Supporting Reflection on Experience with SenseCam

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Introduction

With the development of more lightweight technologies and the rapid increase in the storage capabilities of such devices, people are beginning to record more of their lives with the devices they carry around with them everyday, such as digital cameras, video cameras and mobile phones. Beyond these everyday devices, more specialized tools for continuously archiving personal experience, or 'life-logging', are being developed [1] bringing Vannevar Bush's dream of a Memex device [2] closer to reality. Whilst such records, as Bush envisaged, can support our memory of experiences [e.g. 1, 3], it is also suggested that they may help us to see our experiences from a different perspective and reflect on them [4, 5]. However, there is little research to support such suggestions. This paper outlines a body of research (part of the author's PhD thesis [6]) that was conducted with one such device – SenseCam – to explore its potential to support reflection on experience.

SenseCam

SenseCam is a prototype device currently under development at Microsoft Research in Cambridge [7, 8]. It is a small wearable device combining a digital camera with a number of built in sensors and is made to be worn by a person around their neck like a pendant. The sensors, which measure light, motion, sound, infra-red and ambient temperature, are used to trigger digital still images to be taken at 'good' times when something interesting may be happening. Currently 'good' is defined by the developer as when there is a sudden change in light (which might happen when we move from one room to another), sound or temperature, or when the infra-red data combined with motion detection suggests another person is near by. On average 3 or 4 photos per minute are triggered in this way. The camera also has a very wide angle, fish-eye lens which captures most of what is the field of view of the wearer from a first person perspective. These combined features allow the wearer to passively capture a whole day's worth of images without having to press a trigger or aim the camera, leaving their hands and attention free to get on with their everyday tasks. When downloaded to a PC, the images can be viewed using a rapid serial visualization tool and the whole day may only take around 10 minutes to review.

Outline of research conducted

An exploratory approach was taken to investigate the potential of SenseCam to support reflection on experience. In order to do this, two questions were asked:

1. What kind of reflection on experience might SenseCam support?
2. How might SenseCam support reflection on experience?

In addition, it was necessary to consider the situations in which SenseCam might be valuable for supporting reflection on experience in. To begin to tackle these questions, SenseCam was initially explored as a tool to support reflection on experience in a number of different situations, before the main focus of research –

looking at how SenseCam could support the reflective practice of teachers – was explored in more depth.

The situations explored were chosen based both on unique and interesting features of SenseCam and previous research. For example, as a passive image capture device, SenseCam is intended to allow the recording of a wearer's experience, wherever they go, without their explicit attention. In addition it is designed to capture large numbers of lower quality images rather than a few high-quality images in order that it might be useful for 'life-logging' or 'continual archival of experience'. Therefore, initial situations were chosen for exploration where such features may be desirable. Two such situations were looked at: reflection on everyday experience - where participants wore SenseCam continually for 2-3 days then reflected back on what the captured images revealed about their lives, and reflection on a field-trip experience [9]- where students used images captured during a field-trip used images to support their reflection and learning from that trip on their return to the classroom.

Insights from these initial studies, including an understanding of the limitations of the current prototype of SenseCam, directed attention to a suitable situation for more in-depth study of the use of SenseCam: as a tool to support teachers' reflective practice. Reflective practice, a particular type of learning through reflection on experience, is an approach used frequently in teacher education. This situation was still able to exploit the ability of SenseCam to automatically record and its wearable nature, but did not put such strong demands on capturing images in low-light conditions, large storage or a long working battery life, which is where problems had arisen in previous situations. In addition, the nature of reflective practice of teachers has been extensively explored through previous research and is something a similar technology, video, has been successfully used to support in the past.

Early explorations

The methodology used to explore each situation was necessarily different: in the everyday reflection and teacher reflective practice situations, an exploratory case study approach was used and qualitative data collected; whereas for exploring the reflection of students' on their field trip experience, an experimental design which provided both quantitative and qualitative data was used.

In order to explore the potential of SenseCam to allow unobtrusive and automatic continuous capture of images for the purpose of reflection on experience, all situations involved participants wearing SenseCam during existing practices. Until the initial studies conducted in this research, SenseCam had never been worn for any length of time outside the Microsoft lab environment.

Everyday reflection studies were very exploratory and informal, with volunteers wearing SenseCam for 2 or 3 days and feeding back their experiences of both recording the experience and viewing the images through interviews with the experimenter. Both the instructions on how SenseCam should be 'used' and the feedback sessions were minimally prescribed in advance, though the experimenter was clear that it was the technology's potential to support reflection on experience that was being explored. This flexible approach was deemed useful at this stage in research where it was as yet unknown what would be the most interesting or fruitful lines of enquiry to pursue [10].

