Handset-Based Data Collection Process and Participant Attitudes

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ABSTRACT

Handset-based measurements are an emerging method for collecting behavioral data about smartphone users. Setting up these kinds of measurements is challenging because of the personal nature of the data collection device and a lack of standards related to behavioral data and the method as a whole. Privacy issues related to the participants of the data collection are of major importance when dealing with behavioral data. Introduced is the process of collecting handset-based data in the OtaSizzle project in the Aalto University community in Finland together with a literature review of other similar data collection efforts in academia and industry. A survey is also deployed to study the incentives for participation, privacy concern levels and innovativeness of the user group participating in the measurements. This article contributes to the body of knowledge regarding measurements conducted with smartphones and sheds light on participant attitudes about them.

Keywords: Behavioral Data, Handheld Computing, Handset-Based Measurements, Participant Attitudes, Privacy, Smartphones

INTRODUCTION

The purpose of this article is to present the process of collecting handset-based data in the OtaSizzle project of the Aalto University in Finland together with a literature review of other handset-based data collection efforts in academia and industry. This research is continuation of previous handset-based measurements conducted in the Aalto University by Verkasalo (2009a). Handset-based measurements are implemented with software installed in the smartphones of the users who have opted-in to participate in the research (i.e., the participants). Because of the personal and “always-on” nature of the device we are able to collect context sensitive data about real user behavior directly from the users. Setting up these kinds of measurements is a complex task including issues related to the selection of software used for data collection, behavioral data acquisition and participant privacy and anonymity to name a few. Furthermore, there are no standards for setting up such measurements and the solutions regarding privacy, for example, tend to be case-specific. Thus this article contributes to the body of knowledge regarding measurements conducted with smartphones and presents the OtaSizzle process as a case study. Also a survey study is implemented to research the incentives

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for participation, privacy concern levels and innovativeness of the user group participating in the measurements. OtaSizzle is a project of the Aalto University in Finland and focuses on social media and mobile services. One of the main targets of the project is to provide data for research purposes. Handset-based data have been collected in the project since September 2009 and the data collection is ongoing as the research will be in progress until the end of 2012. The data collection is implemented with a user panel in the university community.

The smartphone has already been identified as a useful emerging tool for social scientists (Raento et al., 2009) and has been used by scholars in the field of sociology (Eagle et al., 2009) and in analyzing mobile service usage (Verkasalo, 2009a), for example. In this article the smartphone is defined as a programmable mobile phone where third party application software can be installed. The data collected in the OtaSizzle project have already been utilized by Karikoski and Nelimarkka (2011) in measuring social relations, for example, and there are numerous other research possibilities that this novel data collection technique enables. Similar articles as this one have also been published by other researchers. Chronis et al. (2009) present a data collection platform, called SocialCircuits together with system capabilities, example applications and real world deployment guidelines. Similar data collection activities by the Nokia Research Center (NRC) are also documented by Kiukkonen et al. (2010) and Aad and Niemi (2010). Furthermore, some data collection tools have been published in great detail such as the ContextLogger2 (Hasu, 2010). All the articles in the novel area of smartphone measurements help and provide guidelines for other researchers interested in following a similar data collection approach. More specifically, this article extends the literature regarding smartphone measurements by providing also participant attitudes in addition to the process description itself.

This article is structured as follows: first the related work in the area of handset-based measurements is reviewed. Then the OtaSizzle project is presented from a general and technical point of view to see how the measurements fit to the overall picture of the project. Third the OtaSizzle handset-based data collection process is presented, including issues related to the data collection software selection process, data acquisition process, legal agreements and participant privacy. Fourth the panel used in data collection is presented together with the recruitment process. Fifth the questionnaire study and results are presented. Sixth the whole process and participant attitudes are discussed together with future research. Finally the conclusions are drawn.

RELATED WORK

The emergence of the programmable smartphone has enabled data collection directly from the users’ handsets. The term used in this article is handset-based data collection, but there are also other terms used for this kind of data collection such as in-device measurements, people-centric sensing, mobile audience measurements or mobile analytics, for example. There are several tools that have been used for handset-based data collection in different academic and industry projects. This chapter is a literature review of handset-based data collection efforts which share similarities with the OtaSizzle project.

One of the earliest handset-based data collection efforts was conducted in HIIT’s Context project. The ContextLogger of the ContextPhone software platform (Raento et al., 2005) was developed in order to provide researchers with a robust and reliable tool for collecting handset-based data. ContextLogger has been used in studying mobility patterns and collecting data on Bluetooth device proximity, for example. The ContextLogger is still being developed and the latest version of the software is documented in detail by Hasu (2010). MIT’s Reality Mining project (Eagle & Pentland, 2006) is one of the most cited handset-based data collection efforts and they used a version of the ContextLogger software (Raento et al., 2005) along with other self-developed software.
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Handheld Computing and Palm OS Programming for Mobile Commerce