

Supporting Emotional Ties among Mexican Elders and Their Families Living Abroad

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ABSTRACT

The aging of the population is a phenomenon faced by most nations, such as Mexico, where 7.5% of the population is older than 60 years, a significant proportion of whom live alone (10%). This fact is related with the ever increasing migration of one or more of their relatives, mostly to the USA. Our work aims to provide a technological solution that eases the isolation of elder people living alone in Mexico while their families are abroad. To envision and inform our design we interviewed independent old persons living alone. We propose an electronic family newspaper, through which elders and their families share information, personal reminiscences and cultural stories, and occasionally interact with each other. Through its functionality, the electronic newspaper enables elders not only to maintain close social ties, but ameliorate cognitive decline.

AUTHOR KEYWORDS

Companionship, elderly, cognitive decline, isolation, sharing, digital photos, communication boards.

ACM CLASSIFICATION KEYWORDS

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

The aging of the population is a phenomenon faced by many nations, such as Mexico, in which 7.5% of the population is 60 years or older. It is estimated that by 2030 this figure will be more than double, reaching 17.5% [2]. Among those elders, 10% of them live alone with no close family members around them. This condition is more likely to occur in some regions of Mexico as it is related with the ever increasing migration of one or more of their relatives to the USA. The living conditions of those elders can be quite complex as they often face the impossibility of visiting or being visited by their families as they lack proper documentation (VISAS or residency permits). And even when this is not a problem, distance and cost might reduce direct contact to one or two visits a year.

Our work aims to provide a design of a technological solution focused on supporting the relationship between elder people living alone in Mexico and their relatives living abroad. To understand the challenges and circumstances around living alone for an elder person in this situation, we conducted interviews with a group of them. Those interviews served to inform our design of a system that aims at easing the isolation of these people. The central concept of the proposed system is an electronic family newspaper, through which elders and their families: share important information; personal reminiscences and cultural stories; may interact with virtual relatives; and occasionally may interact with the actual relatives. We argue that the electronic family newspaper will enable elders to feel more engaged and connected with their family network. The activities offered by our electronic family newspaper, not only stimulates elders socially, but mentally as well, which has been demonstrated may prevent cognitive decline and have a positive impact in their health [1].

UNDERSTANDING ELDERLY PEOPLE

Our field work was designed to understand the emotional needs of Mexican elders with families living abroad. We focused on five main aspects: communication with relatives, feelings of isolation, health care, keeping updated with things around them such as family events, and being self-dependent.

Methods

An analysis of characteristics of the elder people experiencing our target scenario feed a discussion to determine typical profiles. From there, we identified a number of individuals with those profiles and who were likely to share with us their experiences. We include people of different gender, age and living in different geographical regions on Mexico. Among the initial group of five people that we identified only three individuals were able to have an interview with us. Our interviews were semi-structured and were conducted within the home environment (e.g. the kitchen). The first interview was conducted in Cihuatlán, Jalisco to a 68 years old woman with some of her sons and daughters living in Colton, California. The second interview was performed in Ensenada, Baja California to a married couple both of whom are over 65. They have a son who lives in Tijuana and a daughter living in Los Angeles, California.

The third interview was conducted in Mexicali, Baja California to a 70 year old woman. Her sisters live in the US since they got married. She rarely communicates with her sisters. Although our sample is limited we consider that it covers a considerable variety to obtain a preliminary understanding of the conditions experienced by elders in general.

Results

The interviews were analyzed by the members of the team using a comparative verification of evidence which resulted on the identification of major themes for each topic of inquiry. In this section we explained some of the most relevant results. We found that the main mode of communication with relatives living abroad was the telephone which basically is used to update each other about news and recent family events. Phone calls are not always frequent and are more likely to occur at special occasions such as birthdays or holidays or when some emergent issues arise (e.g. accidents or other major problems). All our informants expressed their preference to being in constant communication with their families, but recognized that this is not always possible. One of our informants expressed that the impossibility of communicating on a more regular basis can bring some sadness to her. Those facts point to the relevance of providing appropriate mechanisms to help elders feel connected to their families. Our results also point to how people handle the feeling of loneliness. In one of the interviews we asked an elder to tell us about the times when loneliness increases, the answer we obtained was straight: “when I feel sick”, she argued that this time is when a person needs more companionship from her beloved ones. Thus, isolation is one of the major issues that have to be addressed in order to make the elders enjoy a better quality of life. Our results also highlighted the importance given by elderly people to photo albums. It is a real treasure to them. The old couple commented, “Our grandchildren love to look at the album and asks us what her mother used to do when she was a kid”. Moreover, they intend to acquire a video camera to record all the visits of their relatives. This showed us that pictures are artifacts from which we could take advantage of, due to the stories and emotive load associated to them. Finally, it was interesting to find that those elders interviewed show disposition to engage in learning new things. As a way to keep them active, some of them are taking courses (e.g. English lessons). Similarly, another person is going to elementary school and is very proud of her achievements and motivated to continue her studies for as long as she can.

