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# TimeCapsule: Connecting Past

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**Abstract**

Our world is changing at an ever-growing rate. The tide of urbanization and globalization has resulted in population migration that consequentially separates people from what is familiar to them. To combat this issue, we propose TimeCapsule. TimeCapsule is a social networking community intending to reserve, organize, share and utilize personal and collective memories by members of the community contributing location-related digitalized materials. Two clients will be designed to meet two kinds of usage: Mobile and Desktop. The mobile application will provide real-time old and new street view fusion in order to facilitate the user experience of appreciating the change in one location. The desktop client will help users organize and share personal and group memories. Special consideration for seniors will be addressed.

By utilizing a connection to our past, we hope this initiative will help us to position ourselves to better appreciate the disparity between cultures and generations, thus unifying us.

**Keywords**

Memory; Connect past; Interaction Design; Augmented Reality

## ACM Classification Keywords

H5.m. Information interfaces and presentation:  
Miscellaneous

### I. Motivation and Background

As we proceed further into the 21st century, urbanization has increased to unprecedented levels worldwide. As a result, landscapes of most major cities across the globe have undertaken tremendous transformations. Such transformation, as beneficial as it is, also destroys some of the physical symbols and landmarks of long-time residents' memories. This may leave them with an emotional void that can only be filled through browsing antique pictures and retelling old stories. This transformation impacts all generations. Many young adults cannot recognize their childhood neighborhood due to rapid urbanization. Old friends and family members are separated and distanced from each other due to this unavoidable trend.

Another side effect of rapid urbanization is the homogeneity of cities around the world. Cities across the world are struggling to maintain their individuality. This of course is bad news for tourists, sociologists, historians and culture lovers. As reported by CNN: "...The old town of Beijing, a city with more than 3,000 years of history [is now being] destroyed in a few years during the second half of the 20th century." [1]

### II Problem Space

TimeCapsule is aiming at preserving, sharing and presenting past memories by allowing users to digitize, annotate and interact with the collective artifacts.

### *Goals and targeted benefits*

**Assemble and annotate personal/collective memories:** We anticipate TimeCapsule to be a social network community platform in which people share their private or common memories. Artifacts that support or invoke memories are of particular value since memories are objectified [2].

**Facilitate authentic touring experiences:** Based on the annotated and organized data, we aim to provide authentic travel experiences by presenting historical objects on-site. By displaying the real-time integration of the past with current time, tourists will have a more holistic and real experience of appreciating a foreign culture.

**Connect generations:** TimeCapsule is also designed to enable emotion communication between generations. Senior citizens are valuable source of our data input. Special consideration should be taken to address the difficulties senior citizens would have when interacting with our system.

### *People*

**Tourists:** Tourists should find TimeCapsule useful and interesting because it enables them to view the city landscape from a historical perspective.

**Family members and old friends:** Family members or old friends would also like to use TimeCapsule as props in their story telling and emotional bonding.

**Senior Citizens:** Seniors are valuable sources of our collective memories. Due to their difficulties with new technologies, they are largely kept silent in the digital world. They would like to engage, and they should.

### *Functionality*

TimeCapsule will support two types of jobs: community sharing and on-site use. By building a social community, we enable the audience to enlarge the data pools and at same time enhancing social bonding between the users and their associates. The client application should support easy contribution and management of the materials, especially for the elders.

On the other hand, we should adopt new technologies to facilitate on-site use of the artifacts so that an authentic experience could be created.

### **III Related Work**

#### *Mobile Spatial Interaction (MSI)*

MSI is an emerging research endeavor which tries to enhance computational and interactional paradigms for mobile devices interacting with the physical world [3]. In particular, Augmented Reality techniques are very applicable to TimeCapsule because it enables real-time image fusion of old and new street views [4].

To achieve that, we also need image-based localization technology to help determine the precise location and orientation of a mobile device so that the user's "field of view" could be calculated and the geo-referenced information will be obtained [5].

#### *HCI for Senior Citizens*

Numerous studies have indicated that they generally require more hands-on instruction and practice [6]. Many useful suggestions from academia provides guidance in designing the interfaces for seniors [7].

Another possible approach is to take advantage of the popularity of motion gaming consoles, such as Nintendo

Wii™, among elders [8]. There are some studies indicating design suggestions for such purposes. [9].

#### *Recording memories*

In terms of recording personal/collective memories, Hitotoki (hitotoki.org) is an "online literary project" for sharing personal experiences related to one geographic location. The site collects narrative short stories regarding one specific location often with image attached [10]. Another innovative attempt is the "disposable memory project" [11], which collects random pictures taken by random people across the world. The disposable cameras people use are passed by the organizers and are passed on to next random person.

### **IV Identify Needs and Gather Requirement**

#### *Preliminary Survey*

This survey contains simple questions about basic behaviors of people connecting with their families and childhood friends. We constructed our questionnaire to be more open ended. The questionnaire and results are attached as additional files.

#### *Contextual Interview*

**Participant:** Mr. Wong, who has been a hotel manager for over 20 years, has been witness to the fastest growing world economy. As we walked together with Mr. Wong around his working place, we asked him about the changes which have occurred to his environment. Transcripts of interview are attached as additional files.

#### *Work Models*

Based on the field data, we use *Flow* and *Sequence* work models to facilitate our design[12]. Figure 1

shows the sequence model that summarizes memory-triggering process for various roles.

