Interaction Design for Public Spaces

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ABSTRACT
In this abstract I describe the doctorial research project "Interaction Design for Public Spaces". The objective of the project is to explore and design interaction contexts in culture related public spaces such as museums, experience centres and festivals. As a perspective on this domain, I will focus on the usage of the body as an interaction device. Furthermore, the project will involve a dramaturgic take on communication and design of interactive systems in the pursuit of new ways to stage the interactive contexts.

The outcome of the project will be guidelines and conceptual frameworks which will help interaction designers when designing for bodily movement, and communicating and staging interactive content in public spaces.

Categories and Subject Descriptors
H.5.1 [**Information Interfaces and Presentations**]: Multimedia Information – augmented reality, audio output H.5.2. User Interfaces - theory and methods. H5.m. Miscellaneous

General Terms
Design, Experimentation, Human Factors

Keywords
Interaction design, user experiences, culture related public spaces, communication, staging, drama, body as interaction device, environments, social interaction.

1. INTRODUCTION
When designing new types of engaging interactive installations for culture related public spaces such as museums, experience centers and festivals, different challenges emerges regarding 1) the domain of public spaces, 2) the usage of the body when interacting, and 3) the manner in which to communicate and stage the interactive space as well as a given culture related content. These three points of interest have been my starting points and become three main approaches in an experimental design research project.

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2. THREE MAIN APPROACHES

2.1 Domain: Public Spaces
The investigation will focus on culture related spaces which are both public and semi-public. The domain of public spaces challenges the interaction design in that it cannot be designed for regular users, but must be designed for intuitive usage, and, moreover, it must be obtainable without prerequisites. Furthermore, challenges include how to design interactive systems for public spaces that facilitate aesthetic communication, experience and active involvement of the users, and, thus, how to utilise the inherent qualities of public spaces to their full potential.

Characteristics to be investigated within the domain include: social/individual contexts; large scale/small scale; outdoor/indoor spaces; physical forms and surfaces, but also formless interfaces such as bodily or spatial interfaces.

2.2 Perspective: The Body as an Interaction Device
Within the Human-Computer Interaction (HCI) community, there is a growing interest in including the body in interaction design. In HCI literature, the attempts aimed at addressing the body have very different outcomes, spanning from theoretical arguments for understanding the body in the design process [1], to more practical examples of designing for bodily potential [3]. This project will mostly consider the latter; though, the research will be informed by theoretical arguments.

When exploring the body as an interaction device, challenges are how to utilise the bodily potential in the interaction context; and what influence and significance the use of the body has on interactive experiences. Characteristics to be considered when utilising the body include: small/large degree of bodily involvement in the interaction; less/large accentuation of the significance of the body in the user experience (the role of the body differs); and finally, small/large degree of user influence.

2.3 Take: Communication and Staging
The project will not only focus on how to communicate a given content using interaction design, but also on how the interactive context, including content, body, space and the interaction itself, is staged. The communication and the staging can replenish each other as a take on interaction design, in that they both can benefit from methods and theories of dramaturgy.

Challenges consist of how to successfully stage the body in interaction design relative to a given content; how to combine the

physical and digital spaces; and which dramaturgic takes can be utilised in the context of interaction design for public spaces. Characteristics to be investigated within the take of communication and staging include: social/individual participation; passive recipient/active participant; transparent technology/visible technology; staging to a less/great extent; and play and experience versus contemplation.

3. PROJECT CASES

The research project is undertaken in the multidisciplinary context of the research center: Center for Interactive Spaces, and is carried out in different projects in collaboration with external partners such as theatres, museums and schools, who have collaborated on developing interactive experiences for different types of public spaces. The research method of this project is based on an experimental design approach; and in the following, I will describe three ongoing project cases which will be part of my empirical research. All three cases have already been implemented and will be further developed in my research project.

3.1 AudioMove Drama

AudioMove dramas are interactive audio plays that let the audience be the main character in a drama. The plays are single user experiments. In the plays the audience is equipped with mobile phones and headsets, and experiences a drama in the streets of a city, where they scan semacode[1] based tags in order to listen to the different scenes of the plays. Furthermore, they receive simulated SMS messages and phone calls, and encounter real life actors as part of the play. To date, two AudioMove dramas have been conducted in collaboration with a local theatre, and another two are being developed.

Figure 1: The user is reading a semacode tag with the mobile phone in order to hear the next scene in the audio drama.

The current development plans include a larger degree of user influence; e.g. giving the users the opportunity to influence the story line. Moreover, different types of sensors and actuators will be utilised to enable the physical surroundings of the play - such as the buildings and interior of the city – to "come alive". In this manner, the surroundings will to a greater extent become an active part of the play and thus give the audience interactive experiences using the city as theatrical scenery.

