
Mobile and Personal Projection (MP²) Workshop Proposal for CHI 2011

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Abstract

In this workshop, we explore the human interaction with ubiquitous mobile and personal projection. We bring together different disciplines to create a new research direction for this emerging field.

Keywords

Projection, personal, mobile, interaction.

ACM Classification Keywords

H5.2. Information interfaces and Presentation: User Interfaces – input devices and strategies.

General Terms

Design, Human Factors.

Workshop Topic and Research Questions

Mobile and wearable pico-projectors emerging in the market and promise new ways to display and interact with content while the user is mobile. Such possibilities range from projecting a large and high resolution information display on any surface to having augmented reality applications and projected interactive user interfaces. This also poses novel interaction challenges, provides a high potential for new applications, and raises many questions regarding privacy or social implications. This workshop intends to address these challeng-

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CHI 2011, May 7–12, 2011, Vancouver, BC, Canada.

ACM 978-1-4503-0268-5/11/05.

es and opportunities by provides a venue for building a research community around this evolving topic. We have seen a few papers and projects in this area in the last years that presented various concepts, interaction techniques and experiments. Therefore, we have the aim to consolidate this field and set a broad research agenda. The workshop specifically addresses the following fundamental research questions:

- What are the unique properties and affordances of mobile and personal projection?
- What are core applications that benefit the most from the usage of mobile and personal projection?
- What are the application contexts and usage requirements?
- What are suitable interaction metaphors and techniques for mobile and personal projection? How can gestures be incorporated? How should visualizations be structured?
- What is the social impact of mobile and personal projection technologies? How can users manage privacy when using mobile and personal projectors? How does public behavior change with the introduction of mobile and personal projection technologies?
- How can spontaneous, co-located collaboration be supported by mobile and personal projection technologies? How can designs support the exchange of media items between mobile projector phones?
- What are suitable strategies and methodologies for evaluating mobile and personal projection interfaces?
- Which aspects have an impact on the user experience?

The workshop aims to attract starting Ph.D. students and senior researchers, as well as practitioners and

industrial partners alike. Work on mobile and personal projection is currently primarily rooted in applied research in human-computer interaction, with a focus on identifying emerging application areas. We hope that the workshop will generate ideas that suggest further promising directions for future work to the CHI community.

Workshop Format, Length, and Size

MP² is planned as a follow-up to the Ubiprojection Workshop (eis.comp.lancs.ac.uk/workshops/ubiproject2010) at Pervasive 2010. The workshop was very successful with about 30 participants from 7 different countries including Japan and the US. For CHI 2011, we plan for a full-day workshop with 15 to 20 participants, an extended thematic scope and aim at wider CHI audience with multidisciplinary insights being explicitly encouraged

Workshop Plan

Before the Workshop

The call for papers will be distributed in several research communities, including those of HCI, mobile interaction, ubiquitous computing, pervasive computing, and intelligent UIs. Furthermore, we will setup a webpage for the workshop and use Twitter and online communities such as Facebook in order to inform about scope, CFP, organizers, reviewers and organization.

Participants will be selected based on their submitted position papers (up to four pages), in which they must demonstrate informed positions about the topic. The contributions will be peer-reviewed by at least two reviewers from an international PC. We will also ask them to produce research questions related to the work that is discussed at the workshop.

At the Workshop

We aim to address the previously mentioned research questions around topics such as interaction techniques, tracking systems, evaluation methodologies, social impact, privacy, collaborative scenarios, and emerging application areas. This is a wide area of research that ought to attract researchers from HCI, ubiquitous and pervasive computing, mobile computing, computer vision, artificial intelligence, information visualization, psychology and cognitive science. We hope to begin a dialog on formulating a research agenda in the area for the next years and set the stage for future cooperation. In light of this, the insight of industrial researchers and practitioners is especially welcomed.

