1st Workshop on Human Factors and Activity Recognition in Healthcare, Wellness and Assisted Living (Recognise2Interact)

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Abstract

Context-aware systems have the potential to revolutionize the way humans interact with information technology. The first workshop on Human Factors and Activity Recognition in Healthcare, Wellness and Assisted Living (Recognise2Interact) aims to enable researchers and practitioners from both, Activity Recognition and Human Computer Interaction to interact and bridge the gap between these two fields. The workshop will provide a comprehensive overview on current technological solutions that benefit from the synergy of activity recognition and human computer interaction with particular focus to Healthcare, Wellness and Assisted living applications. The workshop is supported by the iCareNet network.

Author Keywords
Activity Recognition, Context awareness, Human Computer Interaction, Human Factors, Pervasive Healthcare, Assisted Living.

ACM Classification Keywords
C.2 – Computer-communication networks, H.4 – Information systems applications, H.5 – Information interfaces and presentation, I.2 – Artificial Intelligence, I.4 – Image processing and computer vision, I.5 – Pattern Recognition

General Terms
Ubiquitous and Pervasive Computing

Introduction
Ubiquitous computing and pervasive systems have significantly changed the way humans perceive and interact with Information Technology (IT). This paradigm transcends the traditional desktop interaction model by moving computing power into the physical world thereby enabling humans to *naturally* interact with computing machines [1].

The availability of cheap sensing technologies and the increase in multiple interconnected devices have pushed research and commercial interests towards systems that adapt and react based on sensed activity and context. Context-aware systems open new frontiers in the research of adaptive users interfaces, context-aware communication systems and proactive applications finding their natural application in guidance and support of their users, in particular in Healthcare, Wellness and Assisted Living (HWA) services. In environments where user attention is poor and not focused on the device such as in HWA, context-aware systems promise to revolutionize the human-computers interaction paradigm.

The possibility to effortlessly carry mobile devices with connected sensors has given rise to the development of systems able to continuous monitoring and recognizing human actions, activities and routines. Recognizing human activities enables interactive systems to provide a further degree of adaptation, proactivity and personalization derived from understanding user intents and behavior.

Activity and context recognition research has large potential in delivering automatic and unobtrusive health monitoring systems and remote-assistance services, if properly integrated with interaction techniques. Many current activity and context-aware system proposals currently lack consideration of interaction requirements, which could change recognition needs and system responses substantially. Related issues include system intelligibility, robustness, integration, motivation, during regular, potentially permanent use by patients, elderly, and health-aware individuals. The HCI research community started looking at the benefits that activity and context recognition can provide in order to improve services and create novel context-aware human computer interaction [2,3,4]. However, wider efforts are needed in joining these two research fields and enhancing the human computer interaction in HWA applications. Research discussions are needed to determine the fundamental requirements of recognition and interaction to benefit from each other and derive integrated solutions with clear practical impact.

Objectives of the workshop

The first workshop on Activity Recognition and Human Factors in Healthcare, Wellness and Assisted Living (Recognise2Interact) aims to bring together researchers and practitioners from Activity Recognition and Human Computer Interaction to disseminate the latest accomplished and/or ongoing researches focused on how activity recognition and context awareness can help to improve the interaction between humans and IT systems. The goal of the workshop is to bridge the gap between these two fields and to help in identifying opportunities and challenges for interested researchers, companies and system developers.

The workshop will provide a comprehensive overview on current technological solutions that benefit from the synergy of activity recognition and human computer interaction with particular focus, but not limited to, Healthcare, Wellness and Assisted Living applications.

Workshop topics include, but are not limited to:

- Sensors technologies and networks for unobtrusive monitoring of human behavior and activities
- Sensors patterns analysis techniques improving users' interaction
- Context inference methods and behavior discovering models for healthcare and smart environments applications
- Gesture monitoring and recognition for natural interaction with context-aware systems
- Long term activity recognition for pervasive applications
- Systems and methodologies for enhancing users' experience

In addition, the first workshop on Activity Recognition and Human Factors in Healthcare, Wellness and Assisted Living (Recognise2Interact) aims to create a network of interested actors in the field of HWA and to share experience and lessons learned by experienced researcher and practitioners. A targeted outcome is to formalise the requirements for future solution developments that incorporate context-awareness and interaction.

All submitted works should illustrate their relevance into both Activity Recognition and Human Computer Interaction. Accepted papers will include a description of the methodology proposed and clear evidence about how one field can benefit from the confluence with the other. Accepted papers will also include a preliminary or exhaustive evaluation in at least one of the two areas.

Participation

Researchers from both industry and research institutions are welcome to participate and submit their work to the workshop. Teams of researchers cooperating to meet the addressed challenges are encouraged to submit works sharing their experiences, approaches and lessons learned. The workshop focus fits with the ongoing European research network iCareNet (www.icarenet.eu), from which participation is welcomed.

