

Exploring Serendipitous Social Networks: Sharing Immediate Situations among Unacquainted Individuals

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ABSTRACT

In this article, we present a serendipitous social network that makes use of individuals' contextual information to connect people in shared immediate situations. We build a prototype microblogging service that uses a serendipitous social network as a substrate. We performed an initial user study and found that users engaged in shared immediate situations are likely to exchange posts relevant to their situation that provide useful information or reflect emotional understanding.

Author Keywords

Social networking services, social interaction, microblogging, serendipitous social networks

ACM Classification Keywords

H.5.3 Group and Organization Interfaces: Evaluation

General Terms

Design, Experimentation, Human Factors.

INTRODUCTION

Social Networking Services (SNSes) are largely popular as communication and socializing mediums for friends and acquaintances. SNSes are designed for users to maintain and develop their social relations, often by microblogging status updates or multimedia content such as images and video. However, in real world situations, serendipitous interactions can occur between unacquainted individuals. For example, a tourist in a foreign country may come across another traveler. Their shared immediate situation, traveling alone, could be a good motivation for those two travelers to initiate a conversation, sharing their experiences and exchanging tips on interesting places to see. This is because a sense of commonality and mutual sympathy can be inspired by sharing the same immediate situation. Conventional SNSes use acquaintanceship-based social networks as a base substrate; they are not designed for such spontaneous and situation-dependent interactions because they connect users based on acquaintanceship.

We present the serendipitous social network, which is an

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instantaneous interconnection among people sharing the same immediate situation. We envision that, through serendipitous social networks, users will be encouraged to share situation-specific information and also experience mutual sympathy from such interactions. In order to investigate the characteristics and benefits of serendipitous social networks, we developed a prototype serendipitous social network service and performed an initial user study using that service. We report our findings on the user experiences and further discuss implications of serendipitous social networks.

SERENDIPITOUS SOCIAL NETWORKS

Serendipitous social networks present several unique characteristics. First, serendipitous social networks are *situation-centric*. These networks are designed for supporting interactions that exchange situation-relevant information in a timely fashion. This kind of interaction is currently not well supported by conventional acquaintanceship-based SNSes which are mostly *peer-centric*. Second, because serendipitous social networks are situation-centric, the user experiences mostly interactions with unacquainted individuals. The majority of experiences over acquaintanceship-based SNSes are, however, interactions with friends and acquaintances. Third, the situation-centric nature of serendipitous social network results in a highly dynamic structure in terms of peer connectivity; such networks can be instantaneously constructed, continuously changing, and easily dissolved. They are based on the situation-relevance of the users, rather than based on existing social ties as in acquaintanceship-based SNSes.

Constructing and updating a serendipitous social network fundamentally consists of connecting individuals in the most similar situations instantaneously. To determine individual's situations, we can make use of various context properties such as their current location, the type of place, activity, history of place visits, and the number of current companions. Figure 1 shows a snapshot of a serendipitous social network constructed based on users' activity, location, and their range of interest.

BACKGROUND

Our work expands on many existing works that have touched on interactions among people in simple shared situations. Ambient social TV [7] was an initial work for observing interaction over a shared immediate situation, watching TV. It was an indication that there are benefits of

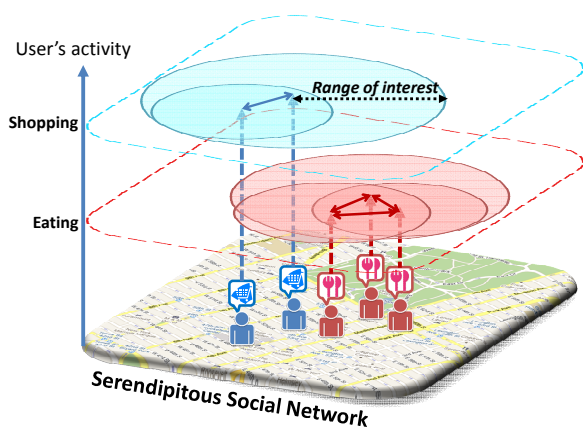


Figure 1. Serendipitous social networks based on users' locations and activities such as "eating" and "shopping"

sharing immediate situations. Also, popular location-based services and research works [2,5] can be understood as being based on the idea that similar location may indicate a similar immediate situation. [9] explored how combining different kinds of contextual data from various sources could improve context-aware inference and enhance applications like recommendation services. Our work also explores using various context information, but in a very different way; to connect users over these contexts in a serendipitous social network. The above works mainly investigated interaction over acquaintanceship-based networks, while interactions over serendipitous social networks are among unacquainted individuals.

In [6], the authors investigated the similarity of strangers in terms of online activity and behavior, showing that there are benefits of interaction among strangers who share some kind of similarity. In [8], the authors performed a user survey and found that the most popular reason given for responding to questions in social networks was altruism, beating out social relationship reasons, suggesting that users may be willing to help each other and answer each other's questions even if they are strangers. Additionally, Constant et al.'s [3] discussed the "kindness of strangers"; revealing that people are likely to help people who are similar to them.

