# THE DESIGN OF A COMMUNICATION MEDIA THAT TRANSMITS A FAVOR

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## ABSTRACT

It is known that in communication, feelings and emotions are better conveyed through non-verbal communication. And it is thought that the role played by non-verbal communication in maintaining and forming interpersonal relationship is a big one. This paper suggested and designed a communication media that can smoothly perform a communication aiming at forming and maintaining interpersonal relationship by the fact that interpersonal good will such as "concern" about the other person is communicated easily using non-verbal metaphor called "look".

*Keywords: Inter personal communication, Nonverbal communication, Gaze communication*

## 1. INTRODUCTION

The functions of communication behavior do not simply end with transmission of information, but it also extensively includes emotional affinity, furthermore the behavioral control of the other party [1]. In Goldsmith et al. examination of topics that university students normally talked about, it showed that superficial topics dominated a large portion of ordinary conversations [2]. It is thought that these superficial topics, the so-called "silly" conversations play an important role in maintaining and forming interpersonal relationships between people who are close to each other. In addition, it is known that in communication, feelings and emotions are better conveyed through non-verbal communication [3], and it is thought that the role played by non-verbal communication in maintaining and forming interpersonal relationship is a big one.

Looking at the history and its technical features, the communication media that utilizes the computer (computer media) has been developed with transmission of information as its main objective. Therefore, the main channel is the verbal channel, in other word, voice and

writing, and because it is lacking in non-verbal channel, there is a problem of conveying the feeling or emotion that is communicated as non-verbal information. This paper suggested and designed a communication media that can smoothly perform a communication aiming at forming and maintaining interpersonal relationship by the fact that interpersonal good will such as "concern" about the other person is communicated easily using non-verbal metaphor called "look".

## 2. INFORMAL COMMUNICATION ISSUES IN COMPUTER MEDIA

In this section, the face-to-face communication is compared to other communication using computer media, and issues in this paper is elucidated (Table 1).

In a face to face communication, as in a conversation, the communication is using not only voice, a verbal channel, but it is also using the so-called non-verbal channel such as looking, posture, movements and hand gestures. The non-verbal channel, where feelings and emotions can be communicated properly, fulfills an extremely important role for the purpose of forming and maintaining an interpersonal relationship, as shown by the fact that actual feeling is conveyed through the non-verbal action when the non-verbal action and verbal action are contradicting each other. In the current mainstream computer media such as e-mails, the main trend is using text only, a verbal channel, and since the non-verbal channel does not exist, it is an aspect that made it unsuited for a communication to convey feelings and emotions. However, it has an advantage in a sense that it allows remote and asynchronous communication to take place.

In trying to solve this problem by transmitting the non-verbal information using image channel such as video phones, it was pointed out that there is awkwardness with the non-verbal information transmitted through images compared to the actual face-to-face non-verbal information [4]. So, while we are assuming that this solution will be the same as the actual face-to-face communication, in reality, it is different. Furthermore, video phone is basically a media that performs synchronous communication, so its characteristics are not suited for asynchronous communication.

**Table 1:** Comparison among communications within various media

| Title 1 | Verbal channel | Non verbal channel | Synchronous | Main channel |
|---|---|---|---|---|
| **Face to face** | √ | √ | Synchronous | Verbal/non verbal |
| **E-mail** | √ | × | Asynchronous | Verbal |
| **Image transmission** | √ | √ (Image) | Synchronous | Verbal |
| **Pictograms, IM** | √ | √ (Pictograms) | Synchronous / Asynchronous | Verbal |
| **Sense of presence** | × | √ (Presence) | Synchronous | Non verbal |
| **Sense of touch** | × | √ (Sense of touch) | Synchronous | Non verbal |
| **This research** | × | √ (Look) | Asynchronous | Non verbal |

The communication tools that utilize the non-verbal unique channel in the text channel of a computer media is pictogram found in e-mails and instant messenger. These forms of communication are adapting a method that uses pictograms in order to express emotions in form of supplementing the text channel. The main channel for communication is text, and the non-verbal channel pictograms are used for the purpose of embellishing and interpolating the message. In addition, both form of communications - synchronous and asynchronous are possible.

There are also researches that study on how to convey emotions using only the non-verbal channel. SyncDecor [5] and Family Planter [6] are systems that enable to feel the presence by communicating mutual actions and existence to each other using switches and human perception sensors. However, these kinds of information are not intentionally transmitted because they wanted to be transmitted, the actions and presence are transmitted automatically by sensors, so strictly speaking, these are awareness systems, and not communication. Furthermore, the actions and presence are transmitted at that instant of time, so these are synchronous transmission.

