Digital Photo Browsing with Souvenirs

Elise van den Hoven & Berry Eggen

Philips Research Eindhoven, Prof. Holstlaan 4, 5656 AA Eindhoven and
Technische Universiteit Eindhoven, Department of Industrial Design,
P.O.Box 513, 5600 MB Eindhoven

e.v.d.hoven@tue.nl, j.h.eggen@tue.nl

Abstract: The concept design of a recollection supporting device is implemented as a portable Photo Browser using souvenirs as a graspable user interface. When brought into an intelligent room, the Photo Browser is able to recognize the presence of people, graspable objects, and available output devices. The ability of souvenirs to trigger recollections is used as a shortcut to (sub-) sets of photos. This paper explains the context and content of the accompanying video, which shows the Photo Browser, the associated souvenirs and displays in use.

Keywords: photos supporting reminiscing, graspable user interface, personal souvenirs

1 Introduction

This paper describes work done in the context of a long-term research project that aims at the development of a recollection supporting device for use in an intelligent in-home environment.

Recently, various studies on photos have been reported in literature. Research topics include the role of photos in family life (Interactions, 1999), the organization of personal photo collections (Rodden, 1999), the sharing of photos (Liechti & Ichikawa, 2000), and story telling with digital photos (Balabanovic et al., 2000). Although most studies do mention the link between photos and memories, only a few explicitly explore the possibilities of photos for in-home memory recall. HP's Memory Box (Frohlich & Murphy, 2000), the Rosebud project (Glos & Cassell, 1997) and the Living Memory Box project (Stevens et al., 2003) represent examples of projects that study how photos in combination with physical artefacts can be used to support people's need to recall and share memories.

At the beginning of the project we organized a focus group to explore in more detail the concept of 'memories' from a user's perspective to complement the application-oriented knowledge reported in literature. Besides a greater insight in the importance and use of memories in everyday life, we learned from our participants that memories are most often associated with keepsake objects and only in some cases photos. In this paper we describe the design, implementation, and evaluation phase of our first prototype, a Photo Browser with graspable objects.

2 Design & Implementation

2.1 The user-interface design

Graspable objects act as physical carriers for virtual data (Fitzmaurice, 1996) and take the shape of souvenirs in this project. The potential of using keepsake objects as triggers to memories was not only identified by our focus group but also in other studies (Glos & Cassell, 1997; Frohlich & Murphy, 2000).

The focus-group results also provided input for writing scenarios of use in order to come up with user requirements. The selected scenario describes a situation where a family, that just returned from a holiday, wants to share their memories with their grandparents. They do so by choosing a photo on a portable touch screen, which makes the room change into their holiday destination. The following requirements were derived from this scenario:

- The device should contain personal, digital photos which can be viewed and shown in an easy manner.
- The device should be suitable for putting it on your lap on the couch, which means it should be portable and wireless.
- There should be a possibility for one or more users at the same time to view photos.

- The device should not look like a PC but preferably more like the old-fashioned photo album.
- The device should be able to contain photos of more people while taking care of privacy issues.

Based on these requirements the user interface for the Photo Browser was designed. It consists of three areas (see Fig. 1): 1 - an area on the left which shows a moving photo roll, 2 - a central area which allows enlarging individual photos, both landscape and portrait, 3 - an area on the right where icons of the current user (3a), other display devices (3b) or detected graspable objects (3c) can be shown. The roll, which contains eight thumbnails, consists of two layers: 1 – an overview of all the albums owned by the current user and 2 – the contents of each album (accessible by clicking on an album-icon, returning by clicking 'back').
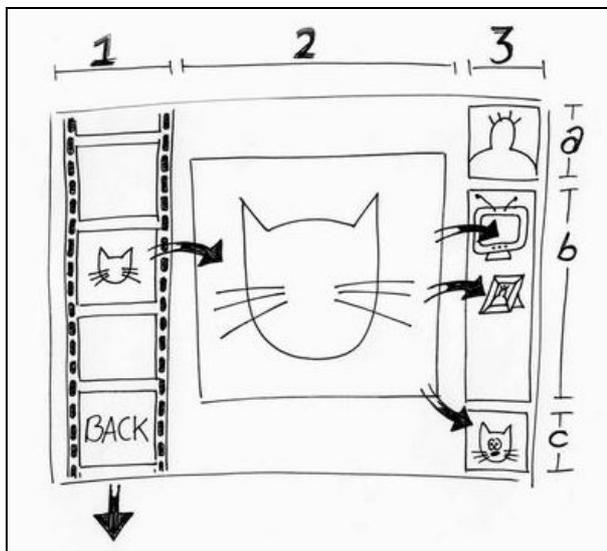

Figure 1: A sketch of the Photo-Browser user interface (for an explanation see text).

