

Analysis of User Interactions in Online Social Networks

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ABSTRACT

Online social networks allow people to communicate, interact, and share information on the Internet. Recently it has focused on user's interactions to recognize the weight of social graphs. In this paper, to find out effective factors on the strength of interactions between users, we surveyed the definition of online friends and analyzed communication interactions of Korean users of both Me2day and Twitter using the twi2me application. As a result, it turned out 60% of users thought offline strangers can be friends online, 32% of them easily accept requests of friendship. The number of private interactions in online is rare, which it should be given more weight to analyze the relationship strength. The trends of each interaction are varied according to the number of followers or friends and cultural backgrounds as well as characteristics of each social network. In the future, some kind of impact factor about user interactions will be calculated to analyze the semantics of the user relationship based on our results.

Categories and Subject Descriptors

H.5.3 [Group and Organization Interfaces]: Web-based interaction
J.4 [Computer Applications]: Social and Behavioral Sciences–Sociology;

General Terms: Measurement, Human Factors

Keywords: Social network, user interaction, Twitter, Me2day.

1. INTRODUCTION

Online social networks such as Facebook, MySpace and Twitter allow people to communicate, interact and share information on the Internet. They offer a variety of interactive features to facilitate socialization as like sharing links, photos, and videos as well as private or public messages. Many researchers who have focused on these web sites to investigate the conventional social network analysis have demonstrated relational patterns of users such as link structure and behavior. Recently some researchers have focused on user's interactions for recommendation or viral marketing. It is useful to estimate link weights by the latent variable model [1] and interaction graphs [2] based on Facebook's user interaction data.

But there are some doubts whether the sum of them expresses trustable relationships and each type of interactions has the different degree of strength or not. In this paper, we surveyed the definition of online friends and captured interactions of users in online social networks. To find out our doubts, we investigate the characters and trends of user interactions of our collecting data.

2. WHAT IS ONLINE FRIENDS?

Firstly we took a poll¹ about "What's the definition of Online Friends?" to thousands of Korean online users. It was asked the range of choices and shown the results in Table 1.

Table 1. The poll results of the definition of online friends

Known		Unknown	
Well-known offline friends	9%	Known only name or famous people	14%
Colleagues or classmates	7%	Unknown friends of friends	13%
Offline friends who I met once	25%	Everyone who requests friendship	32%

We divided items into two categories, i.e. known and unknown people in offline. The 60% of users thought an unknown person in offline can be a friend in online. Especially 32% of users can easily accept request of friendship.

It means the trustable relationship of offline is hard to be reflected in online social networks. Its interactions can be useless to measure the strength of trustable degree. Especially most of celebrities make their account in purpose of marketing and communicates with online users to get tons of interactions such as Twitter's following or Facebook's replies on the wall. It means that must consider different interactions according to each type of online friends to measure proper centrality and betweenness.

3. ANALYSIS OF USER INTERACTIONS

There are two kinds of online social networks. One supports traditional two-way relationships under approval of both users such as Facebook, Myspace and LinkedIn etc. The other does one-way that anyone can make a connection like Twitter.

So, we choose and collect the data of user interactions of Twitter and Me2day², a famous Korean micro-blogging service that is similar with Twitter, but it supports two-way relationship of users and both web sites also offer many types of communication interactions to recognize personal relationships.

3.1 Data Collection

Our data were gathered by Korean Twitter users in state of the small community in early stage. For capturing online user interactions, we implemented Twi2me³ application which delivers

¹ <http://answers.poll daddy.com/poll/1230119/?view=results>

² <http://me2day.net>

³ <http://channy.creation.net/project/twi2me>

messages of Twitter, i.e. tweets to Me2day in automated fashion via each openAPIs shown in Figure 1.

In collecting data, we focused only on communication interactions such as messages, replies and metoo except content sharing because these are important to recognize real relationship between users.



