Open Door:
Encouraging Welcome Calls with Shared Context

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ABSTRACT
Past forays into mobile context applications have focused on preventing unwanted communications in a work environment. Open Door is a system for sharing status on mobile phones that encourages welcome calls and lowers barriers to communication in a social context. We discuss the tradeoffs between availability-based and activity-based systems, and explore the effects of providing a fixed set of statuses from which to choose. We have conducted a study with two groups of users and preliminary results are encouraging.

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Context, social networking, mobile interaction, phones, instant messaging

ACM Classification Keywords
H5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

INTRODUCTION
IM software and mobile phones currently allow users to prevent unwanted communication in a variety of ways, an example being away messages. Substantial research has focused on automating the negotiation of communication and enriching it with contextual information. However, less work has been done to try to lower the barriers to interaction by encouraging wanted calls.

Open Door is a system that gives users access to the context of friends. We are currently investigating what types of context accomplish this goal.

Definition of terms. We will hereafter refer to the user about whom context is being shared as the *setter* and the user who is viewing this context as the *viewer*. Note that in the systems we discuss all users have the role of both setter and viewer.

DESIGN SPACE OF SOCIAL CONTEXT
Before we discuss related work, it is helpful to describe the axes of the design space for social context systems.

Explicit vs. implicit setting. Inferring and setting status without user intervention lessens the burden on the user, but it may also be perceived by the user as a violation of privacy and a loss of control.

Locus of interpretation. Some systems [2] present information about the location or *activity* of the setter, allowing the viewer to interpret this information. This has the added benefit that it may be possible to automatically infer this information. Other systems [1] allow the setter to present her *availability*, removing the need for interpretation or guesswork from the viewer's side. In these systems the setter retains more control over the communications she is eliciting.

Structured vs. freeform. Systems that constrain the set of potential choices can reap the benefits of shortcuts for text entry and icons or abbreviations for status display. However, they risk excluding important information that does not fit the mold.

Foreground vs. background. Systems that present contextual information in the background are less disruptive; however, such systems are not ideal for urgent communications. They also sometimes burden the viewer with the task of polling.

Work vs. social. Many systems are designed to help employees contact each other in a work environment. Social settings are less structured and more varied, and systems must be designed accordingly.

Mobile vs. desktop. While mobile systems make possible new types of uses, they lack the input and display capacity of desktops.

RELATED WORK
There have been a handful of attempts at mobile context systems.

Personal Presence. Milewski and Smith [1] propose the live address-book as a means of viewing the availability and current location of co-workers, as well as initiating calls. Their address book does not have an option aimed at encouraging communication, possibly because of the nature of the office environment. Instead, the status choices consist of the neutral "Available" along with various degrees of

unavailability. Milewski and Smith concluded that users were not motivated to keep their availability information updated, rendering this information useless to other users.

Calls.calm. Pedersen [2] hypothesizes that in a work setting, availability information is less desirable than more specific activity or location information. He chooses to represent a user's status along the three axes of role (at work, off work, in between), location (at home, at work, nearby, away), and social setting (alone, in meeting). However, user tests yielded no conclusive results.

We believe that users may be more motivated to share their status with friends than with co-workers. Also, in a social setting, the barriers to communication are much higher. Therefore, a social context system should focus on encouraging as well as discouraging communication.

Dodgeball. Dodgeball [3] is a mobile social context system with a few hundred thousand users. Dodgeball intrusively pushes context information via text message, an approach that may be adequate for bar-hopping but is not always appropriate. The popularity of the system suggests that in a social context, many users are willing to periodically update their status.

DESIGN CHALLENGES

As noted above, our primary goal is to facilitate mobile social communications. This presents a number of challenges.

Do not insult the social capabilities of users. This was cited as a key pitfall of social technology by Jung & Persson [5]. By integrating social information into an address book format, Open Door appears to be an enhanced address book rather than a tool to help people socialize.

