

Challenges of data collection in semi-public settings for an event database

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This paper explores methodological issues of gathering qualitative data of interaction for product design in service fields, based on an ongoing ethnographic video study of behavior in a museum.

1. Introduction

Although one of the most significant areas for the application of AI and design, designing for service fields presents additional challenges for engineers, principally due to the complexity of interactions between actors and their actions, with the use of multiple technologies. Research to develop responsive agents, whether virtual or robotic must address the social interaction that occurs when multiple, rather than individual users are present. They should also explore the 'intentions' actors hold or display in order to create more believable agents. Multiple studies have been done to explore multi-user and multi-modal interaction to understand how to interpret users actions in these contexts, often using an experimental approach [Biriukova 2014, Lala 2013, Rehm 2005].

To improve the design of service provision, the development of a database has been proposed, which in future may be used in concert with workshops, gathering data on the actions of providers and users and enabling reflective changes in style and content of provision [渡辺 2013]. The development and use of a database such as this may be expected to lead to more suitable products, reflective of the actual (or desired) use by stakeholders, following a participatory design approach [Sears 2009]. In order to grasp the actions that occur in real-world service provision, there is a need for qualitative data collection and analysis. The study described below, while not directly aimed at database-creation, raises issues that directly speak to the potential of a database for product design in service fields.

The paper reports on an ongoing study of museum visitors using a system of information retrieval and display. The focus of the paper is not the system itself, but some of the methodical issues that have emerged in the course of the study due to the qualitative data collection process, which presents challenges to the development of a database for service design. On a fundamental level, the need to somehow sense, store, categorize and analyze data in real-world settings, and respond back to users, presents problems that must be addressed if the take-up of technologies will occur, let alone for those technologies to become seamlessly part of the social world of the service industry. The following study raises questions in the hope of prompting a discussion on these methodological issues.

2. Museum study background

The National Museum of Ethnology (Minpaku) in Osaka, Japan, installed a visual guide to exhibits in 2012, called "Image Finder" [Nakamura, 2014]. The system provides information to items in the museum's collection, searchable via touchscreen interfaces. The location of Image Finder in the museum's 'Discovery Space' is designed to allow visitors to find related information on exhibited items and the studies done by museum researchers, and the interface and contents reflect Minpaku's founding philosophy of a structured display style.

In 2014 a study was initiated to gather data on visitors' use of Image Finder, with an aim to improve future systems and the provision of information to visitors. As a service, Minpaku and its staff not only provide visitors with descriptions of collections, but also aim to engage them with the fields of research. Like most museums, visitors differ in their age, background knowledge, regularity and group size.

3. Two methodological issues

3.1 Capturing 'Natural' Data

While various sensors may be used to collect data on user behavior, the initial study has aimed to gather naturally occurring interaction from visitors via qualitative methods in addition to numerical log data from interaction with Image Finder. The question arises how to create an environment where 'natural' behavior can unfold and how it can be captured. For this pilot study, ethnographic video was taken with hand held-cameras of visitors roaming the museum space who volunteered to be part of

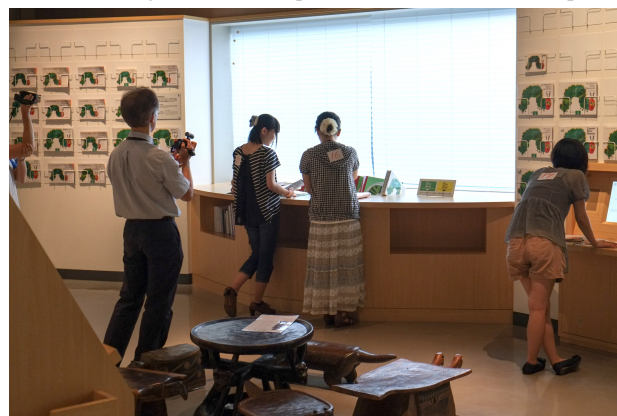


Figure 1. Recording interaction in the space

the research over the course of a day (Figure 1), with additional photographic data of interactions directly with Image Finder. Hand-held cameras allow research subjects to move around the large museum space freely. Our first issue is whether this impedes 'natural' action from emerging. Subjects had been asked to ignore the cameras and visit as they felt they would normally and appeared to do so. However, museums are places of multi-party service provision. Staff members at Minpaku introduce visitors with information leaflets and portable audio/visual guides. Visitors encounter exhibits that have been ordered and displayed by staff. They also use digital systems like Image Finder. These encounters are done alone, but also often in groups, and often with other visitors around them. Recent research has examined the way visiting groups move around museums [Tolmie 2014] and the relationships within groups [Hope 2009], but way this affects the collection of ethnographic data needs further exploration. Non-research participants are unavoidably captured on video and interact with research subjects in the natural semi-private setting of a museum. Significantly in terms of data, should the actions of non-research participants be recorded as 'data' for the database? When a research subject moves away from an exhibit because a group of non-research subjects has moved into that space, which actions should be recorded, transformed into data?

3.2 Categorizing 'action' data

A second related difficulty for the translation of qualitative data into a form suitable for service design via a database is how to decide what defines an 'action' or significant collection of events. The Minpaku study collected photographic data of interaction with Image Finder, automatically capturing a photograph from above whenever the interface was touched (figure 2), thereby showing the relative position of the users and their physical actions. The interaction was also captured with the hand held video from another angle.



Figure 2. Still image captured when screen is touched

When viewing this data decisions must be made on what constitutes a substantive unit of meaningful *social* action. This is important so design can be enacted to not only reproduce recognizable patterns of physical behavior, but also answer the

questions of 'what service are the users using—with others—at this time?', 'how do users use (or attempt to use) the service?' The video clearly shows discrete actions—touching the images on screen, pinching to zoom—but it is up to the viewer of this data to determine the units of social action. Should we count the action from the event of a button press, or before, or even as far back as when the exhibit was viewed in the physical exhibition space? All of these singular acts and their associated events may sequentially make up meaningful social action, but how should this be determined?

4. Discussion

This brief paper has presented two methodical issues that arise when examining interaction in a real-world setting with the aim of storing observed data in a database for service design. The first concern, that of the issues around capturing 'natural' data, raises an ethical quandary. Non-participants in the research have not given consent to be filmed, but their interaction affects the behavior of research participants. It is unrealistic to ask all visitors to consent to being part of research, but omitting public visitors to the space would add another unnatural aspect to the data. Misconstruing what is 'natural' behavior would not only be ethically unsound, it would lead to poor service design.

The second concern is also important, as deciding wrongly what constitutes an 'action', by perhaps omitting the early interactions around, before, or after viewing a physical exhibit, could misconstrue the needs of users. This would not only lead to less effective products but in terms of research is also ethically problematic.

The implication of is that greater emphasis could be made of interactive workshops with users, social scientists and engineers. Some of these concerns, such as the need to determine the units of social action, can be the basis for workshops, perhaps reflecting on video extracts with users. A mid-point between automated pattern recognition of discrete actions and reflexive discussion of social action is exactly the space that workshops could provide when used in concert with a database. But the greater message is that these concerns must be taken into account at the initial point of research design and certainly during data collection in semi-public settings.

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