Figure 1. Data flow of Twi2me between Twitter and Me2day

We collected interactions of 32,200 accounts of Me2day from January to October, 2009 and 890 users of Twitter on time of Dec. 12th, 2009 on condition of academic research.

3.2 Characters of User Interactions

We gathered over 2 million interactions in Me2day and it can be divided into several kinds of interactions shown in Table 2. We could only measure the number of interactions by users because of privacy issues, but it shows notable decreasing trends of the number of interactions from public to private categories.

Table 2. The number of interactions in Me2day

Type	Numbers	Description	Pattern
Reply	2,074,284	Comments between users	Public ↑ --- ↓ Private
Metoo	451,260	Similar with ReTweets	
Msg.	31,915	Similar with Direct Messages	
SMS	30,000	Short message by phone	
Gift	3,590	Sharing items in SNS	

It means private interactions such as messages, SMS and gifts are rare in online communications and it should given more weight to measure the relationship strength between users based on user interactions in online social networks. It will help to analyze the semantics of social graphs in the future.

3.3 Trend of User Interactions

We selected 235 users who answered⁴ how many direct messages they received from their followers because the number of them is also one of private data. It shows that interactions per tweet are typically increased from favorite to replies in Figure 2.

Likewise Me2day, the number of private interactions like direct messages and favorites are smaller than public actions in Twitter. But, in case of Retweet, it shows that a lower pattern than direct messages compared to Me2day's Metoo actions. It coincides that 38% of tweets are replies and only 3% of them are retweets [3].

The private actions like direct messages are higher and it is originated by Korean Twitter's culture [4] with heavy users in the early stage. It is important to understand the cultural differences as well as interactive characteristics of each online social network.

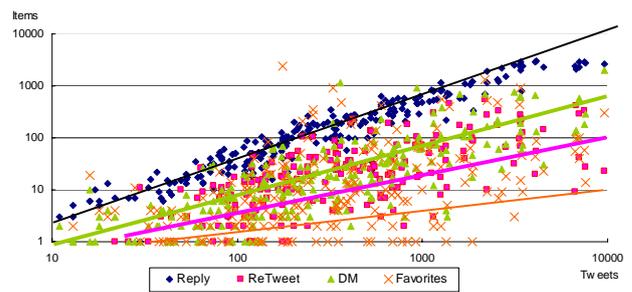


Figure 2. The trend of user interactions per tweet in Twitter

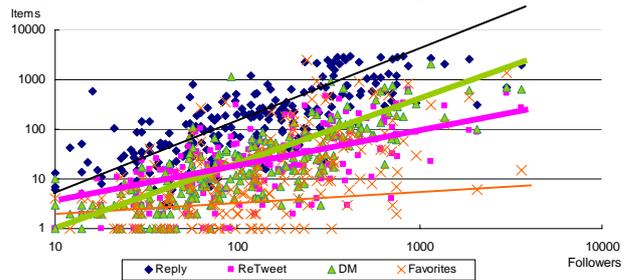


Figure 3. The trend of user interactions per follower

Figure 3. shows trend of user interactions per follower. As the number of followers is increased, the number of direct messages and retweets are reversed in the point of a bout 100 followers. It means the weight of interactions must be different in grades according to the number of followers or friends.

4. CONCLUSION

In this paper we surveyed the definition of online friends and analyzed communication interactions of Korean users of both Me2day and Twitter using the twi2me application. As a result, it turned out 60% of users thought offline strangers can be friends online, 32% of them easily accept requests of friendship.

Especially the number of private interactions in online is rare compared to public, which it should be given more weight to analyze the relationship strength. The trends of each interaction are varied according to the number of followers or friends. So it must be considered detailed patterns of interactions and cultures of each online social network. In the future, some kind of impact factors about user interactions will be made to analyze the semantics of the user relationship per each online social networks based on our results.

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⁴ <http://channy.creation.net/project/twi2me/poll.php>