

# Thanks for the Memory

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## ABSTRACT

This paper reports the trial of a memory prosthesis, SenseCam, as a resource for digital narratives. Over a period of one week, six participants were asked to use SenseCams to capture digital traces of their experiences, and to use the same to create 'story telling' materials for presentation. The study found that all users delighted in the devices, though the traces that the SenseCams produced were not analogues to their own memory. Instead, the data traces presented a picture of daily life which was at once different to the one recollected by participants and yet brought a sense of wonder, depth and felt-life that was enriching. Furthermore, SenseCam data enabled participants to create artistic and evocative stories about prosaic activities that would not normally merit being recounted. The paper will comment on the implications these findings have for memory prosthesis device design, and on the epistemological assumptions underscoring them.

## Categories and Subject Descriptors

H5.m. Information interfaces and presentation (e.g., HCI):  
Miscellaneous.

## General Terms

Design, Human Factors, Theory.

## Keywords

Memory; memory prosthesis; sociology, psychology; digital narratives; wearable data capture; SenseCam.

## 1. INTRODUCTION

Technology and the conceptual frameworks that determine the function and meaning of that technology go hand in hand, one might say, though there is of course much discussion about which comes first: technology or concepts. Whatever the answer to this question - whether it is the technology or the idea that drives change - what is generally agreed is that the trajectory of the resulting marriage is fairly clear to discern. The merging of cameras with mobile phones, for example, has shifted what it means to be a photographer just as it has altered

the value placed on captured images. Whereas once photographers were experts of sorts, their presence used to celebrate special events, and the images they captured displayed in honored locations (the mantelpieces, bedside cabinets etc), so now everyone is a photographer, every event is photographed and there is no knowing what will be displayed. The trajectory here is one that suggests that the relationship between images and special events is dissolving, as is too the relationship between the image and its honorific display. The scope and depth of research into this trajectory is, now, one might add, immense.

Sometimes, however, a conceptual shift can alter a perceived trajectory in new and exciting ways. For example, the massive reduction in the cost of digital memory and data capturing devices has led some researchers to invent what they call memory aids or memory prostheses. MSRC's SenseCam is one such device. This consists of a camera, data storage chip and various other sensors, combined with a battery all embedded in a lightweight case about the size of a corporate ID badge, which can automatically capture and store about 3000 images. Currently various researchers are investigating the utility of SenseCams for this conception, building their enquiries around the framing concept of Qualia, and the idea that memory consists of some kind of internal mind's eye [1,2].

Whatever one thinks about this set of enquiries, this is not the only set of framing concepts that can guide the trajectory of use and development for devices like SenseCam. For instance, if one abandons the idea of memory as cognitive process and instead conceives of capturing images as a way of providing resources for digital story telling, then what something like SenseCam can do, how it is used, and hence how it might be developed, can shift.

It was just this possibility that we report on in this paper. More particularly, we report on the use of SenseCams by a set of six users who were asked to produce digital narratives over a one week period. The findings from this study have encouraged us to think that this particular conceptual shift is likely to produce dividends.

More especially, this paper will report that the 'narrative'(s) produced by SenseCam data traces are not ones that reflect the experience of living as typically thought about, reflected upon or remembered, by our user group at least. Instead, these traces are discontinuous with that experience. This does not mean that they contradict or correct 'lived memory'. It is rather that what is captured, what is seen and what is evoked is distinct. The paper will suggest that this is a benefit, at least for users if not historians. For these very differences created new values, new resources for narrative and self-understanding. These have distinctly appealing values to our users.

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These findings are, we think, of profound importance, but space precludes full consideration of them here. The bulk of this paper will instead be devoted to reporting the research upon which these claims and the evidence for them were gathered, though it will end with some further elaboration of what these findings mean for memory prostheses and their conceptual underpinnings, wherever they might be.

The paper will be organized as follows. Having described the study, it will then present the findings, breaking those into sections around the type of experience evoked. This will be followed by discussion of the implications, as just mentioned.

