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CSE 537S
April 28, 2008
Class Project

Amusement Park Mapping Service Project

Introduction

We propose a mobile application and infrastructure to allow users access to detailed, customized guide maps for a given location. Specifically, we are proposing a map application in the context of a user at an amusement park, although our project is to design a framework that will be generic enough to be usable for other locations such as museums, business districts, and shopping malls. Our project would consist of three parts:

1. An application that could be downloaded onto a cell phone/PDA
2. A server that would provide map information when requested by a user on their cell phone/PDA
3. Local infrastructure that would interact with the application when the user is in the general area

A simple scenario for this project would be to imagine a customer at an amusement park. The user would download the map of the amusement park using our application. She would then be able to look at the application to see descriptions and locations of the various rides. If the user's phone is GPS-enabled or otherwise location aware, the user could then see where she is in relation to desired rides. The amusement park could also broadcast announcements, ride wait times, or other current data that would be useful to the user's phone. This would make the experience at the park much more enjoyable. Additionally, it is not hard to see how this could have application in museums (where users could interact with exhibits using their phone or get self-guided tours), shopping centers (to see where shops are and have shops transmit deals or sales to the phone), and restaurants (to make reservations and order or pay for food). Once the basic application and infrastructure are established, it is a nearly trivial exercise to expand the scope. By keeping the application interface generic, we would hope to be able to apply this project for other uses that we haven't even thought of yet.

Existing Products

Although there are existing products that may seem similar to ours, we are confident that our solution provides a complete, unique, and economical approach that is vastly superior. The two major existing solutions are Disney's Fast Pass technology and Lo-Q's ride reservation system -- which is used by Six Flags and Dollywood as Fast Lane and Q-bot respectively. Both systems are based on the idea where the visitor is able to save a place in a virtual queue instead of standing in line. Once they are close to their actual ride time, a notification is sent out. Special hand held devices are loaned to the visitor, who must use them to reserve a slot at a special kiosk located in front of their ride. Disney is hoping to expand on this by introducing a way for guests at their Disney hotels to reserve their ride slots in advance, and

receive a notification via their cell phone prior to their ride (via an SMS or MMS). There are obvious pitfalls to these systems. These solutions only offer a reservation capability. The user has no knowledge of the estimated line wait or the status of their rides. The user must still rely on maps placed on the premises or physical maps to locate their ride. Our services provide a technology that complements existing ride reservations. We give the users a way to know the location and the status of the rides, restaurants and attractions. We wish to capitalize on the fact that no existing solution yet provides mapping services for amusement parks in promoting our product. Not only do we save costs by eliminating the need for amusement parks to provide and maintain costly handheld devices, we also provide a multi-tiered solution. Operators who cannot afford to provide any infrastructure investment in live-data statusing can easily provide users with a park mapping service where attractions and restaurant information are highlighted. Our framework is scalable and can easily be applied to historic sites, parks, museums, business districts, or even shopping malls.

Project Components Overview

There are four component aspects to our project that needs to be addressed: 1) the client side application used on the cell phone; 2) the map servers; 3) the map specification; and 4) the attraction live-status reporting service.

The cell phone application will be built on the Google Android platform for ease of deployment. Built-in support for Gzip, Internet connectivity, and location awareness capability are key technologies that we rely upon. The Android platform provides APIs for everything we will need (except perhaps an SVG manipulation library). Our application will provide a simple framework for downloading, managing, and viewing maps for a certain region. Users would create an account and log in to the application when they sign on. This allows for us to verify the user and also save their preferences. Using the location awareness capability, the user can be shown a list of maps near them for download. The map viewer will allow the user to browse the amusement park grounds. It will display the available attractions. Additionally, each map data file will have associated meta file links to the web server responsible for that map's attraction status information hosting. When using it in a online mode, the location awareness can pinpoint the user's location. It will then try to see if there are any attraction statuses reporting services available. If so, the ride or restaurant status can be also presented to the user on the map. Each attraction supporting this feature will need to manually update the information, but this can be simple to do (see attraction status reporting below).

