
SenseCam

Introduction

As people get older the loss of memory functionality can become a significant challenge for many.

There are currently around 700,000 people suffering from dementia in the UK¹, highlighting the significance and urgency of finding solutions that will assist people to cope with this debilitating condition.

Short-term memory is crucial in maintaining conversation links that are necessary in terms of understanding and accessing day- to day information.

Recent assistive technology research by Microsoft Research Cambridge offers the potential of providing some aid.

Microsoft Research Cambridge has been working to develop a wearable digital camera, designed to take photographs passively, on a timer (for example every 30 seconds). The device captures everything the wearer views and by transferring the data to a computerised photo playback facility the wearer is able to review images that help to enhance the recall of specific events or activities.

Background

Most of us forget things and it can at times be hard to recall previous discussions and events.

More serious neurodegenerative diseases that can damage the brain to a point of no recovery can be particularly prevalent in an ageing population.

A significant neurodegenerative disease for older people is Alzheimer's where there is an erosion of the short-term and long-term memory².

A number of efforts to build tools that will assist people with such illnesses have been explored in recent times and the work by Microsoft Research Cambridge to develop the SenseCam is currently very pertinent.

SenseCam is a small wearable camera, invented and developed by Microsoft Research Cambridge. Collaborations on clinical trials with the Memory Clinic at Addenbrooke's Hospital, also in Cambridge, began in 2005. Microsoft has since established and funded additional collaborations with academic and medical memory experts to further investigate SenseCam's role in improving memory recall.

¹ Alzheimer's Society, 2008. *Demetia UK: what does the report say*. [online] London: Alzheimer's Society. Available from: http://www.alzheimers.org.uk/site/scripts/documents_info.php?categoryID=200120&documentID=342 [Accessed 14 April 2008]

² Steve Hodges, Lyndsay Williams, Emma Berry, Shahram Izadi, James Srinivasan, Alex Butler, Gavin Smyth, Narinder Kapur and Ken Wood, "SenseCam: a Retrospective Memory Aid" In Dourish and A. Friday (Eds.): Ubicomp 2006, LNCS 4206, pp. 177 – 193, 2006. © Springer-Verlag Berlin Heidelberg 2006.

Prototype

SenseCam is designed to take photographs on a timed basis, therefore capturing most things as they are viewed by the wearer.

Instead of a viewfinder or frame display screen, SenseCam is equipped with a wide-angle (fish-eye) lens to maximise the field of view.

In the current design (v2.3) users typically wear the camera on a cord around their neck, but it would also be possible to clip it to belts or pockets.

SenseCam takes pictures at VGA resolution (640 x480 pixels) and stores them as .jpg format. The SenseCam is currently fitted with 1GB of flash memory that can store over 30,000 images.

The data recorded by SenseCam is downloaded on to a computer at the end of the day or week. The images can then be seen by a simple image viewer application. The viewer is very easy to use.

The application has a window where images are displayed and a simple VCR-type control, which is positioned at the bottom of the display window. Image sequence can be played slowly (2 images per second), quickly (around 10 images per second), rewind and paused.

Results So Far

In 2005 Microsoft Research Cambridge and Addenbrooke's Memory Clinic commenced a trial with a 63 years old patient suffering from amnesia (Mrs B). The patient was given a SenseCam and asked to wear it during the kind of event that she would like to remember.

Following an event Mrs. B would spend around half an hour reviewing the images every two days over a two-week period. Mrs B typically completely forgets everything about an event after five days or less. However during the course of this period of assisted recall using SenseCam, her memory steadily increased and after two weeks she could recall around 80 percent of the event.

Mrs. B appears to have a lasting ability to recall the events even without reviewing images repeatedly. (Microsoft Research SenseCam 2008).

Trials are now being conducted with Alzheimer's patients and using SenseCam is a positive experience for several of these patients. Some patients have also reported feeling much more relaxed after the experience of using SenseCam.

Further development

SenseCam is, at this stage, purely a research project and still is in the early stages.

Although SenseCam has the potential to help people with a variety of memory conditions and the results to date show great patient improvement, the Microsoft Research Cambridge team believe there are number of important questions still to be answered before the SenseCam can be developed into a viable product available to the general public.

For more information please refer to the research project at this website: <http://research.microsoft.com/sensecam/>.