

Exploring Graspable Cues for Everyday Recollecting

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ABSTRACT

This paper gives a short overview of a four-year PhD-project which concerned several aspects of a device which helps people to recollect personal memories in the context of the home. Several studies were done on related topics, such as: autobiographical memory cuing, using souvenirs in the home and developing the user-system interaction of a portable digital photo browser.

Keywords

Everyday Recollecting, Ambient Intelligence, Recollection-Supporting Device, Digital Photo Browser, Graspable User Interfaces, Tangible Souvenirs.

INTRODUCTION

Most people are actively dealing with their personal memories. Take for example a woman who just returned from a holiday. Probably this person talks about her experiences with various people, which in fact is the rehearsal and perhaps the fixation of her holiday memories. When she refers to other holidays in the same conversation she is trying to relate her new memories to other existing memories, therefore she is working on her old memories at the same time. And there is a fair chance that her listeners are doing the same thing. Since most people reminisce everyday and the results of this process shape their personal histories and thus their identities this is an important process, which often goes unnoticed.

Today, with the increasing digitalization of memory carriers, such as digital photos, this remembering or reminiscing can be aided in ways previously impossible. In this paper the possibilities of supporting people in dealing with their memories with increasing digital support are investigated.

Context

The work described in this paper was done as a four-year PhD-study [1] both at Philips Research Laboratories Eindhoven and at the Eindhoven University of Technology. Currently the author is continuing this work at the

Eindhoven University of Technology as an assistant professor in the Industrial Design department.

The work was concerned with the topic of supporting in-home recollecting. The content of this work was influenced by both the project context as well as the industrial context. The project team decided together on the aim of the work, which was to build a demonstrator of a “Recollection-Supporting Device”. The industrial context of this project was that it was part of the Ambient Intelligence research program at Philips Research.

Paper Outline

The following section of this paper gives an overview of the abovementioned PhD-thesis, which is followed by some sections on relevant topics worked out in more detail.

THESIS OVERVIEW

Several studies were performed in order to explore the wide area of recollecting memories in the home context. The first study tested with questionnaires how people use souvenirs in the home. It confirmed that souvenirs can be seen as external memory and that they are suitable candidates to be used as tangibles in a graspable user interface for the Recollection-Supporting Device. The second study focused on the analysis, design, implementation and evaluation of a user interface for browsing and viewing digital photos on a touch screen device. This user interface consisted of a graphical and a graspable part, the latter using personal souvenirs as tangible user interface controls. The research into the use of tangibles led to an extension of the current Graspable UI-categorization, which mentioned only so-called “generic” objects. From the souvenirs it was learnt that compared to generic objects personal objects have the benefit that users already have a mental model and the object is embedded in the user’s personal environment. The Digital Photo Browser raised some issues on memory cuing. Therefore, an experiment was conducted which compared the effect of modality (odor, physical object, photo, sound and video) on the number of memories people had from a unique one-day event. During this event all above-mentioned modalities were present and they were later used to cue the participants. Against expectation, the no-cue condition (in effect only a text cue) created on average significantly more memories than any of the cued

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conditions. The given explanation for this effect is that “specific cues” can make people focus on the perceived information, whereas text leaves space for reflection. In view of the inherent qualities to souvenirs, representing a memento for storing and stimulating memories, the physical-object cue condition was expected to do better than it did in practice. Before concluding that this expectation was not confirmed it was tested whether the participants in the cuing study indeed viewed their personally handmade artefacts as souvenirs. It turned out that most of them did and therefore it had to be concluded that souvenirs cued fewer memory details than text-only cues.

All the information from the above-mentioned studies served as input for the last part of the thesis, which summarizes guidelines for designers who want to realize a future Recollection-Supporting Device. This part comprises a literature overview, a lessons-learned section and some future directions.

Although this thesis answers a lot of questions about several aspects of a Recollection-Supporting Device, still a lot of work has to be done in order to realize one, because this multidisciplinary area appeared to be rather unexplored.

