

Proposal of a Visualization Method to Support Informal Communication Using Twitter Attributes

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Abstract. In this paper, we propose a method to visualize information regarding hobbies and interests of a person inferred from tweets on Twitter to support informal communication in the real world. Analysis of the current states and experiments on informal communication clarified that it is important and useful for a person to know information such as hobbies, interests and other attributes which indicate background of his/her partner to start and maintain a first and good meeting. Through experimental results, we demonstrated that our proposed social profile diagram was effective for informal communication.

Keywords: Social networking service · Informal communication · Visualization

1 Introduction

Along with development of the Internet technology, recently, people have communicated online by means of a wide variety of communication methods. In particular, SNSs and microblogging services (called social media services) that support interpersonal communication are popular these days. Use of social media services provides users with easy ways to transmit and collect information. The number of active users of such social media services has increased. The users of Facebook, which is one of the representative SNSs, actually exceeded 1.35 billion users across the world (2014). Under such circumstances, various studies using information that is posted on social media services have actively been made, such as motivation improvement based on gamification by using SNS [1], influence of SNS posts given to the service users [2], and categorization of posts on electronic bulletin boards based on Bayesian filters.

We consider that social media services have accumulated a wide variety of information necessary for conducting informal communication, such as tendencies and tastes of service users including their affiliations and locations. Therefore, presenting such information must serve as help to activate not only communication conducted on the Internet, but also face-to-face communication that is conducted in the real world.

2 Study Purpose

The purpose of this study is to clarify how to activate informal communication by focusing on one of the popular microblogging services, Twitter.

In this study, information communication (referred to as “IC” hereinafter) is defined as spontaneous communication with no specific purpose. Examples of IC include chatting at a lounge, and information exchange among friends in the same organization. This study focuses attention on university students, who belong to a main service user segment, having many opportunities to conduct IC. This is because, as indicated by Iizuka [2010], the communication skills of young people has tended to decline, while the enhancement of communication skills of students has become an important issue.

3 Analysis of the Current Conditions

We first explain about a questionnaire survey and a semi-structured interview survey targeting 70 university students we conducted in order to identify information that would be utilized for conducting IC and to clarify the usage situations of social media services. We, then, explain about Twitter that we focused on and the current conditions as a summary.

3.1 Analysis on Informal Communication

Analysis on Informal Communication based on Questionnaire Survey. In the beginning, we conducted a survey on the following items in order to clarify how the students felt about IC.

- Do you have any difficulty to talk to a stranger?
- What kind of things do you particularly feel when communicating with strangers?
- Do you need any cue to start to communicate with strangers?

The questionnaire survey results confirmed that those who feel that they are good at conducting IC had many friends in the real world, with a tendency to have positive feelings when communicating with strangers. On the other hand, those who feel that they are not good at conducting IC had negative feelings toward communicating with strangers, such as having trouble with choosing topics to start communication (Fig. 1). The questionnaire survey results also confirmed that both types of the students, who are good at and not good at conducting IC, tended to feel that common tastes or interests should be necessary for starting communication with strangers (Fig. 2).

Analysis on Informal Communication based on Face to Face Communication Experiments. Next, we conducted experiments related to IC in order to clarify the following items.

- Topics often picked up when IC is conducted
- Cues necessary for activating conversation

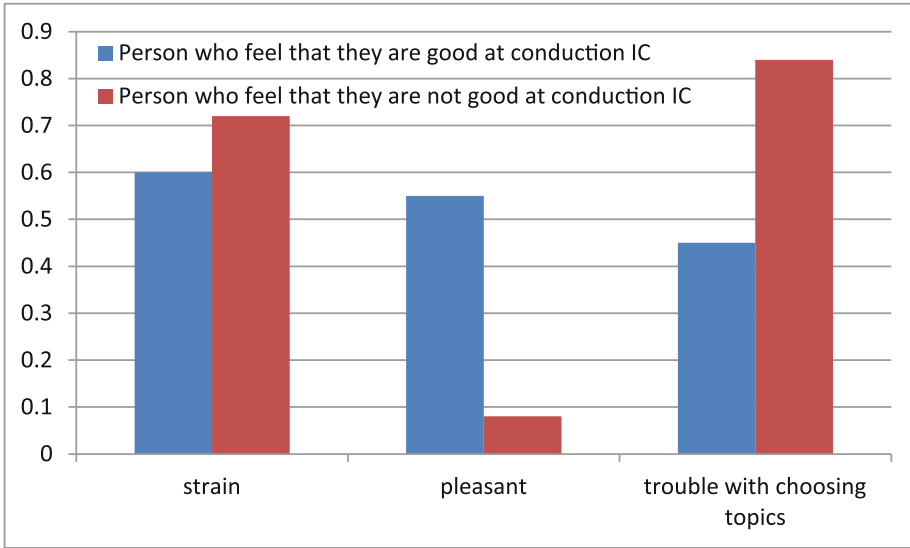


Fig. 1. Ratio of people who feel strained, pleasant, and difficult with choosing topics among those who think that they are good or not good at conduction IC when communicating with stranger.

