BARMOTIN- A Voice Controlled Mobile Tourism Information Network for Barbados

David Byer and Colin Depradine

University of the West Indies,
Cave Hill Campus, St Michael, Barbados
david.byer@gmail.com, colin.depradine@cavehill.uwi.edu

Abstract. Throughout the world, mobile devices have become one of the standard means of communication and data access. With the rapid and continual improvement in technology, these devices have taken on several of the roles that were once restricted to laptops and desktop computers. One of the fastest growing areas for mobile devices is that of GPS navigation. Work in this area has produced a variety of navigation and information apps using GPS satellites. These apps have become very popular in developed countries and as a result, visitors to developing countries generally expect to gain access to some form of information system however basic. This paper presents BARMOTIN a voice controlled mobile tourism information system for the Caribbean island of Barbados.

Keywords: Mobile, tourism, networks, heritage, android, GPS, navigation.

1 Introduction

Barbados is the most easterly island in the Caribbean. Tourism is its main foreign exchange earner and after the civil service, is the second highest employer. Since tourism is the primary foreign exchange earner, the use of technology is seen as an essential mechanism for improving the visitor experience and encouraging multiple visits in the future. BARMOTIN provides the fundamental features expected of a tourism oriented app, such as directions to selected locations. However, it also provides information on the places of interest the user is currently visiting, since some of the places are unmanned or unknown and the visitor may only obtain very limited information about its history or culture. Another function of the system is to show locations and amenities which are in close proximity to the user's current location. For example, the user can select the nearest church in their denomination or the nearest doctor with a specific specialty.

The system provides an alerting system for the user in case of emergency. This allows operations control to send the relevant assistance to the user even if the user does not know which part of the island they are located. The user can also open an Instant Message session with operations control for any queries. The system also provides a

S. Yamamoto (Ed.): HIMI/HCII 2013, Part II, LNCS 8017, pp. 347–354, 2013.

visual and audio dictionary of the local vernacular. This dictionary will assist the visitors when they have to interact with the local population.

2 Contextual Aware Systems

The word *context* may be defined as the conditions under which an entity exists and which may influence and or change the state of the entity. For example, a context aware system may change and adapt to the location of the user (Schilit, Adams, Want, 1994).

Context aware mobile systems depend on the location of users and the surrounding cellular networking infrastructure for them to work efficiently. They also rely on information about the user and his or her environment so that the system can come up with the best ways to serve the needs of the user (Cohen et al, 2004).

There are two types of context awareness; active and passive. With active context awareness the application immediately and automatically changes its behavior to reflect the newly discovered context. When the context changes, the user no longer has access to the previous behavior as the current one takes it place. With passive context awareness the application also changes and adapts. It presents the new data to the user and if they are interested they can access it immediately or the context can be made to persist, for the user, for access to the data at a later date (Chen and Kotz, 2000). The BARMOTIN system employs both methods in its user interface.

3 Existing Systems for Barbados

Currently there are a small number of mobile apps that can be used by visitors and locals to navigate and find various sites and businesses within Barbados.

3.1 iBarbados - Destination Guide

This app presents articles on dining, beaches, spa experiences and more. It has an integrated business directory with video promotions on these businesses and tap-to-call functionality. The app also has a reward points system for the users. With this app, the user is able to browse through branded merchandise, books and music. The app also has a search engine which the user can use to select the type of places they would like to stay while on the island. It also keeps the user connected to essential services (iBarbados, 2011).

The first notable difference is that this app has static content and has to be updated periodically while in the case of BARMOTIN, the data is added in real time. BARMOTIN's main focus is on the information the user receives when they visit a site and not on the commercial aspects of these sites. BARMOTIN is useful to the local population as they can learn the history and culture associated with sites in Barbados.

3.2 iLandGuide

This app provides the usual tourism information such as local habitats, transportation schedules and food. This app comes with a detailed map which shows your current position, your destination and the best way to get there. The map also provides places of interest and upcoming events like festivals and parties so that the user can plan for them. The app conserves roaming changes by storing all of the data on the device. The user can update the data when they have a WIFI connection. It also has a search engine which the user can use to filter places they would like to visit while on the island. Users are presented with shopping deals and coupons to be used while in the island (iLandGuide, 2011).