In this project case, I expect to investigate how to stage the city as an active part of narratives; which interactive technologies can be utilised, and based on which guidelines or frameworks is it possible to design interactive systems for public spaces.

A more specific challenge to address and investigate is the fact that the dramas are individual experiences. When wearing headsets, it is not possible to communicate with others or share the experience with e.g. children. The condition of the dramas is to let the audience become absorbed in the play, identifying themselves with the main character. In case more people should participate in the same play, it would be necessary to assign different roles to the participants. In this project I expect to investigate these possibilities by looking into dramaturgic structures and how to integrate them with interaction design.

3.2 SoundSpots

The SoundSpots have been developed as a part of an art exhibition communicating inspirational material behind the art works of Japanese artist Mariko Mori [3]. In collaboration with the artist twenty-five SoundSpots were designed and located in the exhibition next to the art works. Each spot consisted of a visual silver circle at the floor and four meters above the circle a directional speaker and a PIR (passive infra red) sensor. When a user would enter a circle, played back recordings with clips of Mariko Mori's voice would be triggered.

Only when standing inside a circle was it possible to hear the artist's whispering comments on the artworks. This way, the hearing experience was individual and somewhat intimate, even though it occurred in an open space with constant awareness of other visitors. The audio clips were randomly selected and could be heard independently.

Figure 2: A directional speaker above an audio spot marked by a silver circle on the floor.

In contrast to traditional audio guides found in museums with earplugs or headphones, the directional speakers supported the visitors in having shared experiences of the artworks and the supplementary material, in two ways: 1) People standing in the silver circles could still hear what was going on around them, and they could maintain conversation. 2) People would share the

[1] http://semacode.com/

audio spots by putting their heads together in the listening zone, and experiencing the same audio clips.

By utilising SoundSpots, the artworks were gently communicated without compromising the works. In this project case, I have learned, that designing communication for artworks challenges the manner in which to stage the interaction space. This can in particular be interesting when the users cannot distinguish between art and art communication. I wish to investigate this issue further and, moreover, I expect to gain insights in how the role of the museum guest changes from passive spectator to active participant, and how built-in sensors and actuations in the museum interior can support this.

3.3 Wisdom Well

The Wisdom Well [2] is a 3 x 4 meter interactive floor which is incorporated in a central square of a local public school. On the interactive multi-user working surface the children are able to use their bodies in fun and engaging collaborative activities while they learn.

From the bottom of "the well" (approx 3 meters below the surface) images are projected on the floor. Utilising the vision-based tracking package, RETINA [5], four webcams track the positions of the users' limbs, which are utilised as user inputs. This interactive picture surface can support and implement new project initiatives and exiting games.

Figure 3: The Wisdom Well – an interactive floor at a public school.

One of the applications developed for the Wisdom Well is the learning game application Stepstone, which can be used by both normal hearing and hearing impaired children. During the game a series of exercises are posed as questions - either as speech or as text on a SMART Board™[2] next to the Wisdom Well. The children must collaborate in order to select as many correct answers as possible by placing their hands and feet on the projected images at the surface.

Cooperation and knowledge sharing across geographic distances are established – internal between the different year groups in the school as well as external between other educational institutions, working places and culture institutions. The Wisdom Well is intended to be a central meeting point to support learning and knowledge sharing among students and teachers.

Having worked with different types of interactive floors at schools, libraries and museums, I have gained some experiences on how to design interactive spaces by utilising the horizontal surface of the floor; and moreover, on how to design for the usage of the body as the only interaction device. With interactive floors the body comes into play at a different level, however, one of the challenges that I would like to look more into, is how to obtain a 3D interface of interaction that corresponds to the bodily interface, without restricting the movements of the user.

In all three of the above mentioned project cases we have conducted interactive experiences for public or semi-public spaces, where the role of the body is significant. I would like to continue experimenting with manners in which the physical IT mediated reality can set the stage for bodily experiences that challenges the users on what the physical world can do. When the physical surroundings react on the users and become an active part of a social and interactive scenography, the users' experiences become part of the physical world, which can be influenced. Hereby, the manner in which to (inter)act in - and experience public spaces is challenged.

4. STATUS OF THE WORK

This abstract has described my research project and some of the research challenges I face. Taking three main approaches as a starting point, I will continue experimenting with project cases in order to concretize my focus and develop guidelines and conceptual frameworks for designing for public spaces.

As an outcome of the doctorial symposium I would like to discuss the three approaches and their challenges in proportion to the aim of designing for public spaces; and further, I would like to discuss some of the preliminary results of my research.

5. ACKNOWLEDGMENTS

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