Creatively Exploring the Context of Personal Data for Design Insight

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Abstract

This position paper outlines my experiences developing creative workshop activities through which stakeholders collaboratively explore the contexts in which personal data have been collected, and then develop ideas for how these data might be used within future service offerings. Through these workshops, we augment quantitative data, such as that generated by smart energy meters, with qualitative data describing stakeholders' emotional responses and expressing their desires.

Author Keywords

Co-design; personal data; workshop format;

ACM Classification Keywords

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

Introduction

New buildings are introducing an infrastructure of embedded sensors with the aim of providing services that exploit the fine-grained data they gather about individual and aggregated user activity. Many of these services will employ machine learning in an attempt to offer a personalized user experience. However, UX

designers find working with machine-learning challenging, and lack effective methods for developing data-enabled services [4]. There are many reasons for this, but one of the most important is that quantitative data typically lack a rich description the human contexts they come from, or in which the services they support might be used.

We see this in data from smart energy products, which can describe how much energy different appliances have consumed at a particular time, and which might provide insight into more efficient and effective energy use in particular areas. However, people often reward savings made through more efficient energy use in one area by using more energy in another; and so on their own, these types of data typically don't provide insight helpful for designing services that support continued sustainability. For example, given enough detail, they can point to twenty halogen spotlights installed in a kitchen ceiling as the reason for high domestic energy use on lighting; but making this saving may finance additional holidays or a new TV. Similarly, data collected from individual Oyster cards might point to more people commuting longer distances and suggest changes in the provision of transport services. A more qualitative approach is required to explore the personal contexts, such as housing costs, employment opportunities, quality of life, schools, family ties, etc. that help explain these data and provide deeper insight for design ideation.

To explore these qualitative aspects of the contexts surrounding personal data, I have been developing a method of generative design research, CoDesign with Data [3]. In these early-stage collaborative design workshops, stakeholders' creativity is employed to contextualize data; and visualized data provide an important source of inspiration for design ideation. The insights gained from such generative workshops are not proposed as an alternative to those gained from quantitative data analysis or ethnographic studies; rather they augment and complement an understanding of what people say and do, with insight into what they feel via what they make [8: 64-70]. This is because generative, creative activities offer access to the intuitive, subconscious or pre-conscious [7: 4].

Case Study in Smart Energy Services

An example in which this method has been used in practice is the design of smart energy services with customers of e.on energy [5]. In this case study, we were working with participants in a long-term technology trial whose homes had been retrofitted with smart meters and plugs, solar panels, and who in some cases had been given electric cars that also acted as a domestic battery.

For the CoDesign with Data workshop held with participants on the e.on technology trial, models were created of possible energy consumption. These were based on data collected from the participants' smart energy products. Data generated by these models were then visualized and used as a source of inspiration for generative, creative activities. We chose to model data about possible consumption rather than present workshop participants with their own data for two main reasons. First, because of ethical concerns related to working on particular data in groups containing members from different households. Second, because it allowed us to encourage workshop participants to create fictional stories and characters through which we

could explore energy consumption practices more freely.

In this case study, the workshop was made up of four main creative activities. For each of these, participants worked in groups of four or five. Each group was provided with an interactive information visualization of the modeled energy data that was designed specifically for use in the workshop and presented on an iPad. They were also provided with wide variety of images of people, places, artifacts, and activities; as well as more ambiguous abstract shapes and materials for making collages, and large worksheets for structuring their outputs. Participants were asked to create a representation of the household they imagined had generated the visualized energy data, and tell a story based on insights gained from patterns in the data; to enter a competition as the household they imagined, in which they should describe ways they might be smarter in their energy use; to explore different types of data that might be generated by future smart homes, and what their emotional reactions to these are, e.g. security and privacy; and finally to describe a new service idea to benefit their imagined household that was enabled by these data.

Reflections, Limitations and Open Questions
The workshop outlined here, and similar examples from other projects, have provided a number of insights into working creatively with stakeholders and their data.

Participants typically find visualized data engaging and meaningful, and their exploration of data provides insight that inspires ideation. Combining data exploration with generative creative exercises encourages participants to share stories and develop rich narratives. For example, one group in the workshop just discussed identified a sporadic pattern of energy used in cooking. They explored this insight by creating a household in which meals were cooked in batches and frozen, because this household worked different busy shift patterns. This story was driven by the interaction of two group members, one of whom had worked night shifts and another who had spent the previous day in a house filled with wonderful cooking smells he couldn't taste because they were being prepared for a party later in the week. Here, rich insights into the contexts of possible energy practices emerge, and are explored and explained creatively in a way that traditional analysis would not have uncovered.

Experience in these workshops has also prompted reflection on potential challenges and limitations of working creatively with stakeholders and their data. One thing that is apparent is that choices made with regard to how data are collected, classified, labeled, and represented have a strong influence on the type of design insights that might typically be derived from them. For example, smart energy devices that measure and report the consumption of particular appliances place the onus for behavior change on people as individual users. They typically pose the question, "How can *you* reduce your individual carbon footprint by *using* energy more efficiently?". The service ideas generated in the workshop described here typically reflected this.

Design ideation is an iterative process of framing and reframing a situation [9], and such strong priming can lead to fixation [6]. Because of this, a careful widening and refocusing becomes an important but challenging consideration when engaging stakeholders creatively

with their data. An alternative question to that typically posed by smart energy data might be, "How can **we** reduce our collective carbon footprint by **using and producing** energy more efficiently?". Exploring this question involves reconsidering and re-representing data, and reframing inquiry.

Another challenge is that the data in digital activity trails are not equally representative of all users of a building, space or service. For example, public buildings and institutions might collect data about Wi-Fi connections and mentions on social media in attempt to improve visitor experiences. However, without careful thought this risks a narrowing focus on those already visiting and who leave a large digital footprint; this is because some voices are louder and more present in data, and some missing completely [2]. Privileging those most digitally visible may also increase the trend in public spaces, and in publicly-accessible private spaces, for *hostile-architecture* and *unpleasant-design*, which intentionally excludes people and activities deemed undesirable. Feeding ethnographic or other richly qualitative data into creative workshop activities, alongside quantitative data from embedded sensors, can help highlight these concerns, pose critical questions, and reframe design activities.

Conclusion

Data that describe a situation quantitatively can prompt a focus on factors such as efficiency and effectiveness. The history of human-computer interaction, interaction design, and UX research highlight the limitations of a focus on metrics such as these [1]. There is a danger that the data generated by sensors in the built environment may encourage a narrow *data-driven* design, which focuses on efficiency at the expense of

experience. In this position paper I have outlined some thoughts and experiences that suggest an alternative *data-inspired* approach to gaining design insight based on stakeholders' creativity, and support a better understanding of the contexts data come from. This is not to suggest that the insights gained from traditional quantitative analysis of sensor data are not useful and important, rather that they are limited in scope and can be augmented by alternative explorations. This is similar to the way that ethnographic approaches are augmenting big data with thick data in search of a richer, broader understanding.

Acknowledgements

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