In the case of reflection on a field-trip experience, as the activity was based on was a field-trip exercise which involved a follow up session in the classroom, it was

possible to have quite a lot of control over how the exercise was carried out. Therefore it was possible to design an experiment to compare reflection and learning during the follow up session with and without SenseCam images to support it. Although certain quantitative outcome measures were used, these provided little explanation of the role SenseCam images played in supporting reflection or learning and so qualitative data was also used to provide a richer picture and deeper understanding of what was going on [11].

Teachers' reflective practice

The majority of work was to explore the potential of SenseCam to support teachers' learning from experience in practice: reflective practice. It was considered particularly important to explore SenseCam as a tool to support teachers' reflective practice in a real world setting, as it is not clear how well any findings found in more controlled conditions would generalise to more real world settings [11]. Also, as research was still at an exploratory stage, and despite predicting that SenseCam might work in similar ways to video in supporting participants' reflection, it was not yet apparent which features of SenseCam would be most important in such a situation and so worth exploring in more depth [11]. Therefore both lesson recording and reflection sessions were carried out within the day-to-day practice of a teacher, and a case study methodology used.

In total, 28 cases within this domain were considered, with images being used to support reflection in a wide range of existing practice situations – including teachers' self-reflection, peer reflection and mentor-guided reflection. Based on the findings of a pilot study, and a review of previous relevant research, a format for research was developed: SenseCam was given to trainee teachers and tutors to wear or place in the classroom as they taught a lesson. Images were then downloaded to PC and discussed in the type of reflection sessions already part of teachers' and tutors' training. These sessions were attended by the researcher and video recorded to allow the close observation of reflection which occurred around the images and an evaluation of that reflection. In addition, participants' experiences of using SenseCam and SenseCam images were elicited through informal interview.

In order to establish how the SenseCam images supported reflection, a framework for recognising the kind of reflection considered valuable for trainee teachers was developed: from an initial starting point based on past research in the field of reflective practice in teaching, the framework was developed iteratively through analysis of the data. Video and interview data was then interrogated to understand more about the role the images were playing in prompting and supporting this reflection.

Outcomes

The results of these investigations include a number of things of interest to this workshop and other researchers in the field:

1. An operationalised framework for recognising and evaluating the reflection supported by SenseCam of trainee teachers and tutors.
2. An outline of the ways in which SenseCam was able to support teachers' and tutors' reflective practice

3. An initial set of guidelines for how to get the best from SenseCam to support teachers' reflective practice

The first outcome – an operationalised framework for recognising and evaluating the reflection supported by SenseCam of trainee teachers and tutors – consisted of considering two aspects of reflection: the level of the reflection and its focus. Although it was based heavily on previous frameworks, these frameworks needed to be adapted for the current purpose as previous research was often not adequately explained to enable it to be lifted and used; and was usually tailored to a different situation, for example where reflection was supported differently (not by images or video), or measured differently (for example through written exercises rather than spoken reflection). Therefore this operationalised framework can form the basis for further evaluation of SenseCam to support teachers' reflective practice. In addition, it is one step closer to an evaluative framework for investigating the potential of still images captured by alternate technologies to support teachers' reflective practice, or even a more thorough investigation of the ways in which video serves this purpose. Further to this, the framework could form the basis of understanding the potential of SenseCam to support reflection on experience in other situations, and thus to explore the opportunity space further.

Outcome 2 – an outline of the ways in which SenseCam was able to support teachers' and tutors' reflective practice – also has implications for the way in which reflection and reflective discussion sessions can be structured and supported by images.

The third outcome – an initial set of guidelines for how to get the best from SenseCam to support teachers' reflective practice – forms the starting point for making use of SenseCam for this purpose; exploring its potential to do this further; and as suggested above, will have overlaps with issues to take into account when using any visual recording of a lesson to support teachers' reflective practice. Again, when further exploring the opportunity space opened up by SenseCam to support reflection on experience, some of these guidelines will have relevance to other situations in which it might do this.

Conclusions

Returning then to the idea that such ubiquitous visual recording devices could in some way support people in reflecting on their lives, this research this is the case. Perhaps what was missing from previous work more than anything was a clear purpose for what such reflection might achieve. For example, WayMarkr's [5] developers simply suggested that:

> "we want participants to have an alternative perspective of their past which will inform their future decisions"

By considering reflection in the domains of teaching and learning from a field-trip experience, where it serves a clearer purpose, it was possible to illustrate that SenseCam *could* provide participants with an alternative perspective of their past; findings and previous research suggest this may well inform their future decisions. Also findings from the everyday study suggest that in at least one case the wearer was able to gain "candid insights" into their life, leading to the reconsideration of aspects of their life and potentially precipitating their decision to give up smoking.

References

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