

Noticing Interactivity of Public Displays

Oliver Dürr

Abstract— Interactive Public Displays are becoming a common sight across larger cities and malls but interaction with them remain rare. Although a person may not want to use the screen because of *social awkwardness* many potential users are either not aware that the display can be interacted with or they do not notice the public display in the first place. Attracting people to notice and potentially use an interactive public display involves focusing their attention in a public setting where countless other stimuli distract the potential user. This paper sheds light on different approaches on how to increase the public perception for these kinds of displays and how different methods of conveying interactivity are more or less effective.

Index Terms— Understanding Interactivity, Expectancy

1 INTRODUCTION

Usually interactive public displays are set up by corporations or cities to portray information for the public or to sell a product. The standard practice of conveying their information has been a static paper billboard for past centuries. This is still a common practice at the beginning of the 21. century but displays have multiple advantages such as seamless updatability at any moment and of course interactivity which can empower the user to get much more information from a screen than from a billboard.

Even though public displays have become common across many large cities around the world they remain unnoticed by many people [1]. Researches have found several ways to increase public knowledge for these displays. Not every method is effective in the same way [5]. Some methods are revamped from older technologies such as the arcade but new technologies allow unforeseeable ways to create public awareness for the interactivity of public screens. Using sensors that capture the environment around the screen may be effective but can also trigger anguish by the people that notice the screen and fear for their privacy, thus not using the display even if they notice the interactivity. People want to know what they are getting into and if the usage could cause social awkwardness [1].

There is still little knowledge over how effective these displays really are in selling products by engaging users and if the high cost of installation and programming are gratified.

2 BACKGROUND

Raising public awareness of the interactivity of public displays has been a field of study since the early 21. century. Other studies on noticing a general display in public go even further back into the 20. century.

The *Opionizer system* is an interactive public display used in an early study from 2003 at the University of Sussex, Brighton [1]. In this seminal study Brignull and Rogers created a public display which could be interacted with via a laptop. They detected basic concepts of how people noticed the display and how they became encouraged to interact with it.

Müller et al. [5] summarized several techniques how interactivity in public displays can be noticed by the public. This field study also gave important insight on how effective the different methods are. Techniques ranged from basic luring methods that have been used for decades to state-of-the-art methods such as mirroring the environment around the screen.

In a related study Huang et al. [2] focused on how aware people are of public displays in general and if their effectiveness is overrated.

Giving insight on the psychology of people in public places whom are overwhelmed by countless other impressions and are usually in constant motion.

Müller et al. [4] take a closer look at what is necessary to convince a person to use an interactive public display. Among other approaches the *Audience Funnel* is an peculiar model that splits the interaction with public displays into six different phases. From a basic passer-by to a post interaction follow up. Each phase can now be individually examined as their requirements clearly vary.

3 METHODS OF INTERACTIVITY INDICATION

People living in metropolitan areas are exposed to interactive public displays. Although not every interactive public display may be noticed or its features may be unclear.

Researches have come up with several methods that attract potential users and show them what the display is capable of. The more people are aware that displays can be interacted with the chance grows that they will actually engage with one. This is also known as *prior knowledge*. In the following we will explore several methods of interactivity indication and discuss their individual effectiveness.

3.1 Affordances

Taking advantage of affordance can help educate the public on what the display is capable of and how to use it. Showing the potential user that there clearly is a camera on top of the display or a *Microsoft Kinect* can help people understand what sort of interaction is possible with the screen. Before a person uses a public display he wants to know what sort of work is required to interact and if it could cause *social awkwardness* [1].

3.2 Using an Attract Sequence

Attract Sequences have been used by arcade machines for decades. They show the passer-by what the possibilities are by interacting with the machine. An *Attract Sequences* usually consists of a video or in some cases a slide show. The sequence should convey the person that is walking by to primarily notice the screen, stop and look at it long enough to understand what is possible and to ultimately interact with it. Müller et al. [5] clarified for this to work a person needs to actively stare at the display for a few seconds to understand the basic concept of interaction possibilities with the screen. This is not an ideal practice because most people do not take a lot of time to look at public displays. Huang et al. [2] conducted a study around non-interactive displays in public where it was measured how long people stared at them. They found that most people, if at all, only glanced a public display for 1-2 seconds. A glance longer than 800ms is considered intentional in an earlier study by Müller et al. [3].

A similar approach can be seen with the *Call-to-Action* method. The idea is simple and consists of a basic digital label such as "Touch the Display to begin". This method is usually more effective if people are already interacting with a device. Common good practices are action

-
- Oliver Dürr is studying Media Informatics at the University of Munich, Germany, E-mail: o.duerr@campus.lmu.de
 - This research paper was written for the Media Informatics Proseminar on "Media Informatics", 2015.

calls such as a phone that reads "Slide to unlock". During a short glance of 1-2 seconds people are unlikely to understand even the basic concept of the screens potential and some cases even its interactivity. The *Attract Sequences* works better in an environment like an arcade where people are actively searching for new screens to interact with. Public screens are competing with a vast number of other impressions, reading or watching an instruction first is considered bad practice and demotivates people.

