Communication Grill/Salon: Hybrid Physical/Digital Artifacts for Stimulating Spontaneous Real World Communication

Koh Sueda[1], Koji Ishii[2], Takashi Miyaki[1], and Jun Rekimoto[1]

[1] The University of Tokyo, 7-3-1, Hongo, Bunkyo-ku, Tokyo, Japan
info@ching-dong.com, ishiikou@docomo.co.jp,
{miyaki,rekimoto}@acm.org

Abstract. One of the problems encountered in face-to-face communication involves conversational imbalances among the participants caused by differences in conversational interests and social positions. It is common for us not to be able to communicate well with an unfamiliar person. On the other hand, old customs in the real world, such as the Japanese tea ceremony, effectively use physical artifacts to enable smoother conversation. In this project, we designed two communication systems that facilitate casual communication using physical/digital artifacts, such as a meal and text-chat, in order to clarify that real world communication can be supported by digital technology. The first system, called the "Communication Grill," connects a grill for cooking meat to a chat system. The grill is heated by the chatting activity. Thus, people must continue conversing to roast the meat. The second system is called the "Communication Salon." It is a computer-enhanced tea ceremony with a chat screen displayed at a tearoom. Using these systems, we conducted user evaluations at SIGGRAPH and other open events. Based on the chat logs at these events, we found that conversational topics gradually shifted from topics about the systems to more general topics. An analysis of these chat logs revealed that the participants began to communicate spontaneously using this system.

Keywords: Augmented reality, Chat, Chat-augmented meal, merging virtual and real, Communication Grill/Salon.

1 Introduction

Face-to-face communication is very important in our daily life, even though online communication technologies now support communication. One of the problems encountered in face-to-face communication involves conversational imbalances among the participants caused by differences in conversational interests, social positions and so on. Some situations require casual conversation, such as brainstorming and blind dates. At the same time, some researchers have reported that virtuality activates communities in online spaces, such as the Internet [1][2]. The virtuality allows an individual to be separated from the real world. Therefore, in

J.A. Jacko (Ed.): Human-Computer Interaction, Part III, HCII 2009, LNCS 5612, pp. 526–535, 2009.

online spaces, it is easy to create a unified community that transcends the conditions of the real world, such as appearance, culture, and social position [3].

Other problems that often cause us to hesitate to communicate with others involve differences in conversational interests or meeting someone for the first time, regardless of whether it is online or face-to-face. It has been found that some games or ceremonies transcend these hesitations by imposing conversational restrictions in the form of rules or goals. In this project, we proposed a system that stimulates spontaneous real world communication by inserting the advantages of an online communication system into face-to-face conversation and placing restrictions on the communication.

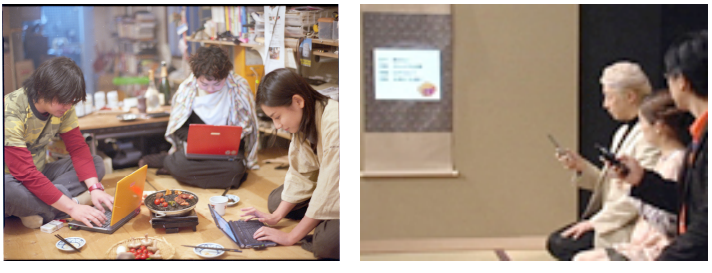


Fig. 1. The places used for the demonstrations: the systems require conversation to eat or enjoy a cup of tea. The imbalance in statements was found to be less significant than in traditional chat systems, and the conversational topics gradually shifted from topics about the systems to more general topics. Communication Grill Chang-tei (Left); Communication Salon Chang-tei (Right).

2 Approach

In Japan, the tea ceremony has many rules and artifacts that provide topics for communication between the participants. These methods are seen in the tea ceremony because it is based on strict aesthetics and ideology. The tea ceremony was developed to optimize face-to-face communication in a feudal society [4]. It has been found that these kinds of methods stimulate casual face-to-face communication in the real world. These methods aim to optimize communication using ceremonies and the design of a physical space to reduce the gaps in the positions and social conditions of the participants.

