aSister – SMS Scheduling for Sheltered Homeless

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ABSTRACT
We present a solution for counselors working with the sheltered homeless population. The solution allows counselors to send text messages, which can be used to remind residents of the shelter of their daily schedule. The system can also serve as a persuasive tool to help them develop positive behavior through the delivery of encouraging messages. Cell phone technology usage is increasing rapidly among the homeless population. The system uses text messaging which is an inexpensive and non-obtrusive method of communication. This paper contains details on the design of this system and attempts to evaluate the efficacy of such a text messaging system.

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Homelessness, text messaging

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

INTRODUCTION
Homelessness is a condition in which an individual lacks a fixed regular and adequate nighttime residence. It also includes individuals whose primary nighttime residence is a supervised, publicly or privately operated shelter designed to provide temporary living accommodations. [5]

On a typical day it is estimated that 754,147 people are homeless. Of this population 338,781 are unsheltered and 415,000 are living in transitional housing or an emergency shelter. [6] Obtaining an exact count of the true number of homeless people is extremely difficult due to the transient nature of this population. The difficulties associated with locating and working with an unsheltered homeless population lead us to look toward the sheltered population.

Gaining access to the homeless population for user research was very difficult. We approached the human subjects committee to request access to the population for initial user research. The chair of the committee indicated this population was protected and in order to work directly with them we would need someone trained specifically in the special needs of the population. Due to this limitation we had to find other ways to gather our initial user research.

Since we could not talk to representatives of the population directly we obtained approval to talk to counselors from three different agencies in that worked specifically with this population. The insights we gained from talking with the counselors were important for us to understand the issues of this population. Our goal was to better understand the reasons for homelessness and the different groups within this population.

The interviews with counselors led to a few interesting points which influenced our design. The shelters required the residents to work or volunteer in order to help them get accustomed to a steady job. The residents also have meetings they need to attend and doctor's appointments to keep track of. These tasks plus chores within the shelter keep this group very busy. The counselors mentioned that the residents often had difficulty keeping track of their schedules. They frequently miss appointments or forget things they are supposed to do. The general state of crisis that they are in contributes to the lack of organization on the part of this group. This group also has trouble remembering what sorts of things they should be doing for their health. People recovering from substance abuse also often need positive reinforcement to stay on the right track. Another interesting insight from the counselors was that to even their surprise, most of the people in the shelter had cell phones. The counselors said this was one of the first things the people would acquire when they had any money.

PROPOSED SOLUTION AND DESIGN
We saw a need that we could address in the scheduling and reminder problem. We also saw an opportunity in the ubiquitous nature of cell phones among this population.

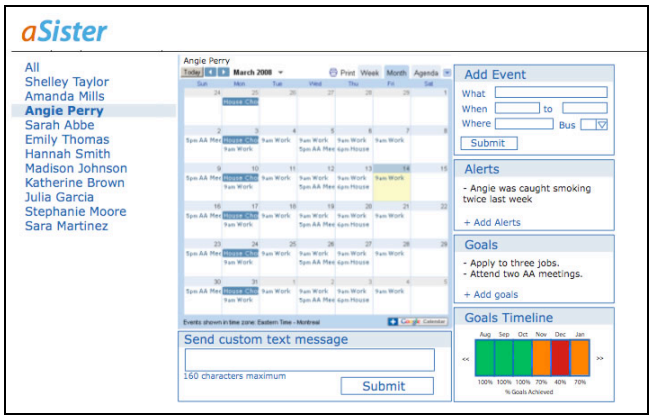

Figure 1. The aSister calendar and goals interface.

Our initial idea was to build a system that would allow the counselor to sync their computer with a calendar application on the person's cell phone. The syncing process would give the person their schedule for the week along with setting up event reminders. This idea rendered some constraints on availability of a calendar application on the cell phone of the homeless person to be compatible with the counselor's calendar application to achieve synchronization. The absence of any standard cell phone software would potentially yield a platform-centered solution. We liked the idea of a reminder system but wanted to design something that could be more universal.

After researching various cell phone technologies we selected SMS (Short Message Service) as the delivery system for the calendar and reminders. SMS was chosen since a majority of the handsets and cell phone providers currently in use support SMS. The ease with which large numbers of messages can be customized and sent by SMS text messaging, along with its availability and comparatively low cost, suggest SMS as the appropriate technology for our solution.

