

Karen Martin: Proposal for EngD Virtual Environments, Imaging and Visualisation

Research Aims

My research aims are to design and develop tools and strategies that use technology to increase people's feeling of connection with their physical location and to investigate how this can be extended into a sense of community.

I plan to achieve these aims by creating technology systems that:

- Harness individual experiences into collective ones
- Add value to a space by increasing understanding of its function, history and attributes
- Act as social catalysts between individuals as they co-create elements of their environment

The theoretical framework for this research is cybernetic ideas of the properties of systems, in particular, Gordon Pask's Conversation Theory. The technological approach is the use of locative technologies, and the design basis for the study is the use of movement as a method of participant interaction.

This research proposal builds upon my studies for the MSc Virtual Environments at the Bartlett School of Architecture, UCL, and draws upon work and ideas from my time as a research assistant at the MIT Media Lab Europe in Dublin, Ireland.

Research Problem

Personal and mobile technologies, large cities, advanced telecommunications and the general pace of life all contribute to a growing anonymity for individuals in our urban environments. People move around so rapidly - often not living and working in the same area - that connections between neighbours are rarely made [Jacobs, 1962]. Communities based on shared location seem to be particularly vulnerable to decline as a result of urban lifestyles and environments. Online communities meanwhile are flourishing. The success of social network websites such as Friendster and Orkut hints that the lessening of connections between people in urban environments is not caused by a decrease in our desire to meet people [Donath, boyd, 2004]. I propose that urban lifestyles and environments are simply not providing the necessary opportunities and conditions to develop relationships between co-located strangers and that locative technologies can be used to initiate and foster location-based communities.

Location-based Communities: Although it's difficult to define the conditions that will encourage a sense of place or community to develop there are some indications from research in fields such as HCI and computer games. Key factors include participants having a shared interest or goal, receiving reward for participation, spending prolonged periods of time with the system and having the opportunity to adapt aspects of the system. Key attributes required of the system include: having an appropriate form of interaction, inspiring trust in participants and clearly indicating the necessary commitment and etiquette from participants. [Schneiderman, 2000][Crawford, 1982] [Brignull and Rogers, 2003].

While space is described as dealing with location, place is concerned with interaction [Brown, Barkhuus, 2005]. Harrison and Dourish describe a sense of place as being "a cultural or communally-held understanding of the appropriateness of styles of behaviour and interaction" [Harrison, Dourish, Re-Place-ing Space: The Roles of Place and Space in Collaborative Systems, 1996] underlining the role that social interaction plays in the development of a sense of connectedness to a particular location. These place-based interactions may occur between co-located people or between people and their environment. The environment may be a physical location, a computer-constructed space or a combination of both. These interactions contribute to our perception of space as a place, distinct from other spaces by means of its features and the activities of its occupants.

In talking about online communities Nova points out "One of the most striking feature of these locative media used in a social context is that people can infer many things based on those information. If A knows that B is connected, A and B feels co-presence and there is a virtual sense of community. The point is hence to find and interpret traces from others in space"[Nova, Locative Media: a literature review, 2004] I believe that a similar situation exists in physical environments. Locative media and

context-aware technologies provide the opportunity for environments to respond to the changing activities and needs of their occupants [Frazer, 1995]. The representation of these changes through altering local environmental conditions increases awareness of the use of the space for people who share those surroundings. To develop this awareness into a sense of community it is necessary for people to engage with each other to create a collective social experience. In these circumstances the technology system acts as a form of social catalyst by facilitating and encouraging social interaction between individuals [Karahalios, 2004].

Locative Technologies: Locative media refers to every kind of information about physical location as well as other contextual information [Nova, 2004]. Typically the information refers to the location of people or objects in either an absolute-based positioning system [Uncle Roy All Around You, Blast Theory, 2003] or relative-based positioning system [tUna, Bassoli, Moore, 2003]. This information is collected either synchronously [Umbrella.net, Brucker-Cohen, Mariwaki, 2004] or asynchronously [Textales, Ananny, 2004]. Technologies for gathering absolute-positioning data include GPS and GSM while relative position can be detected using sensor-enhanced objects and devices, peer-to-peer networks, ad-hoc networks or Bluetooth. Contextual information includes location-aware data as one of several possible physical factors that might be collected. Other physical factors are light, time, temperature etc.. Contextual information can also include human factors, for example, information about the participant, their social environment and actions. The collection of contextual information can either be explicit (i.e. provided by the user) or implicit (obtained by monitoring user and computer activity) or a combination of these.

Projects exemplifying the use of locative and contextual technologies include Skyear [Haque 2004] and the Active Badge system from Olivetti Research Lab [Want, Hopper, Falcão and Gibbons, 1992].

Movement as an approach for interaction

When an interactive system is placed into a public space then the question of how to engage participants is vitally important. If the intention is for people to find worth in the system beyond novelty value then it is essential that they trust the system and understand the requirements and commitment involved in participation. This process of transforming observers into participants is commonly acknowledged as being difficult. I suggest that using actions as inputs for the system might offer a means of achieving this. There are several benefits to using movement as an approach to interaction between participants and system. Firstly, interaction through movement does not require people to learn any special skills because we interact with our environment in this way everyday. Secondly, because the interaction is intuitive the participants' focus is on the content of the system rather than the system itself. Finally, movement is a powerful form of non-verbal communication capable of suggesting clues about the context surrounding peoples actions without explicitly requiring them to register, submit information or otherwise actively agree to participate.