Motivating users to set their status. Fun is an important part of any social system. To this end, we chose a lighthearted set of icons based on smileys. We also hoped that users would be more comfortable using lighthearted statuses like "Busy bee" and "Bad hair day" rather than blunt ones like "Don't call me" and "I am sad." The presence of timestamps also motivated users by making it visible to all when a user had not been updating his or her status.

Display size and input. The constraints on display and input always present a challenge to mobile application design. In order to make the status of many users peripherally visible, we have chosen to represent status as one of seven visually distinct icons. The limited number of icons simplifies selection.

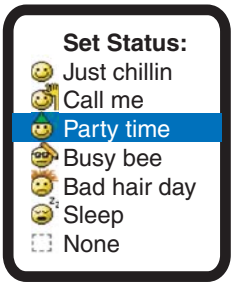
Respect users' privacy. Users should always feel that they are in control of their personal information and are not being spied on. For this reason, we have chosen to limit status to what is manually entered by users, augmented by timestamps. Likewise, we have chosen to place the burden of interpretation on the setter.

DESIGN AND IMPLEMENTATION

We designed and implemented Open Door, a system for sharing social context on mobile phones. Open Door replaces a phone's normal contact list with a networked, enhanced contacts list. This list shows the names of the viewer's contacts, including Open Door users and non-users, and each contact can be clicked to place a call as usual. Next to the name of each Open Door user appears the user's current *status,* as represented by an icon, the user's current *message*, an arbitrary text string, and the *time* since the user's availability or message was last changed.

The server side of the Open Door system was implemented as a set of Python CGI scripts storing and retrieving information from a primitive database. Users accessed the system from a mobile device using a WAP browser or a custom J2ME client, or from a desktop computer using a web browser (Fig. ?).

Users could choose their *status* from among seven icons:



Where possible, we avoided location- and activity-based statuses such as *home* and *work* in favor of availability-based statuses.[1]

Poking. While we hypothesized that users would not want to maintain separate access lists for different types of status, it seemed natural to add some facility for one-to-one asynchronous communication, as in Calls.calm [2]. Inspired by the "poke" feature of Thefacebook [7], we allow users to send short messages to one another in the form of "pokes." The recipient of the poke will see the sender and message at the top of his or her contacts list on the next viewing.

[1] We felt that "sleep" was a common enough activity to warrant an exception.

METHODS

We tested the Open Door system on 6 phone users for approximately two weeks. The users, all friends of the authors in their early 20s, consisted of two social groups. Group A consisted of 2 men and 1 woman, and group B consisted of 3 men. Two users (both in group B) participated using Nokia 6710 mobile phones that were loaned to them for the duration of the study and the remaining four users participated using their own phones. In addition, the two authors used the system (one in each group), but are not included in the data or the results. One other individual (a male, also in social group A) participated somewhat using only the desktop interface, and did not install the Open Door mobile application; he is also excluded from the data and results.

Of the 6 users, 3 used the WAP browser interface and 3 used the J2ME client. The mobile users in group A also used the desktop interface when convenient, while the users in group B did not.

RESULTS

During the two-week study, participants exhibited a wide range of usage patterns. One of the 6 users was unable to participate due to problems with his phone. The remaining 5 participants used the Open Door application an average of 3.5 times per day (stdev 2.0, range 0.8 to 6.1). Of these 3.5 times, they changed their status an average of 1.6 times per day (stdev 1.3, range: 0.1 to 3.4).

Use of icons and messages. Of the available status icons, users predominantly used "busy bee," "sleep," "just chillin," and "call me." Users set "party hat" occasionally, and "bad hair day" and "none" very little.

Users almost always specified a free-form message in addition to their icon. In many cases, users used their status to describe their location or activity; for example, "dinner," "movie," "meeting," "home," "band practice," or "desp housewives." In additon to using the "call me" icon, some users employed the message to explicitly negotiate future activites. One user entered "dinner?" and "dinner with [friend]?" on different nights. Two other users entered "call me" as their message at least once. Our desktop-only participant entered "want to hang tonight (thurs)?" once.

