

Incidental Mobile Information and Large Public Displays

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Abstract

Much research in the large public display and mobile device area is focused on the synchronous use of the two platforms. Furthermore, there is an emphasis on interaction with content explicitly authored or generated for the large display context. By way of contrast, we present a prototype that displays information previously captured from mobiles of users unconcerned with how their content would later be repurposed for the large screen. We discuss the findings of an initial series of studies using this probe.

Keywords

Large Situated Displays, Mobile Interaction, Search Queries, Location Visualisation.

ACM Classification Keywords

H.5 Information interfaces and presentation: H.5.2 User Interfaces and H.5.3 Group and Organization Interfaces.

Introduction

Mobiles are pervasive and large displays are becoming so. There is a clear and timely interest in extending the approaches and thinking regarding the interaction of these two platforms. Our focus, here, is to consider two elements: first, asynchronous combination of mobile and large-screen use, decoupling the two experiences (and potentially the user groups); and second, the form of the content displayed on the large screen, moving

from explicitly authored material to the notion of 'incidental information', that is information that arises from some other use or activity.

Specifically, we take mobile search queries captured during previous studies and re-purpose them for large screen display [1, 8]. We also consider the effect of location of the large display on the utility and users' perceptions of the information displayed.

We begin by briefly reviewing related work and then, describe the mobile-large screen probe. We subsequently sketch out the method and results of the research. Finally, we summarise the work and present pointers to future research.

Related Work

There is a variety of previous work that impacts this programme of research.

Firstly, the interaction between mobile devices and large displays has been the subject of a number of research projects. These include the use of vision and motion sensors to enable sophisticated, rich synchronous interaction between mobiles and displays [2, 7].

One common focus of large display research has been on the degree to which placing displays in public settings improves a "sense of community". It is hypothesised that public displays foster of social encounters and an enhanced awareness within the community. [3, 4, 6].

Finally, large-screen display prototypes have tended to emphasise content and actions explicitly authored and

intended for that context. However, there has been interest within the wider field of HCI and mobility on incidental interaction [5, 9], i.e. on unintended uses or outcomes of encounters with interactive devices.

This project contrasts with most studies of interaction with large-screen public displays, by focussing on *asynchronous, incidental* interaction and how it can communicate a *sense of place*.

The Large screen Probe

In contrast with other work, we are beginning to consider the asynchronous use of mobiles and large screen displays. Our particular concern here is the repurposing of information from one platform and task to another.

The large screen display shows aerial overviews of locations around Swansea, UK. These included work, shopping, leisure and cultural areas. These are overlaid with mobile search queries gathered in those locations in an earlier study [8]. The University Campus location is shown in Figure 1.

The purpose of the probe is to explore whether other people's queries (while mobile) might be of use, intrigue or, indeed, distraction to the large display viewers.

Every 14 seconds, the location being displayed is changed, revealing a new location and related queries. The queries themselves are updated every 7.5 seconds. Thus, for every query location, 2 separate collections of queries would be displayed. These displayed queries are overlaid on an aerial view of the site at which the queries had originally occurred. This continuous



figure 1. Mobile Queries Overlaid upon aerial view of Campus (Close up of Screen).

change and dynamic display was intended to maintain audience interest.

There were 7 different screens which were displayed, 6 of which showed different locations but kept the queries (so we nearly the same except for location). The 7th screen was a departmental advertisement.

The probe was deployed in three different locations on a university campus in order to elicit insights into how different areas might affect the responses received and observed. The locations were:

- Busy café inside a theatre (public/ indoors)
- Walkway adjacent to theatre (public/ outdoors)
- Common room of research Lab (private/ indoors).

In the two indoors locations we used existing on-site large screen plasma screens. These screens were already in use for public information and advertising purposes. The set-up in the café is shown in Figure 2 and the set-up in the common room in Figure 3.

In the case of the outdoor venue, we projected the display onto the side of a building. The building was adjacent to a busy walkway on the campus. This resulted in obtaining the views of the people as they passed to see if they engaged or acknowledged the display. The projection displayed on the building was 20 x 10 feet, and is shown in Figure 4. The length of time that the displays were shown at each location was, 2 days in the lab, 4 hours café (11 am – 3pm), and 3 hours outside on side of the building.



figure 2. Display positioned in the Café



figure 3. Common room



figure 4. Projected query map

The Study

The study aimed to consider the value and types of reactions that may be provoked by unanticipated incidental information. Further we wanted to consider how responses might differ in different locations. Finally we also probed the possibilities of people interacting with the display via mobiles and other technologies.

The study involved the observation and questioning of 36 participants. This included the interviewing in detail of 20 people from the café setting, 5 from outside and 2 inside the lab. There was a range of backgrounds, from student to business people to retired persons. This allowed for a broad diversity of the targeted audience and allowed the expression of different views and experiences.

