Street Stories: Cellular Phone Platform

Seema Moorjani
School of Information Management Systems
University of California, Berkeley

INTRODUCTION / MOTIVATION

Street Stories is a project that has emerged from the School of Information Management Systems at UC Berkeley in Spring 2001. Professor Sack and a few of his students came up with this idea to create stronger communities within neighborhoods by having audio narratives available for people to listen to while walking around the area. Listeners would hear these stories, recited first-hand by the people who experienced them, as they are walking around the relative areas of the neighborhood. It would also give visitors a unique experience within the community that they are likely to remember more than just visually due to the voices heard by the residents in these stories.

BACKGROUND

The Street Stories project was designed to keep audio files on a portable device that people could carry around and be able to listen to on this device. The portable platform to design the product on was debated back and forth during the project's initial stages. A cellular phone seemed like a convenient platform, but the technology for putting an application like this on such a device was not feasible at the time of the project's commencement. Technology for detecting location information was not prevalent in cell phones at the time, and the few phones available that would support such applications were too expensive for many people to afford. The reasonable choice for the Street Stories platform given this information was another type of portable device that seemed

to be growing popular – the Pocket PC. One specific type of Pocket PC, the Compaq iPAQ, was chosen to implement the design of the project.

A couple of years later, a lot has changed in society. The popularity of the iPAQ has increased as predicted, but the device is still too expensive for the average consumer to buy. Cellular phones are cheaper, owned by more consumers than ever before, and technology to customize and develop applications for cellular phones is more available and more advanced. Possibilities for cell phone applications are less limited than they have been in the recent past. One type of emerging platform is BREW – Binary Runtime Environment for Wireless.

BREW was introduced by Qualcomm, Inc. in January 2001 as a way for cellular phone users to use their devices for other tasks besides talking on the phone. The newest version of BREW uses the Global Positioning System (GPS) so the phone's location information can be retrieved at any time. There are methods given by BREW to interact with the GPS that is on the cellular phone.

RELATED WORK

The Street Stories project has already been implemented on the iPAQ device, and is fully functional with an attachable GPS device and additional memory in the form of an external memory card. All of the audio narratives as well as the database that is used to determine which story to play depending on the location of the user are on the iPAQ device itself. The application is relatively fast since all of the files are stored on the

device. As of now, there are stories compiled for the Mission District in San Francisco, California, but if other narratives are to be added in the future, the amount of memory available for these audio narratives becomes an issue.

The iPAQ device has been shown to potential users in order to determine if the user interface and platform are ideal to the average user. User testing revealed that people found the iPAQ device to be too heavy. Another complaint users had with the iPAQ was regarding the low quality of the audio as heard through the iPAQ speaker, as well as the fact that other people around them could be disturbed by the noise. Users were also skeptical as to whether they would purchase an iPAQ in the near future due to the high price of the device. The fact that additional components need to be purchased for the application to run was also a deterrent for users.

A change of platform for Street Stories would solve these problems and potentially satisfy users. Since the project started a couple of years ago, cellular phone usage and technology have developed tremendously. There are more than four cellular phones for every ten people in the United States alone. This is a huge number of potential customers as opposed to the iPAQ, which has just over two million customers possibly due in part to the cost of the device. BREW has become more popular and more advanced, now allowing for obtaining location information of a cellular phone using GPS technology. Verizon Wireless is a service provider for BREW in San Diego, California, and currently has over one million subscribers to the service. The recent developments in wireless

technologies coupled with the increasing number of cellular phone sales suggests that changing the portable platform of Street Stories would be beneficial.

DESIGN / ARCHITECTURE

In order to develop Street Stories for the cellular phone platform, the original design needed to be altered. Since cellular phones are small and have very limited memory, the database of audio narratives cannot be stored on each individual cellular phone. A server was implemented so each phone could communicate with this server to get the minimum number of audio files needed depending on the location of the phone. Since BREW does not currently support the playback of WMA files, the audio narratives needed to be stored on the server machine in MP3 format.

