
Unobtrusive Interfaces for Historical and Culturally Sensitive Places

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Abstract

Unobtrusive and interactive interfaces for historical and culturally sensitive places in public, urban environments are still under-researched. Yet, the need for calm and unobtrusive technology is evidently considering its ubiquity as well as the multitude of user groups and needs that it should comply to. In my research, I am looking into potential design elements and materials to develop new interfaces with the aforementioned properties. Current use cases focus on installations at public places, cemeteries as well as museums. Traces of use are a potential design strategy for indicating interactive areas while also incorporating the property of unobtrusiveness due to their ubiquity. With my research, I want to contribute to making urban environments more connected and engaging while keeping the ambience of historical sites or green areas as-is. Thereby, users should identify more with their surroundings while dealing its history and culture.

Author Keywords

Unobtrusive; urban; culture; history; natural design

CCS Concepts

•**Human-centered computing** → **Human computer interaction (HCI); Human computer interaction (HCI); Haptic devices; Interaction devices;**

Introduction

Embedding new technologies in public, urban places with high historical or cultural meaning to make them more engaging and informative faces several challenges. Among others, there is the challenge of keeping the natural atmosphere and the meaning of such a place. Another concerns the diversity of user groups and needs that a system would have to comply. Especially in the public context, we find the situation of one user group wanting to use an area to just sit and relax, whereas another would like to explore it and get more information about it. Mobile apps provide certain solutions already to the problem. However, they also guide the user's attention away from direct interaction with the environment and make them experience it through a phone-size format [?]. Hence, these solutions limit the user's capabilities to embody a place or to interpret the meaning of it as well as its atmosphere. Additionally, in some places, mobile phone usage is even considered as disrespectful [8, 12]. Other researched solutions consider pervasive displays or media facades. Use cases for pervasive displays range from art installations [6], tourists information [13] or to location tracking of users and their devices [14]. Most applied pervasive displays consist of an LCD screen which is rather distracting again, especially if applied in a more sensitive area. Instead, media facades such as by Telhan [16], Böhmer [5] or Gehring [7] offer great possibilities for engagement but are very visible and obtrusive. Currently, the majority of public, interactive installations is either only temporarily available or not used due to not being recognized as interactive. Reasons for short-term installations are, among others, lacking sustainability, area accessibility and a lacking need that would justify a long-term setup. Instead, as we see with some pervasive displays, people do not understand that (a) such installations are interactive and (b) how to interact with them. In short, there are currently several, partly contradicting challenges that HCI faces

in the context of interactive technologies for public, urban environments:

- The need for additional information about and installed at cultural and historical sensitive places.
- The need for unobtrusive installations that embed seamlessly into the environment.
- Lacking design strategies to indicate interactivity of such interfaces.
- Lacking strategies for (approaching) sustainable solutions.
- Outstanding identification of user needs and use cases in such a context.

These challenges are partly addressed in former work related to calm technology or peripheral interaction. Bakker [1] and Bakker et al. [2] define several aspects for designing for peripheral interaction, such as that task-related information are rather noted than non-task related information or that such interfaces should shift easily between the centre of attention and the periphery. Other examples make use of concepts from calm technology [15, 3] in which interfaces are aimed to be designed for unobtrusiveness and implicit interactions.

Research Goals

I aim at researching solutions to embed interactive technology into public, urban places with higher cultural and historical value. Hereby, the interface design should apply to the natural theme and meaning of the target environments, while indicating interactivity through its affordance. Hence, research goals include the development of design strategies and methods that could be applied to indicate and develop interactive, yet unobtrusive interfaces. Furthermore,

my research looks into the understanding of natural design and defines it in the context of public, urban environments. The identification of universal aspects and characteristics is thereby one of the main goals.

Challenges

The targeted research is highly context-dependent. Aspects, such as weather conditions, spatial setup, mentality, noise levels etc., vary for each situation which challenges reproducibility and general validity of the outcomes. Aiming for a natural design in the context of each target environment, research is required to establish methods to identify properties that contribute to a natural design. Former research, such as by Kuipers and de Jongs's work [11] provides already tools to support the analysis process. Other challenges, related to the aforementioned topic, are material constraints and possibilities. Properties of urban interface materials, such as concrete, steel or glass, are very little researched within the HCI community. A collaboration with other fields, such as architecture, the construction industry or archaeology is therefore planned or already established.

Current and Future Work

Cemeteries and museums are locations at which a certain atmosphere and behavior are expected by visitors. Having conducted open-ended surveys at one cemetery ($n=19$) as well as one museum ($n=35$), results showed that people would like to get more (interactive) information provided at the object they were visiting which was either a grave or an exhibition object. Thereby, the "natural beauty" of the cemetery, so 10 participants mentioned, should be kept as-is([9]). Whereas these surveys are very limited in the number of participants, the results still indicate the value of naturally kept places for various reasons, such as restoration and recreation, but also for creating a certain atmo-

sphere and connection to the place. In continuation of this work, traces of use in urban environments were analyzed as re-occurring, ubiquitous patterns in regard to their recognizability and potential to be used as design strategy [10]. We define traces of use as traces that are caused by repeated direct or indirect human interaction with an object over a certain period of time. Other research fields, such as archaeology, use such traces to derive conclusions about behavior patterns and relationships of people who have lived in previous ages [4]. Furthermore, we assume that the properties of such traces could be used to indicate interactive areas, while, due to their ubiquity, representing a rather calm and unobtrusive pattern. For testing this hypothesis, we are currently experimenting with how to reproduce fake traces of use as well as testing what type of touch interaction participants relate to the reproduced elements. Hereby, we applied them on pieces of concrete as it is a ubiquitous material in public, urban environments. Other, current projects focus on the perception abilities and capacities of people in public places. In this context, we look at scenarios in which one user group would like to get engaged more with a place or get to know more of its background, while others would prefer not to be disrupted, like in the cemetery example [9]. Targeted research questions aim to understand how current concepts of attention, including inattentional blindness and deafness, could be used as an advantage in such a situation for either directing people into a certain direction or for making them ignorant.

In the following, I want to continue testing the hypothesis about the traces of use as a potential design strategy for indicating interactive areas and how to interact with them. Additionally, I want to research further on natural materials and how to define natural in a public, urban context. Lastly, it is about exploring the potential of unobtrusive, yet interactive interfaces in the aforementioned context and how it

could change people's understanding of and engagement with such places.

At the conference, I hope to receive constructive feedback to my presented ideas, including potential risks, but also opportunities that relate to it.

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