A SOCIALIZING INTERACTIVE INSTALLATION FOR THE URBAN ENVIRONMENTS

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ABSTRACT

In this paper we present the LEDs Urban Carpet: an interactive urban installation using a body-input as a form of a non-traditional user interface. The installation was tested in various locations around the city of Bath, UK. We selected locations with low, medium and high pedestrian flows. The aim is to generate a novel urban experience, which can be introduced in different locations in the city and with different social situations.
The installation represents a game with a grid of LEDs that can be embedded as an interactive carpet into the urban context. A pattern of lights is generated dynamically following the pedestrians movement over the carpet. In this case the pedestrians become active participants that influence the generative process and make the pattern of LED-s change. The paper suggests that introducing this kind of display in a social scenario can enrich the casual interaction of people nearby and this might enhance social awareness and engagement. However, we should point out that a number of factors need to be taken into consideration when designing an interactive installation, especially when situated within the urban space.
The experience we present here can assist designers in understanding difficulties and issues that need to be taken into account during the design of an interactive urban project of this nature.

KEYWORDS

Interactive urban installation, body-input interface.

1. INTRODUCTION

Traditionally, architecture has been perceived as the static floors, walls and roofs that surround us. With the dawning age of ubiquitous computing technology is slowly disappearing into the surroundings, becoming unobtrusive and ubiquitous [Greenfield, 2006]. Physical computing and digital systems are becoming more pervasive in our architectural and urban spaces, allowing us to perceive architecture as a dynamic and adaptive surface that can respond to the surrounding environment. This brings the challenge of developing novel computing interfaces that move beyond the Graphical User Interface (GUI) and the usage of desktops and laptops and can be embedded into existing or new physical environments.

2. URBAN ENVIRONMENT AS A PLATFORM FOR SOCIAL INTERACTION

Urban landscapes are places where people spend a significant amount of time; they contribute to our own formulation of identity, community, and self. The built environment with its architectural space is the framework where our cultures develop and transmit; through its rules and norms social interaction is expressed, shaped and reproduced [Hillier & Hanson, 1984]. In that regard, the introduction of physical computing technology into an architectural and urban setting can support new ways of experiencing the city. It may provoke new types of social encounters and social interactions between people as well as interactions between people and the physical environment. In an attempt to take a step towards that direction, this paper investigates the levels of engagement between inhabitants who share the same public or urban space when a new type of technology (the LED-s Carpet in our case) is introduced as part of the physical space.

2.1 Related Projects

Recent researches have addressed some aspects of pervasive systems introduced in physical environments. However, most of them have been developed for workspace atmospheres to create opportunities for informal interactions and communication, such as "Hello Wall" [Streitz et al., 2003], or "Wallmap" [McCarthy, 2002]. Other cases of large interactive systems, for instance "The Opinionizer system" [Brignull, H., & Rodgers, Y., 2003] and "Dynamo" [Izadi et al., 2003], have been introduced into social settings with the aim of extending existing activities and practices or to help people to initiate a conversation with people standing beside them.
In relation to projects developed in urban environments, the Mobile Bristol group developed a range of outdoor situated "Mediascape" experiences, such as "Riot! 1831", "The BBC's Bristol Mobile Nature Application" or "A Walk in the Woods" [Reid et al., 2005]. Also, the Equator research group produced a range of urban experiences such as "Can you see me now?" or "Uncle Roy All Around You" [Source: http://www.equator.ac.uk/]. However, in those outdoors proposals, the user or player has to carry portable devices to trigger the digital media or connect online.

A few urban projects have been designed to use the body movement and gestures of the user could activate the digital media. For instance some works of the Mexican-Canadian artist Rafael Lozano-Hemmer, such as "Urban Scan" and "Body Images" use body-input interaction (in this case user's shadows) creating a direct relation between the human body, the technology interface and the urban space [Source: http://www.lozano-hemmer.com]. However, in those cases the pattern of interactions is informally described. Moreover, no attempt has been made to compare a class of behaviours in different settings. In our project we aim to identify signature patterns and paths of movement and to develop a basis for more systematic comparisons. This is to be achieved in different phases, in this paper we describe the initial phase.

2.2 The LEDs Urban Carpet Prototype

The project is conceived as a portable urban installation in the form of a carpet of LEDs. The LED-s Urban Carpet consists of two layers. The first is a grid of light-emitting diodes (LEDs), which interact with pedestrians by tracking their paths over the grid. (fig. 1) The lights will turn on or off depending on a computer program, which defines the behavior of each light at every instant.
The program is written in Processing language using a Boid algorithm based on Craig Reynolds' rules [Source: http://www.red3d.com] to simulate a flock of seagulls that follow the pedestrian. It gives the whole experience a recreational and fun atmosphere.
The location of each pedestrian over the carpet is recognized by the second layer, a grid of pressure pad sensors, which is located behind the grid of LEDs. Both the LED and pressure pad layers form a unit that sends the user's input to the computational program and performs the outputs as well, in the form of seagulls. (fig. 2)

