Meeteetse: Social Well-being through Place Attachment

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ABSTRACT
This paper introduces Meeteetse, a set of technologies designed to facilitate social well-being through place attachment. Meeteetse builds a connection between individual homes and a local community center, a connection that is designed to encourage active involvement in community events and create a support network for those who might otherwise be isolated by the effects of old age. The design consists of several parts that work together to build this connection. A location-aware digital camera and a large public display are integrated into the community center to strengthen shared identity. A touch-screen scheduling device and a digital picture frame create a tangible community presence in seniors' homes. Together, these components enhance social well-being and lower the barrier for participation in the community.

AUTHOR KEYWORDS
Companionship, artificial companionship, social well-being, isolation, place attachment, community, elderly, aging.

ACM CLASSIFICATION KEYWORDS
H5.m. Information interfaces and presentation: Miscellaneous.

INTRODUCTION
As people age, declining health and a lack of mobility make it difficult to maintain an active social life. Friends and family become busier and move away, making it harder to stay in touch. Loved ones pass on, often causing an increased sense of isolation. Community living institutions work to address these problems by providing health care staff and an active social environment for their residents. However, many seniors have a resistance to institutionalization or simply cannot afford the high monthly fees. Alternately, new forms of communication, like e-mail and instant messaging, help seniors maintain contact with busy family members and make new friends. These mediums, however, do not provide the subtle cues people pick up over the telephone, in person, and through letters, and they do not help when others are too busy to respond. Advancements in artificial intelligence and robotics have the potential to provide permanent, low-maintenance, useful robotic companions that can supplement seniors' social lives, but it is questionable whether such companions are truly socially and psychologically healthy for seniors.

This paper lays out the design of Meeteetse, a set of technologies which use the concept of "place attachment" to encourage strong relationships between seniors and a particular place in their community. This "artificial companionship" then provides a forum in which seniors can make new connections with other members of the community. In this way, Meeteetse provides the benefits of artificial companionship—permanence, low-maintenance, and usefulness—with the psychological and social well-being that come only from real human relationship.

BACKGROUND
Our background research began with a series of interviews and focus groups with seniors in local retirement communities to try to get a more accurate picture of their lives. The seniors we talked to were concerned about health and mobility, family members who are often too busy to make contact, and maintaining their independence. It became clear that they receive immense support from the community they live in, and that communal living provides them with a very strong social safety net.

In addition to talking to local seniors, we looked for some general background information on isolation, depression, and companionship in the senior population. We found that there is an important distinction between *loneliness* and *aloneness*: some individuals can be physically alone without feeling lonely, while others feel a profound sense of loneliness even when surrounded by people. While both elements are important to psychological well-being, it is the sense of loneliness, and not the state of solitude, that seems to have the greatest impact [1].

We also did research on the social effects of robotic companions, and discovered arguments that the low-maintenance nature of this companionship is particularly well-suited to seniors [4]. The seniors we talked to, however, were skeptical about such bonds. Participants in our focus groups who were familiar with Sony's AIBO before, and while they felt that though the robotic dog could be a genuine companion, it only seems valuable when human companionship is not available. The strategy of using robotic companions to replace absent loved ones is also somewhat dubious. A study of widows found that those who sought companionship as an act of substitution or replacement for their lost husbands were actually more depressed than those who did not, at least in the short term [14].

In order to try to find a creative solution that took these lessons into account, we tried to identify as many different types of artificial companions as possible—plants, animals, memories, places, characters, etc. Within these categories, we generated several promising ideas, including:

- A device that would give a voice to potted plants, allowing the plants to ask for water and converse with seniors, adding to the overall presence of life in the home.
- A location-aware digital camera with a projector or pair of glasses that could superimpose old photographs on the locations in which they were originally taken, allowing seniors to revisit those places and connect with their past.
- A set of wireless, context-aware devices that would be spread throughout the home to monitor its state, helping maintain seniors' companionship with their home, pets, and plants while offering practical daily assistance.
- Modifications to a place (city, town, community center, etc) to make it easier for seniors to form a relationship with it. This would provide a "friend" which was always there, and would help seniors feel more comfortable going out and being social.

