A framework for designing and enhancing serendipitous encounters

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Abstract
In the research outlined in this paper we focus primarily on the potential of technology in fostering serendipity and sense of discovery in public physical spaces. We present two prototypes exemplifying two different approaches on how to investigate and capture users' sense and understanding of the public space in question as well as the use of artifacts and tools in the above-mentioned public environments. The collected insights will offer a basis for discussion on how to co-design technologically mediated experiences together with the user of such spaces.

Keywords
Technologically mediated physical environments, User studies, Participatory design.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g.,HCI): Miscellaneous.

General Terms
Social media, design

Introduction
Paul Dourish, in his foreword to the book Shared encounters [5] states that "the fundamental character

of ubiquitous computing research is not computational, but spatial." The spatial characteristics of ubiquitous computing are not "merely geometric" but that "inhabit the space as we do, and they structure it and organize it in much the same way as our own activities and movements do. Here the concerns of computer science and technological design intersect with those of geography and urban studies to produce an immensely generative new research area".

We are witnessing a burst of social media focused on mobile applications and services, like Four Square, Gowalla, Open Street, Loopt, to name a few. In the digital spaces/places enhanced by these services, users can now co-create and form communities across time and space. However, although these applications are providing information anytime anywhere, questions about how this influences patterns of behavior through premeditated actions, such as signing into locations or getting recommendations for products and services are a concern.

Related work

Examples of research looking at scenarios are offered by Konomi et al. [10]. They discuss capturing historical data to support verbal and non-verbal communications in social encounters looking at a history-enriched framework for supporting pedestrians' physical distance, movement patterns, and cognitive and social patterns. Embodied in location-relevant blogs and social networks, these support collocated pedestrians using ad hoc networks.

The patterns that Konomi et al. [10] reveal and utilize seem to undermine chance discovery and serendipity in social encounters. The work we present here aims to examine the role serendipity plays in chance-driven encounters, how it can contribute to the design of technologies that support or even initiate these real events.

Serendipity

According to the online Oxford dictionary, the meaning of "serendipity" is "the occurrence and development of events by chance in a happy or beneficial way". Given in any activity context it is where one has one aim in mind but in the process finds another unexpectedly.

Leong et al. [11] discuss users of technology as actively making sense of the situations they encounter, and using tools to negotiate and create experiences. Seen in this light, users are authors, characters, protagonists, and co-producers [6]. This work positions serendipity within user-experience; where it can be seen as the meaningful experience of chance encounters, where unexpected discoveries can occur. The work analyses how the shuffle experience of music can reveal serendipitous experiences by observing participants' creation of context and fulfilling experiences out of randomly played songs taken out of context.

Shared experience in encounters

Understanding the physical setting where encounters happen helps shape how people interact and define the context. Communication technologies offer other forms of encounters from remote locations that affect the fundamental nature of presence in encounters. Mobile technology is currently driving this by encouraging shared experiences by feeling connected through content creation and sharing. It is through this

awareness and experience of sharing that engages users. Youth cultures' adoption of mobile devices demonstrates this [3].

Shared experience and play

Shared experiences greatly influence play due to the need to establish a space for players. For successful play to take place, context, roles, expectations, and responsibilities need to be defined, which shapes meaning and convention to the encounters [19]. Play occurs unconsciously, consciously, or dynamically [17] and is influenced by a desire for tactile experiences [9].

Bedwell et al. [2] research elements of performance and play with 'Anywhere', an application where participants are guided over the phone by unseen on-the-street performers in exploring an urban area. They analyze the production of paths through content by the performer-participant pair in the city as they access location-based activities and staged performance in multiple locations.

Spatial settings

Considering the role that spatial settings play in shared encounters, Goffman [7] states that our communication and interactions with others can be considered as situated in that they are shaped by both the physical setting and the social situation and that we behave differently accordingly to the degree of both. Meyrowitz [14] says that communication technology now undermines the impact that physical setting has on how we perceive experience in space. McCullough [13] reinforces this by stating that ubiquitous technologies "require new ways of grounding digital information in that they do not undermine ways of acting in the physical world."

Jacucci et al. [8] suggest that the vision of Ubiquitous Computing from Weiser [18] and Abowd and Mynatt [1] have not materialized; that social implication has driven technological innovations rather then making social use the target of design [1]. Their research focuses on materiality that ties together the physical artifacts and embodied interaction and discusses how digital objects and interfaces become props in the social environment, rather than just media to be consumed.

Designing for shared encounters

When considering how to examine serendipity and shared encounters and effectively design for it, suitable non-traditional techniques and frameworks are required.

Paay [15] demonstrates an empirical user-centered approach in studying sociality in the city. She examined aspects of the physical and social context of environment that impact people's experience of place, their interaction with their environment, technology and each other. Then she designed, implemented and evaluated a context-aware pervasive computing system called Just-for-Us.