## 2. THE STUDY

The study was undertaken as part of a three year, DTI-EPSC and commercially funded project, called PARTICIPATE. This primarily involves the BBC, BT, MSRC and the Universities of Nottingham and Bath. Part of the project entails investigating forms of data capture that allow ordinary users to 'participate' in new 'ubiquitous' computing experiences. SenseCams obviously fit under these auspices.

With this in mind, during Easter, 2007, the BBC arranged for six participants in South Wales to be given the use of MSRC SenseCams for one week. The BBC have been undertaking studies of and user oriented workshops for digital narratives for some time, so were well versed in how to make a success of such trials. More particularly, having each been given a SenseCam and laptop to run the associated application, each participant was given a brief on how the devices worked. To help the participants focus their endeavours, they were asked to perform five simple tasks during the week, such as choosing one image per day and captioning it. The tasks were left vague, however, so as to maximise the degree of freedom participants felt they had. The subjects were then given some guidance as to what digital narratives might consist of, but were assured that in this instance the narratives they produced, whatever their quality, were not for broadcast.

At the end of the trial, participants were invited to a review meeting where a free discussion of their experiences took place. Each participant was invited to present some results in a form which they found suitable and, if they so desired, to make samples of SenseCam images and associated materials (such as notes, edited Media-player or I-Movie films), available at the review meeting and ultimately to the research team. The following findings derive from these materials.

### 2.1 Findings

Narratives can of course take many forms and indeed can be motivated by many desires: to broadcast one's identity, for example; to celebrate lives that might be otherwise ignored; and so on. But underneath all these purposes there is a sense in which a narrative will be empirical if it is anything at all. Hence, one's experience, one's bodily movement through space, one's moment-by-moment thoughts, all this and more may be thought of as the raw stuff of which narrative will be made, presumably, whatever their purposes. It seems perfectly reasonable to assume, therefore, that various sorts of digital devices can be brought to bear on the task of capturing this 'stuff' and making it available for the assembly of such things as digital narratives. Our research taught us that this is not such a straightforward proposition as it seems.

From the outset of the SenseCam feedback session, it became clear, as we have already noted, that SenseCam 'data' is not the analogue of experience. It is in various ways discontinuous yet empirically bound to it. This sounds contradictory, but as shall

become clear, there is a subtle but important set of possible relationships between the remembered experience before examination of SenseCam data and experience as recollected thereafter. These relationships have to do with such things as the difference between the 'stuff' that ought to be remembered and that which was not; between the 'stuff' which is never remembered because it lacks merit; between one's own 'stuff' the 'stuff' which is another's view and so could not be remembered; and so forth. Each of these dimensions has distinct characteristics and properties. Such dimensions became visible as we listened to our participants, each talking in turn and offering their own digital narrative(s). Accordingly, we present the main dimensions or 'properties of the past' separately, below, before bringing together an analysis.

#### 2.1.1 Strangeness

First of all, then, and as we have just indicated, participants frequently expressed surprise at how their lives were, to a degree, rendered 'strange' by SenseCam images. At the minimal, this included 'noticings' of previously unremarked features:

*N: I took it on holiday and 80% of the photos were of my boyfriend ... but what I loved about it was the way it caught his mannerisms and behaviour ... the way he'd be looking out the window or watching something else...the mannerisms ...*

Sometimes, participants remarked on the way in which things they habitually took for granted looked different:

*M:.. it was a bit like being in a silent movie ... you could see over the handlebars ... it made me look at things that I'd taken for granted in a different way ...*

Part of the strangeness was also achieved because the SenseCams have fish eye lens cameras. This type of lens had been fitted since the original designers thought the images captured would be closer to those experienced. As it happens, this is quite opposite to the truth:

*N. The fish eye lens makes everything look different but its quite cute, it's kind of more interesting..*