For creating an informal communication using the sense of touch as non-verbal channel, there are inTouch [7], Herty Egg [8] and Lovelet [9]. The sensation when rolling the roller in inTouch, the pressure when holding the Herty Egg balloon shaped device, these sense of touch when touching the touch sensor are conveyed to the other party as heat, and in Lovelet, the temperature is conveyed as LED color and your touch is communicated through touch sensors as heated areas. Because these media are able to communicate the non-verbal information with the sense of touch, which is an extremely intuitive form, they are suited for communications to form and maintain interpersonal relationship. However, these media require dedicated devices, and they are synchronous medias due to the fact that the actions are transmitted to the other party at the point of time when the actions were committed.

Therefore, this paper suggested a media that can convey "look", as a media that can perform communications for the purpose of forming and maintaining interpersonal relationship between users who are in distant locations using only the non-verbal channel. By using "look" as a non-verbal information, the synchronous and asynchronous communication are made possible without any need for dedicated devices.

## 3. THE DESIGN OF A COMMUNICATION MEDIA THAT USED LOOK

This section introduces the communication media that can convey the "look". The media characteristics are as follows.

### 3.1. Communication using only the non-verbal channel

This media is expected to form and maintain interpersonal relationship by bridging the psychological distance between two people and sustain it through mutual communication of interpersonal good will emotions of "concern", and "wanting to get in touch" using non-verbal channel between people in distance locations. When they want to establish a communication such as a conversation as the result of conveying interpersonal good will, they will use e-mails or telephones, and other verbal channel media.

## 3.2. A communication that conveyed interpersonal good will using the "look", given to the other party

As eye behaviors in interpersonal communication, there are scanning, one-sided look, and eye contact. Scanning is an action when a person looked around his or her surrounding and collected information, and when there was someone he or she wanted to establish a communication with, he or she will give that person a one-sided look. If the other party looked at him or her, eye contact is made, and communication such as greeting and conversation ensued. Like this, the look has a function that display intention and indicate good will such as wanting to get in touch. Therefore, it is thought that using the look to express emotions to the other party in distant locations saying "wanting to get in touch", "concern" or "wanting to show my good will", is an extremely intuitive and natural expression.

The communication using "look" in this paper is a communication that conducts an act called virtual "looking" to a virtual partner in a distant location where he or she actually cannot be seen and a communication that can convey thoughts to the other party just like giving him or her the look in reality by communicating the said look information to the partner. Concerning the timing to convey the look non-verbal information saying "I'm looking at you." to the other party, the fact that it is a communication between users in distant locations is considered and both forms of communications explained in the following section, the synchronous and asynchronous communications, are considered.

## 3.3. The asynchronous communication of the "look"

Basically the "look" information is not communicated to the other party at the time of point when the "looking" took place, but it is communicated when the other party wanted to know if there are any looks directed to him or herself, and this has turned into an asynchronous communication form. Therefore, it was not the information saying "I'm looking at you right now" that was communicated to the other party, but the information saying "I've looked at you". Based on this, it is thought that perhaps the other party communicated an emotion saying "concerned". The reason it is conveyed asynchronously is by communicating to the other party at the point of time the looking had taken place is to prevent excess interruption to activities of the other party who is at a distant location, and to prevent from compelling an answer such as wanting the other party to also look his or her way right away because him or herself had looked, from happening. For example, there are A and B, and after A "looked" at B using this media, B will only know that he was looked at when B used the same media later.
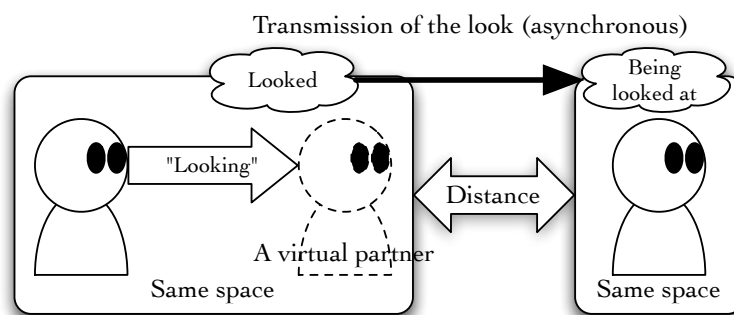