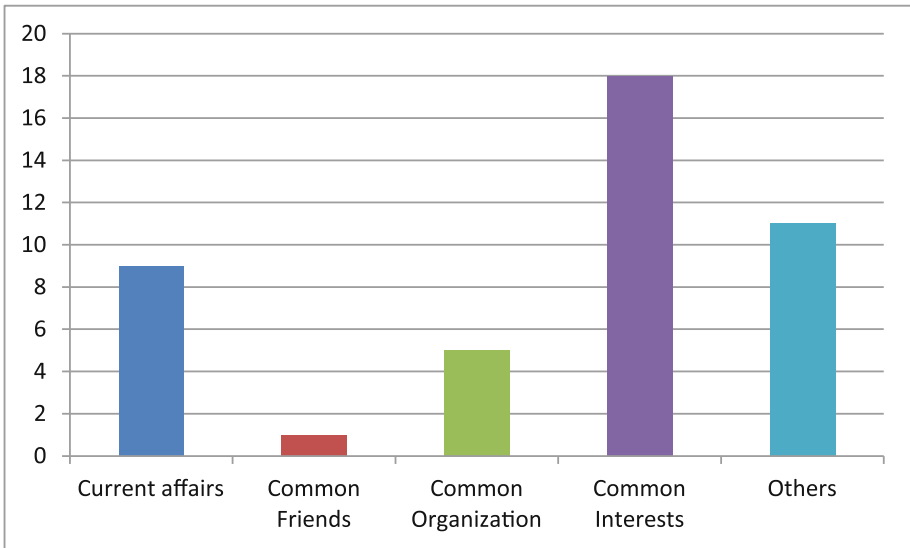


Fig. 2. The number of respondents who answered affirmative to questions what were cues to activate conversation with strangers.

The experimental subjects were divided into three groups consisting of a total of 11 students (8 males and 3 females), with 22 combinations of meeting for the first time. Assuming that IC would be conducted between two subjects, two subjects that met for the first time were placed in the experimental room along with movie cameras and voice recorders. Having them conduct IC without giving information of the other party to each of them, we recorded their IC with video and audio. When IC of each pair was completed, the questionnaire survey (feedback survey) was conducted. The questions answered by the subjects are as follows:

- What kind of topic did you talk with your partner?
- What was your impression of your partner?
- What activated your communication?
- What kind of clues or topics could have activated communication?

The survey results confirmed the following tendencies of the subjects.

- There is a correlation between how the subject satisfied with what they talked and how they felt how activated the communication was 0.77.
- In many cases, common interest or current situations serve as factors to activate communication
- As for factors that bring conversation down, in many cases, topics mismatched and bad first impression was created
- Common interest and friends in common are the factors that the subjects felt were important to activate communication

In this study, therefore, these results clarified that information of individual's interest and attribute information that indicates individual's background would be important keys for conducting IC.

3.2 Analysis on Twitter

The questionnaire survey on the usage situations of social media services showed that 74 % of the subjects were Twitter users. The survey also clarified that they use Twitter in order to communicate with their actual friends and collect information of their interests and tastes. It was also clarified that many of them post their tweets about what they are interested in or about their current situations.

As for posting frequency in other SNSs, 95 % of the users post five times or less per week. On the other hand, in Twitter, approximately 50 % of Twitter users frequently post tweets five times or more per week. While 13 % of users of other SNSs post what they are interested in, 52 % of Twitter users post tweets about it. This percentage for Twitter is apparently higher than that for other SNSs. These results clarified that there should be more information related to interests and tastes of service users on Twitter when compared to other SNSs.

3.3 Summary of the Current Conditions

As is described, we conducted the questionnaire surveys in order to identify information that would be utilized for conducting IC and the experiments targeting IC. The results clarified that information of individual’s interest and attribute information that indicates individual’s background serve as important factors for conducting IC. In addition, the questionnaire surveys and interview surveys on usage situations of Social media services clearly showed that Twitter is a service where which has more information regarding interests and taste of service users and many users are quite active in making posts. In keeping with the results of analysis on the current conditions, in this study, we propose a method to support IC by visualizing information of individual’s interest and attribute information that indicates individual’s background extracted from Twitter.

