

# **A Sense of Place and Pervasive Computing within the Urban Landscape**

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## **ABSTRACT**

In this paper we report on recent investigations within an ongoing research project, which aims at developing a better understanding of the urban landscape augmented with the digital landscape in the heritage City of Bath.

Here we describe early findings from the deployment of a socialiasing digital installation in various locations in the city. The aim is to create a novel urban experience that triggers shared social encounters among friends, observes or strangers. The installation is implemented in the form of a digital urban ground, embedded in the physical surrounding, which acts as a non-traditional interface and a facilitator between people and people and people and their surrounding environment.

In this paper we explore the relationship between the urban space and technology driven encounters. We outline initial findings about how people move, congregate and socialize around the digital ground and illustrate the impact of the spatial and syntactical properties on the type of shared interactions in a city context. Finally we discuss initial results and mention briefly our on going work.

## **KEYWORDS**

Urban landscape, digital and social encounter, urban installation.

## **1. INTROCUION**

Designing new technologies within our physical environment is often accompanied by speculations about their potential for influencing social behaviour and shared encounters. This may lead to results far from expectation but it may also lead to changes in the environment of interaction causing new social behaviour to emerge.

Hillier and Hanson have argued that the urban physical environment plays a critical role in the construction of social behaviours. This can be seen in the way it acts to structure space (Hillier and Hanson, 1984). In this respect it does not only reflect social patterns, but can also play an important role in generating these

patterns, providing a platform for rich and diverse social encounters. For instance, public spaces such as the bus stop or the cafe can act as 'encounter stages' on which people negotiate boundaries of a social and cultural nature.

With the advent of pervasive technologies in public and urban spaces (always and everywhere present), we need to achieve a better understanding of the notion of place and the role of context as an emergent situation- physical, social and mental-of surrounding aspects that give meaning to our activities in order to capture the complex relationship between pervasive systems and urban space in general and the impact of the deployment of pervasive systems on people's relationship to each other and to their surrounding in particular (Fatah gen. Schieck et al., 2006). Whereas the social aspect is often taken into account in designing technology enhanced spaces, relatively little attention has been given to date however, to the spatial properties and the cultural and individual aspects of the place, and so to address their impact on forming possible shared encounters enabled through digital technology, in particular within the public urban space.

## **2. RELATED PROJECTS**

Recent research has tackled issues related to implementing pervasive systems within the built environment. However, when the built environment has been considered, it has in general been focused on the relatively small-scale architecture of individual buildings (Rodden and Benford, 2003). Many projects have been developed within a workspace environment to create opportunities for informal interactions and communication, for instance "Hello Wall" (Streitz et al., 2003), or "Wallmap" (McCarthy, 2002). Other cases of large interactive systems, have been introduced into social settings with the aim of extending existing activities and practices or helping people to talk to people standing beside them, for instance "Boundary Functions" (Scott Snibbe, 1998) "The Opinionizer system" (Brignull, H., & Rodgers, Y., 2003) and "Dynamo" (Izadi et al., 2003).

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". However, in those outdoor projects, the participant did not use body movements, instead they were given portable devices to trigger the digital media or connect online.

A few urban projects have been designed to use body movements and gestures to activate the digital media. For instance the work 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 (Lozano-hemmer, 2005). However, unlike our approach, projects developed in the urban contexts have not focused on the spatial properties, and its potential on influencing technology enabled social encounters.

In our research we aim to develop the basis for a more systematic approach, by looking at the urban environment as an integrated system mediating both the built

environment and pervasive systems. This is achieved in different phases, in this paper we report on the preliminary phase.

In the next section we describe the digital prototype. We then review preliminary findings from the early implementation of a digital prototype in the city of Bath, before we finally, draw conclusions on certain aspects and highlight related issues that need further research.

### 3. PROTOTYPE DESCRIPTION AND INITIAL FINDINGS

The urban prototype, shown in Figure 1, is a digital surface that can be embedded as an interactive installation into the urban environment. It is made of (1.8mX2.8m) rubber door mats surface that detect people walking on top of it. In response, it illuminates a series of LEDs (Light Emitting Diode) arranged in a grid embedded in the rubber surface. When pedestrians walk over the surface a pattern of lights is generated dynamically following the pedestrians' movement over it. The aim is to generate a rich urban experience that can be introduced in various locations in the city.