The server organizes the MP3 audio files using a MySQL database of latitude and longitude coordinates. BREW-enabled cellular phones wirelessly connect to the server and send their location coordinates to a PHP script. The PHP script takes the appropriate steps to query the database for the names of the files within the phone's region. The server returns the relevant file(s) needed based upon the location of the phone. After each narrative has been downloaded to the phone, the MP3 file is played to the user through the cellular phone speaker. Attaching a hands-free device to the cellular phone and listening through the earpiece can improve the quality of the audio.

MEASUREMENTS / RESULTS

A few problems were encountered along the way to putting Street Stories on BREW-enabled cellular phones. Integrating the MySQL database with PHP scripts and the Apache server was time consuming and difficult due to lack of updated documentation for the newest versions of software. Once everything on the server side was settled, the client side was not difficult to configure due to the relatively simple BREW API.

A BREW-enabled cellular phone could not be ordered due to budget and time constraints. However, an emulator of a phone is supplied with the BREW SDK, which is available at http://www.qualcomm.com/brew/. The BREW emulator has the capability to simulate moving around by reading a file of GPS coordinates to use for the location of the cellular phone. However, documentation on how to use this feature of the emulator could not be found. Because of this drawback, a map is available to send location information to the emulator depending on where the user clicked on the map. This data is transferred in a similar way that the audio files are transferred from the server to the cellular phone.

There are many ways to retrieve data from a server using the BREW API, but the one that is used for Street Stories does not have the capability of streaming the audio files as they are downloading to the phone. Therefore, as of now, the user must wait for the entire MP3 audio file to be downloaded before hearing the contents of the file, which may seem slow, especially as the user gets far from the location of the server.

The speed of the emulator in comparison to an actual BREW-enabled phone is said to be identical, although this aspect cannot be verified without a compatible cellular phone to

test the Street Stories project. Similarly, it is not clear as to how accurate the memory monitor displayed at the bottom of the emulator is, and if different BREW-enabled phones have different speeds and/or memory constraints.

CONCLUSION

The cellular phone is the ideal platform for the Street Stories project. The portable device already has a wide audience to cater to, as well as the ability to deploy the project on different types and models of cellular phones, which will not restrict the type of device required to use the application like the iPAQ, which is the only Pocket PC device that can be used to run the application.

Changing the platform of Street Stories also required a server of files to be created, so that the portable device can run the application with as little memory as possible, allowing for possible future expansion of the project to many other locations.

The cellular phone is the most sensible platform for Street Stories for other reasons than just memory availability and easy accessibility to a large number of users. The purpose of a phone is to talk and listen to others, and in most cases people are telling and listening to stories. Street Stories is similar to this in that people are telling their stories, while others are listening to these stories. However with Street Stories, the user of the application can not only listen to stories, but also be able to visualize them more vividly due to the fact that they are in the setting of where the event occurred. They are also listening to these

experiences first-hand from the people who actually witnessed or encountered them, which results in little, if any, alteration of the original stories.

FUTURE WORK

Even though the majority of the specifications that were laid out for the first phase of the project have been implemented on the cellular phone platform, there are still many more improvements and modifications that can be made to the project.

Currently, the BREW-enabled phone will download the appropriate audio file to the phone, and then play the file once the entire file has been downloaded. It will only repeat this process when the user changes location. Stories would flow better if multiple files, all within a certain range of the user's current location, could be downloaded at the same time. An even better modification would be if the audio could be streamed so that the file could start to play the first part of the audio while the rest is being downloaded, or to download, play, and then discard each stream of the audio files.

The Street Stories application only allows for a static database of files to be supported. Adding the capability to record audio using the portable platform and store the audio at a particular location would be a beneficial feature. Users might also want to add narratives to certain locations for other users to listen to without having to be at that location. Implementing this feature results in the need for other restrictions such as maximum length of an audio narrative and where to insert the narrative so that the story of the area still flows naturally and makes sense.

Although user testing has been done on the Street Stories project using the iPAQ platform, testing still needs to be done with the cellular phone platform. Using a BREW-enabled phone for user testing will be an accurate way to measure the usability of the new platform as well as to evaluate the user interface.