Human Nature-Interaction: Observations in Berlin's City Parks

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Abstract

We have empirically explored human-nature interaction in Berlin's city parks in order to find the most natural solutions to the intersection of technology and nature in future applications. Our study addresses that playful activity was the dominant form of interaction with all the nature elements. Our principal finding is that the elements of nature seem to have the power to stimulate imaginative acts and thus can be seen as affordances for creativity which creates valuable basis for nature inspired interaction design. The study implicates that ephemeral elements in particular seem to stimulate immediate interaction in urban city parks.

Author Keywords

Human nature-interaction; interaction; playfulness; observation study.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Most of us encounter nature daily to some extent in either urban environments or natural settings. Biologically inspired approaches have already led to innovative designs in many fields and fostered solutions to a range of design challenges (Bar-Cohen 2006;

Bonser and Vincent 2007; Helms et al. 2009; Barthlott et al. 2016). In addition to providing the impetus for innovative solutions, human interaction with nature has been shown empirically to have several positive effects on health, cognitive ability and well-being (e.g. Keniger et al. 2013; Qin et al. 2013; Shanahan et al. 2015; Hinds and Sparks 2015). Beyond these effects, artists, designers and researchers have started to contemplate and discuss the affordances offered by plants and nature for stronger experiences and emotions (e.g. Disney 2017; Steer et al. 2015, Park 2016; Cho et al. 2015). In line with the increasing interest in nature in the human-computer interaction community, one sees discussion emerging about ephemeral user interfaces (Dun et al. 2012; Kwon et al. 2015; Döring et al. 2013; Seah et al. 2014).

In addition, as recently presented for the Arctic context, momentary features in nature are seen as manifestations of ephemerality that may be useful in technology-user interactions and may provide novel approaches to interaction design (Alakärppä et al. 2017). Our work contributes to research in the area of the intersection of nature and interaction design. Our ultimate goal is to produce new knowledge for user interaction design by providing insights into people's behaviour in the nature and how they actually interact with natural elements. In addition, our study provides a basis for further studies of human-technology interaction in the context of nature and for issues relating to biologically inspired or nature-based user interfaces.

Using nature as an element in user interaction design

The relationship between nature and human beings is becoming increasingly important as a facet of user interaction design. The sensitivity of plants to various energy flows has been widely utilized in artistic installations to encourage direct interaction between humans and plants, which result in stronger emotions and more intense experiences (e.g. Pouprev et al. 2012; Manzella et al. 2013; Scenocosme 2017). For example, Disney Research (2017) has presented an interaction technology, called Botanicus interacticus, that can convert real or artificial plants into interactive objects that detect touch, location and movement on their surface. The literature also includes research that has addressed the use of human emotions and living materials as interaction media. One study in this vein is that by Steer et al. (2015), who examined affordances offered by plants for emotional attachment to computer interfaces. The results indicate that plant-based interfaces created enjoyable interaction, emotive connections and engaging experiences. Steer et al. (2015) have sparked discussion of natural changes in plants (e.g., growth, death, seasonal changes) and their effects on users' possibilities for interaction. This is a significant point of view to consider when designing interaction with organic materials, which constantly undergo change. Research can also be cited that has used organic materials like plants as a living display (e.g. Holstius et al. 2004; Botros et al. 2016). A living display does not necessary require plants as presented by Roo et al. (2016). They broadened the notion of a living display from plant-human interaction to sand-human interaction in an experiment with a mixture of spatial augmented reality, natural sand material and physiological sensors. Another interesting and novel
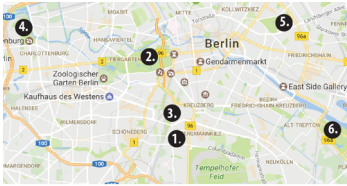
1. Viktoriapark   2. Tiergarten
3. Park am Gleisdreieck
4. Park of Charlottenburg Palace
5. Volkspark Friedrichshain
6. Treptower Park

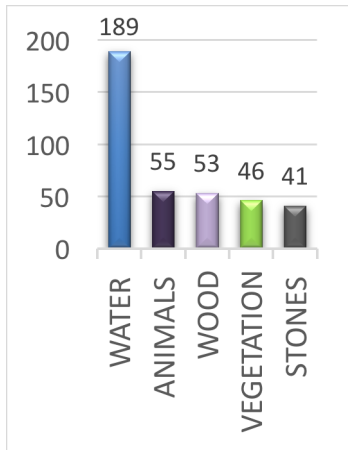Figure 1: The park locations in Berlin

Figure 2: The 384 field notes were distributed among the five focal elements of nature

approach to living displays is MIT´s "HydroMorph" (Nakagaki et al. 2016). This dynamic spatial water membrane system can change form, for example from a curvy splash into a flapping bird, turn itself into an interactive timer or direct a stream of water into a cup. Water is already being used as an element of interaction in many ways (e.g. Raffe 2015; Häkkilä and Colley 2016; Lappalainen, Colley and Häkkilä 2017). Yet another example is a study of Kan et al. (2017) who utilized a selection of pH-reactive organic compounds and created pH-reactive programmable biomaterials, that is, organic primitives. Our state-of-the-art review reveals an interesting design space and the vast potential of nature-based user interaction design. We argue that there is need for more empirical research on human-nature interaction in the wild to be conducted from the point of view of interaction design.