Fig. 2. Restrictive rules are used to optimize a tearoom for face-to-face communication while every guest and a master enjoy a cup of tea (*Left*). Confessional: the penitent can confess anonymously by stepping into a small, enclosed booth for a face-to-face conversation (*Right*).

These are seen in the features of a Zen temple, including its tearoom and confessional in the cathedral, which is a venue for courtesy ceremonies (Figure 2: *left*). These methods have the following points in common:

1. They provide spatial or mental immersion by means of a restrictive procedure.
2. Daily activities, including conversation and a meal, are conducted under non-daily circumstances.

In addition, real-time online communication, such as text-chat, has these common points [5][6]. Text-chat provides only verbal information under real-time communication. This kind of restriction forces participants to imagine non-verbal information more profoundly than during normal face-to-face communication. In this study, we focused on and considered the potentials of these two points. Our aim is to propose a system that allows spontaneous real world communication by the fusion of a text-chat and daily communication, such as during a meal. We designed two communication systems, the "Communication Grill" and "Communication Salon," to realize this idea. The “Communication Grill/Salon” stimulates a conversation by using systems that require the participants to chat in order to eat. Demonstrations were conducted and evaluated at exhibitions that included ACM SIGGRAPH and Ars Electronica.

As a result, we found the following two points by stimulating casual conversations between participants using the “Restriction” that the system required conversation in order to eat.

- The bonds between participants were deepened as a result of the meal.
- The common goal such as enjoying meal or tea bring the participant positive utterance whether they were first meetings / join on the way or not.

2.1 Conceptual Background

“Communication Grill/ Salon” makes participants to recognize a gap between verbal communication and nonverbal communication by the system requiring irrational text-chat on a face-to-face communication in the real space. When the participants recognize inconsistent situations, they try to concentrate on the nonverbal information from each other. According to Mehrabian’s report, the spoken word is only 7% effective during face-to-face communication when we receive ambiguous messages, such as the words spoken are inconsistent with the tone of voice or body language of the speaker [7]. Normally, face-to-face conversations contain visual, tone of voice, and verbal information. However, it is difficult to recognize the importance of nonverbal information, because we usually receive both verbal and nonverbal information at the same time, and subconsciously.

On the other hand, the “Communication Grill/Salon” provides a way for the participants to receive the two forms of information separately. Requiring conversation to eat is an easy way to overcome an awkward situation, because the participants have to talk with others quickly to heat up the grill. Thus the participants try to receive more nonverbal information from each other, and thus deepen their

mutual understanding by more profound observations. This is why the system imposes restrictions on the participants, such as requiring them to converse in order to eat or drink. The participants become sensitive to nonverbal information because of the requirement of verbal based conversation with the others through the use of this system. The conversations on the absurdity of a system that requires communication in order to eat allowed the participants to gain more insights about each other.

3 System

3.1 Chat System

The Communication Grill/Salon Chang-tei system is comprised of chatting devices, such as a browser phone, PDA, and laptop PC, chat applications that control a heater and indicate the remaining power time, and an electric heater powered by the conversation. When these various parts work together via a network, the act of chatting results in the heating of the heater (Figure 3).

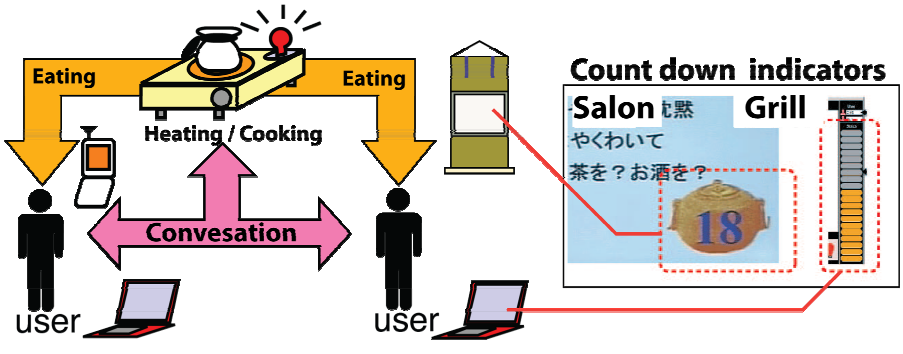


Fig. 3. System Diagram: (The countdown indicators) The timer and meter indicating the time remaining before shutdown and urging the participants to converse

3.2 Interaction Design

This system is equipped with a timer that controls the heating element of the heater. This timer turns off the power to the heater if the conversation stops. The chat application interface provides a countdown timer that indicates the remaining time before the power shutdown, urging the participants to converse (see Figure 4:*right* and Figure 5:*center*). In addition, the heater is equipped with a red pilot gauge that visually indicates the operating status (Figure 5).

