
Family Album - Photo Sharing for Intergenerational Connection

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Abstract

There is a growing divide between seniors and their younger family members today due to differences in access to and attitudes towards technology. Much of the benefits of digital technology remain inaccessible to seniors. Photo sharing is one such area. We hope to explore a method of sharing photos between generations and strengthen their communication. We present a novel photo browsing interface that combines the connectivity and convenience of the digital world with the familiarity of a traditional album. The Family Album disguises a cloud-connected photo browsing device as a photo album under a lamp which can be easily used by the elderly user. A smartphone app was designed for younger users to share and manage photos for their elderly relatives who use the Family Album. Design, prototyping details and user feedback are also discussed.

Author Keywords

User Interfaces; Design for Seniors; Photo Sharing; Tangible Interface

ACM Classification Keywords

H.5.2. [H.5.2. Information Interfaces and Presentation]: User Interfaces

General Terms

Human Factors; Design.

Introduction

Digital technology forms the basis for most remote communication today. It brings more freedom in being able to communicate across distances and time zones, but also results in a large proportion of our communication being moved online. Young adults use mobile phones, email, social networking, teleconferencing and video chatting regularly [12]. However, not all people are comfortable with this use of technology. At particular disadvantage are seniors, especially those in developing countries, who did not encounter any digital technology in their youth and find learning to use modern devices extremely difficult [1]. Our interviews show that many seniors in the developing world still prefer books and newspapers over the internet, communication in person or using the telephone over email or video chat, and an address book over social networking. Add to this the divergent interests of different generations, migration to and between cities that tears families apart and the fast paced city lifestyle that leaves little time for family communication, and we have a dire need of technology that can keep family members connected. In particular, seniors beyond a certain age often suffer from loneliness, depression and lack of companionship [8].

Photo sharing is an area where the divide is particularly bad. While the youth have smartphones and digital cameras at their disposal and take thousands of photos each year, only a minute fraction of these ever make it to their grandparents. The young adult uses Facebook, Instagram and a whole host of other online services to share photos with their friends and, to some extent, their parents. For them, lightweight photo sharing is fast

becoming a common communication medium used for maintaining a presence in the lives of friends and family [4]. Seniors who do not use online technology are left out of the loop. In fact, we found that the few seniors who do use computers do it mostly to download and view photos sent to them as attachments to emails.

Seniors tend to have photo albums with a lot of pictures taken over the years. They cherish these albums and enjoy looking through them. A successful connection of the generations offers promise as a means to improve communication between them, by giving an easy way for the younger generation to send photos to seniors in order to keep them in the loop. The challenge here is to create a system that is accessible to the elderly while offering the convenience and the connectivity of digital technology to the younger generation. Presents attempts to enter this problem space (Digital Photo Sharing), like digital photo frames, have been achieve some success. But in our interviews, seniors who didn't use them offered multiple reasons, the primary one being the lack of control seniors have over what photos are being displayed the difficulty of navigation through photos.

Here, we describe a device that aims to provide senior users the convenience of digital media while maintaining the familiarity of a regular photo album. We also discuss the response from user testing, and directions for future work on this concept.

Related Work

There have been many studies on the design of senior-friendly technology. ECHOES [8] tries to encourage companionship in senior populations using the TeleTable, an easy interface for seniors to interact with digital contents. TeleWindows [11] is another elderly-oriented

design that provides telecommunication solution for seniors. [5] studies the concept of furniture, items a person interacts with over the course of a lifetime, due to their inherent functional and aesthetic nature.

Tangible interfaces can allow for more intuitive and easy to use devices [7]. The SUPER DOTS project created new possibilities for social networking for seniors by making social media tangible [9].

Photo sharing is often important for seniors to stay connected to their family members. Design requirements for photo sharing have been well studied [10] [13]. [6] and [14] are works that focus on how to improve the experience of managing photos. However, in these researches, the special needs of the elderly were neglected. SharePic [2] is a multi-user, multi-touch, gestural, collaborative digital photograph sharing application for a tabletop interface designed for both young adults and seniors. Care Delivery Frame [3] is another photo sharing device specially designed for elderly, which is an integration of a home tele-health system and a remote photo sharing service of digital photo frame.

Description and User Interface

The Family Album (Figure.1) is a photo sharing device that consists of a projector and a camera fixed above a blank paged-photo album. The camera is used to detect a page number/code on the page, and the projector displays the corresponding image on the page. The user gets to flip through the album like she would any photo album. The electronic components are hidden inside an elegant lamp. To combat the problem of multiple relatives sending photos and the larger number of photos than pages on the album, we have multiple virtual albums, which can be created and deleted through a Windows

phone app. These virtual albums can be cycled through unidirectionally using a pull chain switch on the lamp.



Figure 1: Family Album

The aim of the Family Album is to faithfully replicate the experience of using a photo album the seniors are familiar with, while allowing their family to remotely send and organize photos on their digital device. This eliminates the need for seniors to learn to use a new interface and hides the technology that can appear daunting to seniors. It is in the form of an album and a lamp that do not appear out of place in a senior's home, and can fit in the living room rather than next to the confusing computer in the study.

