

ATTENTION, AN INTERACTIVE DISPLAY IS RUNNING! INTEGRATING INTERACTIVE PUBLIC DISPLAY WITHIN URBAN DIS(AT)TRACTORS

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Abstract

Display or interaction blindness is a known problem for interactive public displays where passers-by simply ignore or pay little attention to them. While previous research created interventions that tried to address this problem or reported on differences between experiences in the lab and in the real world, little attention has been given to examining different attractors surrounding the interactive public display, i.e., people, artifacts, and stimuli that compete for people's attention in the urban settings and distract them from interacting with public displays. This paper reports on a systematic examination of attractors around a case study of an interactive urban display in London. We outline the initial spatial exploration with the aim to identify suitable locations for the placement of the interactive public display within the urban setting, followed by a two-hour observation of attractors and stimuli around the urban display. We highlight the main attractors that compete for people's attention and distract them from potentially interacting with the public display. We also note our attempt to reflect the environment and integrate the public display within its setting.

Keywords

Interactive Public Displays, Situated Interactions, Urban Computing, Urban Screens

Introduction

Interactive public displays are becoming a common element of the urban landscape (Kostakos and Ojala, 2013). Although they have the potential to become the next communication medium (Davies et al., 2012) they are struggling to attract people's attention to interact with them – an effect known as display (Huang et al., 2008) or interaction blindness (Ojala et al., 2012). Researchers have acknowledged this as one of the problems in the area and have started working on potential solutions for directing people's attention to displays and communicating its interactivity to passers-by, e.g., through using visual feedback to the incidental movements of passersby and showing them their silhouette through a live video feed (Müller et al., 2011) or by examining the best button design that would stimulate the passers-by to click on it (Kukka et al., 2013). Both these examples focus primarily on the design of the digital medium without taking into account the display context or the surrounding environment within which the display operates. While previous work created interventions that aimed at addressing this problem (as the above-mentioned works) and have described some of the challenges related to different experiences in the lab and 'in the wild' (Memarovic et al., 2013b; Ojala et al., 2011) little attention has been given to examining the impact and effect of attractors – artifacts and stimuli in the urban setting – on people's attention in a specific context. The original works that described the problem of display/interaction blindness mainly report on passers-by scarce attention without examining the reasons behind it, colloquially said "describe the scratch but not the itch". This paper informs the challenge of display blindness by presenting a case study of a systematic examination of attractors in an urban setting in London that compete for passers-by attention together with interactive public displays. In the next section we describe the setting and our exploration of the urban space in order to understand the properties of possible locations to place a display. We then present findings from a two-hour observation session of the artifacts and stimuli that distracted people from potentially interacting with the display. We highlight their effects and analyze their properties. Building on lessons learned, we note our attempt to integrate the interactive public display within the urban setting and its attractors. Finally, we discuss the implications of our work and present concluding remarks.

The Setting And Display Placement

The interactive display under investigation in this paper is located in Leytonstone, London where it was placed as part of the Screens in the wild project in May 2012 (<http://screensinthewild.org/>). It has several applications running since then described here (North et al., 2013; Memarovic et al., 2013a). The display is

placed within Leytonstone public library building. The setting is depicted in Figure 1 and 2: on a high traffic area located close to the corner between the underground station and High Road Leytonstone. Saint John Baptist's church is in front of the library.



Fig.n. 1 - Display setting in Leytonstone, London. The display is indicated with a red frame. a) and b) show the street where the display is located, c) shows the St John Baptist church, which is located in front of the display, and d) shows passers-by interacting with the Moment Machine application

In order to find the best possible location for the urban display we used the Space Syntax spatial analysis methods, explained in details here (Fatah gen. Schieck et al., 2013). Through the combination of the spatial analysis with onsite observations we identified spaces that offer better visual properties and enable a higher exposure for the display to passers-by, as shown in Figure 2. We selected a few candidate locations based on this analysis and chose the Leytonstone library as the most suitable one. The final placement was decided based on the potential areas identified through the spatial analysis, which was reinforced through the observation of visual attractors adjacent to the proposed location. The whole process was also strongly framed by practical factors such as the availability of the site, the possibility of the deployment, and other factors related to the interest of the local council, venue owners, and businesses in the area (Fatah gen. Schieck et al., 2013).