METHOD

Service Prototype

To investigate the effects of a serendipitous social network, we implemented a prototype service utilizing a serendipitous social network as a substrate. The prototype service is a twitter-style mobile microblogging service that allows users in the same situation to exchange posts. As the prototype service was implemented and deployed on off-the-shelf mobile phones, the user study was performed under realistic usage conditions (see Figure 2).

Users' activity and location contexts were used to determine the immediate situation, because they are intuitive contexts for representing users' immediate situations. As the focus of our user study is on investigating

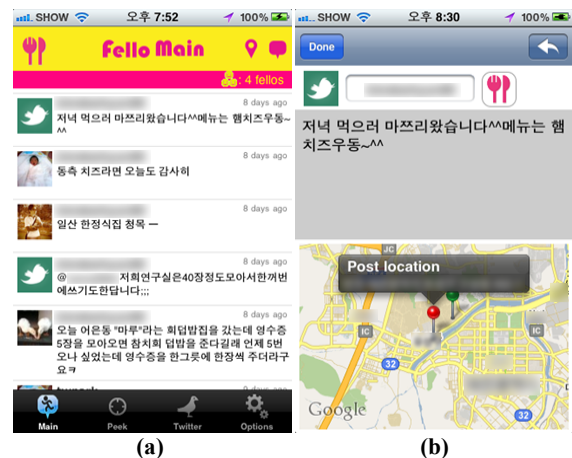


Figure 2. The prototype service: (a) posts from others engaged in the same activity ("eating" in this figure) within the user's range of interest (b) details of a typical dinner post

the effects of serendipitous social networks and not on context detection, we decided that the user would manually select her activity in the prototype service. Although manual selection of activity would not be an appropriate approach for future real-world applications, it can provide the most precise detection of a user's immediate situation which is essential for the user study. We conducted a preliminary user study to decide on the activity categories before the main user study. For this preliminary study, 23 people were recruited through a public BBS. The 8 most frequent activities were chosen from their one-week activity logs and used in the prototype service.

Procedure

Participants for the main study were recruited from a public BBS and 21 people applied. 16 people actually participated in the user study and the remaining 5 people were screened out for having no previous experience with SNSes or dropped out. Participants ranged in age from 21 to 40 and have diverse occupations. Only two of them were previously acquainted. Participants were paid the equivalent of \$20 for initial motivation to join the user study. However, we did not employ other means of encouraging participants to use the prototype service often such as a usage report or notification system. The study was held over 2 weeks while the participants' application usage was logged. At the end of the user study, a questionnaire was given using a 7-point Likert scale for each question. The questionnaire was followed up with 30-minute individual interviews conducted in person or by phone. During the user study, there were 5 participants who only logged in one or two times. During the interview, these participants mentioned that interacting with unfamiliar people was a little awkward so that they hesitated to use the prototype service. It might be a natural result that not all people are interested in serendipitous encounters or interacting with people outside of their acquaintanceship networks. However, the majority of other participants enjoyed the prototype service and the results from the majority were used for the rest of this paper.

FINDINGS

Casual nature of service usage

Throughout the interviews, many participants mentioned that the service has a very low barrier to entry. In most existing acquaintanceship-based SNSes, users are supposed to build their network from scratch by adding acquaintances incrementally; the service initially provides little value for new users who do not yet have a sufficient number of contacts. Serendipitous social networks, however, are automatically constructed and maintained since they are based on users' immediate situations rather than manual user action. A new user can get as much value out of the service as a veteran user.

"Because I started using the service a little late, I was worried about joining existing networks of the other participants. However, when I joined, I found that I could use it the same as other people." – Participant B

Participants also mentioned that they feel relatively free when using our prototype service. They did not feel compelled to keep checking their friends' status updates like in conventional social networks. They just used the service when they had something they wanted to talk, ask or read about. The situation-centric characteristic of the prototype service helps users be free from the burden of managing their own network in the service, resulting in a casual style of service usage.

Immediate situation-related posts

Participants remarked that they wrote about what they are doing or what they are feeling during their everyday life. They also commented that the casual nature of the prototype service usage allowed them to write posts without having to give it much thought. Participants generally felt that posts in the prototype service are more related to their immediate situation than other services ($M=5.5$, $SE=0.31$).

Sharing over immediate situations naturally affected the content of the posts. Most participants generally indicated that the topics of posts are different from those in other SNSes ($M=5.36$, $SE=0.27$). As conventional SNSes are peer-centric, users need to consider the interests of their audience of followers or friends. Over serendipitous social networks, however, interactions are situation-centric; participants are freed from having to consider the interests of their audience.

"I usually talk about IT-related news or political issues on [a SNS]. I don't think my followers are interested in my personal life. That prevents me from writing much about my situations. However, in [the prototype service] I can share my situations as much I want to." – Participant J

Situation-relevant information

Participants were naturally aware of the possibility of informational usage of their posts. Post content that included driving home, visiting a new restaurant, or watching a movie, implicitly or explicitly imparted useful

information such as current traffic conditions, an informal restaurant review and a movie recommendation.