#### 2.1.2 Measuring a life

The strangeness that the SenseCam images induced also provided a different way of measuring what a day's activities had entailed. In particular SenseCam images provided a way of 'foregrounding' events that might otherwise have slipped from view. In the following, one participant talks about how a 'bad day' she had had with her daughter had been utterly transformed in a single moment she was able to retrieve later. Her captioning of this moment had a poetic quality, one which moved all of the people in the discussion:

*S: ... cos, I'd had like the worst day ever ... I just found it ..., she'd been driving me absolutely mad ... and we were in the playground and there was no-one there ... and she was ... she won't eat properly .. she's so small ...*

*Q: And what you've written, is that documenting [image of daughter next to a giraffe painted on the wall]...*

*S: Yeah, yeah, it was like the conversation we had ... it was like, 'but Mum, when ... when am I going to be bigger ...*

We found that, typically, our participants remarked on the way that the images they reviewed made them see the mundane in new ways, ranging from noticing for the first time what the world looks like from between a pair of bicycle handlebars, through to the foregrounding of concerns, as in the above

example, to the surprise evoked at seeing candid images of a child reacting to being 'caught' in some trivial way:

*S: ... I actually caught her on camera eating a dog biscuit and giving another one to the dog ... the guilt on her face ... I never ever could have got that if I was trying to take pictures ...*

In various ways, then, the SenseCams brought the mundane to life, whether it was by simply seeing things another way, foregrounding what had previously been background issues, or capturing things (like a boyfriend's mannerisms) that would otherwise remain neglected.

### 2.1.3 Reflection

Seeing events in this way also provided opportunities for reflection. More than one participant talked about their surprise on discovering certain features of their lives they ordinarily seem to neglect, and in particular their realizations about certain mundane features to be discovered within them:

*S: I noticed how much I was in the car ... how much you go shopping ... how much of your day is taken up by washing up ... you know ... you see quite a lot of the insides of my house ...*

*A: you look at newspapers and it's all about lifestyle ... that's why I like this ... it actually goes into the life you're leading ... the boring bits where you're not achieving status ... they turn out quite interesting ... it focuses on the things we don't [normally] reflect on ... you make a slightly different judgement ... it can be really reaffirming, to look back on a really nice day and say, oh, it was ok ...*

It was striking the way in which respondents chose to talk about the ordinary and humdrum features of their lives. SenseCam images could be an excuse for celebration, to make the subjects humble about something, or to laugh at themselves. SenseCam images could even suggest a need for change:

*M: No, what I would do is only put it on ... it's brought home to me that I need to change a few things ... it makes you rethink your life a little bit ... wear it for a week and you realise what you're doing with your life ... like a therapy...*

### 2.1.4 'La Vie des Autres'

A further dimension of the experience evoked by SenseCam images was a heightened sense of the lives of others. At its most prosaic this simply meant seeing those others:

*M. All the people you focus on normally are people who are present in your life, and the strangers ... you exclude them ... this brings the strangers back ...*

Some participants asked partners, workmates and others to wear the camera.

*I: I'd be interested in seeing other people's days .. I actually gave it to my housemate to see what he does at work ... the answer was, 'not much' ..*

Through the lives of others was not the only way that SenseCams provided opportunities. Animate and inanimate objects alike provided vehicles for exploring different views:

*I put it on a kite. We were in the park ... I wanted to know what it looks like when you fly . I'd love to know what that's like so I put it on a kite with some gaffer tape. It didn't work though!*

*Yeah, I wanted to put it on my dog. the world from his level ...*

### 2.1.5 Creativity

Some uses can only be described as creative. Creativity here refers to both imagined and real uses of the devices. This was especially driven by a concern with the novel aesthetics of

SenseCam images, such as related to the perspectival distortion the fish eye lens produced.