Fig.n. 2 – Spatial configuration of Leytonstone. The figure shows visual integration, which explains occupational potentials for space and the likelihood for people to stand or interact. The visual integration goes from high marked in red to low marked with blue. The display location is indicated with a black dot.

During the period before the display placement, observations around the selected site were carried out with the aim to identify visual attractors in both static and dynamic forms. In Figure 3 we can see the Stone art gallery to the right of the display location with its visually attractive content that changes periodically. To the left of the display there is a window space, which resembles an extension to the art gallery and is used mainly to display community artwork. In front of the window space (i.e., on the other edge of the pedestrian pavement) there are two notice boards with council related posters and maps.



Fig.n. 3 - A continuous display. Display location is indicated with the red square.

Overall, the whole process, which was conducted during the first 6 months of the project, represents the best effort to fit in a display within the setting in order to maximize its visual exposure. After the display placement, during a full day observations of people behavior towards an interactive display, we noticed the interconnected nature of the interactions in the urban space, which are defined through the spatial layout, people and actions, type of social activities in the area, and time of the day (Fatah gen. Schieck et al., 2013).

A Case Study Of Attractors In An Urban Public Space

After the display installation, observations at the Leytonstone site were carried out on a regular basis for different purposes. During this period the research team noticed the influence of different attractors in the area on passers-by attention. We present here an example case study of the attractors in the setting and how they work. These were identified during two hours of observations that took place in May 2013 while one of the applications – the Moment Machine (Memarovic et al., 2013a) – was running. The application has a very simple user interface that allows passers-by to take photo with a single button press (see Figure 1-d) A prominent attractor during the observation was an event – a wedding – happening at the church. The situation is depicted in Figure 4. When the bells started ringing this immediately diverted people’s attention to the church. Passers-by started queuing in front of the church gate in order to peek in and see what is happening. The whole scene lasted around 10 minutes and the more people gathered around the church gate the more people got attracted – creating a honey pot effect.

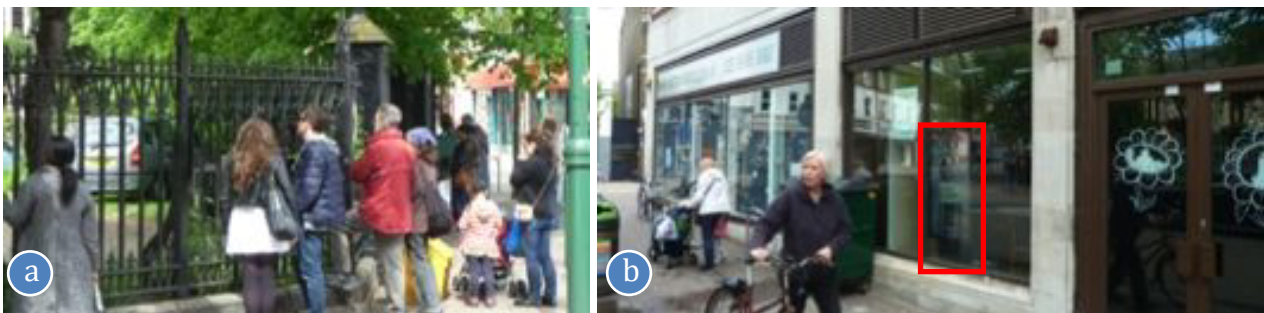


Fig.n. 4 - Wedding and wedding bells attracting attention

This instance supports some of our previous findings (Behrens et al., 2013) that indicated if there is a social event happening at/near the public display location it is more engaging than the display: in other words people are more interested in observing what other people are doing. However, this instance also points to the acoustics in the environment as strong stimuli that get people’s attention immediately. Without the loud wedding bells passers-by might not have noticed that there is an event taking place in the church. The bells served as the beacon signaling to people where they should look.

Another interesting example of people acting as attractors was spotted with parents and children who passed by the display. As the display is located somewhere close to the street parents paid particular attention to their kids in order to make sure they do not run onto it. Sometimes kids’ and adults’ attention was caught by the people in cars who would gesture, talk loudly, or play music, while waiting for the red traffic lights (which lie in front of the screen), thus becoming a temporary attractor. However, at the same time people waiting in cars would pay attention to the screen if they would see someone interacting with it.