3.3 Communication Grill

The Communication Grill consists of an electric grill controlled by the participants' text-chat, a chat application to communicate with the others sitting with them, a

network (enabling the use of non-Internet connections), and the tableware for eating (Figure 4).

Fig. 4. The communication grill (all in one edition): an LCD (1) to indicate an IP address, an Ethernet port (2) to receive operating signals from chat applications, and an indicator lamp (3) (*Left*). The Communication Grill Application: a screen shot of the chat application. The bar meter indicates the remaining time before power shutdown, implemented on the right side of the window (*Right*).

3.4 Communication Salon

There are some differences between the Communication Grill and Communication Salon. These two systems provide almost the same interaction, but the interfaces are different. The Communication Salon consists of an Internet connected chat server, a power controller for the heater, Internet connected client devices, a hanging scroll onto which the chat is projected and the remaining time before power shutdown is indicated, and a tea set (Figure 5). One of the big differences compared to the communication grill is the hanging scroll display of chat logs.

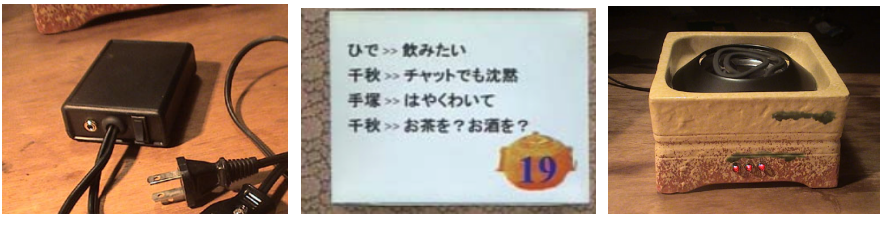


Fig. 5. Equipment for the Communication Salon: power-controlling device (*Left*), hanging scroll chat-log display (*Center*), and electric heater (*Right*)

The participant are only able to join and communicate with each other in the same location, because the chat logs are only displayed on a hanging scroll in the tearoom. The hanging scroll also shows a countdown timer for the remaining time before power shutdown. Therefore the hanging scroll is very important in this system. Every participant has to watch the hanging scroll throughout the conversation. In the typical tea ceremony, a hanging scroll is a symbol of the event, and each participant respects

the hanging scroll, which depicts the theme of the event. Thus the participants see the symbol of the conversation automatically through the use of the Communication Salon.

3.5 Chat Application

The chat application for the Communication Grill was installed on a client PC, to provide a normal chat system and a status meter to indicate remaining operating time for the grill (see Figure 4). This chat application allowed the system to be used with a network, and controlled the timer to operate the electric grill (a remark turned on the heater for 5 s). The bar meter, which used animation to indicate the remaining operating time, was placed on the right side of the chat application window. The chat application was supported by multicast IP and so did not need chat servers and an Internet connection.

The Communication Salon requires only an Internet connection, a power control device (Figure 5 (*left*)) for the electric heater, a client device to display the chat-log (Figure 5 (*center*)), and an electric heater (Figure 5 (*right*)).

3.6 Demonstrations

The Communication Grill was demonstrated at several exhibitions at open events, including Ars Electronica 2003. We sampled over 16,000 remarks in English or Japanese from the participants' conversation logs, which contained first meetings. In this research, we analyzed 6,808 remarks from a total of 16 sessions and 33 participants. The Communication Salon was exhibited at open events that included Yokohama EIZONE 2007 and SIGGRAPH 2007. Just as with the Communication Grill, we sampled over 5,000 remarks in English or Japanese from the participants' conversation logs, which contained first meetings. In this research, we analyzed 2,200 remarks from a total of 31 sessions and 57 participants. Individuals were invited to participate at the venues of the exhibitions.