4 Proposal of an Informal Communication Support Method by Using Social Profile Diagrams

In this study, we propose a new communication support method based on social profile diagrams to visualize information of individual’s interest and attribute information that indicates individual’s background (Fig. 3).

Social profile diagrams are created by using information obtained from profiles of Twitter users along with those they follow as well as their followers. However, there still exist Twitter users that keep their profile blank. Additionally, it is difficult to identify individual user’s interest and attribute that indicates their background only from profile of each Twitter user. Therefore, this study focuses on using profile of those that the user follows and his/her followers.

On Twitter, only the tweets of users you follow are displayed on your timeline; therefore, Twitter users tend to select and follow other users that they are interested in. For this reason, we consider that some attributes of users followed by the user might be related to certain factors that the user is interested in. In this study, therefore, we tried to obtain the information of the user’s interest from the profiles of users followed by the user.

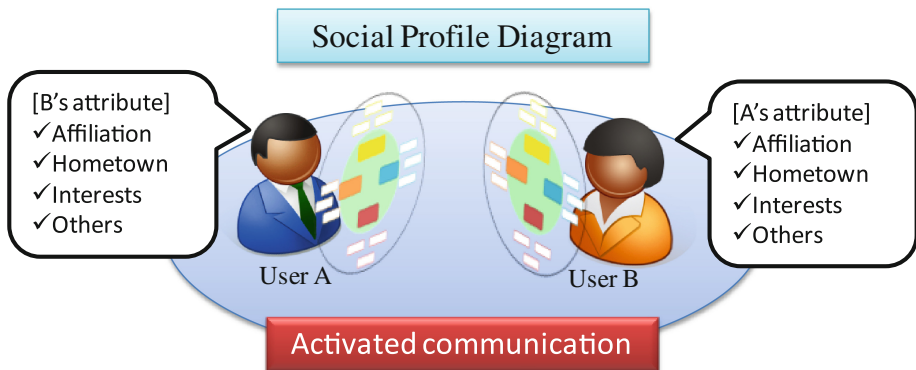


Fig. 3. An image of communication using social profile

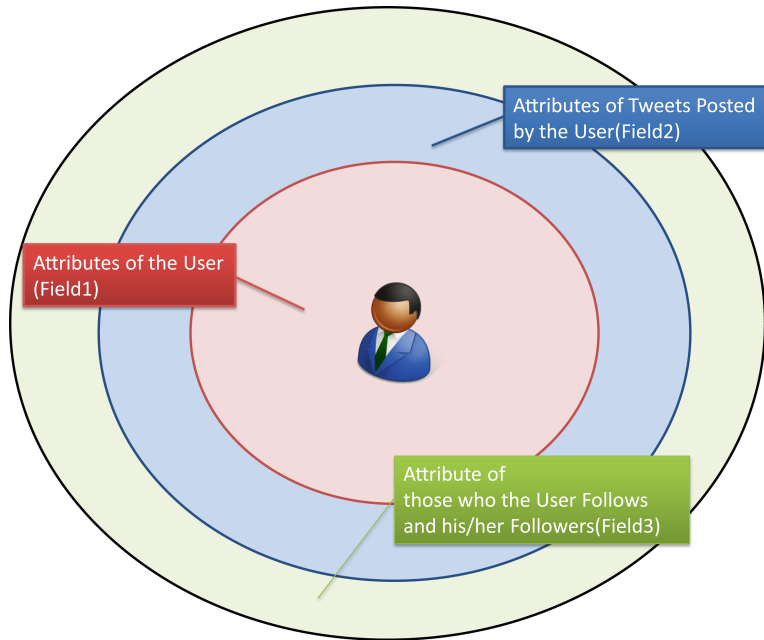


Fig. 4. A template of the social profile diagram with the layered fields that show attributes

Additionally, the questionnaire survey we conducted clarified that those users in a common affiliation or community tend to follow one another. With that, in this study, we attempted to obtain information of the user's attributes regarding their backgrounds from users in the relationship of following one another. These two types of information obtained from those who they follow and their followers were utilized for creating social profile diagrams. In order to obtain these types of information, we used API provided by Twitter. We also used Python as the development language.

To begin with, texts in the profile of a Twitter user were analyzed by conducting morphological analysis. Based on the result obtained, the frequency of each word was calculated. The top 10 words with high frequency were defined as the characteristics of the user. By using these characteristics of the user, a social profile diagram of the user was created. Here, those words that indicate the user's characteristics are displayed in Field 1 of the social profile diagram (Fig. 5).

