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# PhotoFlow in Action: Picture-Mediated Reminiscence Supporting Family Socio-Connectivity

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**ABSTRACT<sup>1</sup>**

Family connections are maintained through sharing reminiscences, often supported by family photographs which easily prompt memories. This is increasingly important as we age, as picture-based reminiscence has been shown to reduce older adults' social isolation. However, there is a gap between sharing memories from physical pictures and the limited support for oral social reminiscence afforded by digital tools. PhotoFlow supports older adults' picture-mediated social storytelling of family memories using an intuitive metaphor mirroring sharing physical family pictures on a table top. The app uses the speech of oral storytelling to automatically organize pictures based only on what has been said. This simplifies the overall process of family picture interactions by leveraging one enjoyable aspect to ease a more effortful one. In particular, the familiar table top interaction metaphor has the potential to bridge the gap between physical picture reminiscence and managing digital picture collections.

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## KEYWORDS

Digital storytelling; older adults; social connectivity; contextual inquiry;

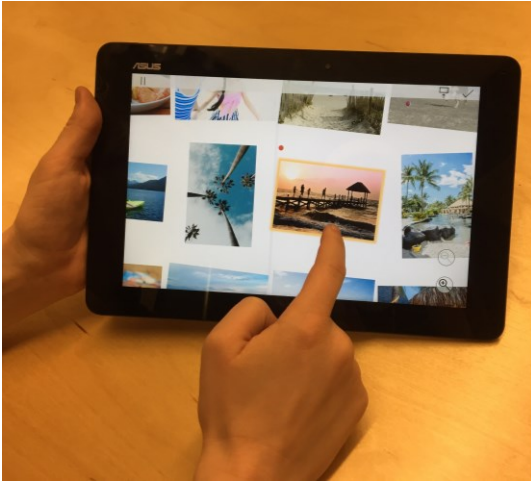


Figure 1: Viewing pictures on PhotoFlow's table top.

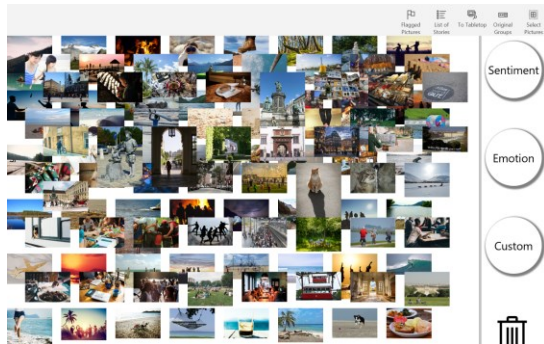


Figure 2: All pictures displayed on the table top. By adding magnets, the pictures rearrange based on memories shared in PhotoFlow.

## INTRODUCTION

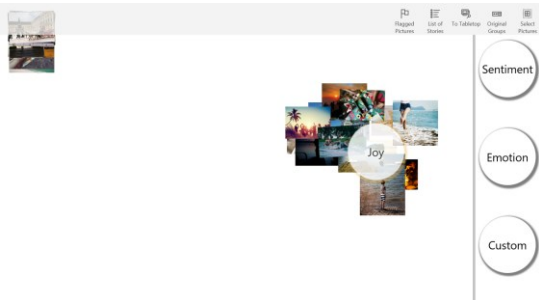
Family pictures collections serve as artefacts of past memories, tools for storytelling, and a means to share or pass on those memories. They support important social activities, like reminiscence (e.g., family oral memory sharing and storytelling activities), which in turn, promotes a sense of self-identity [7] and decreases social isolation [4]. These benefits are of particular importance to older adults, who generally have captured and cumulated many family pictures over the years and feel a stronger motivation to share memories [6,8], but are also at a higher risk for social isolation [3]. Unfortunately, managing these large collections of pictures, especially keeping pictures organized so they can be found and shared, requires a lot of time and effort [6].

Older adults, and families generally, require a lightweight, portable, and accessible digital tool to browse through pictures and reminisce together. Such a tool should also ease the work of picture organization and memory documentation in ways that are understood and controlled by users, so they remain the narrators and curators of their own memories. PhotoFlow (figure 1) provides this space for simple browsing and reminiscing, as is done with paper pictures now [1]. Built around the metaphor of pictures spread out on a table top, the oral memories shared on PhotoFlow's table top contribute to the organization of large picture collections. PhotoFlow supports casual reminiscence in a digital space, not as a replacement for paper photographs, but as a digital corollary and demonstration of the different possibilities of digital reminiscence.

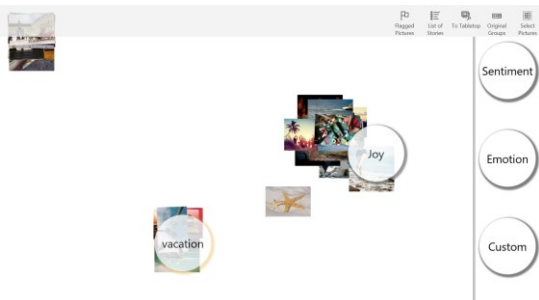
## 2 DESIGN AND DEVELOPMENT

The design of PhotoFlow is based on a contextual inquiry into older adults' reminiscence activities with their family photographs and physical artefacts (e.g., albums). A contextual inquiry is an observational research method that provides a strong understanding of target users and their motivations by observing their current practices in their natural settings [2]. We chose this method to build an understanding of what is done with physical albums currently, without comparing them to digital options. We conducted nine sessions with older adults aged 60 to 88, who showed us how they stored their pictures and selected examples of this storage (usually photo albums) to show in more detail and to reminisce from.

