Supporting the autobiographical experience of place

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1 Introduction

Whyte used still cameras, movie cameras, and paper to document urban behavior Whyte (1980). I propose to use Momento, an application I developed, to support the city-wide explorations planned in this workshop. Using Momento, participants could send any type of data their mobile device can collect to a desktop client. The workshop organizers could monitor data as it arrives in real time and could use the desktop client in a number of ways, such as organizing findings or sending encouragements to participants for intriguing findings (or admonishments for banal reports). Importantly, using Momento requires only that the organizers download and run the desktop client, a standard Java application – workshop participants need not install applications on their mobile devices.

Other groups have used Momento for a variety of activities – from prototype evaluations to experience sampling and diary studies. For this workshop, the issue I am most interested in exploring is unobtrusiveness – that is, how can Momento be used in situations where technology must not disrupt behavior. For example, another research group is using Momento to study how children learn new technologies. In that case it is important that Momento itself not introduce a new technology that the children must learn. To address this issue, Momento can gather data from standard mobile messaging available on most mobile phones, including those used by the participants. For this workshop it is equally important that any new technology remain unobtrusive lest it distract from the organizers' main goals. I am interested to discover how workshop organizers and participants adopt Momento to support their own agenda.

2 What is Momento?

Momento is a set of software tools that support early-stage evaluation and prototyping for ubiquitous computing applications.

Ubicomp applications are often designed to integrate into tasks that scale across multiple people, activities, and places. Their situated nature creates a need for real-world approaches to iterative design. However, gathering realistic data as part of early iterative design for ubicomp applications is challenging. In interviews with nine developers of mobile technology, I identified difficulties that include the difficulty of building deployable prototypes, a need for remote testing, adoption and retention and the need to study events that may occur infrequently. Also, developers highlighted the value of qualitative data such as that gathered from experience sampling studies (ESM) and diary studies.

Momento is a tool that supports needfinding, rapid prototyping, and evaluation of mobile or situated ubicomp applications. Momento includes two main components: A desktop interface for researchers and a set of clients for endusers. Communication between clients and the desktop is event based. Researchers can configure the desktop interface to run ESM studies or diary studies and to prototype and field test mobile

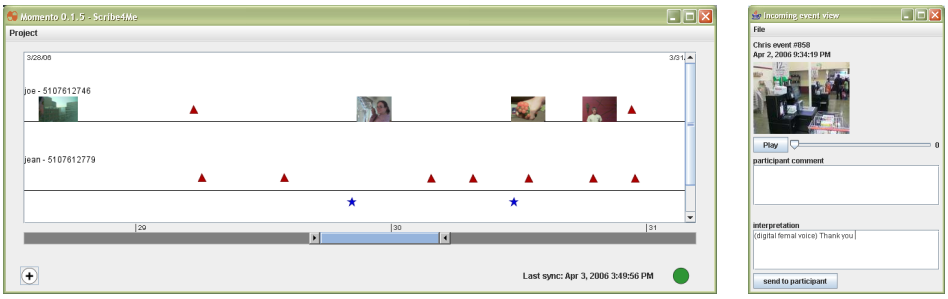

Figure 1: **(left)** A peripheral display of logged participant data is available while a study is running. **(right)** An interface allowing inspection of and response to data.

applications that rely on Wizard-of-Oz interaction or event-triggered data retrieval. Researchers can also use the desktop interface to monitor events and carry out actions as wizards. Momento's clients can include SMS and MMS enabled mobile phones, applications built using the Context Toolkit Dey *et al.* (2001), and a mobile platform that can be configured to support multi-user, multi-week ESM studies, diary studies, or deployment and testing of a prototype application.

This workshop would likely rely on Momento's integrated support for diary studies and ESM. Momento supports event-contingent ESM, which helps to focus feedback on moments when something important happens Intille *et al.* (2003); Iachello *et al.* (2006), queries to participants are triggered by context. Momento also supports media capture, such as photos, sounds and context, which can enhance both ESM and diary studies Beaudin *et al.* (2004); Carter and Mankoff (2005). Momento supports these techniques and enhances them by enabling real-time or "day-of" back and forth discussions between developers and end-users.

Momento logs all communication in a format compatible with most data analysis programs to support analysis. Momento leverages cellular networks to share information between deployed mobile devices (such as common consumer mobile phones) and a desktop system available to a remote wizard or researcher. Momento can respond to end-user requests, ask end-users to manually capture data, or automatically gather data from mobile devices, including images, audio, Bluetooth data, and GPS data.

3 How others have used Momento

I are collaborating with several groups using Momento for a variety of diary studies, experience-sampling studies, and prototypes. As mentioned above, external researchers at a West Coast university are using Momento to conduct a two-week long diary study of children's approaches to learning new technologies. Participants are using Momento to capture images using camera phones they already own, and will annotate those images to answer experimenter-specified questions. Researchers are also using Momento to send follow-up requests asking for additional information. At the end of this study, researchers will conduct in-person interviews with participants.

In another ongoing project, I am working with researchers who are using Momento to prototype a mobile application for migrant farm workers. The application is designed to alert the workers when pollution (from pesticides) reaches unhealthy levels. Researchers have piloted different methods of broadcasting levels of pollution to the workers, including text-based SMS updates as well as graphics sent via MMS.

4 Why is Momento valuable for this workshop?

Probably the most valuable aspect of Momento for this workshop is that it automatically organizes and vizualizes captured data in real-time for each participant. Having all of the captured data in one place

could allow organizers and participants to move rapidly to analysis of captured information. Momento also supports formatted printing of captured events that organizers could use in brainstorming sessions. Also, as suggested above, organizers could use Momento to send events *back* to participants in the field as well. This feedback could take the form of comments about captured data, encouragement to follow-up on details or trends, or unexpected bons mots.

5 Try it

Momento is available for download at http://www.cs.berkeley.edu/~sacarter/momento/. Please email me if you have any questions or feature requests.

6 Biographical statement

I am a doctoral candidate in the EECS Department at the University of California, Berkeley. Before coming to Berkeley, I spent a summer studying at the Denmark Design School where I designed the !hobgoblin interactive .net art museum. Before that I earned a BS from the University of New Mexico. While at UNM I worked in the Brain and Computation Lab, creating visualization tools for encephalographic research, and worked at the school newspaper (The Daily Lobo), creating and maintaining its first Web site.

My work in ubiquitous computing concentrates on off-the-desktop displays and communication. My thesis project explores the relationship between *in situ* capture and annotation and *ex situ* access, elaboration, and exchange. The goal of this project is the production of a set of tools and techniques to facilitate the use of capture and access methods for the design and evaluation of ubicomp applications.

Other work in ubiquitous computing concentrates on encouraging reflection on the ramifications of ubiquitous capture and access on personal privacy. I co-developed iVSi, an interactive digital mixed-media sculpture that helps people understand the costs and benefits of privacy through direct engagement of their representation, captured on both physical and digital documents. I have also explored ways that my own work could be used to support violations of privacy and trust (http://madpickle.net/strikeubicomp/).

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