A very typical example is depicted in Figure 5 where a person passing by the display is engaged with his phone. Although a smartphone is not a situated part of the urban environment it is a widespread technology that people carry with them. Similar examples include iPods/MP3 players that cocoon people and disengage them from their environment (Seeburger et al., 2012), ultimately limiting their attention to anything else but the screen (and sound in the case of iPods/MP3 players) of their choice.

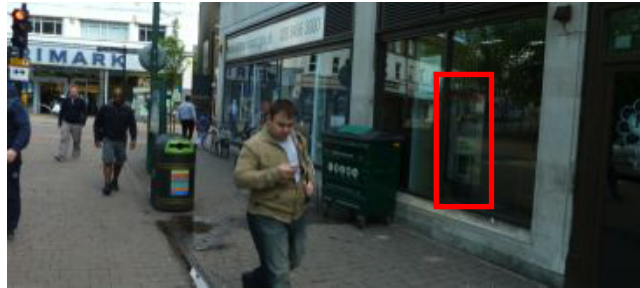


Fig.n. 5 - There is one screen that can always offer more interesting information

As shown in Figure 6 other artifacts in the environment were other forms of non-interactive urban displays, e.g. the Stone art gallery window and the window to the left of our case study screen where local artists could display their work. The Stone gallery's simple see-through window allowed people to peek into the art gallery and see paintings from local artists. The gallery's content drew people to stop for moments and see what's inside (Figure 4-a). When people were inside the gallery they formed a strong attractor and drew passers-by attention. Moreover, the window had a small advertisement for a local 'Star Wall' event and for this event graffiti was made just across the street: the two formed a connection, i.e., after looking at the advertisement some passers-by would look around and would spot the graffiti (Figure 4-b and -c). Similarly, to the left side of the interactive display there were paintings from the local artists and their information. This was another artifact that caught people's attention (Figure 6-d).

There were also environmental conditions that caused problems with noticing the display and due to the fact that the screen is located behind the glass window, there is a strong reflection of the church yard, the big trees around the church and people who pass-by acting almost like a semi transparent mirror, which makes it hard to notice the display content (see Figure 1-d). During a certain time of the day, the natural light became really bright and due to the reflection on the screen, the display visibility became quite low, similarly as reported in (Memarovic et al., 2013a; Memarovic et al., 2013b). If initially it was hard for people to notice the screen, it became almost impossible to do this after this point. During the evening and nighttime, and unlike daytime, the display and the gallery become strong attractors and most of the analogue visuals around them become less dominant visually.