Photos can be added to the album either by sending an email with the photos as attachments, or by using the Family Album Windows Phone app. Photos sent to the

device will be automatically downloaded over Wifi, and the user will be alerted of new photos via a notification on the contents page in the album. In addition to adding photos from the phones gallery or from the camera, the app allows you to change photo captions, create albums and rearrange and delete photos.

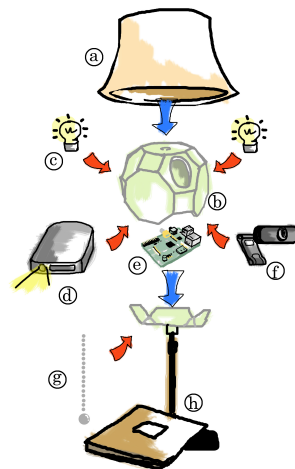


Figure 2: Hardware Design

Hardware Design

The Family Album consists of a lamp (a), and an album(h) fixed under it. The traditional lamp with a burlap lampshade hides inside it a webcam (f), a pico-projector (d), a Raspberry Pi (e) (a credit card-sized ARM-based computer) and a Wi-Fi dongle (Figure. 2). The electronic components are contained in a plastic polyhedral enclosure (b) that is manufactured using 3D printing and Laser cutting. The light bulb (c) configuration has been modified to spread light evenly around the enclosure and make it look like a regular lamp.

Fixed under the lamp is a traditional large photo album (11.75in X 10.75in) with blank pages made of durable and non-glossy plastic-reinforced paper. The pages are stiff enough to be easy to flip and metal page corners help the elderly user grasp the corners better. The projector covers a display area of almost 11in diagonal on the album, and the 300 lumens it produces is sufficient for clear images even in bright conditions. The 640x480 webcam covers a 11in length along the spine where the page number is encoded in the pattern. The metal pull-string switch (g) hangs right next to the album.

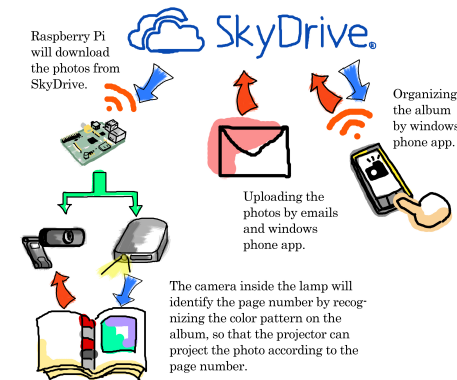


Figure 3: Family Album workflow

Software Implementation

The software for the Family Album runs on the Raspberry Pi (RPi) and is written in C++ and executes via a Linux shell script. The two main challenges are: page detection and photo display, and photo syncing. The latter allows user to use a smartphone or email to upload photos. The workflow is shown in Figure.3.

For page detection, a pattern consisting of blocks in three

colors was designed to be captured by the camera and processed to extract the page number. This method is much faster than QR code or OCR and the pattern fits aesthetically with the album and hides the technology elements from senior users, making this album more "magical". In the pattern (figure.4), a sequence of the blocks represents a certain page number. Some blocks are used as color references for robustness. A redundant sequence of blocks was added to make the pattern symmetric for detection stability and for a better appearance. The detected page number is used to select the photo to project.



Figure 4: Pattern for page detection.

When a new email is received, the system extracts, resizes and saves the attached images and adds the subject of the email as the photo caption.

The smartphone app is a convenient interface for the younger generation to upload and manage photos for their parents or grandparents. SkyDrive, Microsoft's cloud storage service, is used to synchronize photos between the app and the Family Album. The app allows users to add and manage photos and virtual albums from their phone.

Testing, Limitations and Future Work

The device was tested with approximate 40 seniors in two senior centers. Each session lasted for 4 hours. Seniors who were invited to use the product have an average age of 65 years old and each person tried Family Album for about 10 minutes. Most feedback was positive, with users appreciating the ease of use, the intuitive interface and

the promise of being able to see new pictures of their family more often. We had expected users to attempt to pull the album towards themselves and resent the fact that it was fixed, however there was surprisingly little negative feedback in this regard. Some suggestions about being able to zoom into photos and return quickly to the contents page were also given by seniors.

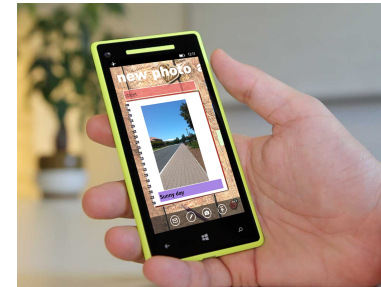


Figure 5: Phone app.

The inability of the device to allow the seniors to organize the photos is both an advantage in that it reduces complexity and a disadvantage in that it reduces functionality that a photo album would have.

Such a platform can be extended in multiple directions - We could allow users to send short video clips in addition to photos. A microphone could record the seniors' comments on each photo and send them to the younger relatives. However, it is crucial that features do not grow to a point where the device starts becoming confusing to the elderly user.

Conclusions

In this paper, we presented the Family Album, which provides an interface the young generation to share photos with seniors who are uncomfortable with computers. We

explained the premise of replicating a physical photo album experience to make it easy for seniors to use. The phone app interface is convenient for young generation to send and manage photos. The electronics and software of Family Album were also described in the paper. From the results of our testing, we believe the Family Album is a viable solution for photo sharing with the elderly.

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