We used various study methods to gain feedback from these areas of interest. These ranged from simple field observations in public places (naturalistic observations), to full interviews. Observations lasted for the duration of the studies, and included 30 minutes before and after allotted times, with the blending in of coffee in background.

We observed the reactions people associated with the changing words upon display as they were fading in/out at the locations. We carried out a combination of informal interviews with people (asking about their opinions about the display, e.g. "does it spark new talk topics, jog memory etc") and direct questioning in the form of a structured interview.

Findings

For each of the three locations we present a selection of initial findings; our intention is to give a sense of the range of responses.

Cafe

There were two main types of response. Some café users who were in a hurry and simply wanted to purchase take-away drinks or food often failed to notice or engage with the display. In contrast, people sitting down commented that they became aware of the display after some time. Some of these people indicated that they had heard about the display from friends or colleagues.

Prior environmental conditioning seems to have an impact on how people interpret public displays. Many participants commented that they initially thought the display was some form of advertisement. As we noted

above, the café's plasma screen was routinely used to give information about upcoming events.

Just under 80% of the café participants thought it would be useful to see other people's mobile queries made in the locations. Most people thought the visualization would be good as a kind of tourist board for displaying the information to new visitors

Walkway

As with the café display, a number of people did not stop and look at the walkway display despite it dominating their visual field. When questioned they indicated they assumed it was just another advert. This repeated the pattern of previous experience colouring the participants' interpretation of the display.

Positive feedback was also obtained. Questioned participants appreciated the large size of the display. They were also intrigued by the apparent dynamic nature of the display. This dynamic form contrasted with the canned advertisements that were usually projected onto the wall.

The group of participants we questioned in this location was less accepting of the incidental, apparently 'random', display of information. Rather they would have liked more curated, structured information. This response may have been due to need for quick, directed information while outside and on the move in contrast to the participants comfortably accommodated in the café.

Common Room

We left the display run for the allotted time, allowing people from the lab to observe the screen. We

observed people's engagement with the screen and asked them for feedback related to what they had seen.

While all of the people who viewed the screen in this location were residents of Swansea, some were able to see value in seeing familiar places. We observed some people trying to make sense of the changing queries – unlike specially authored location content, some queries appeared to have little to do with the place in question.

Most common room users thought that it would be of most value in a more public place but indicated that if the queries were 'live' it could be an interesting background display in the common room even perhaps acting as a 'conversation piece' where groups might try to guess the need being the mobile search query or identify trends and patterns.

From these points we can see, ideas linked to past experience with systems, visual engagement of the screen, deciding on contextualization of location, and overall surprise from display.

General issues of interaction and engagement

Across all three venues in which we installed our display, some common underlying issues arose.

Many people were concerned about approaching or engaging with the display in fear of losing the anonymity and privacy that is, paradoxically, a feature of being in public. Several participants asked us about the possibilities of using a private, handheld device (such as a mobile) to engage with the display without other people being aware of their interactions. We observed that the fewer people at a location, the more likely people were to approach the display and stare at it.

While the desire to blend in was most evident; some participants we approached relished the idea of being centre of attention and would like to collaborate and interact with people around them.

The most enthusiastic responses to the probe came from those less than 30 years old; an audience that is who have been brought up with digital technologies, and who could imagine using such a system. The general response of older participants (aged 60 and over) is succinctly captured in this comment: *"oh we don't understand or have these new gadgets ... we'll leave it to our grand children"*.

Conclusions

The probe and study had three elements of novelty: the decoupling of the mobile and large screen interactions; the move to incidental rather than considered content; and, the exploration into the impact of location on the engagement.

The studies presented are pilot ones but provide some themes to stimulate further discussion and work.

Respondents were intrigued by the notion of watching representations of the interactions of other, asynchronous and mobile users. While the mobile queries are clearly not valuable for those with specific, structured information seeking needs their large screen presentation did give some viewer unexpected insights and lead to discussions with other people at the location.

Location clearly affected the engagement with the device in two ways. Firstly, there was the 'conditioning effect' – people are becoming used to large screens

providing advertisement style information. Future, more engaging displays will have to either accommodate or exploit this exposure. Secondly, the form of ambient visualisation provided in our probe seems most suited to locations (like the café and common room) that allow people to become gradually aware of the display.

In progressing this work we are looking at further ways of capturing other forms of incidental information via mobiles and other sensors and representing them on large screen displays. A further concern is a more direct interaction between a user's own mobile and the displays they encounter. So, for example, we are considering how interactions currently realised on the display might be repurposed or recreated on mobile devices.

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