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## Experiencing Interactivity in Public Spaces



Figure 1: Public display interaction [10]



Figure 2: Public pico projection to a temporary display area [15]

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### **Abstract**

Mobile and ubiquitous systems create opportunities for new kinds of interactivity in public spaces. Examples of human-technology interactions in public spaces include interactive displays on different scales; mobile systems enabling projection in public environments; smart interactive and reactive objects; tangible interfaces; and public media arts. Human-system and mediated human-human interactions become public and visible to the people around the same space. This creates many possibilities and challenges for designing the user experience that arise primarily from the social and physical context. This workshop will bring together researchers, designers, practitioners and media artists to discuss elements and viewpoints of such new forms of experiences. The results of the workshop will be an “experience design space” and a research agenda for experiences with interactive systems used in public spaces.

### **Author Keywords**

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### **ACM Classification Keywords**

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Figure 3: Tangible tabletop interaction in a night club [1]



Figure 4: Interaction with a media arts installation (by Alvaro Cassinelli and Danielle Wilde, 2011)

## Introduction

New types of interactive systems are designed and brought into public spaces such as city centers, high streets, exhibition halls and outdoor areas, schools, airports and transportation vehicles. In addition, mobile, wearable, and context-aware systems are used in public areas. Interaction with these systems is driven by and the user experience is strongly influenced by contextual factors such as location, place, people, and technological infrastructure. The following systems and research efforts illustrate types of public interactivity.

### *Interactive Public Displays*

Public displays emerge as a communication media [5] and create a new space for interactive experiences [10] (an example in Figure 1). Designing engaging forms of interaction aiming at enjoyable user experience with public displays poses new requirements. Designs need to take into account social situations and bodily gestures which impact the user as well as the environment [11]. In some cases, the public displays may appear interactive even though there is no control mechanism for the observers, such as in Chris O'Shea's "hand from above" [12].

### *Projection in Public Space*

Through the availability of mobile projectors, and an increasing number of pico projectors being integrated into phones, mobile public projections are feasible and may become common in the near future [15] (Fig. 2). As walls become temporary displays, the notion of ownership in public space may change. Artists have used projections on buildings to create new interactive experiences [7] opening up a new space for Media art. In *Laserinne* by Cassinelli et al. [4], a whole ski slope was transformed into an interactive display, where (laser) graphics are drawn in response to the skiers'

motion. While the users or spectators may not be able to interact with the projection itself, the producers and spectators of the projections "share" the resulting experiences, and may interact with each other offline.

### *Interaction with Mobile and Wearable Devices in Public*

Mobile applications are often used in situations where passers-by can observe the interaction. This is evident in context-aware applications such as location-based services (e.g. FourSquare) or proximity-based communication services such as TWIN [16]. Wearable technologies introduce further considerations on how to interact with technologies on one's own body (e.g. [3]). These experiences can also be negative as in the July 2012 attack on Steve Mann, wearing the bolted AR glasses [9].

### *Tangible Interaction*

Tangible user interfaces are a growing category of novel interactive systems which are often used in public or semi-public spaces. Examples of TUIs are tabletop surfaces, for example used in night clubs [1] (Fig. 3), and tangible learning systems for children in schools [6]. In public urban environments, interactive artistic installations can be tangible (an example in Fig. 4) and in the semi-public museum spaces, many installations and guiding systems are also tangible, e.g. Kurio [17].

## Experiencing Public Interactivity

Most of the publicly available systems can be used by individuals or by groups of people. The involved people can be familiar with each other, or strangers. From the viewpoint of designing interactivity, one of the central issues is, what motivates people to be social (such as self-expression or curiosity) and what are the resulting – positive or negative – experiences.

With these systems, new kinds of “beyond the desktop” interactivity are formed with and around them. The interaction is affected by various aspects of the social, physical and task contexts. The social context includes effects of the spectators, cooperation and competition between users, and social acceptance of the public interactions. The physical contexts sets limits to what kind of interactions are possible. The task context (e.g. motivation, flow to other tasks) affects how the system is used, for example the length of the usage session.

Positive user experience (UX) has become an important success factor of interactive systems. UX covers both the pragmatic (practical) and hedonic (emotional) experiences with the interactive system [8]. Pragmatic aspects of UX are bound to users’ instrumental goals, such as finding a location on a publicly displayed map. Hedonic aspects of UX lead to emotionally satisfying experiences, such as feeling connected to friends and self-expression.

Whereas many studies have addressed specific issues of interaction with publicly situated technologies (such as acceptance of gestures [13], crowd interactions [13], or how to notice interactive displays [11]), there are very few studies which focus on *how people experience* interaction with such systems. Therefore, the focus of this workshop is set on *experiencing interactivity in public spaces*.

### Basic Challenges

Given these developments we see a set of new challenges arising for human-computer interaction that are specifically related to interaction in public space. Interaction in public spaces is becoming more common and usage of information technology in public is

ubiquitous, but we still have a very limited understanding of how to create a good user experience in these settings. We see the following challenges that will be discussed in the workshop:

- **Understanding Existing Systems.** We aim at gaining an overview of the types of existing systems and forms of interactivity taking place in public spaces. Our approach to this is to analyze and discuss a broad set of case studies of experiencing interactivity in public spaces and how the environments facilitate this.
- **Describing the Impact on Users.** It is important to understand what kinds of experiences are created, by systems that are deployed in public places or used in public. The impact may be intended by the system designer or happens unintentionally.
- **Charting the Experience Design Space.** This design space should describe all known factors that impact the user experience in public and provide a tool for reflecting on the design of such systems.
- **Research Agenda.** Based on insights from the current deployments and the factors identified in the design space a research agenda is formed. In particular it is assessed what are the central open issues and how to further study and design user experiences of publicly used systems.

### Topics of Interest

We bring into the discussion a broad range of systems which are used in public spaces. Both outdoors and indoors systems which are used in public contexts are relevant. Topics range from implementations of systems, to description of a user study, or discussions of the expected experiences. Description of “in the wild” study cases are especially valuable.

The following issues and perspectives are in focus:

- Experience elements of publicly used interactive systems (experienced by the users and spectators)
- Public interactions which invite other people to join vs. public interactions which are meant as private
- Experiences of public interactivity with various modalities, e.g. bodily movements and gestures
- Social acceptance and social implications of interactivity in the public space; privacy
- Community interaction and collaboration; multi-person interaction; ad-hoc community formation
- Experiences with interactive media arts
- Methodological issues of evaluating user experience in public spaces (e.g, [2])

### Conclusion

We aim at creating a description of an “experience design space”, i.e. what kinds of user experiences may take place in interaction with systems used in public and what are the defining factors. Additionally an initial research agenda for the field is defined.



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