Additionally, TF/IDF values for the user's tweets were calculated in order to extract characteristic words of the user. These words are then displayed in Field 2. The size of each word when it is displayed was determined depending on the TF/IDF scores.

Next, texts in the profiles of those who the user follows and his/her followers were analyzed by means of morphological analysis, where the top 10 words were defined as the characteristics that were close to the user. In both of those who the user follows and his/her followers, those highly-frequent words were treated that they were of high importance. Here, those words that indicate the characteristics of those who the user follows and his/her followers are displayed in Field 3.

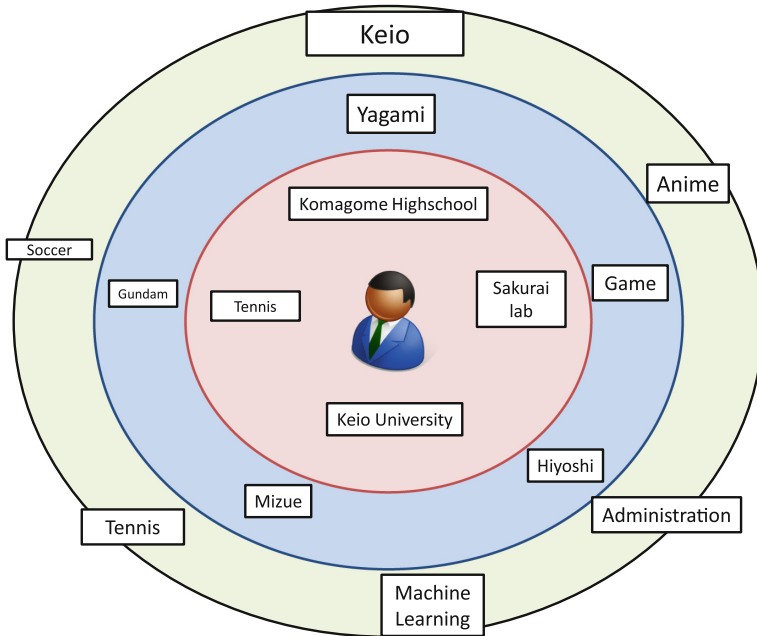


Fig. 5. An example of the social profile diagram using “Sasajima” data

The emphasis on each word that would be displayed in the social profile diagram was determined depending on the word’s occurrence frequency. The stronger the interest was, the larger the word’s font size was made, so that the level of interest reflected on words could be understood at first sight. Words were used for creating profile diagrams because many sentences contained in tweets on Twitter might include ungrammatical sentences; therefore, we considered that the user’s characteristics would be accurately obtained on a word basis. Figure 4 shows a description of each field. Figure 5 shows a sample of profile diagram created.

5 Experiments and Results

We verified whether a group of words displayed in the social profile diagram would indicate information of users’ interest and information of their attributes or not. The subjects were 10 students who have their own Twitter accounts. Targeting the subjects, we conducted a questionnaire survey on their own social profile diagrams. The evaluation was done on a five-point scale. The outline of the questions is described below.

- Does your social profile diagram indicate information of your interest and attributes properly?
- Can your social profile diagram serve as an effective information visualization when talking with others?

- Did you feel that this social profile diagram was easy to understand with its interface and the number and size of words?

The group of words that the subjects evaluated most highly was the one in Field 2. In order of Field 2, Field 1, and Field 3, the groups of words got high points. The words in Field 2 were more highly evaluated than the words in Field 1 which were derived from the profile of the user. This was because information displayed on Field 1 could contain significant bias because the user can edit the profile itself and the users vary between those who edit their profile information precisely and those who do not. On the other hand, Field 2 scored high on average without varying much. This is because the words in this field less varied because the characteristic words were extracted from many tweets related to the user and were smoothed in a sense. It was confirmed that those users who gave low points to Field 1 tended to give high points to Field 3. We can say that either of Field 1, Field 2, or Field 3 actually contains information of the user's interests and tastes properly. Additionally, the subjects tended to answer that this information would be effective for conducting IC when meeting with their conversation partners for the first time. This actually confirmed the effectiveness of this information.

6 Conclusion and Future Issues

Targeting university students, in this study, we proposed a communication support method with the aim to activate communication in the real world. Specifically, we created the social profile diagram that visualizes profile information of the user, those who the user follows, and his/her followers. In the future, we are going to implement a system including this proposed method and verify the effectiveness of this method. We are also going to classify those tweets related to interests and tastes collected as information of users' interest into topics so as to utilize such information for proposing topics when communication is developed.

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