BARMOTIN has similar map functionality but includes features that cater to the user's health and religion by adding doctors and churches by denomination. BARMOTIN further enhances the user experience by providing emergency assistance in the event the user has an accident, falls ill, experiences vehicle trouble or requires the police.

3.3 BajanNav

BajanNav is an audio navigation app for the island of Barbados. It comes with a map that shows roads, towns and villages. It displays tourist attractions, gas stations, hotels, restaurants and other business. It is funded by companies who pay to have their business placed on the map. The app took over five years to develop and has a very accurate map, which shows over 10,000 roads, each of which were painstakingly plotted. The map is very interactive and the app can issue voice instructions. The app allows users to post data about traffic condition so that other users can be warned not to take a particular route. The app also has the facility to track users with their permission (BajanNav, 2012).

The BARMOTIN navigation features are not as advanced as those contained within this app but this is not its main focus. BARMOTIN's main focus is to provide information about local services and obtaining emergency assistance. BajanNav is updated every six months which means that the users are only able to see new additions twice a year but with BARMOTIN, updates are immediately available.

4 The BARMOTIN System

Figure 1 shows the overall architecture of the BARMOTIS system. It is essentially a network of mobile devices, cloud servers and legacy systems. It consists of 7 components and is based on Microsoft Windows, Java and Unix technologies.

4.1 The Information App

Conventional tourism marketing apps concentrate on the sites and activities that are current and are commercial in nature. Most of the tourists who visit a country not only

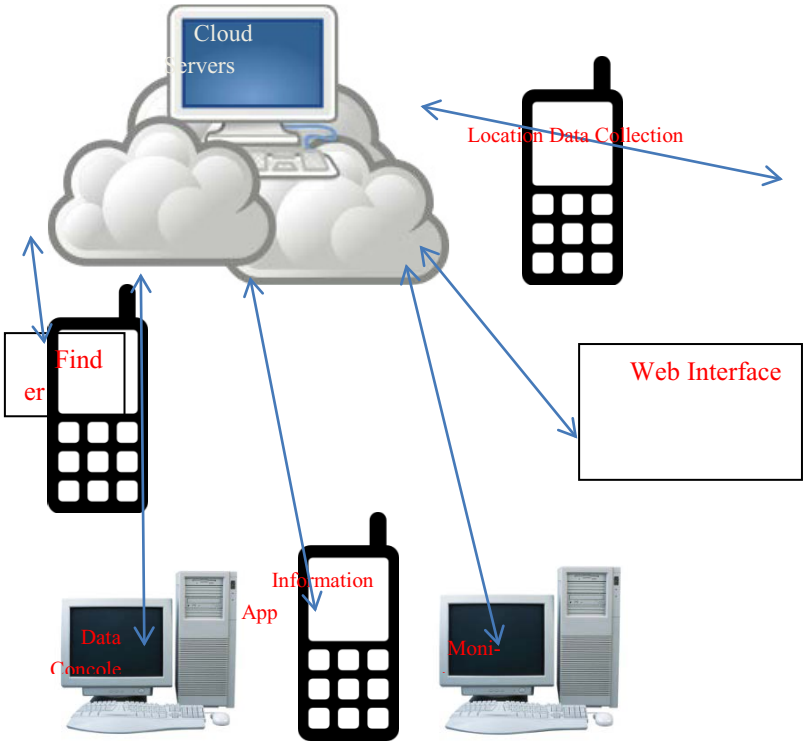

Fig. 1. The BARMOTIN System

want to enjoy the beaches and popular entertainment but they may want to know about the historical and cultural events that occurred at any particular location they are visiting. This app uses both conventional menus and voice commands for navigation. The user has the option to use voice commands instead of the menus. This app requires an email address and a user name in order to log into it. One of the features of the Information app is the proximity historical and cultural component. This component, once started, runs in the background and when the user approaches any location that is of historical or cultural significance he or she is alerted. The user then has the option to view data about the particular location. This may be in the form of text, graphics or video. The provided information includes the contribution to the Barbadian society and what it would have been like to live back in that era. The user may, due to bandwidth constraints or expense, choose to save the location in their favorites list. Later, when the users get to an area that has WIFI connectivity or a computer with internet access, they can view the data about the locations they have saved. The advantage of this feature is that when the visitor returns to their country they have a record of the places that they visited.

