Challenges in Eliciting Privacy and Usability Requirements for Lifelogging

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ABSTRACT

With the first commercial release of a simple lifelogging camera this year and the continued growth of cheap computing and memory, it is clear that multimedia lifelogging will soon be commonplace. In this paper I argue that lifelogging presents new challenges for studying privacy and usability and that new methodologies to elicit privacy requirements will be needed.

Categories and Subject Descriptors

D.2.1 [**Software Engineering**]: Requirements/Specifications,
H.5.2, H5.m [**Information Interfaces and Presentation**]: User Interfaces, Miscellaneous,
K.4.1 [**Computers and Society**]: Public Policy Issues

General Terms

Measurement, Human Factors, Legal Aspects

Keywords

Lifelogging, privacy, requirements, usability.

1. INTRODUCTION

Lifelogging is the non-selective or indiscriminate continuous capture and recording of data about a given individual [7]. The historical origin is often attributed to Vanevar Bush's Memex [2] and versions of lifelogging have been available for decades. Simple examples include portable medical data loggers which record pulse, blood pressure, and other personal health data for short durations to help diagnose medical problems. Some individuals have their e-mail client configured to save every e-mail they ever send or receive in their lifetime. In the utopian vision suggested by Bell and Gemmell [1] every document, book or web page one reads or writes, every email read or written, the exact latitude/longitude of every place ever visited, and every waking moment is recorded in full quality audio and video.

There are clear privacy issues common to all of these examples, and indeed common to all personal data: that of how to control data leakage and access control for what could be extremely personal and embarrassing data about the owner of the lifelog (the
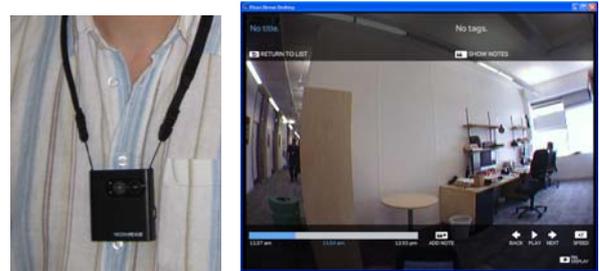
Figure 1: ViconRevue camera (left) and software (right)

lifelogger). However as Moore's [5] and Kryder's [8] Laws lead to devices with higher resolution at lower cost and with the cost of data retention becoming cheaper, we move closer to Bell's continuous video recording of a person's life from birth to death. Already, the SenseCam from Gemmell et al.'s [3] MyLifeBits project has been released as a commercial product under the name ViconRevue (see Figure 1). Marketed as an aid for people with Alzheimer's disease or other memory problems, it is a small camera worn around the neck with light, temperature and movement sensors. It takes a single VGA resolution photo in response to environmental changes. When plugged into a computer, the camera dumps its images and presents the user's day as a slideshow which can be sped up to show the entire day in the space of a few minutes. Of course, the wearer also captures images of all of the people encountered throughout the day as well. With such higher resolution video capabilities in all mobile phones today, and the ability to store tens of gigabytes on micro SD flash cards, the trajectory for lifelogging hardware and software is on a collision course with legal, ethical and social norms.

2. ISSUES IN LIFELOGGING TECHNOLOGY EVALUATION

Lab-based studies of privacy requirements have always been fraught with problems due to the difficulty users have in describing their attitude towards an abstract concept in a theoretical situation. Observing actual behavior in real life scenarios gives a more accurate picture, but is expensive. Studies of attitudes towards lifelogging and privacy are additionally complicated by a number of factors:

- In addition to the lifelogger, there are two more actors: bystanders encountered by the lifelogger, and the wider society which may choose to regulate lifelogging.

- Lifelogging technology is often invisible, so bystanders may be unaware their data is being captured.

- Lifelogging is rare, thus people have little experience of the technology and may be unable to imagine its applications or implications, let alone what their attitudes towards it.

When one chooses to record and keep private data about oneself there are few, if any, social or legal issues, other than perhaps the right of the state to access one's private data. But when data about others is captured (still images, video or audio) a number of privacy laws may come into play depending upon the jurisdiction.

There are obvious privacy issues for the lifeloggers as well as bystanders; few lifeloggers would want their data visible to the world.. For simple medical data there would appear to be fewer issues since the data is usually only of interest to the lifelogger's doctor, but even here there are risks: would you want others to know when your blood pressure or pulse was rising in a meeting? Of course there are bigger risks for leakage if the lifelog contains rich multimedia information. Lifelogging itself presents other technical usability issues for the lifelogger who wishes to search or access an item from a potentially vast data store. The security of data becomes an even greater concern if the data is held in the cloud as opposed to under the user's direct control.

3. CHALLENGES IN EVALUATING FUTURE LIFELOGGING TECHNOLOGY

In common with most ubiquitous computing technology, lifelogging has the difficulty that users are so unfamiliar with it that they are unable to predict how they will react to features or privacy issues which limits the applicability of lab-based evaluations. One lab-based technique is the use of mock ups or a video portrayal of the technology. This has the additional limitation of giving participants a limited perspective on how the technology could be used. The obvious difficulty with doing field experiments is that participants cannot be given technology that does not yet exist.

Another challenge is the moving target of both legal and social acceptance of these privacy invasive technologies. At time of writing, there are no known court challenges to lifeloggers, but it is likely that various European jurisdictions (among others) will have problems with lifelogging even in public places. Social acceptance will vary hugely by age group and the trajectory will be difficult to predict: ask an older Generation Y member who shares their life on Facebook if they would have considered doing such a thing 10 years ago.

4. POSSIBLE RESEARCH METHODS

We have developed a methodology for evaluating future technologies, called ContraVision [4,6], which involves producing two contrasting video scenarios of a technology. In this method the video scenarios have identical scenes but the actors behave subtly differently in their reactions to the technology. In one they are positive and trusting and show off the positive aspects of the technology while in the other they have a negative attitude, appear distrustful and have problems with the technology. By comparing the reactions of groups which view each video we are able to tease out a range of responses that would not be reported from participants who have a single perspective. This method has the disadvantage of expense since one often needs professional or semi-professional actors and production crew to achieve a quality level sufficient to get a believable result. Our experience in developing ContraVision showed that participants need a rich scenario within which to immerse themselves and in order to locate themsleves in this virtual context: so simple researcher-written scenarios were not as effective.

Another possible technique for evaluating both user and bystander attitudes in the field would be the use of mockup lifelogging devices worn by participants in the field who later interact with a Wizard of Oz interface to some lifelogging data in the lab. Bystanders/family/friends/colleagues of the lifelogger could later be interviewed after being told that the device was a lifelogger recording high quality audio and video. Privacy concerns could then be analyzed and compared with the justification given for the lifelogger recording the data.

5. SUMMARY

Lifelogging presents new challenges for privacy and usability evaluation due to both the nature of the data captured and the lack of familiarity of the general public with the implications of the technology. While some existing techniques may be useful, the trajectory of lifelogging technology development suggests that methodologies for evaluating lifelogging will have to evolve as rapidly as the technology..

6. ACKNOWLEDGMENTS

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