As part of our evaluation of these ideas, we engaged in a lengthy discussion about artificiality. "Artificial" can have many negative connotations. It often means that something is false, mechanistic, cold, or externally imposed on someone's life. If unaddressed, these can offset the benefits of permanence, low maintenance, and usefulness.

From this discussion, our research, and our conversations with senior citizens, we developed a set of criteria for our design: Our solution should take health and mobility into account; encourage independence; address loneliness as well as isolation; provide the benefits of an artificial companion without being false, cold, or foreign; encourage relationships with people; not intrude on the grieving process; and discourage premature replacement of loved ones.

Because companionship with a place builds on existing relationships and behavior, is not a replacement for loved ones, and is unobtrusive yet always available, it seemed to us like a promising solution. While much research has been done on virtual communities, we found no research into virtual tools which enhance companionship with a physically situated community. Sony's "Community Place" is a multi-user online community that tries to build a community among physically distant individuals [10]. The "Helper Agent" project uses an agent which interacts with participants in an online virtual environment to facilitate conversations between humans [8]. While these projects encourage social well-being online, they seem inappropriate for seniors because they require participants to learn entirely new modes of communication, and an entirely new form of community. By creating virtual tools that enhance and sustain companionship with an existing place and a living community, we can provide some of the convenient accessibility of online communities without forcing seniors to radically change their behavior.

DESIGN

In order to design a system that fosters such companionship, we did research into the phenomenon of "place attachment," which is "the extent to which an individual values or identifies with a particular environmental setting" [6]. The goal of this research was to both gain some understanding of place attachment and identify ways that we might encourage it. Our design, called Meeteetse (Shoshone for "meeting place"), is a set of devices which help community centers encourage greater attachment among their members. These devices work together to build this attachment by increasing exposure, supporting identity creation, creating a sense of constancy, and providing valuable function.

At the simplest level, Giuliani [5] suggests that "the psychological state of well-being experienced by the subject is the result of the mere presence, vicinity or accessibility of the object" and that "the state of distress is set up by the absence, remoteness or inaccessibility of the object." Therefore, the first way we try to build attachment to a place is by increasing its presence in seniors' lives. Meeteetse does this by bringing images of past community events and information about upcoming