Case study on human-nature interaction

The approach in this research can be described as exploratory in that it seeks to gain a deep understanding of how people interact with elements of nature in an urban environment. Our overall objective was to explore human-nature interaction in order to find the most natural solutions to the intersection of technology and nature in future applications. In order to understand the human-nature relationship in natural urban environments, we set out to observe how people interacted with nature in Berlin's city parks. We focused on the summer season and activity taking place during daylight hours in public settings. The research strategy is a combination of case study and observation. The research comprised 20 observation sessions in six different park locations (Figure 1). The parks were selected based on their particular environmental characteristics. Each location was visited three to four

times, with a session lasting from 1 to 3 hours. In our study the researchers took on the role of visitor by behaving like other city residents and tourists visiting the park; that is, they walked around, sat on benches, watched birds, looked at water scenery and occasionally took pictures. This position of passive observer has also been described as that of unobtrusive observer (Gorman & Clayton 2005) and marginal participant (Zeisel 1997). The object was to collect observations of situations in which people interacted with or showed some reactions to the natural environment or some element, creature or phenomenon in it. The observations were recorded using a dictation application on the phone and, if the situation permitted, the setting was also photographed.

Research material

The 20 study sessions resulted in a total of 166 minutes of recordings, which contained 384 notes that were distributed among the focal elements of nature as shown in Figure 2. Each theme embraces several elements and the interactions associated with them. Water was the theme that figured in most of the observations, with 189 observations relating to water. The transcribed data were analysed using qualitative content analysis, a method which focuses on identifying emerging themes and patterns, grouping them under themes and ultimately organizing these into meaningful categories. Interaction with a natural element regardless of the duration of the interaction constituted an event, which was used as the unit of analysis. Based on the observations, we identified five main themes, described in terms of the principal element that people were in contact with or that resulted in some action.

Figure 3: A man playing with a swan.

Discussion

Our empirical observations can be divided into two categories based on the characteristics of the interaction. We submit that animals and water may be considered ephemeral elements, whereas stones, vegetation and wood are relatively stable ones. Ephemeral elements in particular seem to stimulate immediate interaction in urban city parks. For example, living creatures such as animals and insects attract people's attention and are usually present only certain period of time. The number of interactions with the relatively stable elements exists but was fewer. Our study does not provide evidence on the intensity of the experiences between the categories and thus further studies are needed to explain the preferences observed. Playful activity was the dominant form of interaction with all the nature elements and was present in the case of all the themes, including animals (Figure 3). A desire to play with animals and need for adventurous experiences and interaction with plants can be linked to seeking a connection with nature, as has been proposed by Cox and Gaston (2016) and motivators for play (Cumbo et al. 2014). We conclude that playfulness, creativity and imaginative actions were present in the case of most of the nature elements and among people of all ages, from toddler to senior citizen. Our observations on children's engagement with nature are in line with those of Skår and Krough (2009), Stordal et al. (2015) and Skår et al. (2016). These scholars assert that as soon as children have an opportunity to explore and manipulate places in nature and make them their own as well as to play spontaneously, they seem to jump into immersed play. In light of our observations this then stimulates embodied engagement with nature. Such activities figured prominently in the case of sand, stone, water,

wood and animals and somewhat less so in the case of vegetation. The observations related to vegetation were mainly instances of people watching and photographing different kinds of plants, flowers and bushes. The study indicates that flowers having long stems or spherical blossoms attracted people to touch or smell them. This finding requires further studies, but we think it may have some practical implications for interaction design in the context of nature. In general, our observations indicate that flowing water is the form of water most likely to be touched by both adults and children. Water seems to be a more ambivalent element for adults than it is for children and adults tend to enjoy water mostly from a distance. Depending on the contexts, water either strongly encourages interaction or is seen as unpleasant and an element to be avoided. These results are parallel with prior findings on water (e.g. Häkkilä & Colley 2016). Our study indicates that both adults and children enjoy climbing, balancing and playing on big stones or tree stumps. Large stones, especially those located near water, were popular places to hang around, sit and relax. This finding is worthy of note when designing city parks and meaningful meeting places in a park. Elements of nature in urban city parks may be seen as physical challenges that encourage people to overcome obstacles or complete tasks. Our principal finding is that the elements examined in the present study seem to have the power to stimulate imaginative acts and thus can be seen as affordances for creativity. Future research should concentrate on exploring human-nature interaction in varying seasons and locations. In addition, a better understanding is needed of the cultural meanings of elements of nature and people's personal experiences in interacting with them.

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