2.2 The user-system interaction

The main input-modality of the device described in this paper is touch. It was chosen, since it resembles the manner in which people at home handle their physical objects and photographs, but also because touch screens 'are easy to learn, require no extra workspace, have no moving parts and are durable' (p. 218, Preece et al., 1994).

2.2.1 Drag-and-drop

The user can interact with the user interface on the portable device by making drag-movements on-screen with a finger or a pen (see the arrows in Fig. 1). Making a downward movement with a finger over the (downward-moving) roll will increase the

speed of the roll and in a similar manner the speed can be decreased. In addition, the small photos (or thumbnails) can be dragged from the roll to the central area where they will be enlarged for better viewing. Photos can also be shown on other screens, since the handheld is only optimal for one or two viewers. This is possible by dragging photos to an icon of any detected and available device, like for example, a digital photo frame or a television screen. The latter situation is especially convenient when a group of people wants to look at photos together. Dragging towards the display-device icons or graspable-object icon is possible from the enlargement area, directly from the moving roll and even from another display-icon.

Except for the object-icon-arrow (arrow towards 3c in Fig. 1) all arrows in Fig. 1 can be reversed, which means that if you drag from the TV-icon to the enlarged area, the photo, which is currently displayed, will be removed from the television and enlarged on the portable device. There is no history kept on the screens, meaning that if a photo is removed the screen will be empty. This holds for the touch screen and the other display devices. It is also possible to change the movement of the roll from downward to still to upward, e.g. in case you want to enlarge a photo in the roll that just moved off the screen. The object-icon arrow is an exception to the rule, since this icon can contain many photos and it is unclear which photo to remove if you drag from the object-icon.

Browsing or moving through the content of the roll on the portable device can be done by selecting the color-coded frames or the content of these frames, the thumbnails. The colors of the frames represent categories of photos: blue – photos attached to a graspable object which is currently detected, orange – an album-icon or the individual photos in one of the albums, white - back up in hierarchy, from individual photos to the album layer, or green – favorite photos, which have been displayed most often.

2.2.2 Graspable objects

A second way of interacting with the touch screen is via graspable objects, which can trigger memories and act as strong-specific input devices. An object can be placed near the Photo Browser in order to change the content of the moving roll to the photos that are associated with the object by that particular user. The object-photos have a blue frame in the moving roll in order to make the distinction between the new roll and what was viewed previously (mainly orange or green frames). With a white 'back'-thumbnail the user can go back to the

previous situation (which might be at the album-level or inside an album, showing individual photos). Returning to the blue frames is only possible by removing the object and placing it again.

As soon as the Photo Browser recognizes the object it gives auditory feedback and displays an icon on-screen. Now new photos can be associated with the object by dragging thumbnails or enlarged photos to the icon of the object. The only effort needed is for the user to make a photo of the object and enter that into the system, similar to entering regular digital photos (which is described below).

Each graspable object can be used by different people, each user has his own private photos attached to the object and cannot watch other users' photos. The reason for this option is that often more people from the same household have memories related to a specific graspable object or souvenir, but those memories (currently represented by photos) are not necessarily the same.

2.3 The user-interface implementation

The prototype is operational in an intelligent home, which recognizes users, devices, the status of devices and graspable objects (see Fig. 2). The Photo-Browser application consists of various components, running on a PC somewhere else. These components comprise services, agents and general applications, which communicate with each other using a service discovery architecture. The user interface (described above) runs on a portable touch screen PC (Fujitsu Stylistic LT), which is connected via a 11 Mb/s wireless LAN link to a 'fixed' PC on which all other services run. In a real-life situation this fixed PC is in the attic or study but to the user all functionality appears to be in the portable device. In general this Photo Browser can be used for storing, browsing and viewing (digital) photos. Adding new photos to the database is possible by means of an attached camera to the portable device, by scanning or by uploading from other storage media. Adding photos can also be done on the home PC, just like several other activities, such as: deleting photos, editing photos, changing the hierarchy in the moving roll and changing links to graspable objects. Those activities require a different type of interaction from dragging, e.g. typing.

After attaching a wireless, battery-free tag (Philips HITAG system) to a souvenir it can be detected when it moves near a coil-shaped antenna. In our set-up the users were seated at a table, and the coil was stuck underneath this table. Therefore, the coil was invisible to the user and the device pretended to react to the objects placed near it.