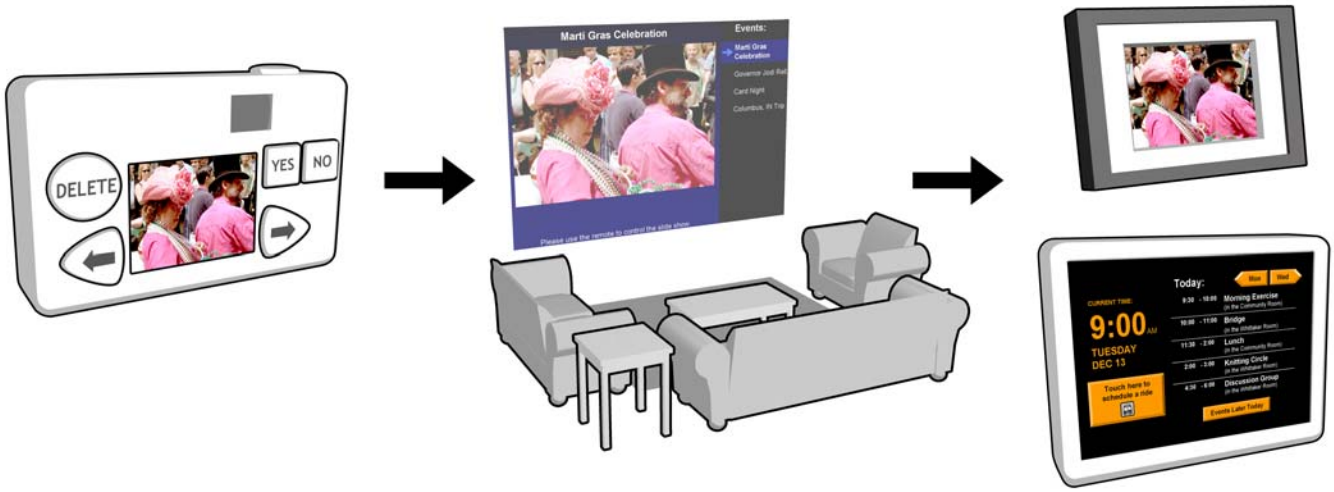

Figure 1: Photos are taken with a simple, location aware digital camera (left), slide shows are given on a large public display (middle), and photos and event information are broadcasted to seniors' homes (right).

events into seniors' homes through a digital picture frame and an easy to use touch-screen schedule (Figure 1, right).

But there are stronger ways to build attachment than by just increasing exposure. According to Bachelard [2], "a key element in the development of people's sense of themselves is belonging to a place." This is a major theme in the place attachment literature. Attachment arises out of individual contributions to the identity of a place and the subsequent impression of that identity on those same individuals. Meeteetse facilitates the creation of a shared identity by providing easy to use, location-aware digital cameras, which can be used at community events much like disposable cameras at a wedding (Figure 1, left). The cameras have been designed to be simple: the LCD screen is dedicated to reviewing pictures and the viewfinder is dedicated to framing shots, eliminating the confusing review/capture modes of most digital cameras. The necessary behaviors are very familiar: lifting a camera up to the face and pressing a shutter. This allows seniors to simply pick up the camera and record community events without instruction.

When the cameras are returned to their chargers at the community center, photos are automatically uploaded and associated with events. Seniors can then share slide shows on a large public display in the community center (Figure 1, middle), and vote "thumbs up" or "thumbs down" on photos using a remote control (not pictured) to determine how long they are kept in rotation.

In addition to increasing exposure and supporting identity creation, Meeteetse tries to promote social, material and behavioral constancy, which is another way to encourage place attachment [3]. Taking and sharing photos becomes a new community ritual, and a permanent photographic history of the community center is built in the process.

Finally, Meeteetse leverages place dependence, which occurs when people rely on a place for a valuable function [11]. For seniors in a Meeteetse-augmented community, the bulk of this value comes from the events that the community center organizes and relationships with people in the community. Meeteetse is primarily a catalyst for these experiences, but it also directly provides several functions, most notably by allowing seniors to schedule rides to events using the touch-screen schedule.

EVALUATION

In addition to regular meetings with seniors to test our assumptions, we conducted an experiment to evaluate the potential for a digital photo frame to increase attachment, and a set of usability tests to refine Meeteetse's design. In order to test whether constantly updated photos in seniors' homes might actually facilitate attachment to a community center, we placed Styrofoam picture frames in four seniors' homes for four days. Removable photographs of events at their church were layered on each frame, and seniors were asked to remove and discard one every morning. After four days, participants were contacted by phone and asked several questions about their attachment to the church. All four participants reported that the photos caused them to think about the church community, and when asked, three of the four either reported feeling closer to the church community or more attached, though only very slightly so. Perhaps the most noteworthy result of the experiment was that one participant reported that several days after the experiment began, when his spouse asked if he would like to go to a church event, he said he "felt inclined to agree, whereas [he] might not have." This is anecdotal evidence, but it was entirely unprompted, and is therefore quite promising.

Figure 2: Animation and color coding on the schedule keeps users oriented.

Most of our participants were already very active in the church community before the experiment started. As a result, all four said that their "attachment" to the community was not different after having the picture frames in their home. However, three out of four participants reported feeling a small amount "closer" to the community. It is unclear how to interpret these results, so we hope to try the experiment again early in 2005 with participants with a more tenuous community connection so that we can obtain stronger conclusions about the effect of rotating photographs on attachment.