4 Results/Evaluation

4.1 Overview

The results of the chat log analysis showed that almost all of the participants tried to communicate with the others spontaneously. The following observations were also made.

(1) There was not a big difference in the remark frequency based on whether or not they were meeting for the first time. (2) Conversational topics gradually shifted from topics about the systems to more general topics. (3) It was easy to shift to a personal topic because of the virtuality of the chat, even though the participants were in the same space. (4) Some of the participants noticed and mentioned the effects of the system.

4.2 Differences between the Grill and Salon

The results with the Grill and Salon did not show big differences, except that the speaking frequency of the Salon was longer than the Grill's. This difference was

caused by the fact that the Salon system worked longer than the Grill per message (Grill: 5 s per message; Salon: 20 s per message).

4.3 Chat Log Analysis

As can be seen in Figure 6, there was no relationship between the remark frequencies and participation time. In the figure, the remark frequencies of two participants (they joined/left the conversation) were not lower than the others. (All of the participants were meeting for the first time and all of conversations were in English.) On the other hand, participant A (a non-native English speaker) spoke less than the other participants. This result showed two features of the system: it did not support language differences and did not stimulate meaningless remarks just for operating the heater.

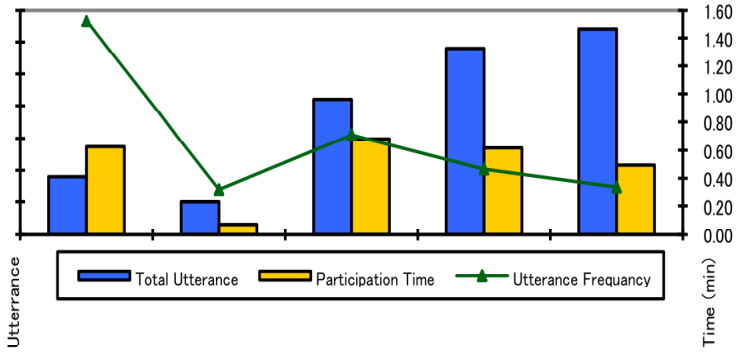


Fig. 6. Relations between remarks and participation time: there was no relationship between the remark frequencies and participation time (participant B joined in the middle of the conversation)

Figure 7 indicates that the participants had become friendly by degrees through the use of this system. This graph classifies the contents of the conversations into three categories: “The topic was operating the heater,” “A topic that resulted from chatting (e.g. impressions about eating, chatting to maintain the heat)” and “other general topics.” The graph indicates the percentages with a 20 remark resolution. As shown in

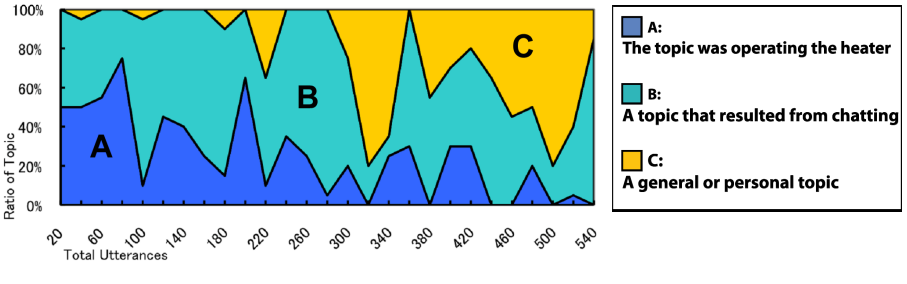
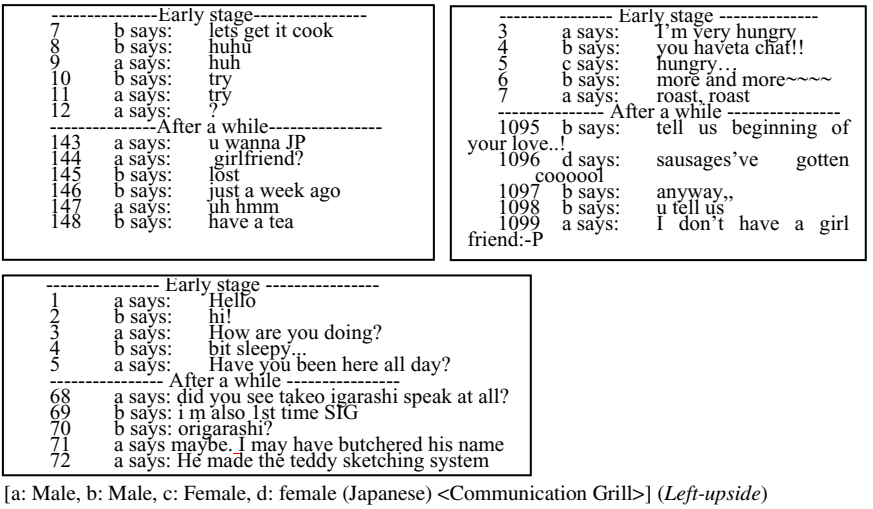