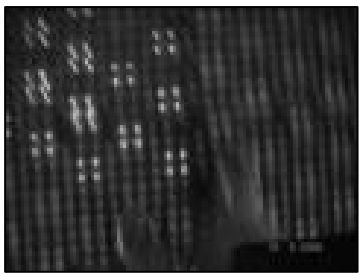

figure 1, The lights turning on

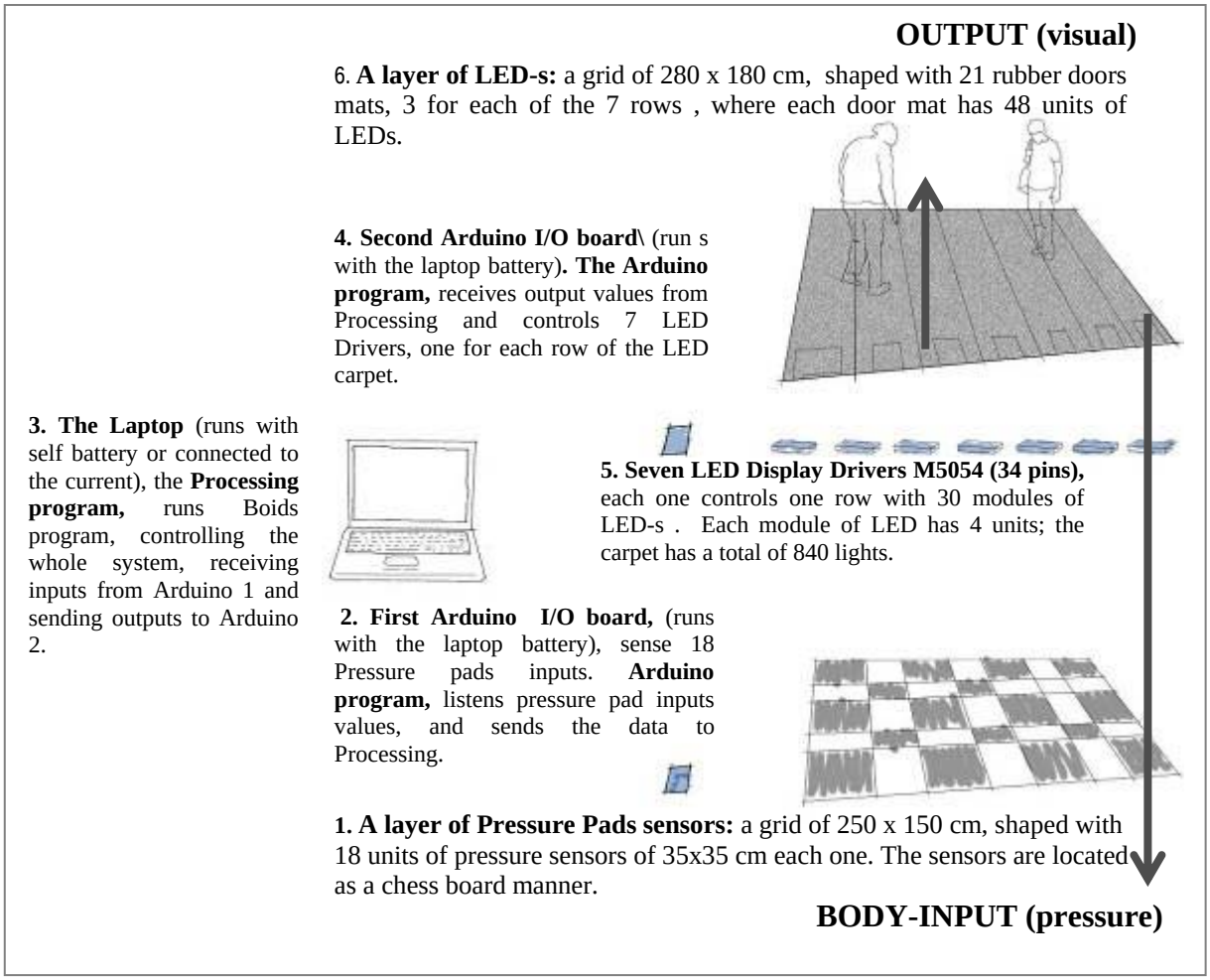

figure 2, LED-s Urban Carpet system architecture

2.4 Testing Process and Initial Findings

In order to investigate the social and practical issues in the public architectural space raised by implementing the interactive installation, the prototype was tested during different sessions in the heritage city of Bath and as follows:

1) Different locations were selected. These varied in the movement flow during the day, land use and the specific role of each location in relation to the city centre area; 2) a range of empirical observation methods were implemented including counting people and observing static snapshots. For each open space under consideration, the observers record the movements in and out of the space, as well as the type of activity taking place in the space. This gives us an understanding of how people appropriate and make use of a particular space, and how these patterns of use bring people into contact with each other; 3) the form of the public interactions with the prototype were observed by two researchers, and notes were taken of difficulties experienced with the interface. The interactions were video taped and the movement on the carpet was tracked. Following the session, a selected number of participants (20) were debriefed in both a structured discussion and using a questionnaire.