In addition to the above experiment, we conducted a series of five usability tests with seniors that were solicited through a local church. The camera and a remote control for the public wall display were mocked up using foam board and other materials for a more tangible experience. The touch-screen and wall display were simulated with laptop computers. Tasks were designed to test each component of Meeteetse, and included taking pictures, giving a slideshow, using the home schedule to find out what is happening in the community in the next few days, and scheduling a ride to an event. Additionally, participants were asked questions throughout usability testing to assess their understanding of the interfaces. Tests were conducted in participants' homes, where most of their exposure to Meeteetse would occur.

All five participants were able to take photos, delete photos, and navigate from day to day on the in-home schedule. However, when asked questions about events that were not currently visible on the screen, participants generally had some difficulty. In an early test, one participant answered questions about today's events while looking at tomorrow's schedule, indicating that she was not aware that today's schedule was no longer being displayed. To address this problem, we added animated transitions and color coding (Figure 2) to give users a visceral sense of change from day to day, which seemed to help in later tests.

One area of difficulty on the simulated public display arose when participants were asked to move from album to album. Four out of five participants were able to complete this task by guessing which button to push, but it was clear that the visual cues we provided on the screen to indicate the current position in the album cycle were not helpful. In fact, the terminology "album" was not always understood. In response, we now divide pictures into "events" rather than "albums", and show events in a list to provide spatial cues on how to use the remote, which we hope will ease confusion.

We addressed several other issues as well, including questions about how to cancel rides on the touch-screen schedule, and confusion about the relationship between the clock, the date on the calendar, and the buttons for navigating the calendar. We hope to test our solutions to these issues in a second round of usability testing early in 2005.

TECHNICAL DETAILS

The largest technical challenge of Meeteetse is the automatic association of photos to events. GPS data is largely useless for elderly users who would often be indoors. Technologies using infrared, ultrasonic or WLAN beacons require a good deal of infrastructure which may or may not be in place at community centers. Cell phone triangulation systems are not likely to be accurate enough to distinguish between rooms. Therefore Meeteetse opportunistically uses whatever methods are available at a given location, and uses a heuristic, based on the location data and information from the event calendar, to guess the event with which a photo should be associated.

In order to make Meeteetse easy to administer for a single staffer, it is provided as a service. Initial setup is performed by a technician, who creates a map of the community center, and annotates it with location information for Meeteetse to use in its photo annotation. If cameras are lost, administrators at the community center can call the service and an operator will use the most recently available location information to try to track it down. Administrators can also use any ICAL-compatible calendar application they like. ICAL files can be emailed to the service, or uploaded to a web server, which then broadcasts event information over the internet to the calendars in seniors' homes. This requires that seniors' homes be wired for internet, which is a critical assumption we make.

FUTURE EXPANSION

The wall display currently provides a basic way to share experiences and create a shared history. However, this space could become much more interactive, allowing community members to share notes, web pages, personal photos and other as in Dynamo [9]. Meeteetse could also become the core of a very powerful event management system, allowing administrators to manage schedules in a central location, create printed schedules manage repeating events and track long-range upcoming events.

Meeteetse also puts in place infrastructure for many valuable applications. A web interface could be provided that would allow families of seniors to send photos to the digital picture frame. The in-home calendar could serve as messaging portal, though this would likely double the complexity of the device, presenting an additional design challenge. We mention these expansions because they could be implemented without interfering with Meeteetse's purpose; however we have focused on taking and sharing photos and connecting people to community events because we feel these features represent the basic functionality needed to start to provide social well-being to seniors through place attachment.

CONCLUSION

By making it easier for seniors to participate in their community, Meeteetse meets a critical need in the elderly population. By building place attachment, Meeteetse connects seniors to an artificial companion which requires no maintenance and is always there. It is affordable for those who do not have the means to live in a retirement facility and supports independence. In addition, since it builds this companionship with an active social environment, it encourages the development of healthy human relationships. By doing so, Meeteetse addresses the root of isolation in the senior population. It allows seniors to benefit from technological innovation without requiring them to focus on anything other than the pursuit of active, independent living.

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