**Figure 1:** Asynchronous communication using the look

### 3.4. The synchronous communication by means of mutual looking

As mentioned in previous section, the look information is basically communicated asynchronously. However, just like the existence of mutual looking when their eyes met with actual look, and eye contact, when both parties are looking at each other at the same time, I think it should mean something such as a trigger for a conversation. And so, because the look information is communicated to both parties at the point of time the looking had taken place in cases where both parties "looked" at each other at the same time, the state of mutual looking where both parties are looking at each other simultaneously is recognized, and a synchronous communication that can give a chance at communication such as a conversation is provided (Figure. 2). Actually, because the other party is not necessarily in the field of vision, it is impossible to reproduce the action where the other party looked when he or she was aware of the look. In addition, since the probability of two people who are in distant locations happened to look at each other at the same time, there is a fixed time period (for example, approximately 10 minutes) in the simultaneous timing. For example, there were A and B. As mentioned in previous section, after A looked at B, B will only know he was looked at when he used the media, but if this took place within the fixed time period and B looked at A, the fact that B looked at A will be communicated to A at that point of time.
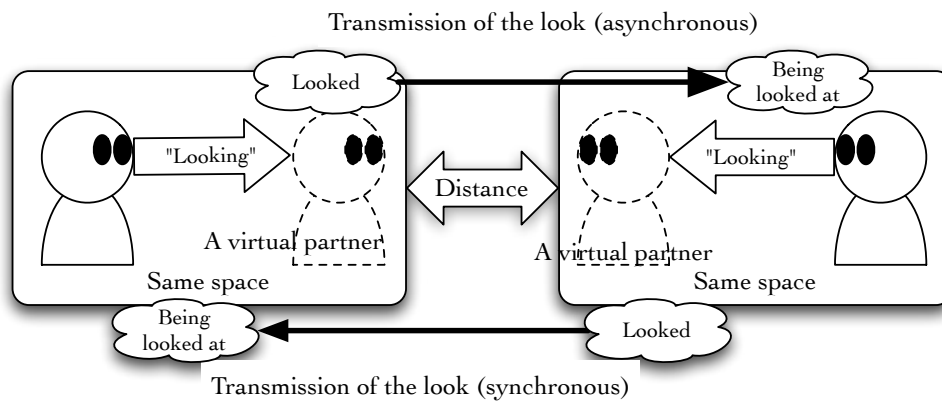
Transmission of the look (asynchronous)

Looked → Being looked at

"Looking" → ← "Looking"

Distance

A virtual partner — A virtual partner

Same space — Same space

Being looked at ← Looked

Transmission of the look (synchronous)

**Figure 2:** Synchronous communication using the look

## 4. THE IMPLEMENTATION OF A COMMUNICATION MEDIA THAT USED THE LOOK

Currently, the communication media that used the look suggested in this paper is under implementation. Apple iPhone 3GS is used as the device, and it is being implemented as an application utilizing the iPhone SDK. iPhone 3GS is a cellphone with GPS function and electronic compass function using 3 bearing magnetic sensor, however, other than iPhone any other cellphones that has these two functions can be used for implementation.

### 4.1. Virtual partner display

This application displays the existence of a virtual partner based on the location according to the GPS, and the direction the cellphone is facing according to the electronic compass. The location of the user who is using the cellphone is sent to the server as latitude and longitude information when the user launches the application. From the location data and the most recent location data of other users sent to the server, the server calculates an approximate distance and direction where other users are located, and resend it to the cellphone (Figure.

3). The discussion related to the location data privacy will be conducted in the end of this section.
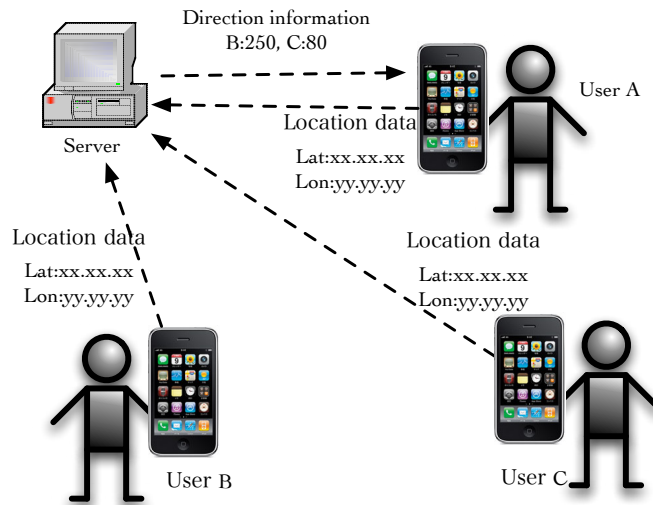