Another component of the Information app is the amenities finder. This component enables the user to find specific services that are in close proximity to where he or she is situated. This component also allows the user to find the nearest place of worship

according to their religious persuasions and denomination. If a medical situation arises, the user can use this component to locate the nearest doctor with the specialty that they require. The user can locate the nearest dentist as well as any nearby pharmacy. This module also finds the nearest banks by type and other essential places like post offices and supermarkets. See figure 2.

This component is not a voice driven navigation system but provides an interactive map that changes and gives directions in text form as the user moves to the desired destination. This component also provides all of the contact information for the professional services, such as doctors and dentists, stored within the system so that the user may call ahead before their arrival.

Another component of the Information app is the emergency assistance component. One of its primary functions is contacting the police. This can be done in one of two primary ways. The user can type a message and send it if they have time or they can just press the police icon. The user can also say the word *police* if they have the voice commands feature activated. In the latter two cases, an automated distress message is sent. Included in the messages is the location of the user. As soon as the message is sent a tracking process is activated in the background. This is done so that if the person is moved and the phone is still on, the police can still track them. This component also allows the user to request an ambulance or mechanical assistance in the event that the vehicle experiences technical problems.

The last component in the information App is the dictionary of Barbadian words and sayings. This component is both audio and visual. The user has the option to hear how the word or saying is spoken in the native vernacular. It also gives the context in which the word or saying is used and the historical or cultural anecdote surrounding the word or saying.

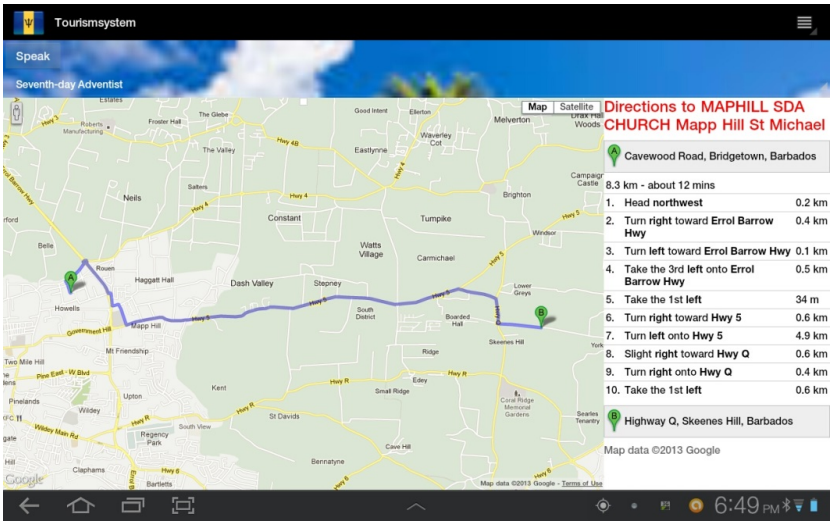

Fig. 2. Information App Showing Directions to an SDA Church

4.2 The Location Data Collection App

This is a mobile app that is used to enter the geographical data for each location and or service that is recorded in the system. The users who are collecting the data go to the relevant location and key in the required information such as the name, address, contact number and location type. Before the information is entered, the relevant data is gathered from a variety of sources such as the surrounding community or from telephone listings. This app only provides the statistical data about the locations but does not upload any historical or cultural data since this is performed by another module.

4.3 Cloud Servers

This system consists of three internet connected servers that form the core of the system. One of the servers is used to run all of the restful services which are the driving force behind the system. The restful services and Java programs provide the communication between the other servers and the apps. The second server is used as the database server and this holds all of the data that is relevant for the working of the system. The third server is used as the monitoring server for the emergency assistance component of the information app. This is a Microsoft Windows system but the operators can access it with any tablet that has remote desktop access.

