See You on the Subway: Exploring Mobile Social Software

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Abstract

This project explores the social possibilities of mobile technology in transitional spaces such as public transport. Based on a cultural probes study of Stockholm subway commuters, we designed a location-based friend finder that displays only people in the same train as the user. We aim at reaching a critical mass of users and therefore decided to make the system compatible with as many phones as possible, thus it was designed as a simple web application. An initial informal study pointed out consequences of certain design decisions on the user experience and highlighted social tensions created by presence awareness.

Keywords

Mobile social software, commuting, cultural probes

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

With the advent of new popular services such as *Twitter* and *Facebook*, social awareness has been brought to the forefront in our daily lives. In HCI, researchers have studied and designed technologies that change and

Figure 1: Something to change - Feeling alone in a crowd

augment daily life activities that occur in specific environments such as work, school or home. However, with the rapid growth of mobile technologies people also bring along and have access to powerful computational resources when shifting in-between these settings. In line with this we believe that the *transitions* between such environments provide intriguing design challenges and need to be further explored in user studies and design work. "In-between-ers" or commuters are people who are on the move from one place to another, mostly between work and home, and who during the transitions engage in different activities such as reading books, newspapers, emails or playing video games. One of the complexities of the in-between situation lies in the transitional role of in-between spaces. They can be considered as 'non-places' [7], most of the time fairly frequented ones. Public transports, lobbies, shopping malls even streets are in-between spaces. People's relation to time and to others is often ambiguous in theses transitional spaces. Bassoli and Martin showed that in-between-ers experience conflicting feelings of togetherness and distance in the London Tube [4]. The subway is generally considered to be a place where people do not socialize or communicate with each other and traversing the city in public transport can easily be taken as an isolating experience. However, recent work have proposed that such experiences also contain social and aesthetic qualities that deserves further attention in the design of technologies related to public transport [8]. Our goal is to explore ways to exploit social awareness and mobile technology in this context.

Related work

Recent applications support social and location awareness in different ways. Status bars in instant messaging and in Facebook (www.facebook.com) are often used as a way of communication one's present activity or location. In Twitter (www.twitter.com), the central question answered by users is "What are you doing?" in both stationary and mobile use. Even if this way of sharing one's activity often implies a notion of location, none of those services directly displays the user's location. With mobile technology, location becomes integrated with activity. An early example of a mobile awareness system was the *Hummingbird* [2], which used mobile devices with radio transceivers to alert users when others were nearby. A system that combined the notion of location with social awareness was *Connecto* [1], which let users tag areas and build up a repartee in a group. An example of technology designed specifically for people in transit was the *Familiar Strangers* system, which would encourage awareness of people that one might pass every day without actually knowing them [6].

A problem with all mobile social software is critical mass – if there are not enough users, such applications are of very little use. In this project we therefore aimed to go beyond existing research prototypes by making an application that was compatible with as many mobile devices as possible.

Figure 2: Something to change - Lack of social interaction and too-high bars

Capturing the subway experience

Even though the use of advanced mobile services in public transportation is common countries such as Japan and Korea, it is still relatively small in occidental countries. Furthermore, in this project, we wanted to explore new application ideas rather than study current use of mobile technology. Therefore we decided to run a background study based on *cultural probes* [5] to capture aspects of what subway riders find important during their commute and what kind of activities they engage in. According to Gaver and Dunne [5] "[cultural probes] were designed to provoke inspirational responses from [a group]. Like astronomic or surgical probes, we left them behind when we had gone and waited for them to return fragmentary data over time."

We asked 8 subway users to take pictures according to several criteria intended to guide the user without missing some parts of the experience. Hence, we asked the users to take pictures of: something good during their journey, something unexpected, something that makes the journey shorter, unique, annoying, something to be changed, something of their choice.

The results of the cultural probes (more than 40 pictures) were not meant to be analyzed in-depth but used as inspirations in our design. However, we distinguished some interesting patterns in the ways the pictures revealed aspects of the commuters' transitional experiences. Some parts shared by users regarded issues related to the design of public transportation systems such as physical problems (Figure 2) or time-related issues (Figure 4).

On the other hand, users clearly highlighted the importance of human interaction (Figure 1, 2 and 5) and the ambiguous situation of feeling lonely in a crowd (Figure 1). The result was a very colorful and diverse panorama of the subway experience. Users were enthusiastic to share their experience and had a lot to say. From pointing to the common civil inattention to emphasizing the role of technology (mp3 players, computers, phones) in their journey, they aimed at the ambivalence of public transportation that is both a crowed and a lonesome environment.

Application and Design Constraints

Taking inspiration from a combination of previous works, current popular applications and our own cultural probes, we came up with the concept of a location-based awareness system. We envisioned a system that would display which of one's friends is in the same subway train as oneself. As any social application, it will need a critical mass of users to make

Figure 3: Something unique – The user's card

sense. Trying to reach this critical mass is complicated especially considering the wide range of platforms for mobile software. Consequently, this implies making several design choices. First, as all location-based services, this brings up issues of privacy. This we decided could be reduced by explicitly asking the user to share his location. When logging in, the user is asked to share in which station he/she is. To facilitate access to the largest audience and avoid common compatibility problems, the service is entirely web-based, and consequently can run on any Internet-enabled phone.