In one instance, a participant selected some images of a group of friend's ten-pin bowling which were, in their mind, meaningless but 'artistic':

*M. Oh yeah, the bowling ones [images of a group of friends ten pin bowling] ... especially the arty ones , this one . I captioned this, 'great bowls of fire' ... I love those kind of abstract images*

This suggests that, for our participants, one of the ways the past could be made interesting was through making it entirely unfamiliar, divorced if you like from the experience-as-experienced. Yet, part of the magic here would appear to be related to how this difference was made visible and more tractable by somehow being anchored in the recollection of the event itself. The delightful difference and artistic value of a 'creative view' was measured in terms of how far that view was from what it was thought and experienced to be.

One desired feature of this tension between empirical facts and the artistic rendering of the same, between what some users said was the fragmentary vision of their existence and the idea that their existence had some narrative or linear form to it, was the possibility that, with SenseCam images of the past, or at least SenseCam traces of it, the past could as it were be juggled up. Respondents juxtaposed, changed, organized images in ways that frequently challenged the idea that their linear flow of experience made for good stories. In one case, a participant designed a film (taking six hours to complete it) which was shown to everyone else present. Afterwards he admitted:

*'It's not the way my week went ... I divided it up ... put things together so they would be interesting ...'*

### 2.1.6 Reconceiving the Author - Subject

If strangeness, the neglected and the aesthetic, were part of the values that use of SenseCam gave vitality to and, if, further, the ability to juggle-up the narrative of life to create evocative stories was also a bonus, then it is not entirely surprising that, with a capture device that can work automatically, people should be less prone to editorialising before or during the event. Our subjects treated SenseCams as a producer of raw material and the values provided to the subjects were in large part up with the fact that the user(s) did not 'steer' or give planned voice to 'stuff' that was collected.

There was a key *social property* of SenseCams that lay behind this which several of the participants commented on. This had to do with how the devices transformed the role and the function of the author and the subject. Whereas photography (both classical and ephemeral, as mentioned at the outset) requires someone to take a picture and someone to be the subject of a picture, so SenseCams make this different. Automatic capture means it no longer matters who is who. This released some participants from the burden of making this distinction itself.

*H. You know with this I don't worry about what the pictures look like; I am not involved, I mean I know I chose to wear it for the trial but you know I didn't feel as if I was taking pictures I didn't ask anyone to stand still and look right - I mean I did sometimes but not always and the thing about it is I feel much more free...*

This in turn, so some participants remarked, made the events in question more 'natural' and less 'infected' (as one put it), by the presence of photography.

This has a paradoxical consequence, of course. When participants first started wearing SenseCams they had worried that they were making the world as a whole a subject. In some instances they had been especially worried about this because they had been in places where imaging was prohibited, such as in playgrounds. There, the very concept of author-subject was the salient along which concern arose. By the end of the week, however, at least some of the participants were delighting in the dissolution of this nexus. They were no longer the author. 'It' was.

### 3. Conclusion

There were, needless to say, other dimensions of experience that came out from our trial. Space precludes discussion of them all. We have focused on what we think are the most provocative and in particular on issues to do with the relationship between memory and memory prosthesis and to a lesser extent issues to do with the creation of personal narratives.

As regards the idea of digital memory. What we have seen is that the relationship between things-as-remembered-by-the-subjects-in-ordinary-ways and things-as-presented-by-the-SenseCams is complex. For one thing, SenseCam data captured things-that-might-have-been-remembered-but-not-intentionally and things-that-were-beyond-the-possibility-of-being-recalled-by-the-user-but-which,-when-presented-to-the-same-user,-somehow-provoked-a-recollection. Here we are thinking of the weird images, views from peculiar places, the faces that were there but not seen, and so on.

This awkward language alludes to the difficult and complex relationship between human memory and digital traces of action. We have seen that SenseCam data makes lived-experience, in various ways and in varying degrees, *strange* to the persons who had the relevant experiences in question. Strangeness here is not a negative thing, as we saw. Strangeness brings values of various kinds. The crux, it seems to us, is that in creating discongruent experiences to the one's imagined or recollected, SenseCams brought to bear ways of seeing that were not obviously the subject's own, but which were nevertheless empirically related to those experiences, though in complex ways.