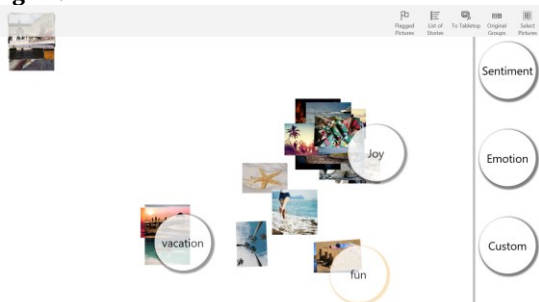
From these examples of reminiscence, we identified three major themes: storage chosen for minimal effort, technology's shortcomings for reminiscence, and effects of storage method on quality of reminiscence. Our participants showed a need for free-flowing interaction and movement between pictures, like flipping back and forth in an album, so that memories are prompted easily and storytelling is not interrupted. From these findings and the observations of physical interactions with pictures (e.g., tapping a picture) we designed a simple, unstructured table top interaction intended to support browsing through a subset of pictures, as families often do on a dining room tables (figure 2).



**Figure 3a: Adding a magnet for the emotion “joy” rearranges the pictures to show how related they are to that magnet.**



**Figure 3b: Adding a second magnet, by typing in the custom word “vacation”, rearranges the pictures again.**



**Figure 3c: Finally, after adding a third magnet for “fun”, the pictures rearrange based on relevance to all magnets.**

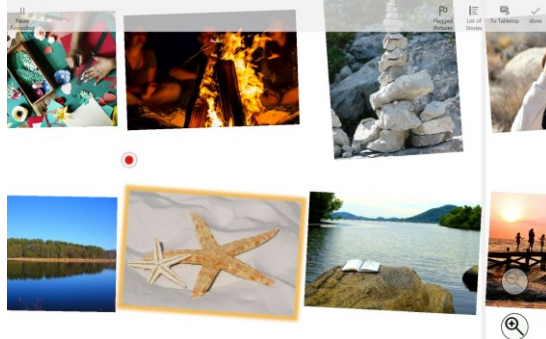
We assessed this interface with ten older adults using their own pictures and comparing it to their current storage. These participants found that using the digital table top was enjoyable and recognized that benefits of the unstructured interaction. Participants also described how they might select pictures to view on the table top from their larger collections of family pictures, which led to the development of the dust and magnet interaction built on the oral storytelling prompted by the table top. In this demo abstract, we focus on describing how the resulting app functions.

### 3 PHOTOFLOW IN ACTION

PhotoFlow uses the metaphor of looking through pictures spread out on a table top to present a simple display of pictures with a consistent menu bar for navigation. This is a common metaphor encountered at family get-togethers, where older members of the family may spread the content of a box of photographs on the table and engage the rest of the family in telling stories, prompted by the photos. This scrollable table top shows pictures as a jumbled grid, so family can easily see all the pictures while moving back and forth between them. This can be scrolled infinitely in any direction, as the finite grid of pictures is repeated in a larger infinite grid. While storytelling, users tap on pictures in turn (as is done on physical table tops and albums) and PhotoFlow records the audio and selected pictures (figure 4).

As stories are completed, the newly recorded speech is transcribed for each picture, based on when each one was selected. The role of speech here is not to use the transcripts directly (e.g., as captions), but to provide data for picture organization. The speech of each picture is analyzed using tf\*idf (term frequency; inverse document frequency) to build a vector space, along with simple measures of sentiment and emotion to further support that. This speech analysis is kept intentionally lightweight so that the whole system can be run locally on a tablet. Besides being simpler to manage, this also protects users’ privacy, as users’ pictures and voices are only stored on their own device. This speech analysis creates a network of relationships between pictures, based on the relevant memories, that can be visualized.

When viewing the entire pictures collection, we use a dust and magnet metaphor to support natural, unstructured exploration on the pictures using the storytelling speech data. Magnets can represent individual words (e.g., “ocean”, family names, or place names), or sentiment or emotions. Adding a new magnet rearranges the pictures to show how related they are to that magnet. Building on previous dust and magnet works [5,9], but rather than move the dust when a magnet is actively being moved by the user, the dust (pictures) move when the magnet is released, supporting the metaphor of placing a magnet on a surface to trigger the attraction. Figures 3a-3c demonstrates how magnets help users to explore their pictures based on their memories to find an interesting subset, much like an album of pictures.



**Figure 4: A story is recorded on the table top with the pictures found with the magnets in figure 3.**

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#### 4 CONCLUSION AND FUTURE WORK

PhotoFlow supports meaningful family reminiscence through simple, natural picture interactions. We are currently assessing PhotoFlow in a more practical setting through a family deployment study which brings PhotoFlow to an extended family and their family photos for two weeks. This will provide important information on how the interactions presented here are used by, not just one older adult, but their whole family, as well as how that use may change over time as the speech data supporting the dust and magnet interaction become more rich.

The potential for dust and magnet picture interactions, supported by speech data are broad and we plan to assess this through a public archive or similar setting. This could provide the larger community with an easy access point for relevant archival data, which is often presented in structured formats which are difficult to explore casually.

PhotoFlow's table top encourages social connectivity and creates a welcoming digital space for family reminiscence, while exploring the role of storytelling speech as an interaction to augment the family experience.

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