SyncDecor: Appliances for Sharing Mutual Awareness between Lovers Separated by Distance

Hitomi Tsujita

Graduate School of Humanities and Sciences,

Ochanomizu University

2-1-1 Otsuka, Bunkyo-ku, Tokyo

112-8610, Japan

g0220529@edu.is.ocha.ac.jp

Koji Tsukada

National Institute of Advanced

Industrial Science and Technology

1-18-13 Sotokanda, Chiyoda-ku,

Tokyo 101-0021, Japan

tsuka@acm.org

Itiro Siio

Faculty of Science,

Ochanomizu University

2-1-1 Otsuka, Bunkyo-ku, Tokyo

112-8610, Japan

siio@acm.org

Abstract

Many lovers separated by distance worry about their relationships, despite the fact that the use of various means of communication such as mobile phones and e-mail is now widespread. We interviewed some such couples, who expressed the desire to feel a sense of connection and synchronization with their partners. They also expressed the desire to have devices that provide awareness about their partners. For this purpose, we propose "SyncDecor" devices, which are pairs of remotely installed appliances that synchronize each other.

Keywords

Awareness, Communication, Synchronization

ACM Classification Keywords

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

Introduction

Although various means of inexpensive communication such as fixed-rate mobile phones, IP phones, video chat systems, and e-mail are available, many lovers

separated by distance still worry about their relationships.

We interviewed nine people (five men and four women), who were separated from their partners by distance. Our aim was to specify their problems and find out what they desired in their communication with their loved ones. The results revealed the following:

- The interviewees had the desire to share a sense of connection with their partners.

- They sometimes found it bothersome to use mobile phones and e-mail.

- They did not wish to invade their partners' privacy.

In summary, the interviewees wanted to feel a sense of connection with their partners in their daily lives, without invading their partners' privacy.

To satisfy these requirements, we propose "SyncDecor" devices, pairs of remotely installed daily appliances that synchronize each other. Using SyncDecor, lovers who live apart from each other can sustain their relationships with ease by regularly exchanging subtle awareness about each other in their daily lives.

SyncDecor

The basic concept of SyncDecor involves the synchronization of pairs of daily appliances—such as lights, trash boxes, and TVs—that are located at a distance from each other (fig. 1). For example, when a person turns on his/her light, the light of his/her partner gets turned on. Although this interaction is extremely simple, it enables the couple to share their daily activities with ease through subtle awareness of each other's actions. It eliminates the need to engage

in special actions such as sending e-mail, and does not invade the other person's privacy.

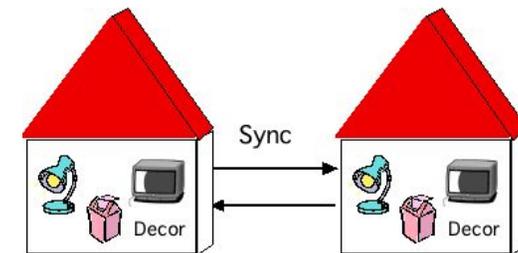We developed three prototype systems: SyncLamp, SyncTrash, and SyncSky.

figure 1. The concept of SyncDecor

SyncLamp
SyncLamp (fig. 2) is a prototype system for sharing the brightness of lamps between lovers who live far from each other. SyncLamp devices are connected via the Internet. When a person controls the brightness of his/her lamp, his/her partner's lamp also changes to the same brightness.

As shown in fig. 3, the SyncLamp and SyncTrash systems consist of a pair of PCs in each house and a web server for the sharing of information. The SyncLamp system consists of a pair of lamps with X10 lamp modules, X10 controllers, PCs with X10 computer interfaces, and a web server. When a person turns on the lamp with the X10 controller, a program on the computer intercepts the X10 signal via the X10 computer interface. Then, the program sends the event to a CGI program on the web server so that the information can be shared. Meanwhile, a PC program in

the other person's house detects the event by polling the web server, and turns on the other lamp via the X10 computer interface.
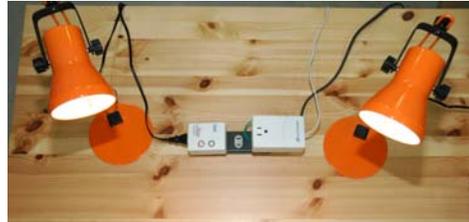

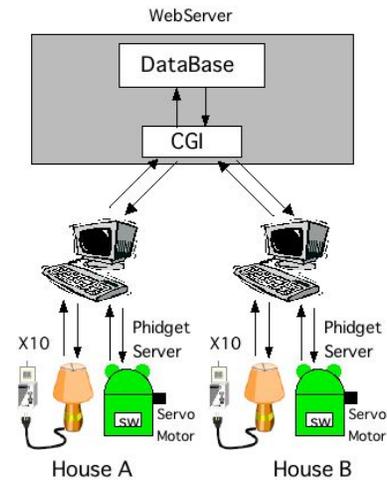**figure 2.** SyncLamp devices

figure 3. Overview of the SyncLamp and SyncTrash systems

SyncTrash

SyncTrash (fig. 4) is a prototype system for sharing the states (e.g., open and close) of the lids of trash boxes, located in places that are at a distance from each other. When a person opens the lid of his/her trash box, the lid of the trash box of the other person (who lives far away) also opens.