From these insights we came up with aSister, an SMS cell phone reminder system. [Figure 1] aSister assists homeless people in their struggle to become productive members of society. The purpose of our system is to help them better manage their schedules. aSister also assists them by providing important health tips, advisory information and motivational messages that could be beneficial in their attempt to overcome their difficult situation.

aSister

We designed the aSister system to be flexible enough to be easily adapted to a variety of shelter models. We have modeled our example after the way Amethyst House, a substance abuse recovery shelter, works with their clients. When a client first arrives at Amethyst House they go through a probationary period where they are required to meet a certain number of goals. The goals include getting a job or volunteer position, attending substance abuse recovery meetings and getting medical care.

When a person first moves into the shelter they work with a counselor to set up goals, a schedule and an aSister account. The counselor takes this information and enters it into aSister using the counselor interface. [Figure 1] The counselor sets up reminders for all of the events the resident has for the week. The counselor works with the resident to determine the lead-time for the reminders of their appointments. The counselor also enters the goals in the goals interface and sets up reminders related to these. The counselor can use aSister to send appropriate health and motivational messages at any time based on the counselor's assessment of the resident's progress. The counselor meets with the resident on a weekly basis to review their schedule and goals.

Once the resident has met their primary goals they are removed from the probationary period. At this point in time the counselor and the resident would revise the list of events for which they should be reminded. The number of meetings with the counselor also starts to decrease. As the resident starts to better manage their own schedule, the number of reminders would also decrease. As the resident makes progress aSister would be transitioned to a mentor in the house who would help the resident stay organized. The mentor would serve a similar role to that of counselor but would be more of an encouraging peer than an authority. The mentor would be someone who has been through a similar situation and has been successful with the system. Before the client moves out of the shelter they would have control over their aSister account. The counselor and the mentor have the ability to stay in touch with the person using the system.

The web interface [Figure 1] gives counselors the ability to manage the schedules of all of the clients that they are working with. The counselor sets up an aSister account for each resident and enters their schedule, goals and contact information. When the counselor logs in to their aSister account they will see all of the residents they are currently working with. The counselor can switch between residents by selecting the resident's name from the menu on the left. Within this interface the counselor can enter a new event for the resident, send a text message instantaneously and update the goals interface. The goals interface allows the counselor to monitor the resident's progress. At the meeting with the resident, the counselor checks if the goals have been completed. As the counselor enters the information about the completed goals into the system, the goals timeline is updated in the interface. This 'goals timeline' is a visualization, which helps the counselor to keep track of the behavior of the client over a period of time. The alerts box is used to note possible issues with the goals.

PROTOTYPE

In order to test the system we built a functional prototype of the application. The aSister prototype is a JSP application hosted on an Apache Tomcat 5.5 server. It makes use of

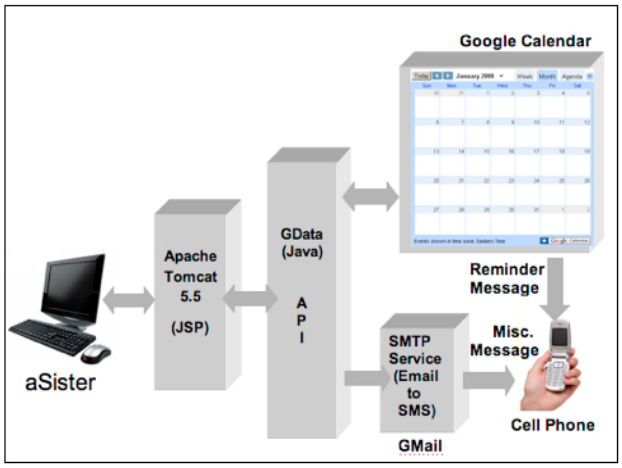

Figure 2. The aSister prototype system.

Google's GData (Java) API to access the Google Calendar and the SMTP GMail services. [Figure 2]

When the counselor logs in they see the main screen that shows a list of names of residents they are working with. Clicking on the name of a resident sends an authentication request to Google servers and retrieves the Google Calendar of the resident. The prototype allows the counselor to add an event to the selected calendar. To add a new event, the counselor provides the event date, start, end times, event location, and description along with the time in minutes before the event start time when the reminder should be sent. An SMS reminder is sent to the resident at the time entered during the event creation. The reminder message contains the event time, location and other information about the event. Additional information such as transportation information can be included.

