Just Saying 'Hi' Means a Lot: Designing Subtle Interactions for Social Connectedness

Thomas Visser, Martijn Vastenburg, and David Keyson

ID-StudioLab, Industrial Design Engineering, Delft University of Technology,
The Netherlands
{t.visser,m.h.vastenburg,d.v.keyson}@tudelft.nl

Abstract. In the domain of assisted living, the majority of the work on awareness systems focuses on communicating information on health and security for functional purposes: to provide better care and peace of mind. When aiming for improved well-being, awareness systems could also be used to stimulate a sense of connectedness. Not much is known on how awareness systems for well-being should be designed. This paper describes several design explorations that illustrate how communication of subtle, low-bandwidth information may be leveraged to support a mutual feeling of social connectedness between people. We discuss the gained insights, which are useful for the design of ambient displays and interactions. The insights presented in this paper are useful for the future design of assisted living services, and for awareness systems in general.

Keywords: Awareness systems, tangible interaction, computer mediated communication, ubiquitous computing.

1 Introduction

Awareness systems support people in their awareness about the things that are going on in specific places or with specific people [1]. Originally rooted in the domain of Computer Supported Collaborative Work, the first systems were designed to provide mutual awareness of workers between two different workplaces (e.g. Portholes [2]). More recently, awareness systems have been designed for many different purposes, one of them being the increase of feelings of safety, security and health between patients and caregivers. Such systems, including the CareNet Display [3] and Digital Family Portrait [4], communicate information about a patient to family or medical care givers, in order to improve care, and to support peace of mind. Awareness systems have primarily focused on communicating functional information, for the end purpose of physical well-being of the patient.

The design of systems for social well-being has received less attention from both designers and researchers in the past decade. Although several examples are known of social awareness (SA) systems, such as the work by Gaver [5] and Vetere [6], these have not focused particularly on the care-domain. Also, more recent examples, such as ASTRA [7] and VIO [8], have aimed primarily for families or romantic relationships.

The present paper discusses how SA-systems can support social connectedness (a key determinant of social well-being [9]) using subtle communication. Several design explorations have been made, based on key considerations found in literature on SA-systems. We first outline the four SA-systems that were designed to connect independently living seniors with their close relationships in a subtle and ambient way. Based on the findings from these designs and the design process, we evaluate the design parameters, and we present three new insights, relating to communication intention, abstract information, and network size. We discuss the value of these insights for designing embedded interaction, and how they may be leveraged to enhance social connectedness. Finally, opportunities for future work and development of SA-systems for assisted living are outlined.

2   Exploring Social Awareness

As part of a design course, teams of post-graduate design students were given the task to design an SA-system that connects seniors with people that are close to them. Based on a review of literature on SA-systems and connectedness, three key considerations were given to the students as a background for their designs:

1. **Foreground / background.** To allow systems to blend in the daily lives of users, without moving out of sight, they should be able to move from background to foreground of the user's attention [6, 8]. In this sense, not just modalities should be considered, but also the aesthetics and appearance of the device.
2. **Tangible interaction.** The use of tangible interfaces supports an easier blend with the home environment. Moreover, tangible interaction with an SA-system is considered to be more intimate [1].
3. **Subtle communication.** Previous research [7, 9] suggests that subtle communication of awareness information can be powerful in supporting 'thinking about each other' and 'closeness', which are dimensions of social connectedness.

The first exploration considers an SA-system, called WeDo, which connects two homes. One device would be installed in the senior's home, and the other one in the home of the relative or friend. Motion detection is used to collect presence information, which is displayed in the remote device by the small opening lighting up. Users may choose to open the box and will then receive more information through snippets of sound from the other room.

Three other awareness systems that were designed are examples of social network awareness, which allow connecting to more than one user. In the case of ScatteredConnected (Fig. 2), motion measured in the room of another user was indicated by the picture frame (representing that user) lighting up. Having more picture frames, and more users involved, this would generate a light pattern on the wall, showing the network activity. Users may also wave at the photo frames to make their own picture blink in the room of their relatives. For both examples, awareness information is displayed in an abstract way, with a possibility to engage in deeper communication.

Fig. 1. and 2. WeDo (left) and ScatteredConnected (right) social awareness systems

KeyPing, a second SA-system with network awareness, is a communication board with magnetic tokens, each representing other users in the network. Using a token on their key ring, users activate the board, integrating interactions in a homecoming routine. The brighter the tokens light up on the board, the closer the other people are to their home. Also, users may 'ping' a person by pressing that person's token. The token representing the user at that person's board will then light up.

WallTree is the final exploration, which supports network awareness of up to 8 relatives. Whenever someone is at home, his or her branch lights up in green in the other homes. A user may stroke a branch representing a person, to light their branch in that person's house, similar to 'pinging' in the KeyPing design.
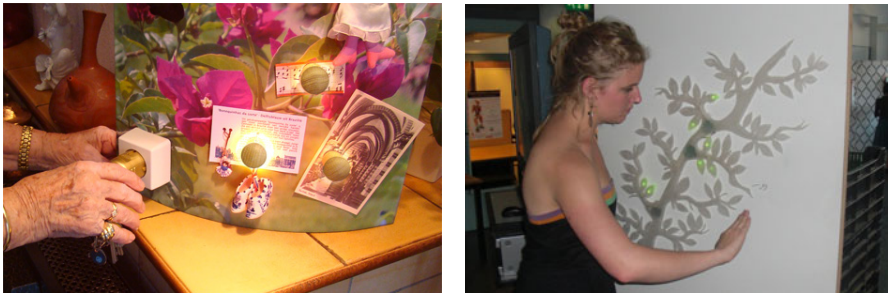

Fig. 3. and 4. WallTree (left) and KeyPing (right)

The four systems were evaluated in an open-house exhibition, with about 40-60 visitors per system. The visitors were able to experience working prototypes of the designs, and they were informally interviewed about their experiences.