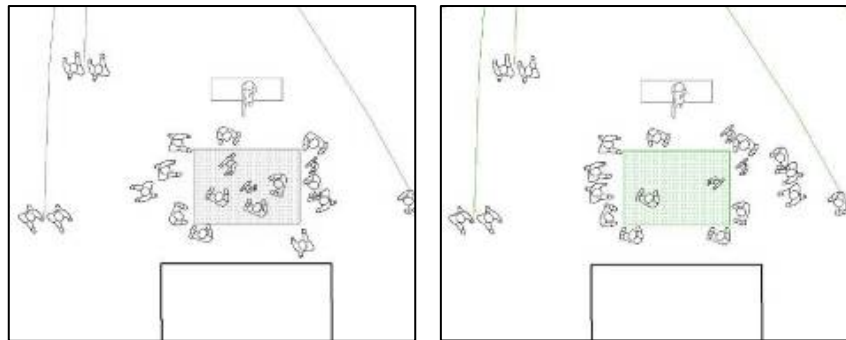
The installation was tested in three different locations in the city of Bath, the sessions were carried out during daytime with an additional test during the evening. We selected locations with low, medium and high pedestrian flows. A range of empirical observation methods were implemented. People's movements in and out of the interaction space were observed and recorded, and the type of activity taking place in the surrounding space was captured. The form of peoples' interactions with the prototype, and with the other people in the area, was observed and video taped by two researchers. In addition, peoples' movement on the digital surface was tracked. Following the session, a selected number of participants (20) were debriefed in both a structured discussion and using a questionnaire.



**Figure 1.** Photographs taken during the evaluation sessions.

During evaluation, we observed certain emergent pattern of behaviour. Different levels of awareness were observed among people walking around the area, from those simply glancing at the interactive prototype, to people stopping around the prototype and asking about it, trying to understand how it works – from peripheral awareness, focal awareness to direct interaction. In some cases this was built up amid anticipation as people used relevant prior experience and expectations of a new experience e.g. often people recognized the prototype as a “dance floor” before they interacted with it. Furthermore, people behaved differently in different situations and the experiences varied depending on whether the interaction took place among friends or strangers (Briones et al., 2007). During the test sessions, most people shared the experiences with friends, however, a few of the

participants shared the experience with a stranger. The most common pattern observed when strangers were interacting was that they were waiting for their turn, providing a platform for an unintentional shared encounter.



**Figure2.** Unlike the case with friends, strangers tended to define their territory and stay on one side, not crossing the interaction area of the other user, and leaving a kind of mutual acceptance distance between users.

Finally, our evaluation demonstrated that the physical setting of the built environment had a direct influence on the movement flow of passers-by and the activities taking place near the locations, which in turn had a direct impact on the level and the properties of the social encounter and the shared experience.

Early findings indicated clear differences in the intensity of interactions with the digital ground and with other people in different locations in the city. This seems to be determined, to some extent, by the spatial configuration of the city.

Different types of behaviour were observed in relation to space properties. For instance, in areas with fast walking pace (e.g. highly integrated, wide streets) people had the tendency to simply glance at the interactive prototype and continue walking in the same pace towards their destination. In contrast, in highly integrated areas with lower walking pace (e.g. the intersection of more than one pedestrians areas that offers a stage for social encounters ) people tended to stop around the prototype and share the experience with other people around the area. This seems to be supported by the properties and affordance of the physical landscape.

#### 4. CONCLUSION

In our study an attempt was made to map and understand shared social encounter mediated by digital technologies and the relation to the spatial properties of its surroundings.

Our observations suggest that public interactive installations may provide a stage for emergent social interactions among various people. However, situating the digital installation in various locations, and depending on the context, might generate diverse and unpredicted social behaviours we, as designers, are unaware of.

We have presented a prototype that explores the role of technology in supporting social encounters within the surrounding environment. The example we

described investigates the relation between the type of shared encounter and the spatial and syntactical properties of the space in the specific location.

The prototype supported the spatial configuration in which it was embedded, and was similarly affected by it. What about the city as a whole? Could digital technologies do for our cities what the park used to do and re-create a sense of shared place and a kind of belonging?

We described the early stage of implementing a digital prototype in the urban context of the city of Bath. As part of our ongoing work we are trying to address a number of issues that came up through this study. Specifically, we are exploring how digital encounters can improve the experience of urban space, and how a system can improve the quality of social encounters.

## 5. ACKNOWLEDGEMENT

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