Remembrance Home: Storage for re-discovering one's life

Yasuyuki KONO

Graduate School of Information Science, NAIST

Keihanna Science City, 630-0192, JAPAN

kono@is.naist.jp

http://ai-www.aist-nara.ac.jp/˜kono/

Kaoru MISAKI

office ZeRO

2-25-27 Motoizumi, Komae 201-0013, JAPAN

misaki_kaoru@nifty.ne.jp

http://homepage3.nifty.com/misaki_kaoru/

ABSTRACT

Remembrance Home is a project for supporting one's remembrance throughout his/her life by employing his/her house as storage media for memorizing, organizing and remembering his/her everyday activity. The Remembrance Home stores his/her everyday memories which consist of digital data of both what he/she has ever seen and what he/she has ever generated. He/she can augment his/her memory by passively viewing slide-shown images played in ubiquitously arranged displays in the house. The experiments have shown that the prototype system that contains over 570,000 images, 35,000 titles of hypertext data, and 250,000 of hyperlinks among them, augments his/her remembering activity.

Author Keywords

Augmented Memory, Remembrance Home, LifeLog, Passive Browsing

INTRODUCTION

The Remembrance Home stores one's (and his/her family's) digitized lifetime memories. Information technologies would provide virtually unlimited storage for storing one's life, i.e., both what he/she has ever experienced/seen (documents, photos, movies, graphics, books, notes, pictures, etc.) and generated (text articles, drawings, etc.). The digital record must enrich his/her life because he/she augments his/her memory by re-discovering his/her past experience. A house can be media for storing/recording its residents' memories, e.g., portraits on furniture, children's doodles on a wall, in all ages. Viewing a record in the real world triggers off one's remembering of the experiences associated with it. The Remembrance Home is a prototype house of next-era for augmenting human memory by naturally integrating digital devices into the house.

The project started in the year 2000. We have employed Kaoru Misaki's house as the prototype. It is equipped with several LCDs and some video projectors embedded into walls and furniture. These display devices continuously and automatically slide-show digitized and stored still images of his life-slice, e.g., photos, books, notebooks, and letters. The number of the images exceeds 570,000 and is increasing by 20,000 per month in average. The hyperlink structure that currently consists of the images and 35,000 titles of texts he has ever written is getting larger by his re-discovering activities of his past triggered by the slide-shown images. We have empirically found that browsing one's past by passively viewing digitized images activates his/her remembrance activity.

THE REMEMBRANCE HOME PROJECT

Overview of Lifetime Memories

Kaoru Misaki's house [1] was rebuilt to set his lifetime memory storage and to install a memory browsing and re-discovering environment. His lifetime memory consists of everything that either he has ever seen or he has ever generated, and that can be digitized. What he has ever seen mainly consists of 1) photo images he has ever taken, and 2) paper materials, he had stored either in his house or his parents' house, such as books, magazines, leaflets, textbooks, and letters. The paper materials were taken apart into sheets and each page is digitized as a JPEG image file by digital scanners. What he has ever generated mainly consists of 1) digitally written documents such as articles, diaries, and e-mails, and 2) paper materials he wrote/drew such as diaries, letters, articles, and notebooks, that were also digitized into JPEG images.

Digitizing of paper materials have been outsourced and is in progress. The number of digitized images increases about 20,000 files a month. Because the pace of the increase is so rapid and the digitizing has not been performed by himself, it is impossible to make symbolic annotations to each image synchronously with its digitizing process as is performed in MyLifeBits project [1]. The images and texts are manually

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[1] He is a technical journalist who usually works in his library to write articles.

Figure 1. LCDs embedded into the library desk. The left display slide-shows digitized images.

Figure 2. LCDs settled in the dining-kitchen.

Figure 3. PC Screen projected on the wall in the library.

linked with each in his daily activity. Whenever he is inspired by viewing digitized images, he manually establishes hyperlinks between the images and associable texts. His lifetime memory consists of over 570,000 images, 35,000 titles of texts, and 250,000 of hyperlinks among them. About 100,000 of the images are digital photos which are newly taken and the rest are scanned materials that belong to his past. The data structure is on the BTRON-based environment where the user can easily establish hyperlinks among data on its GUI.