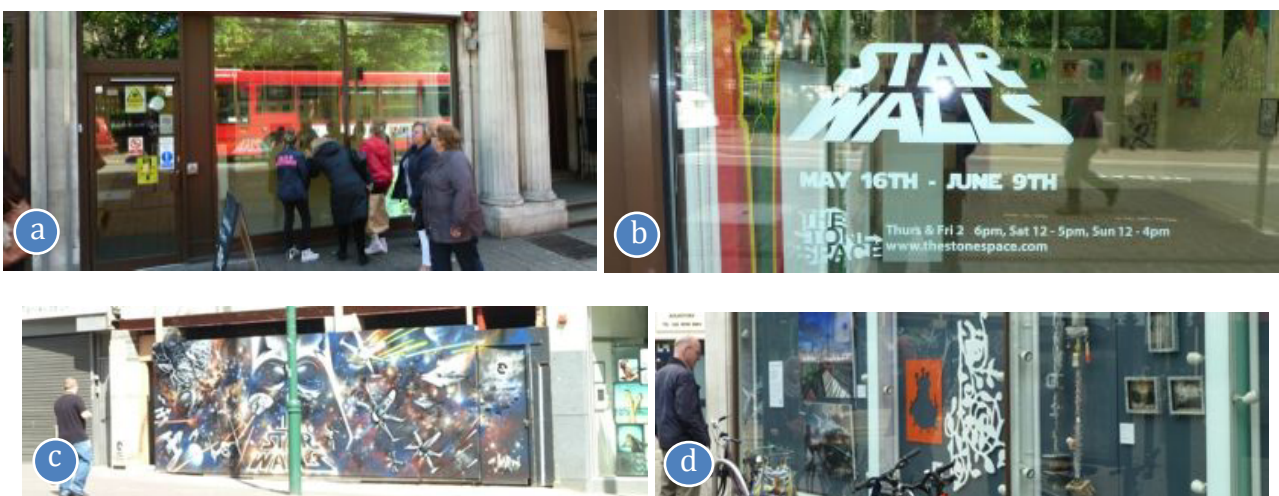


Fig.n. 6 – Urban/handmade displays as attractors

The above-mentioned attractors can be described through the properties shown in Table 1. We will use the wedding event and graffiti as examples to describe the properties of the attractors. The type of attractors, we have observed, were either audio – the wedding bells during the wedding – or visual – graffiti. Some attractors were not changing and were static, e.g., graffiti, while others were quite dynamic, e.g. people at the wedding. Also, on a time based duration some of the attractors were permanent and continued to stay in the setting beyond the observation day (changing after a few weeks/months), e.g. graffiti, while others were quite temporary, e.g. the wedding.

Attractor property	Sub-categories	Example
<i>Type</i>	Visual	Other forms of displays, people, mobile phone, Stone art gallery, window showing local artwork
	Audio	Wedding bells
<i>Dynamicity/Change</i>	Static	Graffiti, artwork
	Dynamic	People
<i>Time based duration</i>	Temporary	Wedding bells, environmental conditions
	Permanent/semi- permanent	Graffiti, Stone art gallery, window with local artwork

Table 1 - Attractors and their properties

Embedding The Interactive Public Display Within Urban Attractors

We note here our attempt on fitting the interactive display within the urban attractors in the immediate surrounding. In addition to the design of the digital content and its visual impact (such as the Moment Machine’s call-to-action button or direct video feed showing passers-by motion etc.), we have tried to make the display visually more noticeable using static illustrations. A researcher worked with a local artist from Leytonstone on designing alternative (analogue) visuals to frame the display. The outcome is the green 'in the wild' context, which can be seen in Figure 7-a.

The aim of the visual layout was to create a static visual narrative that extends the digital visual effect of the screen itself. The digital effect of the screen is framed through its relatively small screen area in comparison to the big glass area around the screen, which tends to reflect the trees and church that are in front of the library building and distract passers-by. In this way, and through the combination of the dynamic digital and the static analogue visuals, we managed to break the dominance of the background reflections and extend the visual effect by creating a continuous visual experience that goes beyond the digital applications themselves. Moreover, the colors (green and white) were taken initially from the existing colors around the display (e.g. white relates to the gallery exhibition titles and the hand free illustrations to the right of the display, whereas green matches the text on top of the library building). Other colors such as the contrasting pink was chosen to attract attention to elements and create additional focal points.



Fig.n. 7 – Our attempts to integrate the display within the surrounding attractors and make it more prominent. The image shows the combination of visual and analog design solution.

When it comes to integrating the display within the environment with respect to audio attractors there was an extensive exploration with positioning the audio source (i.e., the speaker) for the SoundShape application. The application allows passers-by to play and combine sounds by touching on a square in a matrix. Active pads have an animated illumination that flashes in time with the musical sequence (North et al, 2013). The sound plays only when someone interacts with the pads and then it fades away after a short period of time. Nevertheless, people in the office behind the window where the display is located complained about what they considered as annoying noise, and therefore the speakers had to be moved to a farther location closer to the library. However, this was also problematic as then the people inside the library could hear it and we had to turn the level down. Unlike the people who occupy the building regularly, passers-by demanded to turn the audio up as they found difficulties in hearing the audio on a noisy street. There is a good question to how people in front of or around the screen would relate to sound, but more importantly how people who occupy the building behind the display and who do not see what is happening on the display relate to the same sound.