Fig. 7. The shifting process of conversation topics: the conversational topics gradually shifted from topics about the systems to more general topics

the figure, the conversations began by exchanging greetings and talking about the operation of the heater. After a while, the participants began to talk more about the topic of eating. Finally, the participants began to talk about personal topics.

4.4 Development of the Conversations

Figure 8 shows samples from the beginning and middle of a chat log. As can be seen in the figure, the conversation had been changing to personal topics. In addition, the participants become to talk more naturally. These results show the possibility that the system enables spontaneous interaction by providing a sense of achievement through the use of restrictions.



[a: Male, b: Male, c: Female, d: female (Japanese) <Communication Grill>] (*Left-upside*)
[a: Male (Austrian), b: Male (Japanese) <Communication Grill> (*Right-upside*)
[a: Male (Canadian), b: Male (Japanese) <Communication Salon>] (*Downside*)

Fig. 8. Shift of conversational topics: Comparisons of the chat contents, early stage and after a while. As shown in the lists, the conversational topics gradually shifted from topics about the systems to more general topics.

5 Discussion

5.1 "Communication Grill/ Salon" System

The goal of this text-chat system was to stimulate communication by mixing the virtual and the real worlds. This system is expected further development in the point of activating communications by situation such as urge, restriction, and reward. These situations provide environments where a user observes, and then considers others.

Typical communication technologies pursue speed, efficiency, and accuracy. These are very important ways to promote communication. In this project, we proposed another way to promote communication that considered it from the viewpoint of culture, habits, and rewards. There are some studies that have surveyed the usability

of a communication system from these aspects [8][9]. These achievements should be applied to a greater extent in the HCI design process.

5.2 Future Works

These features can be applied to communication that requires casual and spontaneous remarks, such as counseling and brainstorming. They can also be applied to amusement communications, because the restrictions of the system promote the discernment of other participants and the shared environment. It is a good example of using a restriction to trigger the same potential that is displayed by a blind person, who makes good use of aural information and memory to recognize environments [10]. This kind of example shows the possibility of "Real-World User Interfaces" that effectively use environmental information. In addition, this system requires quantitative analysis by comparing it with a typical online chat in real space or surveying related projects [11].

6 Conclusion

The proposed Communication Grill/Salon is a system that promotes spontaneous remarks by applying the online text-chat virtuality to face-to-face communication. Observations of the chat logs showed that participants began with casual remarks about using the system. (1) The imbalance of remarks was improved by using this system in conversations, even under circumstances where the participants would normally hesitate to speak, such as first meetings or joining an ongoing conversation. (2) The system provided the participants with a motivation for conversation by requiring text-chat in order to eat. (3) In addition, as result of the chatting, the groups became more communicative throughout the meal.

In the future, this research should pursue another new interface design that promotes spontaneous communication by applying the culture or customs of daily life.

Acknowledgments

We thank all of the participants on this project, and all of the publication's support personnel and staff, who provided helpful comments on this paper. Some of the references cited in this paper are included for illustrative purposes only.

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