Figure 4. Bookshelf before the project.

Figure 5. Current bookshelf. Papers have gone away.

Furnishings and Their Settings

In one's living space, necessary but uncomfortable objects for daily living such as paper files, computing devices, cables, and audiovisual equipments, should be transparent/invisible to him/her. In the Remembrance Home, computers, storages, audiovisual equipments, and most of keyboards are set under the floor. Most cables are embedded in walls and ceilings. Several LCDs and some video projectors are ubiquitously settled in the house so as to naturally merge into the environment (See Figure 1-3).

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The amount of documents in bookshelves/cabinets has extremely reduced, because they were discarded after the digitizing (See Figure 4-5).
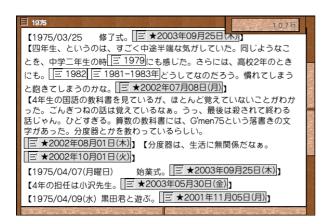

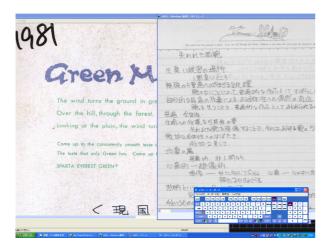**Figure 6. Embedded hyperlinks in a past diary text.**

Figure 7. Example of digitized image (a notebook page of a class when he was a high school student).

WORKING/LIVING IN THE REMEMBRANCE HOME

The Remembrance Home Project started in the year 2000 by Kaoru Misaki. Paper materials have been continuously digitized month by month and stored into a Windows-based file system. At the beginning of the project, he had daily diary text data started in June 1986 stored into the BTRON-based file system that is suitable for making annotations and hyperlinks among data (see Figure 6). Each digitized image (page) was originally annotated by the following two features: 1) the day and the time it was scanned as the time-stamp of the image file, and 2) the title of the set of pages as the folder name such as the book title. Additionally, the following digital data were kept in the storage in average: (a) 20 e-mail texts a day, (b) 10 web pages a day, and (c) 100 digital photo images a day. In the early stage of the project, each image was manually browsed by him and was

hyperlinked from existing text data with additional text annotation. Sometimes inspired by the browsed image, he created a new text file to write down the re-discovered event by detecting the era, the year, the month, or the day associated with it. We call such kind of hypertexts that make mention of re-discovered his past experiences the "past diary." Figure 7 shows an example of a digitized image.

Elementary School Times, 1978-1980, 1981-1983, 1984, 1993, 1985, 1986, 1987, 1988, 1989, 1992, 1994

Figure 8. List of past diary titles before Apr. 2002.

1965-1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1977/06, 1977/07, 1977/08, 1977/09, 1977/10, 1978, 1978/04, 1978/08, 1979, 1979/08, 1979/12, 1980, 1980/02, 1980/04, 1980/05, 1980/06, 1980/07, 1980/08, 1980/09, 1980/10, 1980/11, 1980/12, 1981, 1981/02, 1981/03, 1981/04, 1981/06, 1981/07, 1981/08, 1982, 1982/04, 1982/10, 1983, 1984/06, 1984/11, 1984/12, 1988/05, 1988/06

Figure 9. List of past diary titles created after Apr. 2002.

Developing Memory Browsing Environment

Although symbolic annotation creation is crucial for active browsing of non-text media [2], rapid increase of scanned images prevented him from on-time annotation creation. The time interval of most of the images, e.g., the day he got the original material, the day the original material was distributed, or the day of the event it reported, was ambiguous/unknown. It takes around 36 days to merely view all the 570,000 images for 2 seconds each, if he spends 8 hours for the task per day.

The passive browsing method where he views periodically slide-shown images is employed, after active browsing where he actively selected a folder and viewed thumbnails in it was applied. Active browsing became harder as the number of images increased. The difficulty prevented his motivation for re-discovering in April 2002, when the number exceeded 100,000. We have employed "JPEG Saver," a freeware screensaver, for randomly showing images into ubiquitously settled screens in the house [3].