During the interaction sessions the following common emergent patterns were observed:

1. Curiosity: while assembling the prototype, passers-by gathered around the area to see what was going on, some asked for information about the prototype. (fig. 3)

2. Awareness of the experience: In some cases it was built up amid anticipation as people used

relevant prior experience and expectations of a new experience (e.g., frequently the public characterized the prototype as a "dance carpet" before they interacted with it). Different levels of awareness were noticed among people walking around the area, from glancing at the interactive prototype but then continuing their way, to people stopping around the prototype and asking about it, trying to understand how it works (peripheral awareness, focal awareness to direct interaction). (fig. 4)

3. Engagement: We have noticed that users need to learn the interaction rules in order to avoid social awkwardness and embarrassment around the public display. During this period, the public gathered around the prototype and watched how others interacted with it before participating, people tend to step over the perimeter of the carpet, until they are familiarized with the display.

4. Immersion: This state could vary from immersion to engrossment to total immersion. People varied in the amount of time they needed in order to understand how the system worked and how the LED-s Carpet followed the position of their bodies over the interactive surface.

5. A socializing platform: after trying the installation, some people commented on the experience and explained rules of interaction to people nearby, generating a kind of socializing scenario. In most of the cases they share experiences between friends, but also a few of them shared the experience with strangers. (fig. 5)



Figure 3, 4 & 5, photographs taken from the test sessions.

During the interaction sessions we noticed that there is a direct relation between the way in which people gathered around the prototype, and the level and type of interaction with it and between people nearby. When strangers interact with the prototype, unlike the case with friends, they tend define their territory and stay on one side and not cross the area of the other user, leaving a kind of mutual acceptance distance between users (fig. 6).

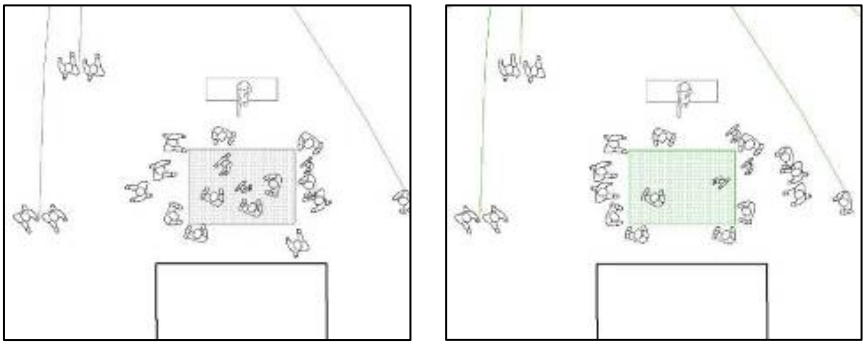

Figure 6, top view of interactions on the carpet: among friends (left) and strangers (right)

Finally, the test sessions have shown that the movement flow of passers-by and activities happening near the locations has a direct impact in the interactive installation final performance; when the display was located in an area with a higher rate of pedestrian traffic it was more difficult to catch people's attention than in locations where the speed flow tended to decrease due to the spatial characteristics of the physical environment and people activity (e.g.: window shopping).

3. CONCLUSION

Our investigation suggests that the success or failure of a large interactive display depends on internal properties of the display and external factors of the social and physical surroundings. The central problem in

setting up new forms of technological surfaces in public space is people's uncertainty regarding how to interact with the display. One factor, which needs to be taken into consideration, is the physical affordance of the interactive display, which engenders certain kinds of social interactions. In this case, installing a large interactive display as a horizontal surface in a public space encourages people to walk over and congregate around it in a socially cohesive and conducive way. People congregate around it or over it, in a non-hierarchical manner, where each user has the same possibilities for controlling the interaction performance.
In addition, it was possible to observe that social proximity or person-to-person distance was necessary between the public interacting at the same time within the display. Distance, which was different between strangers compared to that between friends. In this regard, the LED Urban Carpet illustrates a weak point: Its size is not big enough to host the interaction between many people at the same time. During the test sessions, the most common pattern observed when strangers were interacting with the carpet was that they waiting for their turn.
However, not only the physical properties of a display can have quite profound effects on the way it is used in a public setting, the affordance will also vary depending of the nature of the space where it is located (e.g., a park, street, bus stop, etc.). Each space has different attributes as do the people who are interacting with it [Gaver, 1991]. Accordingly, it is possible to argue that different kinds of surfaces will be needed to augment, support and enhance what people already do in that specific space [Briones, 2006] and it seems that the ability of an interactive large urban display to enhance social interaction depends on the social atmosphere where it is located, the type of audience and cultural background, the affordance of the prototype, and the affordance of the environment where is located.
Hence, large interactive public-displays have the potential to generate social interaction and awareness around them. However, in situating them in different locations and social environments, diverse behaviors and reactions will emerge from the public, which the designer could not necessarily predict.

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