**Figure 3:** The calculation of direction from the location data

Based on the direction of each user that was sent back from the server, if there are other users in the direction where the cellphone is facing, the cellphone will display the existence of such users on its screen (Fig. 4). For example, from where user A is looking, user B is in the southwest while user C is in the southeast. If the cellphone is facing the southwest, then the image showing the existence of user B will be displayed on the screen, and if the cellphone is facing the southeast, the image showing the existence of user C will be displayed instead. By doing this, a user is able to gain a solid sense of the existence of the other party who is far away, like "he (she) is over there" through the screen of a cellphone.
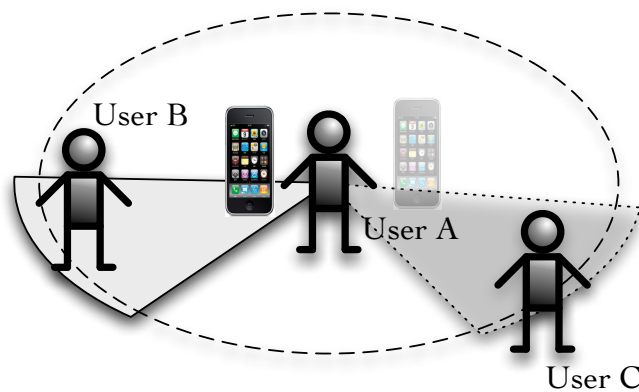


**Figure 4:** The realization of "Facing" (The user indication corresponding to their direction)

## 4.2. The realization of the look

When images of other parties are displayed on the screen, it represented the act where "I am facing in the direction of the other party" in a face-to-face situation, in other word, it corresponded to scanning in the eye behavior. While the act of touching the displayed image of the other party on the screen means "I've looked at the other party", in other word, it corresponded to one sided look in the eye behavior. These definitions are set this way because, if one sided look is defined when the images are displayed on the screen, then

everyone will be "looked at" just by moving the cellphone 360 degrees horizontally, and the look information will be transmitted to everyone. Because in a face to face situation, the look that indicates intent and goodwill such as wanting to establish contact with the other party is the gaze imbued with the said intent given to the other party, the "facing" and "looking" in the face to face situation are made to correspond to the "display" and "touch" on the screen in this application.

## 4.3. Communicating the look information

The look information "I've looked" is sent to the server from the cellphone. The server, following the flow in Figure 5 will send the information to the other party cellphone. If there is no look information that indicated that the other party had "looked" in this direction in the past, or in the case where the receiving time of the look information that indicated that the other party had "looked" in this direction is past the fixed time period (10 minutes for the current implementation), when the other party launch the application, the look information is sent to the other party cellphone together with the direction of other users replied from the server. In other words, the user's look is conveyed asynchronously to the other party. On the cellphone screen, along with the display of time the other party had looked this way, the communicated look information expressed the look indicating that the other parties had "looked" this way by changing the images showing the users.

If the time when the other party had "looked" in this direction in the past is within the fixed time period, then it was determined that the looks overlapped at almost the same time (mutual look), and the look information sent by the server is sent to the other party immediately. In this case, the user look is conveyed synchronously to the other party. Assuming that the other party is not launching the application, then the look information sent to the cellphone will be sent using notification functions such as e-mails or MMS in a message saying "A had looked this way".
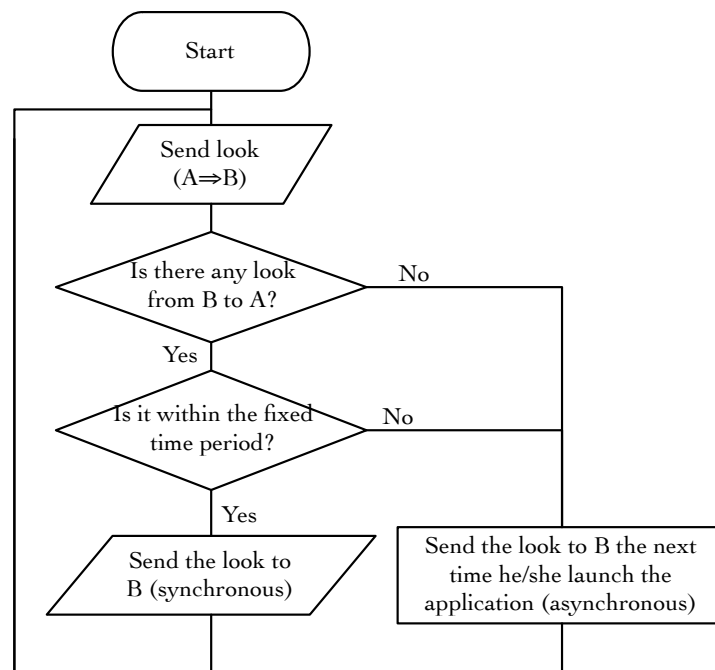