By switching the browsing style, his re-discovering activity has extremely activated. Inspired by randomly and daily shown images, he has re-discovered his past experiences step by step. His past diary has become more detailed and accurate. By remembering the detail of each his past experience, he has discriminated his diary files into months while his past diary was divided by years or school-times before the passive method was employed (See Figure 8 and 9). Before April 2002, he had 129 diary texts among which 12 (9%) were past diaries. The total size of these diary texts was approximately 230K bytes. After the switch, he has created 68 diary files among which 48 (72%) are past diaries. The total size of these diary texts becomes

approximately 855K bytes. Furthermore, 33 files (66%) of the past diaries are divided by month, i.e., each title contains not only the year but the month, as depicted in Figure 9.
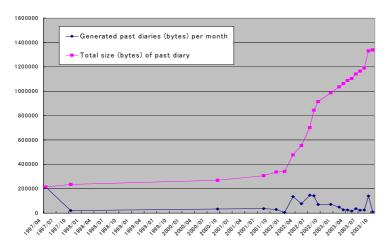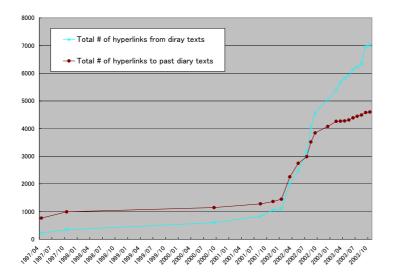

Figure 10. Total size of past diary texts.

Figure 11. Total numbers of hyperlinks from/to past diary texts.

Explosion of Past-Rediscovering Activity

We have empirically found that browsing his past by passively viewing digitized images in daily life extremely activates his past-rediscovering activity. By switching the style of browsing digitized images to passive one, his description in the past diary has been more detailed as mentioned above. Figure 10 shows the trend of total size of past diary texts. This indicates that the amount of description on his past experiences extremely increased after Apr. 2002, i.e., the total size of past diary texts is approximately 4 times than that before the switch. Figure 11 shows the trend of numbers of hyperlinks from/to past

diary texts. This indicates that passively viewing slide-shown images contextually associated with past experiences explosively activates his past-rediscovering activity, i.e., referring to past experiences and annotating the past diary.

Most of digital contents in the storage is in either text or JPEG image format. A photo image captures surroundings with object(s) of the photo in general. By repeatedly viewing an image within certain period of time, viewer's intention moves into detail of surroundings. Such transition must activate his further past-rediscovering activity.

CONCLUDING REMARKS

This paper introduced the concept of the Remembrance Home that supports one's remembrance throughout his/her life by employing his/her house as storage media for memorizing, organizing and remembering his/her everyday activity. This paper also described the design and current implementation of the Remembrance Home. We have been digitizing Kaoru Misaki's lifetime memories and storing into the house. The memories must be one of the biggest personal and digital memory archive, although large scale social and digital logging projects are in progress [5, 6]. Passively viewing the memories augments his memory and activates his past-rediscovering activity. The digitizing is still in progress over 100 times faster than that of MyLifeBits [2]. The Remembrance Home is going to store around 3 million images in 10 years.

We are also planning to enhance triggers for one's remembrance activity from PC screens to the real world, by providing means for hyperlinking among his external memory elements and real world indexes. As depicted in Figure 5, paper materials have gone away by the project. It means that contexts have been replaced into symbolic annotations and that only indexical objects whose shapes/existences have some meanings for him are left. We should have means for annotating one's memory by beings in the real world. We have already proposed the framework for memory albuming systems, named SARA, that employs real world objects as media for augmenting human memory, by providing its users with functions for memory retrieval, transportation, editing, and exchange [4]. We believe that integrating the framework into the Remembrance Home brings us a new vision for both augmenting one's memory. The Remembrance Home must also provide its family members with the means for sharing digitally augmented memories.

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