Information-offering method in personal communication

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Abstract

Japanese young people, who are avid users of cellular phone e-mail, often feel uneasy when they do not obtain an immediate response, even though email is an asynchronous communication tool. This uneasiness may increase in future with the development of the ubiquitous environment. Investigating how this communication tool is used among young people, we found that uneasiness occurs when the sender is not aware of the receiver's situation. To solve this problem, we propose an information offering method. In this paper, we discuss its requirements, which are that state information should be indicated imprecisely and should be generated according to context.

Keywords:asynchronous communication , status information , instant response

1. Introduction

E-mail on cellular phones (cellular phone mail) has become the most important communication tool among Japanese young people. A survey conducted by IPSe Marketing, Inc. reported that 74% or more of people under 25 years old use cellular phone mail rather than voice-calls [1]. This daily use of cellular phone mail is a new communication trend. In one investigation, almost 80% of university students said that they were worried when they did not get reply mails [2]. Because cellular phones can send and receive mail at anytime from anywhere, many users feel that cellular phone mail, which cannot provide real-time communications, is a real-time communication tool. Therefore, when a sender sends cellular phone mail to a friend, he/she tends to mistakenly expect that the receiver will read it immediately and strongly expects the receiver to reply soon. If the sender does understood that he/she cannot get an answer, he/she may not worry about it.

In the near future, worries about "delays with expected replies" may spread not only among cellular phone mail users but also other ubiquitous service users who will communicate in ubiquitous environments. To relieve the anxiety caused by these delays, we propose a method of notifying senders how long they can expect to wait for a reply.

Section 2 reviews existing methods for providing information to senders and discusses what kinds of information should be provided by analyzing existing systems and the results of interviews with users. Section 3 describes the requirements from the receiver's viewpoint. Section 4 discusses how to meet the requirements and Section 5 proposes a system that achieves this.

2. Methods for providing information

2.1 Existing approaches to the problem of delayed replies

There are two ways to alleviate the delay in expected replies. One is to stimulate the receiver to reply more quickly and the other is to extend the time that the sender can tolerate waiting (Fig. 1).
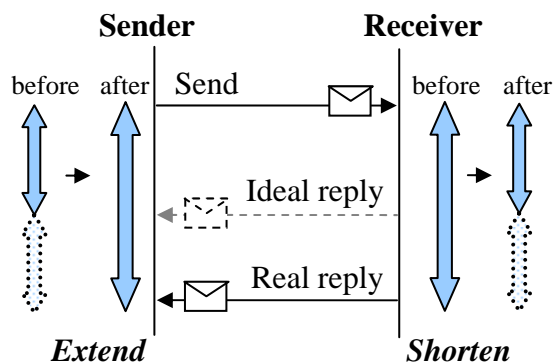
Figure 1: Mail exchange model.

Stimulating quicker replies: There are two reason of delaying of a reply from the viewpoint of the receiver.

One is an insufficiency of alarm to the receiver. In many case, the receiver does not realize that the sender is eager to receive a quick reply or that the receiver receives a mail. Some existing systems try to indicate the importance of incoming mail. The labeling system [3] labels messages with a priority according to the message content, sender's ID, etc. This helps the receiver understand the importance of a received message. So the receiver can reply to an important mail without overlooking.

The other is the sender's poor expression. As a result of a poor expression, the receiver can not easily understand the sender's message. So the receiver takes time to reply. Some existing systems help the sender to express his/her message richly. The mail decoration service, as known as "Deco-mail" [4] in Japan, provides colorful cute expression messages that help the receiver to understand and reply to them. **Extending the waiting time:** Senders might be willing to wait longer if they knew the receivers' circumstances. The receiving time report service [5] provides confirmation that a message has been received. The opening time report service [6] reports when the message was opened. The automatic reply system [7] returns to the sender a predetermined message, which might for example state that the receiver will be away and unable to reply for a certain period of time.

Stimulating quicker replies requires action by the receiver. However, the problem of "delays with expected replies" is really the sender's problem, so it would be better to solve it without forcing the receiver to take action. Therefore, the following discussion is based on ways of extending the time that the sender is willing to wait by providing information about the receiver's status in order to enhance existing e-mail systems.