Each workshop participant will introduce themselves at the beginning and provide a compact overview of the position statement. This will be followed by an informal demo session as each of the participants will be invited to bring a prototype or sketch of an idea or question to the workshop. In the next sessions, the participants will work in groups on selected questions, ideas and concepts. These may lead to sketches, paper prototypes, ad-hoc studies using the available mobile and personal projector hardware, or exploration of personal projector services. The results of these group sessions will be discussed with all workshop participants. Finally, we will discuss future research areas, challenges and the potential for mobile and personal projection in order to lay the foundations for a research agenda in this field.

After the Workshop

All position statements, slides, discussion results, etc. will be published on the workshop website and relevant online platforms (such as Slideshare and Flickr). We

intend to publish selected workshop contributions in a special issue of a journal.

Organizers' Backgrounds

Raimund Dachsel is working as an assistant professor at the University of Magdeburg. His main research interest is the development of visualization and interaction techniques for a seamless interaction in environments with multiple displays and devices.

Matt Jones is a full professor of computer science. He has worked on mobile interaction issues for the past fifteen years and has published a large number of articles in this area. He has had many collaborations and interactions with handset and service developers. He has been a Visiting Fellow at Nokia Research and is currently a member of its Scientific Advisory Board.

Markus Löchtefeld is a junior researcher at the German Research Centre for Artificial Intelligence (DFKI). His research focuses on new interaction techniques for mobile projection, including augmented reality and context-aware applications.

Michael Rohs is a senior research scientist with Deutsche Telekom Laboratories at TU Berlin. His research interests are in pervasive computing and mobile interaction. This includes physical and virtual aspects of the user's environment, sensor-based mobile interaction, and handheld augmented reality.

Enrico Rukzio is an assistant professor at the University of Duisburg-Essen and a lecturer in the computing department at Lancaster University. His research interests include mobile interaction with personal projectors, interactive surfaces and public displays.

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Abstract

The emergence of mobile and personal projection devices promises new ways to display and interact with content while the user is mobile, and offer new opportunities and challenges for HCI. This workshop aims to formulate fundamental research questions around this emerging field and provides a venue for discussion for researchers and practitioners working in this area. We will focus on new interaction techniques, applications, personal projection devices, interaction design, multi-user aspects, multi-modal user interfaces and social implications. Our aim is to foster the evolution of a mobile and personal projection community.

Keywords

Projection, personal, mobile, interaction.

ACM Classification Keywords

H5.2. Information interfaces and Presentation: User Interfaces – input devices and strategies.

General Terms

Design, Human Factors.

Introduction & Motivation

Mobile and personal projection interfaces are no longer fiction and have received considerable attention recently. Integrated pico-projectors in mobile and wearable devices could make mobile projection ubiquitous within

the next few years. Walls, desks, floors, ceilings, t-shirts or palms will act as projection surfaces for these kinds of new devices.

These technological developments offer new opportunities and challenges for novel forms of interaction. Virtual displays can extend beyond physical device boundaries and augment existing objects. There are also new opportunities for spontaneous multi-user interaction. However, issues such as lighting conditions, privacy, and social acceptability also come into play.

We will bring together researchers and practitioners who are concerned with design, development, and implementation of new applications and services using personal mobile and wearable projectors in their user interfaces. The workshop aims at conveying hands-on experience with current state-of-the-art technology and prototypes through demonstration sessions and encourages discussion about future research topics.

Related Work

Several projector phones and mobile phones with built-in projectors are already commercially available, have been demonstrated, or are announced [6]. It is expected that such projector phones will be integrated in many of the next generation mobile handsets. Initial research in the field of mobile projection has focused on creating distortion free projection as well as first interaction techniques [5]. Furthermore, we have seen initial research towards the integration of pico-projectors and cameras into various wearable systems, such as pendants [4], headsets [8], or wristwatches [1]. These lead to new form factors, interaction techniques, and applications. The mobile projection and camera units have a great potential to overcome some limitations of

mobile and wearable devices, especially their limited input- and output capabilities [7]. They offer a large projection area or are able to project virtual interfaces where multiple people can spontaneously interact with it [2]. Besides novel interaction techniques, new social implications also arise from ubiquitous projection [3]. Moreover, there is also increasing interest in embedding pico-projectors into environments relating to cars, public transport, and future lighting systems.