Based on these findings, we engaged in designing a system that overcomes some of these aspects and intends to reduce the negative effects of being alone.

RELATED WORK

Some design concepts and products have intended to create emotional connections over a distance by applying theories of affective computing combined with ubiquitous computing

technology. The *Gust of Presence* system provides a suitable carrier for affective communication by enabling a two-way notification of presence [3]. This system lets parents and children who live apart inform each other know when they have arrived home. It uses a bowl, which senses when the user throws something into it, such as money or keys, which may indicate he has arrived at his home. Then, the bowl takes a picture from the inside and sends this information to another identical bowl located in the parent’s home. The *Lovelet* [4] is a wearable communication tool for intimate people by naturally and timely conveying affection. This consists of a thermosensor that always senses air temperature surrounding a user, the temperature data is transmitted to another user and depending on the temperature, a full color LED (Light Emitting Diode) illuminates in different color to indicate an emotional state. The above mentioned projects enable users to communicate their feelings to the persons they loved. However, these technological proposals do not enable users to share their personal reminiscences with others, which we consider can ameliorate the isolation of old people. Several projects have focused on providing mechanisms to enable users to capture and maintain the family’s memories. The *Living Memory Box* [5] is a device that assists families in preserving memories in a variety of media forms, such as photos, video and audio. The *Living Memory Box* appliance can be seen as both an archival and narrative device, allowing families to bring together artifacts and then tell stories about those particular items. The *digital storytelling* [6] is a device that enables digital photos to be used in a manner similar to print photos for sharing personal stories. A portable device combined with a novel interface supports local sharing like a conventional photo album, as well as recording of stories that can be sent to distant friends and relatives. Finally, the *FotoFile* system [7] provides a unified interface for annotation and search, using categories such as people, places, and events that are commonly used for labeling photographs.

The above presented systems and our own findings have motivated us to propose a system to help Mexican elders to ameliorate their isolation by means of digital photos and narrations accessible through an electronic newspaper. Through this newspaper, the elders and their family share their emotions, anecdotes, memories, and other kind of information, such as Mexican traditions.

DESIRABLE SYSTEM’S FEATURES

We envision that to ameliorate the loneliness of Mexican elders, our system needs to address the following aspects:

Enable elders and their family to feel close and maintain contact in an entertaining way. We propose an electronic family newspaper, which enables users to share information, such as personal memories, anecdotes, or traditions that elders would like to transmit to their younger relatives, or vice versa, the family residing in USA sharing the American customs they have adopted. The information transmitted through the family newspaper, is categorized in different

sections. For instance, in the Social section the family may publish photos or a video when the granddaughter graduated from high school. The Entertainment section provides activities for elders, such as a memory game, in which the elder may play with a virtual relative.

Enable the easy capture of digital photos and text. Elders and their family can contribute to build the newspaper, thus we have to consider interfaces suitable for using by the distant family and the elders. We consider that for elders we need to propose an easy way to use system that may be controlled through verbal orders or by entering instructions in a touch screen. Seniors may use not only digital cameras, but scanners to get images of documents or printed photos they want to publish in the newspaper.

Elders may visualize the family newspaper in several places within the home. The family newspaper is presented in a display that can be hanged on any wall of the home's room of an elder, in which a senior spends most of his time or usually reads the ordinary newspaper.

To clarify how these features are addressed by our system, we elaborated several scenarios of use to illustrate the system's functionality. The creation of scenarios enabled us to generate and communicate design ideas for our system and to understand better the implications of particular design solutions [8]. Next, we present some of the use scenarios in which we envision how elders may ameliorate their loneliness through the electronic family newspaper.