We seek contributions within, but not exclusively, the following application areas:

- Interaction in hospitals and care institutions
- Interaction with context-aware systems
- Smart monitoring for rehabilitation and home motor training
- Monitoring of dieting, food intake activities and

alimentary behaviors in daily life
- Ambulatory estimation of mental strain, stress, emotion and depression
- Automatic assessment of the quality of life
- Monitoring of home patients and analysis of sleep disorders
- Analysis of gait, falling and lying in Assisted Living scenarios
- Human, social, and organizational aspects of wearable context-aware systems
- User Mobile Interaction

Program committee

Researchers from different technical areas and expertise in activity recognition and human computer interaction compose the program and technical committee. The program committee is reported in the following list.

- Oliver Amft, *TU Eindhoven, The Netherlands*
- Pierluigi Casale, *TU Eindhoven, The Netherlands*
- Steven Houben, *ITU Copenhagen, Denmark*
- Thomas Pederson, *ITU Copenhagen, Denmark*
- Paul Lukowicz, *DFKI, Germany*
- Mark van Gils, *VTT, Finland*
- Nico van der Aa, *Noldus Information Technology, The Netherlands*
- Jo Vermeulen, Hasselt University, *Belgium*
- Oriol Pujol, *University of Barcelona – Computer Vision Center, Spain*
- Mads Frost, *ITU Copenhagen, Denmark*

Running the workshop

The workshop will run over a full day on September 9th.

For each accepted paper, one of the authors will present the work by means of presentations in electronic format. For each accepted paper, at least one of the authors will attend the workshop.

Participation to the workshop sessions is open to all the interested people previous registration. In the concluding session, participants will have the opportunity to provide feedback on the workshop and decide for any continuation at another venues in future events.

An invited keynote speaker will open the workshop.

A "Best Paper Award" will be conferred to the author(s) of a full paper presented at the workshop, selected by the Organization Committee based on the best-combined marks of paper reviewing, assessed by the Program Committee. The award is sponsored by the iCarenet project.

The awards will be announced and bestowed at the workshop closing session. The author(s) of the awarded paper will be entitled to a signed and stamped official award certificate.

About the organizers

Pierluigi Casale is a Post-doctoral researcher of the ACTLab research group at TU Eindhoven, Eindhoven, The Netherlands. He received a Ph.D. in Applied Mathematics from the University of Barcelona, Spain, in 2011. His main research interests are focused on approximated machine learning techniques and distributed learning methods for human activity

recognition in Healthcare and Assisted Living applications. He co-organized the *7th workshop on Advances in Theory and Applications of Computer Vision*, in 2012 in Barcelona, Spain.

Steven Houben is a PhD student affiliated with the Pervasive Interaction Technology (pIT) Laboratory at the IT University of Copenhagen. His research interests include human-computer interaction, ubiquitous computing and computer supported cooperative work and is focused towards the theory, design, construction and evaluation of activity-centric computing interfaces, systems and infrastructures that support real work practices.

Oliver Amft is an Assistant Professor at TU Eindhoven and a senior research advisor at the Wearable Computing Lab, ETH Zurich. He received the Dipl.-Ing. (M.Sc.) from Chemnitz Technical University in 1999 and the Dr. sc. ETH (Ph.D.) from ETH Zurich in 2008, both in Electrical Engineering and Information Technology. Until 2004, he has been a R&D project manager with ABB Inc., leading product developments in embedded communication systems. Oliver received the EWSN/CONET award for his PhD thesis. His research focuses on multi-modal activity recognition and human behavior inference algorithms with applications (among others) in healthcare, wellness, sports. He has co-authored more than 60 publications in this area.

Pre-workshop preparation plan

Pre-workshop preparation plan is defined in the following subsections. Relevant dates for the workshop have been set in order to match the requirements provided by the UbiComp2013 organization committee and including the workshop proceedings into the supplemental proceedings of the conference.

Workshop Webpage

A dedicated webpage for the has been set up at the address https://sites.google.com/site/recognise2interactworksh op/ with all the relevant information about objectives, important dates and papers guidelines submission. Upon acceptance, all the titles of the accepted papers will be published on the workshop website. After the workshop, the website will contain further material for the follow-up workshop plan.

Workshop Distribution

Announcement of the workshop and the Call for Papers (CfP) are distributed through the Ubicomp2013 conference webpage and the dedicated workshop webpage. In addition, the workshop will be announced though the main social networks channels (Facebook, Twitter, Linkedin, etc.). Organizers and technical committee members will actively announce the workshop and the CfP through their personal professional and academic network.

The workshop will be also actively promoted through the websites of national and European projects that promote the workshop (iCareNet, GreenerBuilding, etc).

Technical Provisions during the Workshop

A notebook running a Windows operating system with the most important application viewers will be provided in the workshop room. A laser pointer and a remote control will be provided to the presenters.

Post workshop follow up

The workshop will be documented by pictures that will be uploaded on the website after the workshop execution

The network of researchers and practitioners created in the workshop will be maintained active through the workshop website in order to set up new workshops and events in future international events.

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