“Are We Crossing the Chasm in Wearable AR?” - 3rd Workshop on Wearable Systems for Industrial Augmented Reality Applications

Abstract

The term “Crossing the Chasm”, coined by Geoffrey A. Moore [1], states that there is a significant time gap in high-tech marketing between the phase of early adopters and visionaries using new products and the early majority. With the latest success of wearable devices or the marketing of such devices, we seem to cross the chasm in wearable technology in general. One of the ideal pictures, we painted over the last years, is the use of Augmented Reality-based wearable computing systems overlaying our view of the real world with useful information. Such systems, though, are only about to become commodities or actual tools and many research results presented at previous ISWC conferences have yet to be implemented and industrialized.

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 modeling.

We invite researchers and industrial developers from
relevant disciplines to a one-day workshop held in
conjunction with ISWC 2014 and UbiComp 2014 to
present novel works 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.

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[2][3], 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 changed a bit with
companies promising first mass market products within
the next 12-18 months.

In this proposed third 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 two 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 4-page short papers, 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[2][3], these contributions in the morning sessions lead to valuable discussion in the afternoons.

**Agenda**
After a series of keynote-style presentations, we will move into a moderated discussion to generate a list of necessary steps, which might help to answer the question of "Are We Crossing the Chasm in Wearable AR?" – 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. In the afternoon discussion, we will discuss those raised questions and try to evaluate their importance and urgency.

**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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