The aSister prototype also allows the counselor to send an instantaneous text message to any of the residents they work with. This feature relies on a feature provided by most cell phone service providers to deliver a text message to their subscribers by sending the message as an email to the email addresses linked to the cell phone numbers. These email address typically have the format <cell number>@<carrier>.com. By storing the cell phone number and service provider information for each of the residents, aSister generates the appropriate email address and send the message and subject entered on the aSister screen as the subject and body of the email. This email is then delivered as a text message by the cell phone service.

JUSTIFICATION FOR THE SOLUTION

Recent years have seen increasing cell phone usage among homeless people [2]. The Fort Worth Star-Telegram spoke with workers at Fort Worth's homeless shelters who said the number of guests with cell phones is growing rapidly, and some shelters have even reported problems with too many guests seeking outlets to charge their phones. [3]

Use of text message alerts in health care has been tried before and was found efficient in reducing the number of missed appointments. [4] Our solution integrates the ability to send automated reminders based on the schedule of homeless residents along with other customized messages.

Since aSister uses free services like Google calendar it does not add to the cost of the solution. Instead of letting the homeless pay for the text messages received, we would seek funding for these messages from grants and approach cell phone providers about free or reduced rates for messages.

USER RESEARCH AND EVALUATION

Once we had a functional prototype to send the messages we did a feasibility study of our system with busy graduate students. All of the students had a full course load in addition to outside work commitments and other meetings. The goal of this test was to gauge the effectiveness of the system to help subjects in keeping up with their busy schedules. We ran the test for a workweek sending them reminders of the schedule that they had provided at the beginning of the test. During the test we asked the users to take notes of their reactions to the messages they received. At the end of the week we had a group debriefing session with the participants. The general reaction was positive with some students remembering events they would otherwise have missed.

Insights gained from this study were the student's desire to have more control over the management of their schedule. They also suggested that if the messages have a more human touch, it would improve the acceptance of the system. After this study, we decided to customize the messages for each individual rather than using the default message sent by Google Calendar. Further all messages received by the user would display the name aSister. We also implemented the transitioning of the system to a mentor. Messages from this person would be seen as being from a peer and not an authority figure.

After a great deal of work with the human subject's committee we were able to obtain approval for a small-scale implementation of our system in a homeless shelter that houses women recovering from substance abuse. We provided the subjects with pre-paid cell phones that were linked to their newly created aSister accounts. We ran the study for a workweek during which the counselors at the shelter used the system to send the subjects reminders of their schedule and custom text messages.

At the end of the study we conducted interviews with the counselors and the women to get their opinions about the system. The counselors indicated that the system was easy to use, contrary to their initial perception. The counselors told us that it worked well with part of their mission to help the women create and manage a schedule.

The women were overwhelmingly positive about the system. They indicated that it helped them remember events they might have forgotten. In contrast to the views expressed by graduate students this population liked the idea of somebody else managing their schedule. One woman said, "I liked it. Because it was still my schedule but somebody else was making sure that I knew exactly what time I had to be there so I didn't have to remember. But no one was TELLING me what I had to do." They also expressed a need for such a system. Another woman said, "I thought it was really helpful. I am very forgetful and even if I write it on a calendar I still forget. Then there are times of the day where you just can't look at the clock every five minutes...But I think it would be beneficial especially with somebody in recovery…I think it would be beneficial to a lot of people."

One of the women created a reminder system using the reminder feature on her phone to input her daily schedule. Every day she enters the things she needs to do into the reminder feature. She receives a reminder for every event she has put in. "I get preoccupied that is why on my own cell phone I have my reminder, I use it. It is my alarm clock everything…I just go to my reminders click it in there…It just lets you set the time the date, everything and exactly what you are reminded of…I wouldn't be able to do without it I tell ya." Seeing how this woman was using a reminder system to help her keep track of her schedule helped us to see the long-term potential of our system.

CONCLUSION

The end goal of this system is to help homeless people in the transition from being a consumer of external services to an independent productive citizen. Feedback taken from professionals working with this population and our user study suggest that this system has the potential to bring a positive change in the lives of sheltered homeless people.

IMPLICATIONS

Homeless people are an atypical population for a ubiquitous computing project. Our work shows how basic computing devices such as a simple cell phone and SMS have become accessible to many different parts of society. All of the shelters we spoke with indicated that cell phones were present among this population. Our work suggests that there may be more that can be done in this area with low cost ubiquitous computing devices.

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