Scenario 1

Mrs. and Mr. Valenzuela are old adults living alone in Guadalajara, Mexico with two daughters and a son living in Santa Ana, California, USA. While Mrs. Valenzuela is preparing breakfast, the display in the kitchen plays an alarm to notify her that there are family news that may be interesting for her. She approaches the display and notices that in the Cooking section there are new messages. As the "5 de Mayo" Mexican day is coming, her daughters are organizing a dinner at the neighborhood and have published a list of potential Mexican dishes they would like to prepare for the occasion. Mrs. Valenzuela realizes that she has the recipes of some of them and decides to go for her cooking book to send them to her daughters. While Mrs. Valenzuela goes for the book, Mr. Valenzuela quickly pulls the display and reads the family newspaper while he is taking breakfast. He selects the Sports section because he is sure his son Mario has written a review of the latest soccer game of the Mexican league. As Mr. Valenzuela realizes that his son would like to read interviews to some of the players that were published in yesterday's local newspaper, he scans the note and attaches it to the review. At that moment Mrs. Valenzuela is back with a bunch of old cooking books and asks her husband: "Do you think that they will find Tejocotes fruit for the tea in Santa Ana?"

Scenario 2

Mrs. Diana is a 72 years old woman who lives alone in Tijuana, Mexico. She likes to play with the memory game included in the Entertainment section of her family newspaper. When she selects the memory game to start to play, a set of images of her family residing in the USA and other places of Mexico is presented at the top of the screen. As she misses her grandson Jose, she decides to play this session with him. For this, she selects the photograph of Jose and the virtual Jose appears saying hello and the memory game, which includes only images of the latest events related to her grandson. When Diana matches a first pair of cards, the virtual Jose, explains a little bit of the event in the picture. While Mrs. Diana and the virtual Jose are playing, her grandson is making his homework in his computer. He realizes his grandmother is playing and decides to join the game. The grandmother is glad of playing with his grandson.

SYSTEM'S DESIGN

In order to achieve the system's functionality we are proposing an agent-based system. Next, we describe the system's architecture and show some images from a mockup of the system that we made for this paper.

System's Architecture

As illustrated in Figure 1, the system includes a HTTP Server in which a weblog is created by the family members to load the information they want to publish in the family newspaper. A weblog is a term used to refer to a webpage that has frequent postings made to it by the person who created the page and others who are given rights to access the page. The trend of using weblogs is gaining momentum with the introduction of automated publishing tools that facilitate the publishing process. These public tools may be used by the elder's family to contribute stories and images to the creation of the newspaper. For elders living alone, we are proposing for them to control the system trough voice commands or a touch screen. For instance, an elder may indicate to the system the voice commands: "scan an image", and then "load the image" to post information to the weblog.

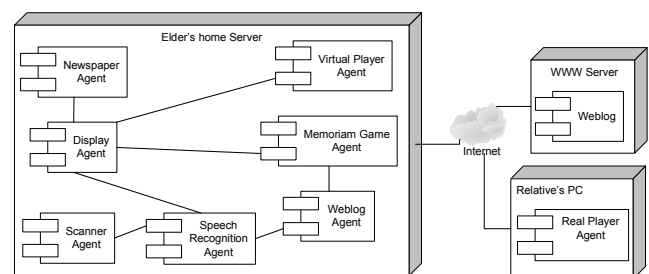


Fig. 1. The Multi-agent system architecture.

At the elder's home there is a display hanged on a wall of the room where he would like to read the family newspaper. This display is a tablet pc with which the elder can interact by touching the screen or by voice commands. The tablet pc acts as a server for the system's agents that enable elders to

visualize the family newspaper or update it. These agents are described next:

The Newspaper Agent: This agent is aware of new entries in the weblog to build or update the newspaper. To monitor and collect the weblog's changes, the newspaper agent was implemented as an RSS reader (RDF Site Summary) [9], which reads an XML generated when a change occurs.

Weblog agent: It acts as a proxy to the weblog by enabling elders to post information into it.

Display agent: It is a proxy to the display. It has control of what and when the information is presented in the tablet pc. For instance, when the display agent is notified that the newspaper is available, it automatically opens the family newspaper application as illustrated in Figure 2.



Fig. 2. Electronic Family Newspaper.

Scanner Agent: This agent acts as a proxy to a scanner. It enables users to interact with a scanner by voice commands introduced by the old adult.

Speech Recognition Agent: It is an agent that interprets voice commands addressed to the scanner agent, the display agent, or the weblog agent. Thus, the order "load image" is interpreted and addressed to the weblog agent which adds this image to the weblog, while the order "scan as a document" is addressed to the scanner agent.

Memory Game Agent: When the elder joins the Entertainment section, he is presented with several activities, such as the Memory Game. The Memory Game Agent is a server application that monitors the movements of the players, and validates them. It also maintains a database with images and a brief story describing them. If the elder chooses to play, this agent will generate a set of cards with the images posted in the weblog.