Diamantaki et al. [4] outline a theoretical framework relating activity theory, actor network theory and embodiment theory.

McCarthy and Wright [12] state that experience is becoming central to our understanding of the usability of technology and present a basis for thinking about and evaluating technology as experience with technological artifacts. They developed an intrinsically connected framework for analyzing experience with

technology consisting of four intertwined threads of experience and six sense-making processes.

Motivations and Observations

Ad hoc behavior of tourists

Of the many visitors that arrive to Madeira each year, those that come by ship are particularly interesting. Tight time constraints put on these tourists means their experience of Madeira is extremely condensed. For those that seek activities, the usual tourist services are often a solution. Interviews conducted with cruise ship tourists choosing not to take part in organized tours reveal that ad-hoc behavior and serendipity are important to people's experiences while discovering new spaces.

Communication between locals and tourists

Tourists travel and seek authentic local experiences, culturally and socially, and this assumption was proven by observations and questionnaires. Residents are often uninterested in interacting with tourists leaving the relationship based on commerce, and value their personal space. They are the source of local information, and stories of the communities they spent their lives in. This presents a wicked problem [16] that involves sharing of local knowledge without sacrifice of private space.

Methodology

By conceptualizing and developing prototypes our research-by-design project aims at developing artifacts and tools that offer people opportunities to discover, interpret, appropriate, and reflect on the social, spatial, cultural, and interpersonal dimensions of encounters. Existing frameworks are used to understand how to capture serendipitous events, shared experiences and encourage co-design. At this stage we are interested in two experimental approaches that involve the design and development of prototypes that we expose to target user groups.

Prototypes

1. Exposing users to technology to observe how they appropriate and use the tools provided.

figure 1. First prototyping of "Reflected Spaces."

"Reflected spaces" is an interactive installation centered on people's routines, public spaces and people flow. Focusing on the idea of the "familiar stranger" it offers people the opportunity to reflect about their lives through the social and physical activities that take place in the space over the course of time. For a limited period of time, people's activity is recorded and reflected in real-time as they move past the installation. Eventually the recorded video is overlaid on real-time footage at the exact time the following day. A phone in front of the installation provides a casual means of communication and a tool to record messages, listen and reflect on the experience. Passers-by can explore these recorded messages and the matching recorded video by picking up the phone and listening to what had been recorded last.

Our approach is not to introduce technology that intrudes but to explore the activities that naturally occur in the space and offer people the opportunity to explore and play with them. With "Reflected Spaces" we are interested in re-adjusting people's notions of the spaces they regularly use.

The first prototype in the entrance hall of the University of Madeira quickly established proof of concept by gauging the level of engagement. Responses were mostly of a curious nature followed by a desire to explore further, though reluctance to fully interact with tools was observed too. This has made us aware of the need to make the experience as intuitive as possible where the user is fully immersed in the experience and artifacts and unaware of the technology that is present. Such insights are aiding refinement of the installation and we are planning further experimentation at various locations.

2. Focus on social context before technology is introduced.

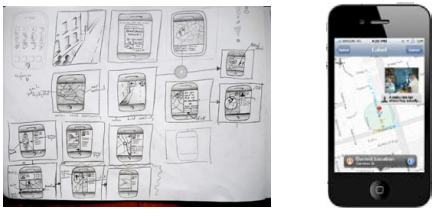

figure 2. Concept and interface design for the "Breadcrumbs" prototype.

Our second prototype, "Breadcrumbs" is an iPhone app that allows users to leave trails of information and media (virtual breadcrumbs) while exploring spaces. These breadcrumbs can be picked up when found by other visitors of these spaces, exposing them to serendipitous events and share the experiences left by others. To inform the design this application, we will involve users in a series of low-fi experience prototypes in order to determine the way content can be naturally presented and interplay with the users' real-world activities.

The first iteration will engage a local person (participant one) and a foreigner currently residing in Madeira (participant two). Participant one takes participant two on a route through a neighborhood, showing places and telling stories of interest. Throughout the route participant two is told to spontaneously divert, taking participant one along, off his track. The objective is to observe participants' experiences of unpredictable events and encourage serendipity through discovery of places, stories, and experiences at locations. Participants will document their experiences using notebooks, a camera and GPS device.

We investigate how people like to explore spaces, what types of unpredictable events unfold and how this influences behavior. Follow-up sessions will discuss and interpret the content created gaining insights to support the development of the high-fi prototype.

Conclusions

New forms of locative media are bringing experiences back into physical spaces. Effective frameworks that establish an understanding of the social, spatial, cultural, and interpersonal dimensions of use, within physical spaces, can inform technological innovations, and our literature review has identified some of these

frameworks. Our experiments will engage users in two different ways, by exposing them to new technologies and by having them enact the process that new technology might incur. We expect that both approaches will inspire the design of the prototypes in complementary ways, leading to concepts that are novel on the one hand and user-centered on the other.

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