

Exploring new ways of interaction with smartphones

ABSTRACT

Current interaction options with smartphones are limited. In this paper, we present four experiments that we conducted and our initial findings. Our experimenting process was analyzed together with Dourish's work on tangible and embodied interaction and we gained insights to better understand the meaning behind smartphone interactions. This sets a foundation for discovering new ways to interact with smartphones in the future such as touch-less, eyes free or haptic interaction.

Keywords

Design, Interaction, Tangible, Embodied, Smartphone.

1. INTRODUCTION

Smartphone interaction is typically viewed as using smartphone applications whereas another perspective of smartphone interaction is the tangibility of its use. Previous works have been conducted on extending tangible interactions with smartphones by light and visuals [3], tangible vibration alerts [4] and changes in mass and shape [2]. Currently, everyday commercially available smartphones have limited interaction possibilities. They are used mainly for communication purposes e.g. calling or tapping the screen for messaging and/or browsing the Internet.

Our paper explores this observation that smartphone use has increased substantially over the recent years but everyday ways to use them have not changed accordingly. The motivation for this paper is not problem-based but rather exploratory, to discover possibilities that different ways of smartphone interaction can benefit and shape our behaviour with these devices and amongst one another. There may be possibilities in smartphone interaction that in some situations allow us to be more expressive, and in some situations allow us to be more subtle in our use of the device. Our standpoint is from an interaction design perspective/approach. In section 2, we explain more precisely the work of Dourish in relation with our work. In section 3, we describe four experiments, which we conducted to realize some meanings behind behaviours of smartphone interaction, and also to provoke new behaviours. In section 4, we present our conclusions and future work.

2. LITERATURE REVIEW

The interaction design perspective covers the topic of tangible interaction as introduced by Paul Dourish. Dourish is viewed as a pioneer in the interaction design community with his notable contributions to the topics of tangible and embodied interactions (Dourish, 2004). While there does exist other scholars who made

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

Conference '10, Month 1-2, 2010, City, State, Country.

Copyright 2010 ACM 1-58113-000-0/00/0010 ...\$15.00.

contributions to these topics, Dourish's notions are held in high esteem and taught at several universities internationally. Additionally Dourish's notion helps to contextualize the work presented in this paper within the interaction design community and gives us a foundation to analyze and interpret results that guide the next stages in this exploration. Dourish (2004) argued for tangible interaction as exploring how to remove focus from the digital device and provide people with a much more direct tangible interaction experience. Related to tangible interaction, he defined embodied interaction as a coupling of tangible and social interactions for the creation, manipulation and sharing of meaning through engaged interaction with artifacts. He used the term *meaning* to capture aspects of embodied interaction. He views meaning as being behind every action the user has with the artifact, artifact being the device or object that is being acted on, and a primary concern for ubiquitous technologies. Considering this, the traditional interface of the smartphone is the display screen and keypad, which does provide interactions, the smartphone itself can be thought of holistically as a mobile interface between the world of human and the world of the machine. Furthermore behind every user interaction with the smartphone is some meaning for this action that makes smartphone use a very integral part of our everyday life at the present time.

3. EXPERIMENTS

In this section, four experiments (the methodologies and results) and a discussion relating to these experiments are presented.

3.1 Fly on the wall

3.1.1 Methodology

This methodology involved the researcher making observations in an environment without interrupting neither the environment nor the persons being observed. The environment observed was the city of Malmö, Sweden. This makes Sweden and by extension Malmö an ideal environment for observations of smartphone interactions. We made observations at everyday places including bus stops, buses and streets around the city. Observations were completed for one day, a Monday from 8am to 6pm.

3.1.2 Results

From this experiment we expected to get a deeper understanding of meanings behind the tangible and embodied interactions with smartphones in public spaces. However, we observed an overwhelming parallel occurrence of smartphone usage by most people in the environment. Instead of considering the whole environment, we decided to focus on a few instances of usage. This yielded some insights on individual behaviour; however we felt that in public spaces the environment was linked to individuals' behaviour. Without being able to properly document and analyze the whole environment, this limited our meaningful observations and interpretations. Nonetheless, this experiment confirmed that in Malmö, there is an existing strong culture of

smartphone use and this leads us to the realization that more staged experiments will be better suited to explore it further.

3.2 Interviews

3.2.1 Methodology

Interviews were conducted with three persons who use their smartphone regularly and each of them having different daily routines. The interviews were conducted at the end of a day and the participants were asked to reflect on their smartphone experiences. Discussions revolved around personal use of their smartphones and the behaviours of others around them during the usage. They reflected on the positive, negative and limitations of smartphone usage.