"It was really helpful to be able to find the exact location of a restaurant from an 'eating' post." – Participant C

In addition to utilizing the context information from posts, participants also used the prototype service to ask for information directly. They understood their current situations well and used them to their advantage when asking questions.

"I used [the prototype service] to ask questions about the schedule of school events and administrative procedures. Because I wrote the post in the library with the 'working' activity, I expected that a student would read my post and answer my questions." – Participant C

In this way, the prototype service can be a good method for discovering information, especially when used to ask about current local information which requires a timely response.

"When I was shopping at [supermarket], I posted a question to [the prototype service] asking if [supermarket] had frozen pilaf. I don't think friends in [my SNS] would know this. But I thought it might be a good question for [the prototype service] because [the prototype service] uses users' locations and activities." – Participant A

Shared understanding among strangers

One of the fundamental characteristics of the prototype service is that it connects users in the same situation. Although they may be strangers, participants reported that they feel connected to people who are engaged in the same activity ($M=5.9$, $SE=0.21$).

Participants also indicated that they feel close in sharing posts about their immediate situation in the prototype service ($M=5.2$, $SE=0.22$). One group of participants bonded over their shared enthusiasm for a restaurant that serves large portions. Such socializing from shared situations and perspectives is more likely to result in positive interactions, even among strangers [4].

Privacy issues

The prototype service publishes contexts with each post which can infringe on a user's privacy. When asked about privacy issues, participants were not very concerned ($M=3.4$, $SE=0.5$). This result is similar to the degree of concern for location-based services [1]. However, in the interviews, participants showed divergent attitudes. Participants A, I, E, and F said that they have no problem with privacy in the prototype service. They said that they are fully aware that their posts are published to the public so that privacy is the user's responsibility, that it's the user's discretion to write or not in a given situation.

"I think, in [the prototype service], it is really difficult to track others' location or activity. In SNSes, you can go to their profile and see all their posts, but in [the prototype

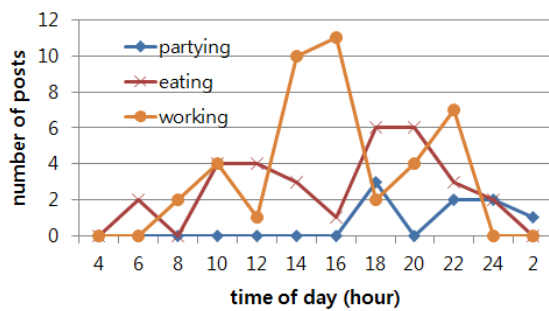


Figure 3. Post quantity of selected activities at different times service] you can only see intermittent posts from people in the same situation” - Participant C

On the other hand, participant H expressed serious concerns about privacy especially in revealing the post’s location. We asked participants if an anonymous posting functionality would help ease their concerns, and they responded positively.

DISCUSSION

We envision that serendipitous social networks will increasingly emerge as context-aware technology is able to detect increasingly sophisticated and nuanced contexts. We expect that the effects reported in our findings, sharing of timely information relevant to the immediate situation and a sense of connection and understanding, will continue to characterize interactions between strangers and be even more evident at larger scales.

Analysis of posting patterns show a correlation to expected user life patterns (Figure 3 shows the number of posts for each hour of the day during the user study period for selected activities). For example, we see a high number of “working” related posts during the afternoon, an increase in “eating” related posts as participants go for dinner around 6 pm, followed by some participants returning to work (“working” posts) and others going to drink and socialize (“partying” posts). This analysis implies that users integrate usage of such a service well into their everyday lives. We expect that with widespread usage of such serendipitous social networking services, one could be connected to a dynamic community of other users in similar situations at every moment, allowing for immediate crowd-sourcing of information or collective action. Thus, we expect diverse services will emerge over serendipitous social networks. A social commerce service is one promising application. For example, in front of a museum, a user can gather people from throughout the city to get a group discount for the entrance fee. From the timely and situation-centric characteristics of serendipitous social networks, users in the service can instantly collaborate with each other so that they can rapidly gather a sufficient number of people. Another notable service is a friend recommendation service. While a recommendation in conventional SNSes is based on an acquaintanceship-based network, a recommendation on a serendipitous social network can be based on histories

of location-visit patterns like restaurants. Users visiting similar places may have a high possibility of sharing a similar lifestyle or interest, leading to better recommendations.

LIMITATIONS AND FUTURE WORK

Although the result of the user study gives implications about meaningful interactions among unacquainted individuals, this study is limited due to the relatively small number of participants and short period of the user study. Our study might have missed potential interactions that could affect current insights on the results. To compensate for these limitations, we are planning a large-scale user study as our future work. It will focus on a specific user situation, in order to control side-effects and to focus on comparing user experiences between acquaintanceship-based SNSes and our serendipitous social network-based service. This work would also provide an opportunity for understanding more about interactions among unacquainted individuals by expanding on the current user study. Understanding which facets of a user’s situation (e.g. place, time of day, activity, participating social groups, etc.) are highly correlated with motivation for posting with each other is a good example.

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