It seems to us that it is precisely this complexity that is at issue when it comes to memory prosthesis. In our view, research which seeks to build prostheses on the assumption that human recollection is merely an empirical object is completely neglecting this complexity. This research tends to treat the problem as one of scope, extent, volume (albeit alloyed with operationalised definitions of types such as 'episodic' 'flash bulb', etc [3]). Once the data is there this research thinks it only a secondary (though sometimes difficult) task to recall it. Our study shows that this might be a wrong way of thinking about human memory and digital data traces.

Our reading of the evidence leads us to argue that whatever ones feeling about the concept of Qualia and related ideas, much of which are deeply contentious, what is clear from this research is that the past is not a place one merely recalls; the past is a place *one ventures into*. SenseCams are thus not merely capturing devices; they capture in particular ways. It is these particularities that gives them their unique value. A fish eye lens creates one way of exploring the past, for example; just as a passive capture technique offers another. Each design choice creates a particular vision on what the past was, can be seen as, and leads the 'user' to find evocative. In short, one should not think of devices like SenseCam as good or bad

analogues for human memory; as successful or failing memory prostheses. They are devices that, in their design, *makes the past in particular ways*. Hence, they should be designed with sensitivity to how that rendering occurs. What we have seen is that these renderings can offer delight, surprise, foreignness and strangeness in equal measure. We have seen too, how these renderings can shift even what it means to be an 'author' (a photographer) of one's own life.

In these respects, we think this small trial ought to make us think differently about memory as an object of interest to HCI. This interest has been, up to now, pretty much solely driven by various forms of psychological behaviourism and-or cognitivism. The evidence here suggests that we ought to move toward a different view, one that is perhaps more sociological. In so doing it might lead us nearer to the view of memory expounded by the speech acts theorists and their pregenitors, the ordinary language philosophers such as Wittgenstein [4].

But even if we do, we also think that the findings ought to make us skeptical of the sociological view of memory which might seem more plausible and more closely allied to the idea of narrative. This holds that memory is a 'social construction' a kind of 'act', and that memories are 'stories' with political intentions. It seems to us that, although the findings do suggest that memory is a 'place one ventures to' and thus one 'acts out', they also suggest that devices like SenseCam make the past a broader, richer, less socially tidy place than one's 'sociological memory' would like. We say this because the sociology of memory literature emphasises the political and intentional arrangement of recollection. In this view, some events are selected to be honoured (by Cenotaphs for example) whilst others are forgotten. Following on from this, personal narratives of the past are designed to give especial credit to some events and not others. Yet our study shows that the 'felt-experience' and discongruent perspectives that SenseCam brings to the past, and the resources it provides for digitally mediated narratives about that past, show that the past is always a big place. What one does routinely, forgetfully, with forethought or with neglect, through habit and indifference, with boredom or with wonder, is not always tractable to social mores that dictate what ought to be recalled and what ought to be neglected. The past is an empirical place, to be sure, but just how and in what ways is up for us in the present, with our desire to tell stories or seek wonder, to explore. Choices about what we explore are not always political acts. Sometimes the past is merely a place one ventures into. It has been the purpose of this paper to show how even a small trial can show that this is so.

### 4. ACKNOWLEDGMENTS

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### 5. REFERENCES

- [1] Hodges, et al, 2006, SenseCam: a retrospective memory aid, Proc.Ubicomp 2006
- [2] Sellen, A. et al, 'Do Life-Logging Technologies Support Memory for the Past? An Experimental Study Using SenseCam', *CHI 2007*, ACM Press, pp81-90.
- [3] Connerton, P., How Societies Remember, Cambridge, CUP, 1989 Sellen, Connerton, P., How Societies Remember, Cambridge, CUP, 1989
- [4] Ricoeur, P. Memory, History, Forgetting, 2004, Chicago.