3   Design Insights

The design process, and the results from the interviews enable a discussion of the considerations introduced at the start of the design process. A primary observation was that the approach to refrain from using (touch)screens or key-interfaces helped to make the designs blend with the home context. Similar to [6], the systems were

designed as decorative elements for the living room. In terms of tangible interaction (and in line with [1]), users experienced pressing (KeyPing) and stroking (WallTree) meaningful interaction for supporting intimate communication. Also, the key-ring-based design of KeyPing allowed successful integrations in daily routines.

Through the explorations, also several new design insights were gained:

1. **Intention.** The designs show that awareness information can be communicated unintentionally (measurement and display of movement) or intentionally (pinging). Users indicated that the absence of a 'ping'-function makes it unclear whether communication is intentional or not, leading to misinterpretation.
2. **Abstract information.** The abstract displays were found to work well for maintaining a sense of privacy. Moreover, contrary to what was expected, users suggested that this type of display might support connectedness more, as it stimulates them to imagine what is going on in the other location, thus thinking more of the other.
3. **Network size.** Awareness systems have traditionally focused on one-on-one communication, or on communication in a small network. Users indicated that, for assisted living purposes, they would be interested in linking the systems to existing social network platforms (e.g. Facebook), to make them less stand-alone.

4   Discussion and Future Work

This paper presented an overview of four design explorations that aim to mediate subtle social cues to support social connectedness. Instead of aiming for 'peace of mind' or communicating information on patient health, the designs focused on enhancing social well-being through social connectedness. The design principles that were taken as a starting point have been explored through the design process and evaluation. Also, we presented three new insights that were generated in the process.

The insights were gained through informal evaluations, and should therefore be further validated in more extensive case studies. The first two insights (*intention* and *abstract information*) were integrated in a system called SnowGlobe, which was evaluated in a longitudinal field study. The results of this study will described in detail in [10].

Future work should also focus on addressing the third new insight, which relates to linking awareness systems to existing online social networks services. Studies into this direction are in development and the first results point towards systems being considered to be less stand-alone, and thereby also commercially more interesting. Additionally, such systems are likely able to generate a broader user base, as it's not restricted to physical products and systems only. Eventually, one might envision the physical SA-systems to become a feature of existing (social) care-networks.

The current work provides a background for discussing ambient mediated social interaction. The insights could serve as a frame of reference for future designs of awareness systems. Although the presented insights cannot yet be supported with formal empirical evidence, we consider them to be a valuable contribution to the field, as they may help designers of such systems to better understand how awareness systems may support connectedness, and how they can be integrated in our daily lives.

References

1. Rittenbruch, M., McEwan, G.: An Historical Reflection of Awareness in Collaboration. In: Markopoulos, P., de Ruyter, B., Mackay, W.E. (eds.) Awareness Systems: Advances in Theory, Methodology and Design, pp. 3–48. Springer, London (2009)
2. Dourish, P., Bly, S.: Portholes: supporting awareness in a distributed work group. In: Proc. CHI 1992. ACM, New York (1992)
3. Consolvo, S., Roessler, P., Shelton, B.E.: The Carenet Display: Lessons Learned from an in Home Evaluation of an Ambient Display. In: Davies, N., Mynatt, E.D., Siio, I. (eds.) UbiComp 2004. LNCS, vol. 3205, pp. 1–17. Springer, Heidelberg (2004)
4. Mynatt, E.D., Rowan, J., Jacobs, A., Craighill, S.: Digital family portraits: Supporting peace of mind for extended family members. In: Proc. CHI 2001, pp. 333–340. ACM, New York (2001)
5. Vetere, F., Gibbs, M., Kjeldskov, J., Howard, S., Mueller, F., Pedell, S., et al.: Mediating intimacy: designing technologies to support strong-tie relationships. In: Proc. CHI 2005, pp. 471–480. ACM, New York (2005)
6. Gaver, B.: Provocative awareness. CSCW: An International Journal 11(3-4), 475–493 (2002)
7. Romero, N., Markopoulos, P., Baren, J., de Ruyter, B., IJsselsteijn, W., Farshchian, B.: Connecting the family with awareness systems. Pers. and Ubiq. Computing 11(4), 299–312 (2007)
8. Kaye, J.: I Just Clicked To Say I Love You: Rich Evaluations of Minimal Communication. In: Extended Abstracts of CHI 2006, pp. 363–368. ACM, New York (2006)
9. van Bel, D.T., IJsselsteijn, W.A., de Kort, Y.A.W.: Interpersonal connectedness: conceptualization and directions for a measurement instrument. In: Proc. CHI 2008. ACM, New York (2008)
10. Visser, T., Vastenburg, M.H., Keyson, D.V.: Designing to Support Social Connectedness: The Case of SnowGlobe. International Journal of Design (accepted)