3.3 Shadows and Mirrors

Using shadows or mirrors involves a hardware that can either collect information about the outlines of the displays surroundings using technology such as the *Microsoft Kinect* or quite simply a video image. The basic concept is to use information captured by the sensors to replicate an image on the screen. Humans are attracted to moving images that represent something in real live, especially human features [5]. If a person simply sees the outline of himself or of someone else in the screen they immediately notice even if they where not actively staring at the screen. Self awareness is a very strong trait among humans and only a few other primates. To further convey that the screen is interactive the image that is cast on the screen can, for example, move around animated objects on screen. Acting in an augmented reality scene where the real world and a virtual world collide. It is unmistakable for the person passing, that this display is interactive even if he merely glances at it. Müller et al. [5] found that using mirrors is slightly more effective than just using outlines because people are even more enticed to look at a screen that represents a real human. Using a mirrored image of the reality may however cause people to shy away from the interactive display because they feel that there privacy might be invaded. It could seem unclear how these images are processed and where they will end up. The study by Müller et al. [5] also shows that using avatars instead of real images of people is less effective.

3.4 Honeypot Effect

A basic human feature is to study what other people are doing and then deciding on whether or not that is something oneself would also do. In some cases it can also trigger mockery over the person doing something that another person is not accustomed to but the basic concept of a human interacting with a public display is still noticed.

By seeing a person interact with the display others become not only aware of the interactive capabilities of said display but they also become very enticed to learn and potentially use it themselves. This effect can happen naturally by someone using the screen in public but can also be created artificially by a sales representative from the company that set up the screen, even going as far as to invite people on the street to use it by offering free goods. In the field study by Müller et al. [5] the importance of the *Honeypot Effect* was detailed in a great manor calling it the most effective practice.

The *Honeypot Effect* can cause large groups to gather around a public display and watch a person interact with the device as seen with the *Opionizer system* by Brignull and Rogers [1]. The *Honeypot Effect* can also be combined with the *Landing Effect* having a user pass by a screen stopping and returning to the screen after seeing that someone is interacting with it. The *Landing Effect* is also effective if several interactive displays are close to each other giving a person a chance to first notice that a display is interactive then moving on and seeing a similar display where the user once again has a chance to interact with it.

4 CASE STUDY

As humans become more and more accustomed to working with a screen where they can manipulate things on the *affordances* of interactive public displays become more clear.

By using touchscreen displays on mobile phones for example we have *prior knowledge* that a screen can potentially be interacted on with a simple touch. As in *Figure 1* we can see that this display has virtual buttons. As someone who is accustomed to using a touchscreen one may try to tap on one of these buttons. The example in *Figure 1* does not take advantage of any methods of interactivity indication discussed

in this paper. A very long text below the map of Munich is also an indication of a failed implementation of an interactive public display.

The power of expectancy is crucial for the usage of interactive public displays. If a display such as *Figure 1* had been set up 1990 no one would have considered touching it in the first place without at least a clear *Call-to-Action* method.

A public display has to work as expected with little to no instruction. Building on what people have become accustomed to in the past decades of using technology or taking new ideas that work intuitively and need little to no introduction.



Figure 1. Interactive Public Display at the "Münchner Freiheit" in Munich, Germany

5 CONCLUSION

Interactive Public Displays compete with various other impressions people perceive in the public. These installations not only require sturdy technology that can run for years but also a developer who should be skilled in providing the content in an appealing fashion as well as an intriguing method of showing interactivity as depicted in this paper. This can be very expensive and has to be considered while deciding on whether an interactive public display is worthwhile.

After an installation of a public display the people responsible should employ sales representatives that show the public how to interact with the screens and show benefits of using it, creating a *Honeypot Effect*. People will gain *prior knowledge* and will be more likely to use the public display in the future. This can also lower the *social awkwardness* of interacting with a large display in public. Naturally this is expensive and using a sensor to display the outlines of a human can be very effective to further convey people to interact with a public display.

Interactivity may not always be necessary when building a public screen by creating models that offer a slow and buggy interface people may be convinced not to use interactive public displays in general. Getting people to notice that a display is interactive is only the first step. The main benefit, whether it is entertainment or information, of an interactive public display should always be obvious to the user after just a few seconds.

REFERENCES

- [1] H. Brignull and Y. Rogers. Enticing people to interact with large public displays in public spaces. In *Proceedings of INTERACT*, volume 3, pages 17–24, 2003.
- [2] E. M. Huang, A. Koster, and J. Borchers. Overcoming assumptions and uncovering practices: When does the public really look at public displays? In *Pervasive Computing*, pages 228–243. Springer, 2008.
- [3] H. J. Müller and P. M. Rabbitt. Reflexive and voluntary orienting of visual attention: time course of activation and resistance to interruption. *Journal of Experimental psychology: Human perception and performance*, 15(2):315, 1989.
- [4] J. Müller, F. Alt, D. Michelis, and A. Schmidt. Requirements and design space for interactive public displays. In *Proceedings of the international conference on Multimedia*, pages 1285–1294. ACM, 2010.
- [5] J. Müller, R. Walter, G. Bailly, M. Nischt, and F. Alt. Looking glass: A field study on noticing interactivity of a shop window. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '12, pages 297–306, New York, NY, USA, 2012. ACM.