The maps and other attraction information will be hosted on a centralized web-server available for secure download (https). The server would run Apache, and we can write simple Python or Perl scripts to handle data requests. A SQL server can be used to maintain any live data needed. Digital Rights Management can be used to protect an individual amusement park's proprietary information. We could also set it up in the future for maps to only be downloaded within a local wireless LAN within each region. All interaction from the client would be with the web-server. User login information could be used when interacting with the maps to set reservations for a ride or restaurant.

The maps are based on SVG Tiny to take advantage of their reduced overhead of mobile profiles. The size of the maps are further reduced with Gzip compression. Each map has a separate XML attraction information file. Pedigree information is

also managed so that only current maps are downloaded. Most importantly, each map also contains a link to where it can find live-status information. Standard validation and encryption for certain segments of the map data is employed to guard against tampering.

The final module is the attraction status reporting service. There are several ways we could accomplish this feature. Each option and level of sophistication would depend on how much the park operators are willing to invest in the infrastructure. One possibility would be an application that can be downloaded onto ride operators' cell phones. They could then log in and input the real-time data about the ride to our server, which would then send down the data when the user is either near the ride or specifically requests information about the ride. The web could be used for data entry -- something as simple as CGI and Perl or Ruby On Rails. Another option would be to create some Wi-Fi hardware that would have a limited broadcast range (shown below in the Interaction Diagram). The operator would then be able to enter specific data, and the ride status would be picked up on the user's cell phone application when they came into range. This would be especially applicable to a museum setting, where the local access point would enable the playback of a tour entry when the user goes into a room or area in the museum. The most complex service would be automated sensors that would upload data without any human interaction whatsoever. This would be expensive and risky due to the inevitable hardware issues that would arise. Our initial product will be focused on the simplest solution to minimize our time-to-market. Thus, our current plan is to have the amusement park provide a web-server that will be able to provide live ride information back to the map browser application on the software.

Challenges

There are several challenges in this project. One is simply in creating the maps for the attraction. The application needs to be able to be viewed on a small screen and allow the user to quickly move around the map (and zoom in/out) so that they can find what they're looking for. It will also be a challenge to make the interface generic enough that this can be applied to more than just amusement parks.

Another challenge is managing the proprietary map data of the different customers. Once the maps are downloaded to a user, we do not want them to be able to distribute the maps. We also need to be able to isolate one company's maps from those of another. This can be controlled with Digital Rights Management which is a technology for the secure distribution of copyrighted files.

Another challenge is providing live data to the users. For the amusement park, an example of live data would be wait time information for the ride lines. Disney's Fast Pass technology allows users to reserve a time to ride. This is to reduce the user's wait time in line. This only allows the user to reserve a ride time, it does not provide current line wait times. So we will need to come up with an interface that allows multiple sources to enter data into our web-server's database, in order to update the status in real time.