**Figure 5:** Determining the mutual look (Determining the synchronous/asynchronous)

### 4.4. The privacy of location data

Since the location data is information that is very much private, there will be many who are reluctant to communicate it to others. In this application, the location data is sent only to the server. To others, only the direction calculated from the location data and the information on distance, which is abstracted in a number of stages from "close" to "far" are sent. As shown in the application screen in Figure 6, because the precise distance to others is unknown, it is thought that there will be no precise location specified. However, since it is possible to guess that the other party is not in his or her usual direction, it is necessary to study by means of actual application test, how reluctant the user will feel to send their own location data to the server.

## 5.  CONCLUSION

This paper had suggested and designed a media that communicates the "look" as a media that can smoothly perform communications for the purpose of forming and maintaining interpersonal relationship using only non-verbal channel. By using the "look" as non-verbal information, and sending it synchronously and asynchronously, a communication that conveyed interpersonal good will such as concern toward others is possible. In the future, the plan is to evaluate the effectiveness of the communication using the "look" by having the prototype used by test subjects with interpersonal relationships, such as friends, or those who are in a romantic relationship.



**Figure 6:**  Application screen image

# REFERENCES

1. Bouchard C., Camous R., and Aoussat A.: Nature and role of intermediate representation (IR) in the design process: case studies in car design, *International Journal of Vehicle Design*, Vol. 38, No. 1, ISSN 0143-3369, pp. 1-25, 2005.

2. H. Katori, T. Sugimoto: Psychology 3$^{rd}$ Edition (in Japanese), University of Tokyo Press, 2004

3. Goldsmith, D. J. & Baxter, L. A. Constituting relationships in talk: A taxonomy of speech events in social and personal relationships. *Human Communication Research*, 23, pp.87-114, 1996

4. A. Mehrabian: Communication without words, *Psychological Today*, Vol.2, pp.53-55, 1968.

5. E. Harada: Artificial material research from person's point of view (in Japanese) ，*Monograph of Cognitive science*，Kyoritsu Publishing，1997

6. H. Tsujita, K. Tsukada, I. Siio: SyncDecor: Communication Appliances for Couples Separated by Distance, *UBICOMM 2008, The 2nd International Conference on Mobile Ubiquitous Computing, Systems, Services and Technologies, IEEE*, pp.279--286, Valencia, Spain, September 29 - October 4, 2008.

7. Y. Ito, A. Miyajima, T. Watanabe: 'TSUNAGARI' communication: fostering a feeling of connection between family members, *CHI '02 extended abstracts on Human factors in computing systems*, Minneapolis, Minnesota, USA, pp. 810 - 811, 2002

8. S. Brave, H. Ishii, A. Dahley: Tangible interfaces for remote collaboration and communication, *CSCW '98: Proceedings of the 1998 ACM conference on Computer supported cooperative*, November 1998

9. M. Anbe, K. Ohmura: Informal tele-communication through a haptic interface [in Japanese], *The Institute of Electronics, Information and Communication Engineers, HIP99* (582) pp.65-70 2000

10. Hidenori Fujita and Kazushi Nishimoto: Lovelet: A Heartwarming Communication Tool for Intimate People by Constantly Conveying Situation Data, *Proc. CHI2004 (latebreaking results: poster)*, CD2, p.1553, 2004.

11. VP Richmond, JC McCroskey, SK Payne: Nonverbal Behavior in Interpersonal Relations (5th Edition), Allyn and Bacon Boston, ISBN：9780205372461, 2000

12. iPhone: http://www.apple.com/jp/iphone/