The SyncTrash system consists of a pair of trash boxes with servo motors, push-on foot switches, PCs, and a web server. The servo motor is equipped at the side of a trash box for opening/closing the lid, and is connected to a computer with a PhidgetServo device. The foot switch is also connected to the computer with a Phidget Interface Kit.

When a person presses the foot switch, a program on the PC opens the lid of the trash box by activating the servo motor. Next, the program sends the state of the trash box (open/close) to a CGI program on the web server. Then, the PC program in the other house detects the state by polling the web server, and opens the trash box in the same way.

figure 4. SyncTrash devices

SyncSky

SyncSky (fig. 4) is a prototype system that enables people who live far from each other to share video images of the sky, as seen from the other person's location. SyncSky consists of a pair of web cameras and projectors. The camera is equipped beside the window of a room to capture the sky and the scenery around the window. The projector displays the captured image on the ceiling of the other person's room.

A window is focused on as a capture area so that lovers who live apart can share awareness about each other's surroundings without invading their partner's privacy. For example, they can share daily activities (e.g., drawing the curtains in the morning, opening a window on a sunny day) through the mere capturing of the window by the camera.

Field Test

SyncLamp and SyncTrash

We carried out a field test with SyncLamp and SyncTrash over a period of two months. The participants were a male (29-year-old office worker) and a female (24-year-old graduate student) living in different cities. The distance between the cities was about 600 km. They had been living apart for three years. We installed a pair of SyncLamp and SyncTrash devices in their rooms (fig. 5). We asked them for their feedback on SyncDecor on several occasions. The results revealed the following.

- Each member of the couple could feel the daily activities (e.g., disposing of the trash, turning off a lamp and going to sleep) of the other.

- In addition, they actively used the SyncTrash device for casual communication. For example, they would open and close the trash box repeatedly to attract their partner's attention.

- SyncDecor often triggered the participants' engaging in other means of communication such as e-mailing or telephoning.

- The couple felt a certain "warmth," which was different from what they felt when they engaged in existing means of communication such as e-mailing or telephoning.

Further, the effects of SyncDecor depended on their lifestyles. While the male participant lived alone in a small apartment, the female lived with her family in a large house. As a result, the male participant became more sensitive to the movements of SyncDecor.

figure 5. SyncLamp and SyncTrash installed in the participants' rooms: the female's room (left) and the male's room (right)

SyncSky

We carried out a field test with the SyncSky device over a period of two months. The participants were a male (24-year-old medical student) and a female (24-year-old graduate student) living in different cities. The distance between the cities was about 1800 km. They had been living apart for two years. We installed a pair of SyncSky devices in their rooms. We asked them for their feedback on SyncSky on several occasions. Our findings were as follows.

figure 6. The images shared through the SyncSky system

- Each member of the couple felt a sense of connection with their partner by watching images of the sky, as seen from their partner's window.

- They preferred the camera position that covered the entire scenery from the window to the position that captured only the sky. They wanted to feel like they were looking through their partner's window.

- They worried about being watched by their partners when parts of their room or themselves were reflected in the window glass.

Related Works

Digital Family Portrait [10] is an electronic picture frame that can display the daily activities of family members who live far from their families. For example, it could be used to display the daily activities of an elderly person who lives far from his family. Family Planter [7] is a pair of artificial flowerpots with sensors, lights, and actuators that indicate the proximity of people in a house that is located far away. MeetingPot [11] is a device that can inform people of a coffee break in a common office area, by using the aroma of coffee. Physical awareness proxies [9] convey a remote user's availability, using a tangible interface. Feather, Scent, and Shaker [12] are elegant designs that enable long-distance couples to communicate. These devices are designed for asymmetrical (one-way) communication. We propose devices for two-way communication.

Lover's Cup [5] is a communication tool for drinking-together interaction between long-distance couples. LumiTouch [2] is a pair of photo frames, and ComSlipper [4] is a pair of slippers to indicate the activities of a partner who lives far away. The bed [6] is a bed environment that creates the virtual existence of a person (who lives far away) in a bed. Peek-A-Drawer [11] provides virtual shared drawers across distant locations. ComTouch [3] converts a pressing force to the vibration of the corresponding ComTouch device. FeelLight [13] is based on a communication scheme based on 1bit information, which is communicated by a button-pressing action. VIO [8] shows color changes over twelve hours. The final image displays the remote partner's VIO state on mouseover. These devices have no immediate relation between the user's action and

the display in the corresponding distant location. SyncDecor tries to reflect people's actions directly onto the remote devices.

inTouch [1] is a pair of communication devices with cylindrical rollers that rotate synchronously. Our design is based on the synchronization of familiar, everyday things, without modifying their original functions.

Conclusion and Future Plan

We have described SyncDecor, which are pairs of remotely installed appliances, furniture, furnishings, electronics, and sundries that synchronize each other. We have built three prototype systems—SyncLamp, SyncTrash, and SyncSky—and have installed and tested them on two long distance couples (four houses). The evaluation test is still underway in order to obtain further findings. We are also planning to implement the use of other types of SyncDecor devices, for example, infra-red remote controllers that synchronize TV sets, radio sets, and audio players as well as alarm clocks and electric fans.

Acknowledgements

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