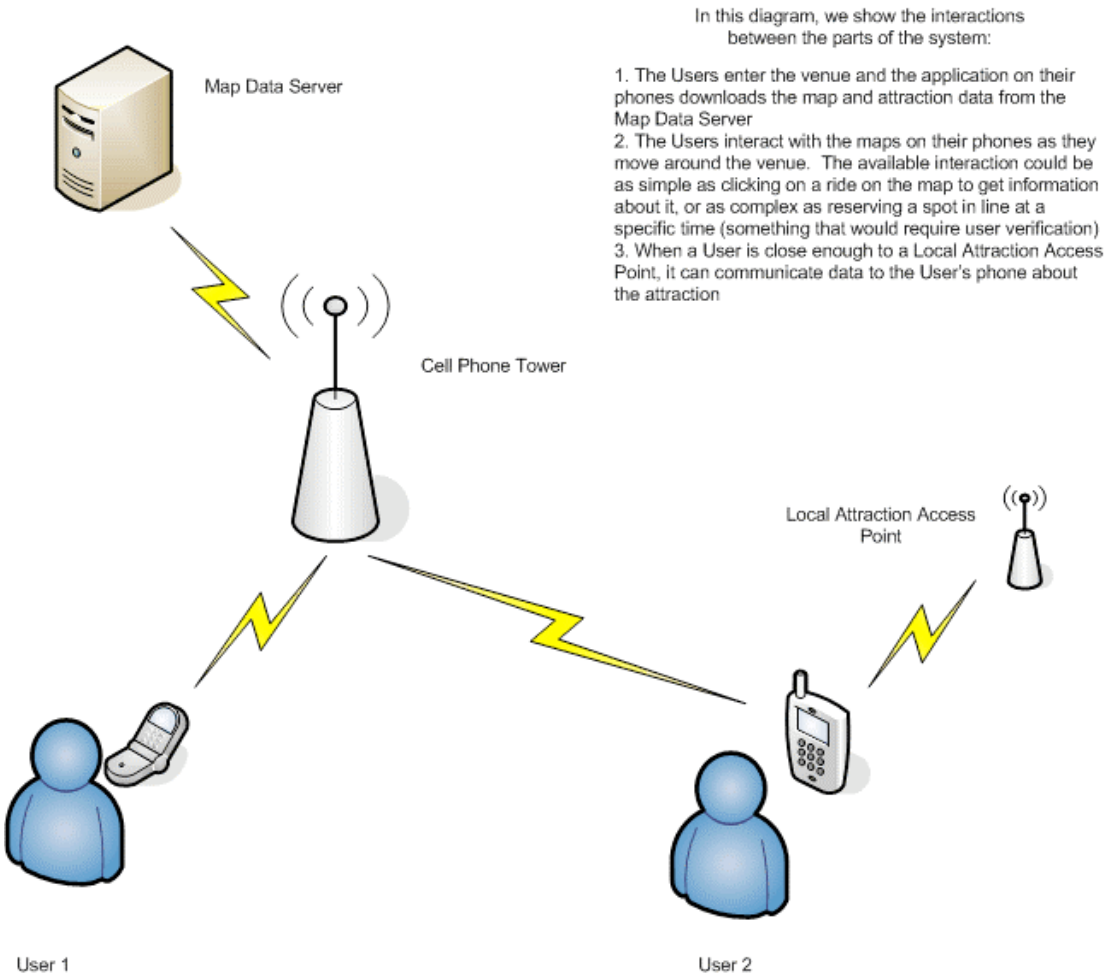
Advantages

The best feature of the service is that it will be absolutely free for the user. There are no subscription or access fees. This service would be paid for by the park and provided by the amusement park as an amenity. This is something the park could

advertise to increase the attendance to the park. In addition to being free, as long as the user has a cell phone, no new devices would be needed to access the service. Users with GPS enabled cell phone would be able to access more advanced features such as the user's current outdoor location. With this information, the user would be able to get directions to anywhere else in the park from their current location instantly. These directions would update as the user moves through the park.

Scalability is another huge advantage of this system. Once the system is in place at amusement parks, it can be easily implemented at other outdoor tourist attractions. Indoor tourist's attractions such as museums or shopping malls can also take advantage of this system. This system could be used to implement a self-guided tour with the assistance of an application that the user could download. This would provide the user with an application without the need to stay connected to the Internet or GPS.

Interaction Diagram



Revenue

This project would have significant revenue-making potential. The most obvious possibility would be to have this application be ad-supported. This would be the ultimate in targeted real-time advertising, since the user is in the park and their interests can be tracked by the activities they do in the park. The philosophy behind this would be similar to that proposed by the proponents of free municipal wi-fi networks. An additional revenue stream could come from licensing the application and interface/infrastructure to venues that would populate the data and use it on their own. Another option would be to do the work ourselves (such as making and maintaining the map) and simply provide this as a fully-featured service. Businesses that use our service or software would be able to advertise a rather significant improvement in the customer experience. For us, the biggest cost would be the initial development of the software and infrastructure. After that, there would be another fixed cost per project to create the map and attraction data. But once that is done, the additional marginal cost is minimal - simply maintaining the map and attraction data, and doing any special announcements. If all our server equipment was centralized, this would also allow us a significant economy of scale savings. If we did have local infrastructure to set up, this would require some extra cost and time.