A personal badge containing a transponder recognizes the user when he enters or leaves the room and plays a personal feedback sound. Placing the badge on the table near the Photo Browser determines who is the current user of the device and thus whose photos are shown on the touch screen device.

The measurements of the touch screen are 21.2 x 16.0 cm, where 15.7 x 15.2 cm is used to display the enlarged photos. The individual photo thumbnails in the rolling film measure 2.5 x 1.8 cm, and the icons in the right area are approximately 2.5 x 2.8 cm.

Figure 2: The demonstrator and graspable objects shown in the Ambient-Intelligent room.

3 Evaluation

3.1 Formative Evaluation

The formative evaluation was part of the design and implementation phase and consisted of a pilot study and an expert review with respectively eight and seven participants. The main conclusions were that the buttons on the device were distracting since they were not part of the user interface but belonged to the device, the movement of the photo roll was too slow, and the user interface was clear and simple. Before the start of the summative evaluation the portable touch screen device was changed to the new Fujitsu Stylistic 3500, because of its bigger touch screen and without the confusing buttons (see Fig. 2). The speed of the photo roll was changed to be adaptive to the user's behavior. The user interface was finalized, meaning it looked more professional graphically.

3.2 Summative Evaluation

This part of the evaluation took place in a living-room in a real house (Eggen & Aarts, 2002), since that is the actual physical, social and cultural context of use of the Photo Browser. Around 2000 people visited demonstrations of the Photo Browser as one

of the applications supported by the intelligent environment. The possibility for people to interact with the application triggered lively discussions about current practice and future possibilities for recollecting experiences from the past.

In general, people discriminated between two different contexts of use: a single-user, or individual setting in which the experience of remembering seems to be linked to *mood* and a multi-user, or social setting in which the activity of recollecting memories is related to *telling* personal and shared *stories* about the past. For both situations people mainly talk about the experiences and less about the actual media that are involved in creating these experiences. This seems to indicate that the problem of how to support recollecting memories should not be formulated as a pure content retrieval problem but that the focus should be on how the media stored in the system can optimally *trigger* and set the right conditions for the experience of remembering. People repeatedly argued that they should always be in control of the application. However, in view of the expected large amounts of media present in the system and because of the prospect of having available different media like sounds, video clips, souvenirs and web information complementing the digital photos, they could imagine the *system* taking *initiative* when appropriate.

4 Summary

The goal of the project described in this paper is to build a device as part of an intelligent environment which supports recollecting. To improve our knowledge level on 'remembering' we organized a focus group to get started and based on the information gathered we decided to build a Photo-Browser demonstrator which uses souvenirs as shortcuts to (sub-) sets of photos. During the evaluation phase we learned that the ideal 'recollection supporting' device should not contain the *memories*, but the *triggers* to the memories. That is why we are currently studying the suitability of several types of recollection triggers including photos, audio, video, smell, and souvenirs. In combination with a planned souvenir study we will have all ingredients available to build an improved recollection supporting device in the near future.

5 Acknowledgements

References

Balabanovic, M., Chu, L. L. & Wolff, G. J. (2000), Storytelling with Digital Photographs. *CHI2000 Conference Proceedings*, 564-57.

Eggen, J.H. & Aarts, E.H.L. (Eds) (2002*), Ambient Intelligence in HomeLab*, Royal Philips Electronics, ISBN 90-74445-55-1.

Fitzmaurice, G.W. (1996), *Graspable User Interfaces.* Ph.D. Thesis, Dept. of Computer Science, University of Toronto.

Frohlich, D.M. & Murphy, R. (2000), The Memory Box, *Personal Technologies*, 4, 238-240.

Glos, J.W. & Cassell, J (1997), Rosebud: A Place for Interaction Between Memory, Story, and Self. Aizu, Japan: *CT (Cognitive Technologies) '97 Conference Proceedings.*

Interactions (1999), *The Digital Hug*, November and December.

Liechti, O. & Ichikawa, T. (2000), A Digital Photography Framework Enabling Affective Awareness in Home Communication. *Personal Technologies*, 2000, 4 (1) 6-24.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., Holland, S. & Carey, T. (1994), *Human-Computer Interaction*, Harlow, England, Addison-Wesley.

Rodden, K. (1999), How Do People Organise Their Photographs? *21st BCS IRSG Colloquium on IR*, Glasgow.

Stevens, M.M., Abowd, G.D., Truong, K.N. & Vollmer, F. (2003), Getting *into* the Living Memory Box: Family Archives & Holistic Design. *First International Conference on Appliance Design (1AD), Conference Proceedings*, Bristol, UK.