„Wearable AR – Towards Industrial Adoption“

4th Workshop On Wearable Systems For Industrial Augmented Reality Applications

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Abstract
In the last year, Wearable Augmented Reality and Virtual Reality devices have seen a tremendous presence in the media. However, we have not seen a widespread adoption in industrial and professional scenarios yet. In this workshop, we want to assemble practitioners and researchers in the field to identify blockers of adoption and work towards overcoming them.

Augmented Reality (AR) is a successful application area of Wearable Computing, especially for professional, industrial settings, in which mobility is an important factor. With the proliferation of mobile technology in the workplace, wearable computing research can offer a valuable contribution to the usability of mobile solutions, such as the use of context information to inform devices and services of the current task and user situation, relieve professionals of tedious and repetitive information entry tasks and increase worker safety in complex and hazardous environments. Wearable AR systems in general are widely utilized in

various domains, including architecture, military, tourism, navigation, and entertainment. Such diverse usages impose several challenges on researchers from both areas of Augmented Reality and Wearable Computing, such as interaction, activity and context recognition, wearability, design, and modelling.

We invite researchers and industrial developers from relevant disciplines to a one-day workshop held in conjunction with ISWC 2015 and UbiComp 2015 to present novel work and discuss the application of state-of-the-art Wearable Computing research and Augmented Reality systems. The workshop provides an opportunity for directed discussion to identify current issues, research topics, and solution approaches, which lead to the proposal of future research directions.

Author Keywords
Augmented Reality, Wearable Computing, Industrial Applications.

ACM Classification Keywords
H.5.1. Multimedia Information Systems
H.5.2 User Interfaces.

Objectives
The objective of this workshop is to bring together researchers from academia, professional hardware and software developers and current and future users of wearable systems. We want to stimulate the application of Augmented Reality on wearable systems in professional environments. The foremost goal is to identify and set research and development milestones to reach the anticipated AR-based wearable systems.

In previous workshops, we set an agenda with research topics, which the participants defined as relevant for the topic. The most significant finding, although in hindsight both amusing enlightenment and disappointment, was that the timeframe for the introduction of such systems is so far continuously defined as "three to five years" – with no change over the last 15 years. Now, this has changed with first mass market products being available in 2015.

In this proposed fourth workshop, we want to intensify this discussion in more detail on open research questions and the results and developments, which have been achieved since last year. We will review the continued list of relevant topics identified in the previous workshops and have the goal to define a more detailed research roadmap or agenda for Wearable AR systems for the coming years. Another objective is to set up and keep an updated comparison between consumer applications in the fields of Wearable Computing and Augmented Reality in contrast to industrial applications. The focus on industrial applications in this workshop shall not exclude introduction of consumer-oriented systems, but rather seek transfer of knowledge and technology to be adapted into industrial applications as well as "consumerization" of originally industrial systems.

Significance
Wearable Computing systems and Augmented Reality applications will more and more become part of daily experience with mobile computing systems. To design and develop such systems, hardware and software experts as well as designers of user interaction and work processes need to collaborate extensively. This

workshop will start a discussion, which could lead into such a direction.

Target Audience

Target audience are users, experts and developers of Wearable Computer systems and/or Augmented Reality applications from academia and from industry. We will highly encourage last years' participants to join the workshop, but appreciate having a lot of additional contributions and new perspectives as well.

Envisioned Contributions

The workshop organizers seek contributions about core technologies, such as hardware – especially head-mounted displays and complete head-worn computing devices, AR development kits, AR-enabled software, software architectures, as well as business ideas and case studies of AR systems in professional applications. The presentation of comparisons of consumer-grade systems with systems designed for users in industrial environments or application of consumer systems in professional applications is encouraged. Presentations will be selected based on extended abstracts, which should derive and present the core research questions or key application scenarios relevant to wearable AR. Additionally, we will invite a limited number of keynote-style presentations of relevant stakeholders in Wearable AR systems. As it turned out in the preceding workshops, these contributions in the morning sessions lead to valuable discussion in the afternoon.

Agenda

After a series of keynote-style presentations, we will move into a moderated discussion to generate a list of necessary steps towards the adoption of AR in industrial and professional environments. The goal is to establish a continuing exchange on the topics and review the results in a future workshop.

The presentations in the morning session shall briefly (in 20 minutes) describe the current developments and R&D roadmaps of the contributors' institutions and then list and raise 2-3 main research questions, which the presenters think are relevant for wearable AR in industrial applications. These presentations could be seen as a pitch on urgent R&D questions.

Organizers' Background

Christian Bürgy works as professor at Baden Wuerttemberg Cooperative State University Mannheim since July 2013; since 2007 he is managing partner of teXXmo Mobile Solution GmbH & Co. KG, a company dealing with and doing research in industrial mobile and wearable computing. Christian holds an engineering degree as civil engineer with focus on *Computer Science in Civil Engineering (Bauinformatik)* from Technical University of Darmstadt, Germany and a Ph.D. in *Computer Aided Engineering and Management* from Carnegie Mellon University in Pittsburgh, PA, USA. Since 1999, Bürgy is doing research in the area of wearable computing. He is currently head of the WearLab BW at DHBW Mannheim.

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Holger Kenn holds a diploma degree in computer science from the Universität des Saarlandes in Saarbrücken, Germany and a Ph.D. from Vrije Universiteit Brussel, Belgium. In 2001, he became Lecturer of Electrical Engineering and Computer Science at the newly founded Jacobs University in Bremen,

Germany where his research focused on autonomous mobile multi-robot systems for urban search and rescue. From 2004 to 2007 he worked as senior scientist at the TZI at Universität Bremen, Germany on research topics in wearable computing. Since 2007, he works for Microsoft in Germany on embedded systems, system-level software and cloud computing.

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