



## **The Memory Box**

David Frohlich, Rachel Murphy  
Printing Imaging Technologies Laboratory  
HP Laboratories Bristol  
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A Memory Box was built to illustrate the possibility of recording and attaching stories to memorabilia kept in a box. Potential users then provided a range of ideas about what kinds of stories and objects they would keep in the box, and how they would use it. The findings confirm the value of attaching stories to souvenirs, especially in the context of gift-giving, and have implications for how this might be implemented through augmented reality interfaces.

## 1. Introduction

The ubiquitous computing movement holds great promise both in extending the reach of computation to new classes of human activity, and in providing new ways of performing activities currently carried out on a PC. A new set of possibilities are opened up in both directions by interacting with augmented objects and spaces rather than with conventional computing appliances [1]. However, to realise this promise it is important to drive and direct the course of innovation in this area with user studies that establish the value of augmented realities of one kind or another. In this paper we report such a study exploring the value of augmented reality interfaces for audio.

In a previous study we demonstrated the value of capturing ambient sounds with digital photos and playing back those sounds from photographic prints [2, 3]. In this study we extend this paradigm to souvenirs; physical objects with sentimental value. In contrast to the activity of capturing sounds-of-the-moment on a digital camera, we wondered whether consumers would be interested in attaching verbal stories to a range of memorabilia including printed photos, especially if the process of attachment and playback could become part of the ordinary practice of telling stories with these things [4, 5]. This constitutes an alternative approach to digital storytelling on a PC where users record a verbal narrative over a sequence of still or video images, and even to the capture of messages or commentary over digital photos on a handheld device [e.g. 6].

To envision the facility of audio playback from souvenirs we built a small container with audio playback capabilities. We call this the **Memory Box** since the design is based around the concept of a woman's jewellery box which allows users to record and associate stories about each item of jewellery, and to playback individual stories automatically on removal of items. In a real product, this might be implemented with a combination of small RF ID tags attached to the items and a sensor and audio system built into the box [e.g. 7]. We then used this envisionment in discussions with potential users, to explore the range of items and stories people thought of storing in the box, to discuss the perceived value of the technology, and to identify expectations about how they would interact with it. In the rest of the paper we describe the box itself and the results of discussions about its value and use.

## 2. Methods

We showed 8 PC-owning families in the Boston area a wooden **Memory Box** (see Figure 1). This was an 8" X 5" X 3" box lined with fur, containing a pair of earrings, a necklace, a pebble, a matchbox and a photograph. The lid of the box contained a loudspeaker, and the box itself was plugged into a Sony minidisk player. Example stories were recorded in an interview with a colleague who commented on the contents of her jewellery box. The colleague found it easy to talk for two hours purely about the memories associated with items in the box. Four stories of about 30 seconds each were selected for use with the items listed above, together with one audiophoto with ambient sound recorded in a previous study [2]. It was suggested through demonstration that each object would be tagged so that its own track would play from the speaker as it passed a sensor as you lifted it out. Tags might be manually attached to objects as adhesive labels or tied with a ribbon. Audio clips could be recorded from a microphone built into the box or downloaded from another audio source.



Figure 1. The Memory Box prototype

### 3. Results

The box appealed more to women and children than to men. Women in particular were intrigued by its relationship with photo albums and jewellery boxes which they already enjoyed, and the potential of combining these with story and commentary. For many this led to a dilemma. On the one hand, they could see that stories could be told for every photograph or object in the house, and that some of those stories were precious:

*M4 I could explain each photo*

*M11 Everything I have I could tell you who gave it to me and for what reason.*

On the other hand, they struggled to see why they needed to record such stories for themselves

*M3 Why do I need the recording? Why can't I say "These are the earrings I bought.."?*

They resolved this dilemma by concluding that the value lay in saving stories to give to others; either as a personalised gift for close family and friends, or as an heirloom to hand down to their children.