2.2. What information is needed?

We investigated what information the sender requires by considering a simple model of the events involved in an exchange of e-mail (Fig.2).It consists of five steps:
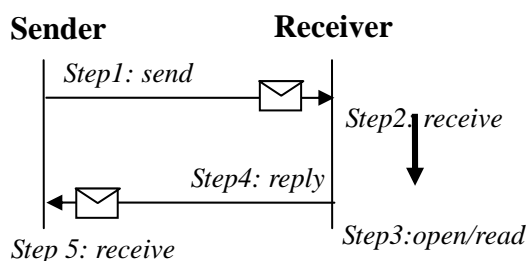

Figure 2: Mail exchange action model.

Step1: The sender sends an e-mail message.
Step2: The receiver receives the message from the sender.
Step3: The receiver opens and reads the message.
Step4: The receiver replies to the sender.
Step5: The sender receives the reply message.

For each step above (Fig. 2), the information that senders want to know is shown in Table 1, omitting steps 1 and 5 because they indicate the sender's initial and final actions, respectively.

Table 1: Information needed by senders.

Step	Status	Sender's question
Step 2	Receive	Has my message been delivered?
Step 3	Open/read	Has it been opened? Has it been read?
Step 4	Reply	When will I get a reply?

2.3 Existing systems and their problems

We checked whether the information offered by existing systems answers the sender's questions (Table 2).

Table 2: Existing systems.

Step	Status	Delivery/opening confirmation service	Automatic reply
Step 2	Receive	Good: delivery confirmation	Fair
Step 3	Open/ read	Good: Open/read confirmation	Fair
Step 4	Reply	Bad: no information is provided	Fair

Existing systems provide information that indicates whether messages have been received (Step 2) or opened/read (Step 3), but they do not provide any useful information about when the receiver is likely to reply (Step 4). Moreover, information provided by the automatic reply system cannot meet all of the sender's requirements at the same time because the receiver must register all the information to be provided by the automatic reply system in advance and it is uncertain whether the information is provided or not.

2.4 User interviews

To determine the importance of information about when the receiver will reply (Step 4), which existing systems do not cover, we conducted interviews.

The interviewees are listed in Table 3 and the results are shown in Table 4.

As a result of interview, we found that this information of Step 4 is indeed important to users. Therefore, we decided to provide a "forecast of the reply time".

Table 3: Interviewees.

	Male	Female
High-school students	0	2
University students	3	2
Office workers	2	1
Total	5	5

Table 4: Interview results.

Question	Answers
Do you usually predict when the receiver will reply to your mail?	Yes: 10
Do you think that, from the a sender's standpoint, it would be convenient to know when the receiver will reply?	Yes: 5

3. Requirements

To define the requirements, we must consider them from the viewpoint of the receiver because "reply time forecast" information indicates receiver's status .We consider the following three points to be requirements for offering information.

(1) No need for action by the receiver

Since receivers are too busy to reply to the message, they are also too busy to provide forecast information. Receivers cannot register extra information at any time to describe their current situation and even if they could, it might be annoying for them to do so.

(2) No stress on receivers

Receivers will feel stress about the offered information if the information is too detailed. They will not agree to send information about their circumstances.

(3) No fiction for the offering information

The reply forecast information is concerning the receivers. The receivers want to offer the information which is based on the truth. And the senders want to know the trustable information. So the information should correspond to the receiver's information. To

generate the trustable reply forecast information, Requirements are:

(3-1) Reference to receiver's situation.

Receivers decide whether to reply immediately based on their schedules. Therefore, it is necessary to refer to the receiver's schedule in generating reply forecast information.

(3-2) Reference to the relationship between sender and receiver.

The value of an exchange of information differs depending on the relationship between the sender and receiver [8], and hence so does the delay between receipt and reply. Therefore, the relationship should be considered in generating reply forecast information.

4. Meeting the requirements

This section shows how to meet the requirements identified in section 3.

(1) No need for action by the receiver

The receiver's situation should be acquired automatically to avoid the need for receivers to have to register their status. Factors needed to generate information are also acquired automatically.

(2) No stress on receivers

The interview results indicate that users feel stress in describing their own status in detail, but do not felt stress giving imprecise information such as whether they are online or off-line. To avoid causing stress to receivers, the information that receivers offer should be imprecisely. We chose to use "the reply index" which indicates the expected reply on a rough scale.
"The reply index" is probability that the receiver would reply for a period

(3) No fiction for the offering information

(3-1) Reference to receiver's situation.