AUTOBIOGRAPHICAL MEMORY THEORY

Recollecting personal experiences concerns Autobiographical Memory (AM), which is defined as “memory for the events of one’s life” [2]. AM, which is a part of Long-Term Memory, includes all the memories people have that have something to do with themselves including traumatic experiences.

According to Cohen [3] six functions of Autobiographical Memory can be distinguished:

1. The construction and maintenance of the self-concept and self-history, which shapes personal identity;
2. Regulating moods;
3. Making friends and maintaining relationships by sharing experiences;
4. Problem-solving based on previous experiences;
5. Shaping likes, dislikes, enthusiasms, beliefs and prejudices, based on remembered experiences;
6. Helping to predict the future based on the memories of the past.

Personal memories are important to people, which can be derived from the different range of functions, from solely internal usage, to communication between people.

Cuing memories is one way of retrieving autobiographical memories. A cue (or trigger) is a stimulus that can help someone to retrieve information from Long-Term Memory, but only if this cue is related to the to-be-retrieved memory. The stimuli most often used in studies are photos, smells or text labels. But anything could be a cue (a spoken word, a color, an action or a person), as long as there is a link

between the cue and the to-be-remembered event. A combination of cues increases the chance of retrieving a memory, especially when a subject in a cued-recall experiment had to perform activities, such as write with a pen or close a door (e.g. [4]). One example of a memory cue is a souvenir.

SOUVENIRS

The word souvenir originates from Middle French from (se) souvenir (de) meaning “to remember”, which again comes from the Latin word subvenire meaning “to come up, come to mind”.

From a questionnaire study with 30 participants it was concluded that many people appeared to have a collection of souvenirs at home. This collection contained on average over 50 souvenirs of the following three categories: holiday souvenirs, heirlooms and gifts. All three categories made the participants recollect memories when they looked at their most valuable souvenirs, meaning they serve as external memory for those people.

Three quarters of the participants brought souvenirs from their holidays but most of them did not throw away any during the last year. Eighty percent of the participants thought self-made objects could be souvenirs. When participants were asked to name their most valuable souvenir, only half of these objects were from a holiday.

Neisser (1982) describes a study on external memory aids used by students. They were asked what aids they used to remember future or past events and one of the results was that students do not know which types of external memory they use, unless they are explicitly mentioned, such as “do you use diaries for remembering”. This result is consistent with results found in the investigation presented in this chapter, because the souvenir-questionnaire participants did not mention remembering as a function of their souvenirs. But apparently they did use their souvenirs as external memory, because when they were asked what happened when they looked at their most-cherished souvenirs half of the participants mentioned that memories popped up or were relived.

DIGITAL PHOTO BROWSER

After learning that souvenirs can be used as external memory to the souvenir owners, it was decided to build a demonstrator with souvenirs. Together with the project team it was decided to focus on digital photos and to implement a Digital Photo Browser (see Figure 1, [5]). This device and the user interface were designed and implemented based on requirements which were derived from a scenario and a focus group. Based on these requirements a user-interface concept was designed, that reminds people of their photos by continuously scrolling them along the display.

The user interface of the Digital Photo Browser (see Figure 2) consists of three areas: 1 - an area on the left which shows a moving photo roll, 2 - a central area which allows enlarging individual photos, both in landscape and portrait

format, 3 - an area on the right where icons of the current user (3a), of other display devices (3b) or of detected graspable objects (3c) can be shown. The roll (1), which shows on average eight thumbnails on-screen, consists of two layers: the first layer shows an overview of all the albums owned by the current user and the second layer shows the contents of each album. This second layer is accessible by clicking on an album-icon, one can return to the first layer by clicking the “back”-button.



Fig. 1. The Digital Photo Browser and some souvenirs in an intelligent living room.

When brought into an intelligent room, the implemented Digital Photo Browser is able to recognize the presence of people, graspable objects, and available output devices. Since souvenirs are suitable for use in a Graspable User Interface and they have the ability to cue recollections, souvenirs are used as shortcuts to sets of digital photos. (This similar interaction was presented in scenarios of the POEMs project, which stands for Physical Objects with Embedded Memories [6].)