While using a completely web-based interface has the advantage of bypassing the incompatibility issues between different mobile terminals, it also has some drawbacks. Location tracking is the most important issue; while native applications such as Google Maps can track the user's location using cell ID or GPS, this is not possible on a web service. Instead, our service requires the user to self-reporting their location when entering the subway, which also gives users more control. After reporting the location, the system will look in the trains' real-time timetable to check when the next train will arrive in at the user's actual location. We use the Stockholm's subway website to confirm timetables. Every subway station has a specific web page displaying the real time information. They all have the same table structure, so we use

Figure 5: Something good - Traveling with friends and free newspapers

a basic parsing method and screen scraping to grab data, which is then stored in a database on a server.

Study

Due to the early stage of the service, we conducted an informal study with a group of 4 people, 3 friends and 1 work colleague of one of them. They were chosen because they have the same travel routine on the same subway line in Stockholm. They sent us text messages while using the service, and then we interviewed them

Figure 4: Something annoying - Trains not running at night

individually. In the first version of the application, the timetables were taken from the predictions from the subway company. Due to the fairly regular delay between the predictions and the real traffic information, some users happened to think that they were in the same train but they were not. Obviously, this led to disappointments: *"The system told me that one of my best friend was in my train, so I changed car to try to find her, but she was not. I ran around looking for her*
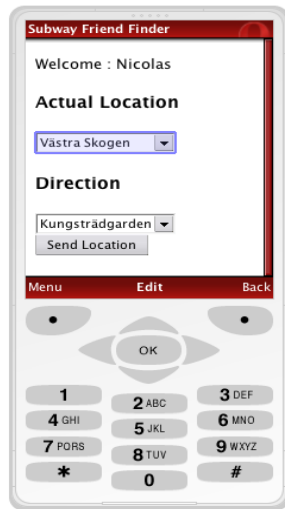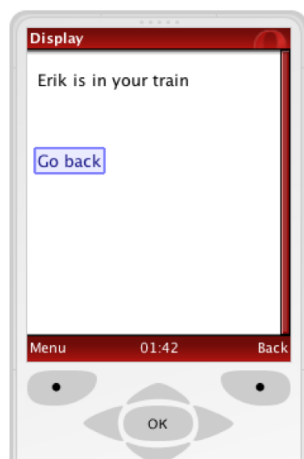
Figure 6: The user chooses his location

Figure 7: Something that makes the journey shorter - Watching outside

in vain". In next versions, real-time timetables have to be included to avoid some of the misunderstandings that occurred during this study. Once reliability is reached, we will be able to conduct a larger study.

What we were most interested in while designing this application is how users will use this information. The interviews showed that the users did not always have an obvious idea for what actions to take once they realized that a friend was on the same train: *"Once I realized one of my colleagues was in my train, I didn't really know what to do... I don't know him so much and I didn't really want to talk about work".* We can see that this presence-awareness leads to a dilemma. The user doesn't really know what to do with this information and most of the times don't do not take contact, which in many cases was quite rational: *"I didn't really want to bother him, maybe he is with his family".* This points to the complexity a social situation like this and the multitude of social layers that comes into play for designers of social services. In this case, it seems like the user didn't feel close enough to his work colleague for taking contact at this particular moment. However, for closer friends the opposite occurred: *"As I saw that my friend was there, I looked for him in my wagon, and then I called him to meet him"* Although the users didn't use this awareness in the case of acquaintances or work colleagues, they showed a will for more interaction in the case of friends or closer acquaintances. Adding the possibility to call the person or send a text message could be one of functionalities improving the user experience.

Future Work
Considering the issue about what to do with the presence information, it appears clearly that whether one actually wants to be contacted on a train or not is a decision by each user. In the first design, we made the assumption that users who don't want to appear would not log in the service. In the study we saw different behaviors depending on the social level of acquaintances. However, getting the information that someone you know is nearby is not only an issue of taking contact or not. Commuters could supposedly use such information in a number of creative and useful ways that can only be revealed through further studies of our application. We believe those different behaviors should be further explored in the design process of presence awareness applications. For instance, we can imagine to allow people to log in as invisible or to define a filter (i.e. groups) to whom one's presence is conveyed.
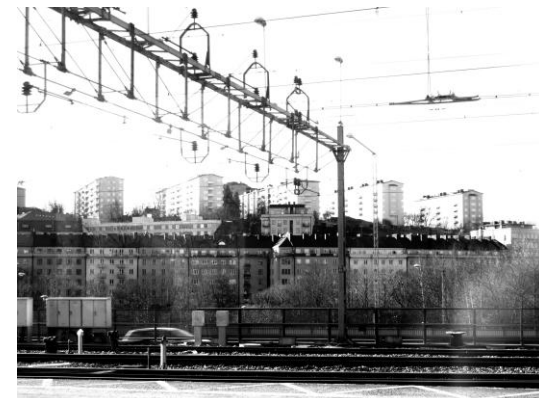
Observing users of social software shows that the user needs and behavior are changing according to time, context and level of acquaintances. We believe that

considering this constant evolution of the user needs is a key to the success of the user experience.

Conclusions

In-between-ers are caught in a tension between different kinds of activities, location, modes of transportation and social acquaintances which provides a complex and still novel design context. Our work shows that when designing location-aware social systems, we need to further understand and address additional social aspects involved. The study shows that the problems encountered are not only due to the qualities of the system but also grounded in the different dimensions behind the notions of friends, acquaintances, colleagues and family. In the future versions, we need to take that into account and design not only for different social levels of acquaintances, but also explore other social and individual conditions for successful design of such applications. We believe that location-aware social applications can create possibilities for new and exciting human interactions in what is now often viewed as a solitary kind of activity.

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