*M2 I think there might be special times when you might want to do this. A baby book, Becky's wedding... A baby book in a box as a gift*

*M5 Pretty neat idea...That's something I would buy for someone as a gift - for my parent's wedding anniversary.*

*M9 I think it's a great idea especially for family heirloom kind of things*

They were also excited about receiving such gifts and heirlooms from their own close family, and especially listening again to the voices of loved ones:

*M11 This is wonderful. To hear my mum's voice...talking about the cameo she gave Jamie*

*M4 That's nice to memorise it all...My mom died and before she passed away she gave my Aunt a card where she said "Happy birthday Margie from your sister Esther". And every year she opens it.*

Some women also noticed that ambient sounds could be included with photos and souvenirs, and thought of more personal uses of the box to record and share memories of special trips and vacations:

*M6 You could keep it on your dresser like a jewellery box and look at it once in a while. Or it could be a conversation piece on the coffee table that tells about your trip to Europe. Maybe you are not a big traveller but once you went to this fabulous place and you keep momentos in the box.*

Children saw it more for themselves as an extension of private journals and containers they already have full of strange objects and memorabilia:

*D2 I like that idea, its very personal*

*D5a I would put in some of my secret stuff; a crabshell I stepped on at Hampton beach.*

In terms of the method of interaction with the box, everyone liked the idea of sounds playing automatically upon removing a photo or other object. Storage of the sounds was assumed to be local rather than remote, so that boxes could be taken anywhere and given as gifts. Most discussion centred around how to get sounds into the box in association with the relevant object.

Some sounds such as commentary for a photo or story about an object were seen as recordable at the box itself:

*M5 When you have an item, like say when you come back from vacation you had something, a shell or rock or something and you wanted to save it and remember, then you would record as you're putting it in .. so that two years from now you open up and when you take the rock out of the box it plays back that recording that you stored.*

Input of other sounds such as live commentary or ambient sounds was felt to be more problematic. Since taking the box out to record such sounds was infeasible, people suggested a range of alternative strategies such as detaching a handheld microphone unit, or plugging in some removable medium like a cassette tape:

*M6 Well , I would like to buy something like this if there was just a little microphone sort of like that pen, that you could visit Grandma and she's getting up in years and you want to talk about things, and she gives you something special and you have the whole thing right there.*

*D7 If you had a tape in here then I'd like it*

In all these cases, people don't discuss the need to tag the object and link the tag to the sound clip. They assumed that this happens automatically with the initial action of recording the sound clip and/or first putting the object in the box. Furthermore, they listed objects of all shapes and sizes that might be linked with sounds in this way, such as: photos, pressed flowers, a signed baseball, shells, baby clothes, shoes, teeth, pianos, vases, ornaments and furniture. Clearly, some of these objects are so small they would be difficult to tag unobtrusively, while others are so big they would not fit in a box.

#### **4. Discussion**

In general, we have found that users responded positively to the idea of attaching stories to souvenirs, as long as the process of attachment and playback is simple and integrated into the way they currently handle those objects. This integration requires automatic methods of tagging objects at the point of

recording, but manual methods of controlling the tag-sensor interaction at the point of playback. The main use people see for this facility is in the creation of personalised gifts out of *shared* memorabilia, such as childhood relics that can be given back to the child in adulthood. This finding concurs with that in [6] where audio capture on a digital photo viewer was used primarily for recording commentary to send to others, rather than to playback locally. This leads to a further user requirement that the technology be self-contained enough to allow it to be given away. In fact this is exactly the model supported by Voice-Express who host a new web-based service for personalising gifts with voice messages (<http://www.voice-express.com/>).

Finally we found to our surprise that the size of some souvenirs was very large, and certainly too large to fit in a jewellery box. This suggests the need for a different kind of implementation altogether, which can accommodate items like pianos, bicycles, furniture, etc. Instrumentation that works at the room level might be more appropriate [cf. the ambient room in 1] as long as it is easily transferable to other rooms or devices in the case of gift giving. Alternatively it might be simpler to attach the audio data itself to each object and supply a separate player [cf. the audioprint player in 3].

While we don't pretend to have a solution to all these requirements we believe the results show sufficient user interest in the approach to search for one. Furthermore, many ingredients of an acceptable solution are indicated in the data, despite the fact that our envisionment didn't actually work. We recommend more user studies of this kind in advance of extensive technical experimentation to ensure that the development of ubiquitous computing is based on user-centred design.

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