The presence of a small set of icons influenced users' behavior in interesting ways. For example, users felt compelled to enter some sort of message, even when none was necessary. When setting their icon to "sleep," users occasionally entered expressive or humorous messages. Additionally, users sometimes combined icons and messages in unexpected ways, for example, "call me/reading" and "call me/groceries." One user also, on separate days, listed his status as "call me/in the car" and "just chillin/in the car," reflecting different moods.

Lack of privacy concerns. In post-study interviews, users reported that they were not concerned about privacy, due to the small and trusted social group. Three of our users noted that they would prefer to use such a system with a small group of friends. Independent of the use of Open Door to share context, one of these users said he enjoyed having a separate contact list on his phone for only his closest friends, and reported using it as a "menu" for choosing someone to call. Another user reported not having used AIM in several months in order to avoid contact with certain acquaintances.

Use of desktop version. We made the desktop version of Open Door available to users after the first week of the study. Most users did not try it due to a lack of awareness. Users who did use the desktop version reported that it was easier to use and more convenient than the mobile version. By the end of the study, one user was setting her status exclusively on the desktop version. She reported that she would be happy using the mobile version as a read-only device. In the post-study interviews, users who did not use the desktop version unanimously thought it was a good idea, and said they would have used it if they had known about it.

Effect of gender. Our lone female user was the most enthusiastic about the system and one of the most active. While we cannot draw any conclusions from this, we will seek a more balanced population in future studies.

Reaction to icons. Several users found some of the icons ambiguous or not useful. Nearly everyone expressed confusion about the purpose of "bad hair day." We also found that most users were using the "busy bee" and "just chillin" icons to denote their activity rather than their availability, contrary to our intent.

Multiple users noted that they used the system primarily to see what their friends were doing rather than to see whether their friends were available to talk or meet. Not surprisingly, these users said they would prefer a system that emphasized location over availability.

Users reported that they found the "call me" icon useful and unambiguous. Moreover, 3 out of 5 users reported that on at least one occasion, they saw a friend's "call me" icon and were inspired to make a call.

CONCLUSIONS

Our users preferred those icons that unambiguously denoted activity ("sleep") or availability ("call me") to those that did not ("busy bee," "just chillin," "bad hair day"). Because the usage pattern did not reflect availability alone, as we had intended, we are unable to make comparisons between activity-based and availability-based systems. Our experience highlights the importance of the specific selection and wording of icons; for example, ICQ has a "free for chat" status but it is seldom used compared to "online" and "away" [6].

Despite this setback, we are heartened that the system encouraged participants to make calls that they otherwise would not have made. This leads us to believe that,

consistent with our hypothesis, social mobile context systems can lower barriers to communication.

Hallmark effect. We were surprised to see that users sometimes combined the same message with different status icons at different times. For example, the message "reading" occurred with icons "call me" and "busy bee," the message "home" occurred with "just chillin" and "call me," and the messages "dinner" and "movie" each occurred with icons "call me," "just chillin," and "party time." We surmise that providing a fixed set of icons does more than merely constrain the sharing of context. Rather, it serves as a set of "off the rack" sentiments. By analogy, the size of the greeting card industry suggests that people are sometimes unable to express themselves on their own, as explained by Mooney & Brabant [4].

This "Hallmark effect" is a capability uniquely afforded by availability-based systems. We are highly encouraged by this finding and look forward to further exploring this phenomenon in the future.

FUTURE WORK

The next step is to design a new set of icons that is unambiguously availability-based and test it with a more gender-balanced group of users. Moreover, we must emphasize the desktop client from the start and try to smooth out differences in phone capabilities that hindered usability in this study.

Longer term, a more rigorous study of the affordances of availability-based and activity- or location-based social context systems is needed. Also, if social mobile context systems are to gain popularity, privacy concerns will likely become an issue.

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