Information about the receiver's ability to reply to a message can be extracted from scheduling information. We chose to utilize log data of the mail service in generating a "reply index" because it is easy to acquire in existing mail systems and reflects scheduling information. For example, students tend to send mail frequently at lunchtime, but not during class time. Log data indicates whether the receiver has sent any e-mail recently, in which case he/she is

likely to be able to reply soon, or has not sent any e-mail recently, in which case he/she may be off-line and unlikely to replay soon. By using mail log data, we can estimate how quickly the receiver can reply.

(3-2) Reference to the relationship between sender and receiver.

The interview results indicate that they reply to good friends by priority. Offered information should utilize "the degree of intimacy" between users. Our method does this.

5. Proposed system

Here, we propose an information offering system that can meet the requirements discussed above (Fig. 3). The action steps are follows:
1. The sender sends an e-mail message.
2. The receiver receives the message.
3. The proposed system gets the information for the receiver automatically.
4. The system generates the reply index.
5. The system offers the reply index to the sender.

In this system, reply forecast information (reply index) is generated automatically. It consists of the log data for sending and receiving and of the degree of intimacy between the sender and the receiver. The reply index is generated as follows.
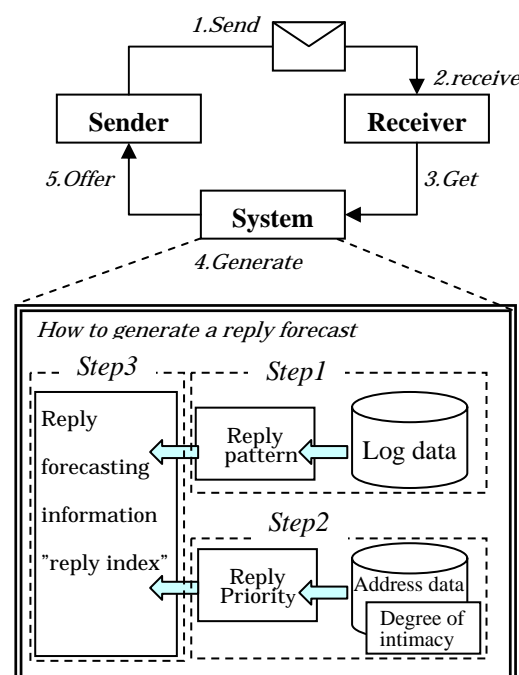

Figure 3: Information offering method.

Step 1: Estimate the receiver's reply pattern from the sending and receiving mail log. By counting the number of send-mail every time zone, find a time zone when users reply soon.
For example: In the case of User A

User A frequently sends mail from 8:00 to 9:00 which correspond to commuting time.
If User A receives mail from 8:00 to 9:00, User A can reply soon.
User A hardly ever uses mail in the morning from 10:00 to 12:00 because there are meeting in the time zone.
If User A receives mail from 10:00 to 12:00, User A can not reply soon.

Step 2: Set the reply priority level according to the degree of intimacy. If the degree of intimacy is high, we considered that the reply priority level in mail which receiver has is high.

Step 3: Derive the reply index by using the receiver's reply pattern and reply priority level.

We have just started developing this system. A screenshot example (in Japanese) of a sender's cellular phone giving a reply index is shown in Figure 4. It shows the reply index as a probability for two different time periods.
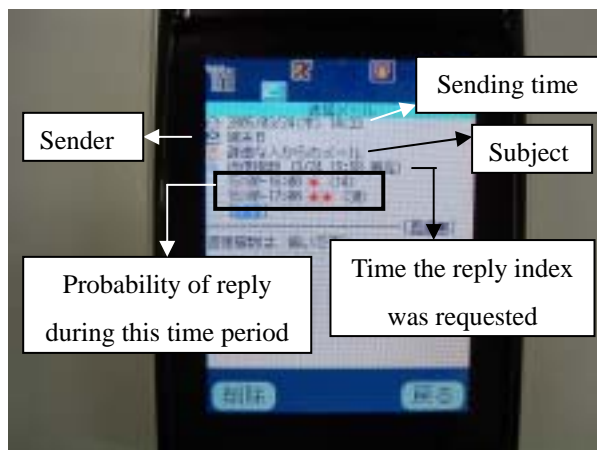

Figure 4: Screenshot example of the forecast reply information.

6. Conclusion

In this paper, we proposed an information offering method that automatically generates a reply index based on the user's situation and the degree of intimacy between the sender and receiver. It makes it easier for the sender to wait comfortably for a reply and alleviates worries about delays in replies. In future, we plan to implement the proposed system and conduct experiments to test its effectiveness.

Reference

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