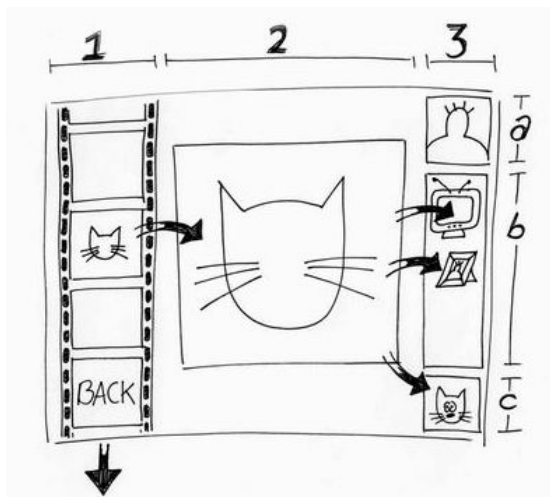


Fig. 2. A sketch of the Digital Photo-Browser user interface (for an explanation see text).

In short the Digital Photo Browser is a portable and wireless touch-screen device. The user can interact via touch (drag and drop) and the physical objects. These objects are RFID-tagged and are recognized when placed on a special table. Immediately the corresponding photos are shown on the portable device. Via a simple drag and drop the photo can be enlarged on this device or any other screen which is available for viewing photos.

CUING AUTOBIOGRAPHICAL MEMORIES

From the AM-theory and from observing people using the Digital Photo Browser it was learned that the ideal “recollection-supporting” device cannot and should not contain the *memories*, but the *cues* to the memories. That is why the suitability of several types of recollection cues including photos, audio, video, odor, and graspable objects was investigated [7,8]. In order to test this, 70 participants joined in a standardized real-life event and one month later they were cued in a laboratory living room setting, when filling out questionnaires, either without a cue or with a photo, object, odor, audio or video cue. In addition, a special method was developed in order to analyze the number of recollection details in these written free recall accounts.

Although this study is presumably the first to investigate a real-life event, which compares quantitatively recollections across different media types, it is perhaps also the first to find a negative effect of cues on the number of memories produced compared to a no-cue situation. Because the main result from this study shows that the no-cue condition for the recall of a real-life event generated significantly more memory details compared to any of the cue-conditions (object, picture, odor, sound and video). This is against expectation, since the encoding specificity principle, which states that environmental cues that match information encoded in a stored event or memory trace cue recollection of the complete memory (see [9] for an overview on context-dependent memory), and several other studies (see [1] for an overview) do predict and show a positive cuing effect on memory recall. In order to explain this result, it is hypothesized that cues might have a filtering effect on the internal memory search resulting in fewer memories recalled with a cue compared to the no-cue condition.

LESSONS LEARNED

The recommendations of Stevens et al. [10] which were derived from their study but some of them were independently uncovered in the work presented in this paper, will be mentioned here, since they are important for the design of a recollection-supporting device:

- *Develop the process of annotating or organizing memories into an activity of personal expression.*
- *Make the inclusion of practically any object possible.*
- *Bring the interaction away from the PC.*
- *Develop “natural” interactions (i.e. touch and voice).*
- *Encourage storytelling at any point.*

- *Assure the capability of multiple “voices”.*
- *Create unique experiences, especially for creating and viewing annotations.*

The design recommendations given by Stevens et al. [10] were the starting point for the lessons learned mentioned here, which are based on all the chapters in the thesis [1]:

- *Include souvenirs in a Recollection-Supporting Device.*
- *Souvenirs should be used as tangibles in a Graspable User Interface of a RSD.*
- *Support the personal identity of the user and the communication to other people.*
- *More media types than just text should be used in the RSD.*
- *The RSD should not pretend to know the truth, since this might interfere with the needs of the user.*
- *Create a metadata system that can be changed easily by the user.*

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