Conversation Theory (also referred to as CT)

Gordon Pask's Conversation Theory was based on his model of the processes involved in complex human learning. While Conversation Theory has most often been applied to learning environments and processes, I believe that it can encompass the construction of knowledge and understanding in a broad range of social environments. Gary Boyd writes:

When used for instructional system design, CT prescribes learning systems that involve at least two participants, a modeling facility and at least three levels of interaction: interaction with a shared modeling facility, conversational interaction about how to solve a problem, and conversation about why that method should be used. [Boyd, Conversation Theory, 2004]

I intend to take this prescription as a starting point and see how Conversation Theory might be applied to tools and strategies for facilitating location-based communities.

Key factors in developing location-based community

1) Levels of Interaction

In Conversation Theory there are several clearly defined levels of interaction occurring in a cyclical form where each cycle increases the opportunity for the evolution of a new understanding of the topic under

discussion. I believe that this structure of interaction could be applied to systems whose intention to increase social interaction in public spaces.

2) Co-awareness and co-creation

Construction of an object is an outward expression of ideas and opinions while co-creation or collaboration provides a means of engaging the individuals of a community in a collective conversation. Creating open systems that allow for negotiation between co-located individuals extends the ways in which people can adapt and appropriate aspects of the space while also becoming aware of ways of thinking that are different to their own. Rather than a representation, the collaborative effort of actions and outcomes then become a tool for group interaction [Brown, Barkhuus, 2005].

3) Time and Trust

One consequence of our distributed lifestyles is that strangers are less likely to encounter each other on a regular basis and the amount of contact time between these strangers is significantly reduced. The length of time people share in occupying a space is one of the factors that leads to a sense of community [Lawrence, 2004] and I believe this might be encouraged by adding value to a space through information or entertainment.

Time is also an important component in the construction of trust. Trust is an essential component in building community, [Preece, 2002] encouraging exchange and reciprocity by establishing acceptable behaviour through socially agreed behaviour. Consequently connections between individuals are strengthened as people become more aware of shared values [Preece, 2002].

4) Common Interests

Our engagement with a place is established and reinforced by the activities we associate with that space as much as by the form and materials of the physical structure [Harrison, Dourish, 1996]. I suggest it's possible to develop a sense of place that will encourage social interaction by reinforcing the common or shared interests between co-located people. I suggest that location-based communities are based on a shared interest in the activities and people who make up the local environment. These activities and people will form the topic of the conversation in these locative media projects.

5) Physical Attributes of the Space

The organization, features and layout of a space affect people's perception of that environment and the ways in which they interact with the space and its other occupants. This can be seen both at an urban scale [Hillier, 1993] and at street or even room scale [Whyte, 1980]. As the activities and interactions that take place in a space are very important to the development of a sense of community then the form and installation of the system into the physical space is of great importance to the initial engagement of participants with the system and their continuing interaction and involvement over time.

6) Publicly Accessible Information Systems

Locative media projects often use personal, mobile devices such as mobile phones or PDA's as the input and/or output tools [tUna, 2003][Urban Tapestries, 2005]. For locative media to be effective at developing communities the information needs to be easily accessible to the widest range of participants [Brown, MacColl, Bell, Chalmers and Greenahalg]. I believe that one way of ensuring this is to work with large-scale public displays as input and/or display tools allowing for people co-located in the space to become aware of the system before making any commitment to participate with it.

Research Questions

There are two related questions that I will address with this research. This will be done through the design and implementation of a number of prototypes to be installed and tested in public spaces:

Qu1. How can locative technologies be used to increase people's feeling of connection with their physical location?

Possible approaches to this include:

- Harnessing individual experiences into collective ones through representation of the patterns of interaction and activity in the space.

- Adding value to a space by increasing understanding of its function, history and attributes through systems which allow people to co-create objects around the subject of the local area and it's people
- Extending ways in which people can adapt and appropriate aspects of the space.
- Facilitating social interaction and conversation between co-located individuals.
- Providing for communal access to information about the local environment and it's inhabitants

Qu2. Does increased social interaction lead to the development of community?

I suggest that increasing the feeling of connection to a physical location would be a catalyst for increasing social interactions by raising awareness of common interests between co-located individuals. I propose that providing a means of connecting individuals in a collective conversation around this topic might lead to the development of a sense of community.

Background

My interest in situated technologies and interaction began with my BA(Hons) Interactive Arts with Roy Ascott at the University of Wales, College Newport. The strategies for designing interactions I encountered here were based on cybernetic principles, and this approach continues to influence my work. During my master's studies these interaction principles and aesthetic values combined with my programming experience led me to develop a project investigating how movement and abstract representation can increase people's engagement with their physical location.

In October 2003 I graduated from the MSc Virtual Environments with distinction and in February 2004 began work as a research assistant in the Everyday Learning group at MIT Media Lab Europe led by Dr. Carol Strohecker. My work here explored how movement might be used as a strategy for learning. This research led to the development of a multimodal representation scheme for movement into sound and graphics. A number of workshops were held to further explore the subject of movement and representations resulting in an abstract being accepted for publication at Include'05 held at the Royal College of Art, London. MLE had a very interdisciplinary research model and I had the opportunity to meet with people from both academia and industry giving me an understanding of the different approaches, agendas and vocabularies.

Following the closure of MLE in January 2005 I was employed as a research assistant to Stephen Gage, Professor of Innovative Technology at the Bartlett School of Architecture to research the relationships between cybernetics, magic and interactive architecture. Currently I am assisting Mette Ramsgard-Thomson with the organisation of a symposium at the University of Brighton in December 2005, at which an invited group of speakers and audience from the fields of architecture, art, robotics and cognitive psychology will have the opportunity to discuss behaving technologies.

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