3.2.2 Results

This experiment provided some insights into the meaning of these participants' use of smartphones however, they were not able to reflect on their behaviours easily because their moment of smartphone interaction already seemed forgotten by the end of the day.

3.3 Role Play Game



Figure 1. Participants in the role play.

3.3.1 Methodology

Six participants were divided into two teams of three and each team given a stack of six cards. Each card had a short description of a smartphone use scenario in a public or private space. Each team took turns acting one scenario to the other team, who then had to guess what the scenario was within 90 seconds. After a right guess was made, or time was up, all participants discussed that use situation. Figure 2 shows one group acting out a scenario of using a smartphone while in class.

3.3.2 Results

Conversations about different smartphone use scenarios flowed freely with everyone actively participating. The paper scenarios and acting out in the present, having a white box (to simulate a smartphone) as a constant prop, made the use contexts alive to the participants who easily recalled their own experiences and

even brought forth confessions of smartphone use that may not be socially considerate.

3.4 Smartphone Prop



Figure 2. Engaging with the white box for expression.

3.4.1 Methodology

In this experiment, three participants of varying backgrounds were given a white paper box without being told what it represented, and asked to express different feelings but by only tangible interactions with the box. It was also done at a private location where they could express themselves freely and without interruptions. Figure 2 shows two of the participants engaging with the white box to express happiness.

3.4.2 Results

At first the participants found it strange to express emotions using only the white box. However by the third task, it was observed that they felt more comfortable engaging with the white box in this way and their expressions became more creative and meaningful. At the end, when they were informed that the white box really represented a smartphone, they were surprised and discussions followed about the meaning of their expressions and how it can relate to smartphone use.

3.5 Discussion

We reflected on these four initial experiments based on Dourish's notion of meaning in tangible and embodied interactions. The first two experiments are standard in design research [4]; however because of the mentioned limitations experienced we customized the white box experiments for this exploration of smartphone interaction. It is imperative first to understand the meaning behind interactions, as it sets a good foundation for later making concept and product design decisions. We questioned the reasons for the shortcomings of fly on the wall and interviews, and realized that in this case 'meaning', unlike interaction, cannot be just observed (fly on the wall), and cannot be effectively reflected on later (interview), it is best revealed in a conscious effort that proceeds engagement (white box experiments). Furthermore Dourish's notion of tangible interaction as removing focus from the smartphone was experimented with in the prop, whereas the other 3 experiments brought the smartphone into focus to provoke conscious reflections on use behaviours. This revealed that at least these

participants have fixed views on how a smartphone can be used. People are inherently expressive and when focus is on more expressive communication and not the device (prop) a different perspective to interaction was revealed. We interpret this as a kind of dictatorship in smartphone use culture due to the lack of alternative interaction options. Smartphone interactions are being dictated by the limited options provided to us from the industry and the lack of realizable research. This in effect defines our social behaviours where we are aware of the limitations of smartphone interaction options and we accept that fact. As one participant stated in the role play discussion “In public if someone calls or text me I want to answer, so I don’t say I cannot use my phone, I make my own space.” Alternative ways to interact with smartphones may not be immediately popular and socially acceptable, but the same may have applied to the introduction of Bluetooth headsets, yet this is currently being used and is one of the alternative interaction options available with smartphones.

4. CONCLUSIONS AND FUTURE WORKS

This work aims to further explore ways to shape interaction by removing focus from the physical smartphone and the use behaviours currently dictated to us and focus more on the meaning behind user behaviours. Next steps include concepts

creation, prototype development, testing and implementation of an idea for a new way to interact with smartphones. It will not be easy to redefine behaviours, however having realistic alternatives available, that is not just another accessory, but deals with the real behavioral needs of smartphone users and has potential to fill some void in the way we use smartphones.

References

- [1] Dourish, P. *Where the action is: the foundations of embodied interaction*, MIT press, 2004.
- [2] Hemmert, F., et. al. Weight-shifting mobiles: two-dimensional gravitational displays in mobile phones. In *Proc. CHI’10*, ACM Press (2010), 3087-3092.
- [3] Juis, C. *Knot: A Signature Based Notification System*, Malmö University, 2012.
- [4] Shin, S.H., et al. An analysis of vibration sensors for smartphone applications using camera. In *Proc. ICTC 2011*, IEEE (2011), 772—773.
- [5] Zimmerman, J., et al. Research through design as a method for interaction design research in HCI. In *Proc. CHI’07*, ACM Press (2007), 493-502.