Objectives

The workshop will provide an open forum to share information, results, and ideas on current research on mobile and personal projection. The participants will explain, demonstrate and discuss their current research with others in order to receive feedback, criticism and ideas for future work. Concrete selected questions, ideas and concepts will be addressed in various group sessions in which the participants will work on topics such as a design space for mobile and personal projection; user interface, interaction design and application sketches; paper prototypes; or ad-hoc studies using the provided mobile and personal projector hardware. The results of these group sessions will be discussed with all workshop participants. Finally, we will discuss future research areas, challenges and the potential for mobile and personal projection in order to lay the foundations for a research agenda in this field.

Workshop Topics

The workshop looks for contributions on the following and related topics:

- Applications and interaction techniques for mobile and wearable projection.
- Personal projection in augmented reality.

- Interaction with projected interfaces.
- Projector phones and wearable projectors.
- Multi-user interactions and applications.
- Multimodal and personalized (mobile) interfaces.
- New application areas of mobile projection.
- Social implications when interacting with projected interfaces.
- Artistic and unusual ways to utilize mobile projection.
- New forms of interaction with the environment.

Research Questions

Mobile and personal projection is at a relatively early stage of research. Reflecting this state, the workshop specifically addresses the following fundamental research questions:

- What are the unique properties and affordances of mobile and personal projection? What are suitable interaction metaphors?
- What are core application domains that benefit the most from the usage of mobile and personal projection? What are the application contexts and usage requirements that support mobile and personal projection?
- What are suitable interaction techniques for mobile and personal projection? How can gestures be incorporated? How should visualizations be structured? How can the projected virtual and real images of objects coexist? What is the role of augmented and mixed reality?
- What is the social impact of mobile and personal projection technologies? How can users manage privacy when using mobile and personal projectors? How does public behavior change with the introduction of mobile and personal projection technologies?

- How can spontaneous co-located collaboration be supported by mobile and personal projection technologies? How can designs support the exchange of media items between mobile projector phones?
- What are suitable strategies and methodologies for evaluating mobile and personal projection interfaces? What aspects impact the user experience?

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Call for Participation

Workshop Mobile and Personal Projection (MP2) at CHI 2011.

Mobile projection interfaces are no longer fiction. Integrated pico-projectors in mobile and wearable devices could make mobile projection ubiquitous within the next few years. These devices have great potential to overcome limitations of mobile and wearable devices, especially their limited input- and output capabilities.

The main goal of this one-day workshop is to develop an understanding of how mobile and personal projection could be combined with new user interfaces, interaction techniques and applications. We seek new ideas, prototypes, and insights as a basis to develop a deeper understanding of the field. We also wish to bring together key scientists in all participating disciplines and practitioners from the industry. The workshop shall provide an open forum to share information, results and ideas on current research in this area. Young scholars and Ph.D. students are especially encouraged to submit papers and to participate in the workshop. Each paper will be reviewed by at least three members

of an international program committee. Selected papers will be published in a journal special issue and all papers will be made available before the workshop.

Topics of interest include, but are not limited to:

- Applications and interaction techniques for mobile and wearable projection.
- Personal projection in augmented reality.
- Interaction with projected interfaces.
- Projector phones and wearable projectors.
- Multi-user interactions and applications with mobile and wearable projection.
- Multimodal and personalized (mobile) user interfaces using personal projection.
- New application areas of mobile projection.
- Artistic and unusual ways to utilize mobile projection.

Here follow some details about the submission process, organizers and the tentative program committee.