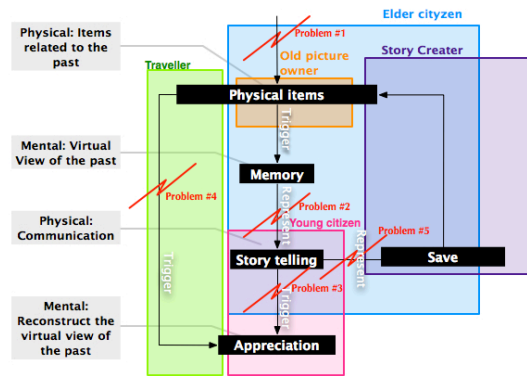


figure 1. Consolidated Sequence Model

### Consolidated Requirements

#### TARGET AUDIENCE

- Tourists: We aim to help tourists appreciate authentic local culture and history.
- Families and old friends: We try to enhance bonding between family members and old friends.
- Senior citizens: We try to ease the interaction process for elders so that they can tell us their stories.

#### FUNCTIONAL REQUIREMENTS

- Easy management of items and stories.
- Augmented Reality image fusion: Augmented reality techniques will be implemented to generate the picture of past and current time integrated.
- Social connection can be imported from other social network services, such as facebook.

- Map and 3D street view should be provided to help annotation.

#### USABILITY REQUIREMENTS

Seniors' usability concerns should be addressed. Interaction paradigms should be minimized so that learning curve is low for those aged members of our society.

## V. Design

### Conceptualization:

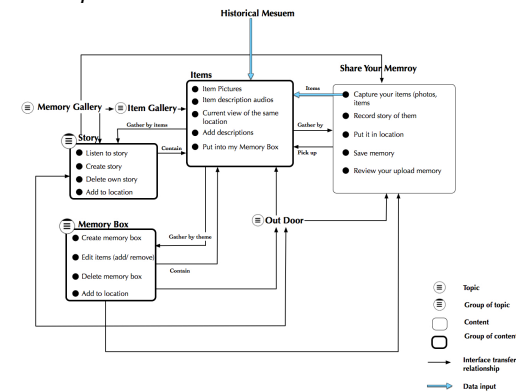


figure 2. Concept map based on IDM [13]. See attachment for a larger version.

#### ENTITIES/TOPICS:

Items

Memories are intangible without meaningful items. Items should be typically digitalized before they are uploaded and utilized in the system. Items can be of many data types (images, sound, textual descriptions). There are three common attributes for items – time, location and people. Items can be private, shared with group or even made public. High quality images will be obtained from public sources such as museums and

municipal digital archives. For personal upload, cameras embedded in devices will be utilized to take pictures of the analog items.

#### Stories

Memories are solidified by stories or anecdotes. Such stories are often related to one specific person or group. By using "Tell a story", users are able to externalize and edit pieces of their memories with help of group contributing and annotated items. In consideration of elders, a guided tour is designed specifically to ease the process of creating a lively story, see the prototypes attached.

#### Memory Box

Memory Box is a metaphor for folders of items. Each Memory Box can be any meaningful arrangement of items. Memories boxes then can be shared with groups and edited and utilized in creating stories or reproducing history view with Flash Back.

#### Flash Back

"Flash Back" refers to the special feature of presenting real-time image fusion with old photos and current street view from the same angle, giving the users the sense of "flashing back" in situ. Augment Reality and Image localization techniques will play vital role in ensuring effect and efficiency.

#### Memory Gallery

Memory Gallery stands for the major interface for viewing, annotating and sharing items, memory boxes and stories.

#### Outdoors

Outdoors is a street view on desktops or smart TVs to simulate walking in a real street surroundings. Like

Wii™ and Kinect™, users can operate the view and select meaningful items by using special controls or body gestures. Outdoors is proposed especially for seniors to engage in the system in case they are physically confined.

#### Interaction Paradigms

On the desktop, users can engage with traditional mouse and keyboard. On the mobile, multi-touch will be enabled. For senior citizens, client on body-sensing game consoles, such as Sony PlayStation Move™, will be provided.

### VI Prototype

We have developed static prototypes for TimeCapsule. All of which are attached in additional files. Figure 3 is the prototype for digitalizing old pictures:

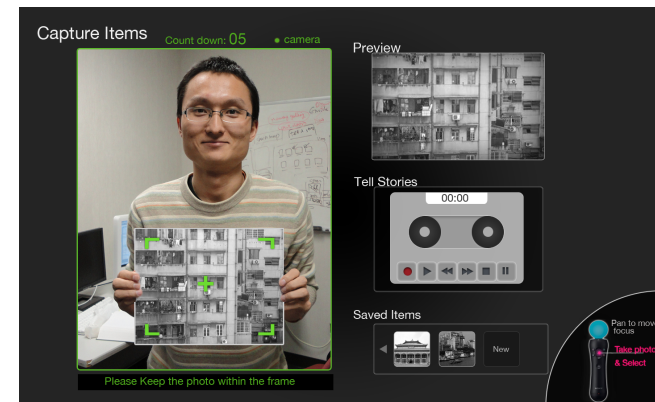


figure 3. Upload analog images.

Figure 4 is the prototype for Flash Back in a mobile device. Please refer to the attached files for more information.



figure 4. "Flash Back" in TimeCapsule Mobile.

## VII Conclusion

In this paper we present our design of "Time Capsule" – a social network service for recording personal/collective memories. We base our design on results from contextual inquiry. By generating meaningful working models, we provide possible solutions and prototypes for constructing such a system. Some of the technological aspects of this design are not mature enough to be fully utilized. However, we do feel encouraging because technologies, such as MSI and ubiquitous computing, are beginning to demonstrate their powerful potential in real life problems. We are optimistic that this idea and design can be fully realized and that we can connect to our past in a digital age.

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