Virtual Player Agent: This is a companionship agent. If the elder chooses to play this game with one of his relatives, then the memory game agent will generate a set of cards containing images related with that particular person. Both, the elder and the virtual player agent will make alternate

movements. When a pair of cards is matched, the Virtual Player Agent will display a brief story related with that card's image as illustrated in Figure 3. This agent is visually represented by a relative's photograph. It perceives though an IM (instant messaging) client if the person, it represents, is connected in order to send him a presence message. This message may indicate to the relative that the elder is thinking of him. If the real relative decides to join to the game, the virtual player agent will cede the control to the real user, and the photo of the relative will be emphasized to indicate the real relative is playing the game.

Real Player Agent: If a relative decides to join a game of memory with the elder, the Real Player Agent is started. Then, it is connected to the game server, which is the Memory Game Agent. The Real Player Agent has an IM client through which the user can maintain contact with the elder while they are playing.



Fig. 3. Memory Game of the Entertainment Section.

Through a sample application, we describe next how these components interact to support emotional and social ties of elders and their family.

Sample Application

We revisit Scenario 1 to illustrate the functionality of the system's architecture. Figure 4 illustrates how the system's components interact to support this scenario: While Mario is at his school, he loads in the weblog a review he wrote for his father of the latest soccer game of the Mexican league. The Newspaper Agent is aware that a change was made to the weblog, and updates the family newspaper. Then, it notifies the family Display Agent that the newspaper is available. The Display agent sounds an alarm to advertise that the newspaper has news. Thus, while Mr. Valenzuela is taking his breakfast, he approaches the display and selects the Sports section. As Mr. Valenzuela realizes that his son would like to read some comments from some of the players published in yesterday's newspaper, he scans the note. For this, he gives voice commands which are recognized by the Voice Recognition Agent and addressed to the scanner system. Then, Mr. Valenzuela orders to load the note. The order is interpreted by the Voice Recognition Agent, which

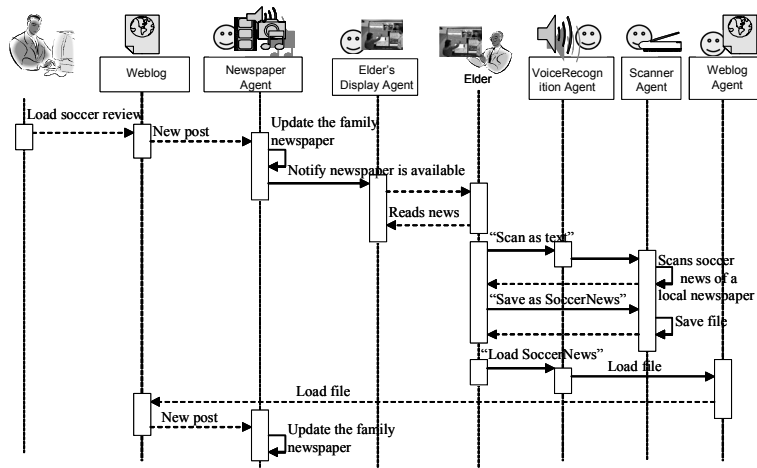


Fig. 4. Interaction of the System's components

addresses the command to the Weblog Agent that posts the note. Finally, the Newspaper Agent realizes of the new change in the weblog, and then, modifies the newspaper.

CONCLUSIONS AND FUTURE WORK

We have presented an electronic family newspaper that helps elders to maintain emotional closeness with their beloved ones, by providing awareness of important family events. This information is presented in sections such as, Sports, Entertainment, and Health, in which the family may publish digital images, videos and text describing a family event. The Entertainment section includes a memory game, in which the elders may play with a virtual family member, and occasionally have fun playing with a real relative. We estimated that our system is cost-effective, since the prices of the devices required for the sub-system at the elder's home will cost less than US\$3,000. The cost of a tablet-pc is approximately US\$1,800, a monthly rent for a 256K internet connection in Mexico is around US\$30, a scanner may cost US\$ 80, and a digital camera costs around US\$300. We believe that those costs can be afforded by family members residing in the US as has been reported that they send in average US\$326 per month to their families in Mexico [10] and already spend money for telephone long-distance services to Mexico. As a part of our future work we plan to develop a system's prototype and conduct an evaluation with users (elders and their families abroad). This will enable us to know the system's ease of use and how the system will fit within their current practices. We also plan to include telehomecare features that enable elders to receive medical news related to their disease, and be timely assisted by a remote healthcare provider. Progress in this project will be presented during the Student Competition session in CHI 2005.

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