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Preface

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1. This issue

In order to offer adaptive and personalized services to their users, smart environments need to monitor and interpret the events involving human users. Identification of particular users as they enter the service domain, recognizing their activities, and taking into account the prevailing context enable an Ambient Intelligence system to react properly to the situation. Research on each of the named aspects of recognizing the user events and environments can hence help create a better understanding of the potentials for developing interactive services that adapto to the profiles and preferences of their users. This issue of JAISE is composed of papers that each address one of the fundamental technologies related to the recognition of users, their events, and the context.

Many systems that offer personal services to users need to first determine the identity of their intended user among a group of humans. Identity management systems based on a variety of sensing methods have been proposed across different settings from retail spaces to smart offices. The use of identity badges with passive RFID tags, biometric sensors, PIN number displays, barcodes, and other electronic signatures has been examined for these applications. Image and video-based identification has also been studied in research level and early prototypes that track an individual across a network of cameras can be found in surveillance applications. The use of ultrasound audio signaling has been tested with mobile phones to recognize the identity of participating shoppoers as they enter the shop. The paper *"Identification System based on Color Sequence and Mobile Phones"* by Garrido et al. proposes the use of a color sequence on the mobile phone display which can be read by a color sensor. The color sequence serves as an identification key that the user carries to different smart systems or places.

Unobtrusive monitoring of user position and activity is an important but challenging task in many smart home applications. Different sensing modalities have been proposed for this aim. The use of video sensors has been examined for various gesture and activity recognition tasks; however, deployment to actual homes still faces challenges such as handling privacy concerns. Other sensing modalities such as ultrasound, passive infrared, and radio frequency have been used to detect the location of users. Networks of motion detectors have been tested in some real scenarios to collect long-term data from user homes. These sensors cannot provide granular information about the activity of the user and the user's location is only approximated based on the geometry of the sensors. The paper *"Capacitive indoor positioning and contact sensing for activity recognition in smart homes"* by Valtonen et al.proposes a new system to estimate the location, posture, and activity of a user based on the conductivity of the human body and on capacitive coupling of lowfrequency signals between electrodes embedded in the floor and the in the environment. The proposed system can locate a person at floor level and monitor his interaction with common household items.

A growing area of research is the use of wearable sensors to quantify attributes of gait and motor functions in the elderly in order to evaluate potential falls risks before such incidents occur. A common challenge for employing sensors which accompany users is that the range and diversity of measurements made by each sensor depend not just on the targeted effect such as gait, but the measured data may also have dependency on contextual factors such as the type of the environment, time of day, and the behavioral attributes of the user. The paper *"Combining Wearable Sensors for Location-Free Monitoring of Gait in Older People"* by Smeaton et al. proposes an approach to address this problem by combining inertial sensing methods for quantitative gait analysis with life logging using other wearable sensors and a wearable camera that automatically record a wearer's contexts at all times. Using the proposed system, a clinician can use both

gait data and the life-log data to mutually index each other and enable a more thorough exploration of data and a greater understanding of the impact of environment on gait function and subsequent falls risk.

Two important aspects of realizing smart environments are context awareness and proactiveness. Systems of sensors with the aid of scene understanding and activity recognition techniques support achieving context awareness, while automation systems, robots, and a multi-agent coordination architecture enable proactivity in smart environments. In order to be effective in supporting human users in real-world situations, these two cognitive processes must operate in unison, informing each other in order to synthesize appropriate, timely and relevant support services. The paper *"A Constraint-Based Approach for Proactive, Context-Aware Human Support"* by Cirillo et al. proposes to use constraint reasoning as the basis for achieving an integration of activity recognition, task planning and execution. The paper leverages a constraint-based reasoning paradigm in which both requirements for recognition and for planning and execution are represented as constraints and reasoned upon continuously.

An important concern in the development process of a smart environment is testing and validation of its services and applications. Living labs have been used in the past to allow the users to experiment directly with the technology and the smart system. The information obtained from such direct user's experiences is valuable in evaluating user requirements. However, living labs have a high cost to build and it is also hard to conduct large-scale tests in them. An alternative to the creation of a real living lab is its simulation by the creation of a virtual physical space, with simulated users, sensors and appliances. Under this approach, it would be possible to create realistic human behaviors and simulate them for the validation of a smart environment's services or applications. The paper *"Chronobiology Applied to the Development of Human Behavior Computational Models"* by Campuzano et al. proposes a methodolgy for creating such simulations based on chronobiology, an area of science which studies how time affects living organisms. The paper applies concepts from chronobiology (such as actograms, plexograms and cyrcadian rhythms detection) to analyze real data about the user's behavior and to create a simulation model of the human starting from the result of such analysis.

2. Book review

A review of the book *"A practitioner's guide to resampling for data analysis, data mining, and modeling"* by Egonvan den Broek follows the articles section of this issue.

3. Upcoming issues

From the beginning of this year JAISE is published every two months. This reflects the increase in submissions and requests from our community to have a higher frequency of publications to better match the rapid pace of the technical landscape. The journal will keep the tradition of alternating Thematic Issues with Regular Issues. Hence, the issue to be published in September 2012 will be a Thematic Issue focused on *Ambient Assisted Living*. This will be followed by a regular issue in November and another Thematic Issue scheduled for January 2013 with a focus on *Contex-Aware Systems*.

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

4. Upcoming events

As usual for an area active like AmI there are interesting events around the world. The last pages of this issue provide information on some interesting upcoming events.