Discussion

People's activities, audio stimuli (wedding bells) and visual stimuli (graffiti or artwork), or other forms of urban displays situated in the setting, e.g. graffiti, windows, or mobile forms such as smartphones/iPods, and environmental conditions, are just some of the examples of attractors that divert people's attention from potentially interacting with displays. The above-mentioned represent different types of stimuli that differ in their effect on passers-by in terms of attractor dynamicity (dynamic people movements vs. static graffiti) or in duration (temporary events vs. more permanent gallery). Researchers need to be able to distinguish between the effects of these different stimuli (see Table 1) and their response solution should not attempt to answer to all of them, but rather the researchers need to be aware of them and aim to identify the ones that have the biggest impact, which they then can take as a baseline for developing an integral solution that embeds the display in its surrounding. In our own case, our design solution came in the form of a visual and analog framing around the display responding to the most prominent observed attractors, which were different non-interactive displays and the church in front.

It is essential to note that while our visual framing of the design solution is static, the audio and the visual digital design of the experiences are dynamic. Similarly, the visual solution is closer to a permanent and long lasting duration of an attractor, irrespective of the audio and visual digital experience, which are changing depending on the application that is running on a display and are rather temporary. The whole process of integrating the display within existing site-specific attractors is iterative and dynamic. For example, the display visual design might need to be reconsidered if some of the permanent attractors was removed or changed, e.g., the Stone art gallery window or the one that displays local artwork. In this respect, it is important to note here that our design interventions overall are static in nature and there is an interesting question here on the extent this may or may not need to reflect the dynamic interplay between the attractors and value and/or effect this might have.

One important thing to note is that it is challenging to evaluate/quantify the effect of the solution in the wild as most people on the street will always see it "as is" – they might not know or remember how the display looked before, or they might evaluate their perception of the presence of the screen ("What is it doing here?") rather than evaluating how well it is integrated within the rest of the urban attractors (and how well the design solution worked). The researchers and stakeholders who followed the project on a longitudinal basis can compare – and in our case our project partners were thrilled thinking of it as an improvement to the area.

Conclusion

Display blindness is one of the challenges interactive public displays are facing in urban settings that have been well documented by prior research. Previous research has mainly concentrated on describing the little amount of attention displays get and has tried to provide guidelines for creating appealing content that would attract passers-by. In this paper we attempted to inform the problem of display blindness in a more systematic way by analyzing some of the attractor, i.e., people, artifacts and stimuli in urban settings that attract passers-by attention and thus divert them from potentially interacting with an urban display placed in London. We have also described some of our attempts to understand the nature of these attractors and apply (some of) their properties with the intention to augment the interactive public display experience and fit it in

within the setting and its attractors. Understanding the nature of attractors in general requires more research, including examining their effect and learning from them, as this can inform the design of interactive public displays and how they can react and/or adapt to attractors in urban environments, thus making them more competitive and visible in their setting.

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Biography

Nemanja Memarovic is a research and teaching assistant at the Faculty of Informatics, University of Lugano, Switzerland. His current research centers on social and community interactions in public spaces, in particular opportunities for intra- and inter-community interaction through networked public displays. Nemanja was PC co-chair for the Community Informatics 2012 conference, a co-organizer of the Workshop on Computer Mediated Social Offline Interactions at Ubicomp 2012 and Ubicomp 2013, "ExS 2.0"

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Moritz Behrens is an architect and maker, an interaction designer and researcher in adaptive architecture and urban computing. His research interest spreads towards human-computer interaction and location-based social networks/media in the city. In particular, he explores social interactions in technology mediated urban spaces and their impact on the spatial morphology of the built environment. Through deploying situated technologies he aims to connect and engage real-world as well as digital communities to enhance social well being in the city.

Kinda Al-Sayed is a teaching fellow on the MSc Advanced Architectural Studies and the MSc Adaptive Architecture and Computation courses at the Bartlett, UCL. She has worked as a researcher on PROXIES, Screens in the Wild at UCL and on the Welcoming Workplace project at JSA Architecture and RCA's Helen Hamlyn Centre. She has studied both in Damascus University and the University of Applied Arts Vienna. She has also pursued studies at the Academy of Fine Arts Vienna and the TUWien and finally at UCL where she obtained her MSc AAS degree. She is an architect with several years of practice experience. Her main interests are focused on -but not limited to- Complexity modeling of urban dynamics, generative and parametric models of architectural and urban design, modeling creativity and knowledge in design process. More recently, she is involved in modeling cycles of behavioral activities that couple spatial networks in cities with transpatial networks in cyberspace.