.

Human activity recognition is a prerequisite for many applications in elderly monitoring and support. A diversity of different activity recognition approaches has been developed from which the majority focuses on the processing of data from one sensor modality only, such as vision. Fusion of data from multiple disparate sources has the potential of offering more accurate, robust, descriptive, intuitive, or meaningful results due to the availability of complementary and partially redundant information. The paper **“A brain-inspired multimodal data mining approach for human activity recognition in elderly homes”** by Velik offers a review of existing multimodal approaches for elderly activity recognition in home settings and introduces an activity recognition model based on brain-inspired multimodal data mining methods. The proposed method is applied to the task of daily activity recognition in a home setting using a publicly available real world dataset, and quantitative results are presented to compare the performance of this method with other multimodal activity recognition techniques.

The deployment of Intelligent Transport Systems (ITS) deals with the integration of the information and communications technologies of vehicles and road facilities. Particular attention is paid to next generation

vehicles, information and communication strategies, services and facilities. The paper “**Vehicle density in VANET applications**” by Reyes et al. considers the likely trajectory of the emerging Vehicle Ad Hoc Networks (VANETs) applications and their related technologies. A study of VANET applications reported in the literature confirms that designing a VANET application is a complex process that requires analyzing all the technical aspects involved in the context where the application will be used. For example, it is necessary to define communications systems that feature a convenient, stable, secure and economic distribution of data over highly mobile nodes. In addition, vehicles require reliable location sensing mechanisms and also a communications capability able to distinguish between critical and informative messages. The paper proposes an approach to determining the density level of vehicles in a location according to the signals collected from a network of acoustic sensors. Based on the density level obtained this way, many VANET applications will be able to adjust their routing protocols in a dynamic way.

2. Upcoming issues

The following is the list of upcoming issues of JAISE:

- Sept. 2014: Thematic Issue on *Challenges of Engineering Intelligent Environments*
- Nov. 2014: Regular Issue
- Jan. 2015: Thematic Issue on *Affect Aware Ubiquitous Computing*
- March 2015: Regular Issue
- May 2015: Thematic Issue on *Evaluating Ambient Assisted Living Components and Systems*
- July 2015: Regular Issue

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