4.4 Data Entry Console

Due to the time it takes to create a web page, it would be time consuming to manually create a web page for each location that is added to the database. This component allows the user to type the document in text form using a text editor. The user can also insert pictures. The system then converts the added data to HTML and uploads it to the relevant servers. This console can be used to add words or sayings to the database and has the ability to record the user as he or she says the word or saying. The user can listen to the recording and if they are satisfied, they can upload it to the relevant servers. This console is also used to upload any recorded video.

4.5 The Finder App

This is a mobile app that will be used mainly by the police and the mechanical teams that respond to emergency calls. Each team will have a unique key that they will enter into the finder app. This will allow the monitoring station to track where the police or mechanics are so that when a call comes in, it can be assigned to the nearest team. When a call is assigned to a team it pops up on their screen and once they accept it, a message indicating that help is on the way is sent to the user. During that time, the user can send updates on the situation which will go to the assigned team and to control. When the matter has been settled the assigned team will close the case on their app. This app has an interactive map that changes as the team moves toward the

distress location or if the person that made the distress calls has moved to a different location. This app uses both conventional menus and voice commands.

4.6 The Monitoring Station

This is used primarily to monitor the system for any emergency requests submitted by the users and to pass them on to the relevant emergency departments. Each department will have their own monitoring station and the central monitor will be used to pass cases on. The operator can open a chat session with the user and apprise them of the progress of the emergency response. This system also displays a map with the location from which the request comes so that help can be directed to the correct location, see figure 3. This is especially helpful for visitors who may not know where they are. The system for each department has a map to show where each of their teams are at any given time so that that closest team can be assigned the case.

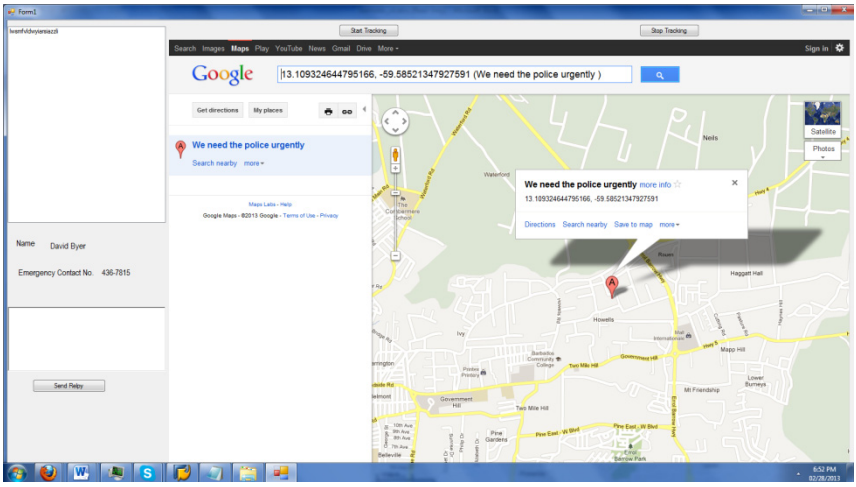

Fig. 3. Monitoring Station Showing a Request for Police

4.7 User Web Interface

Each user that uses the system must register and create an account, on the system's web site, before they can use the system. When the users register they have access to the information app which they can download. During the registration process, the user provides emergency contact information which can be used in the event of an emergency. The interface is also used by the user to maintain passwords. This is the interface that the user will use if he or she wants to view sites or locations that they have saved while they were out visiting and did not have the time to review.

5 Progress

The system is approximately 90% complete. The development process has now entered the data gathering phase. This entails collecting the geo coordinates of all the locations which will be featured on the system. This also involves collecting historical and cultural data and contact information where applicable on the sites to be added to the system.

6 Testing

BARMOTIN is now in the preliminary testing phase where all of the modules are being tested separately and then as a complete system. As the data is being gathered, each component of the system is being tested with that data. With the data collected so far the system has performed as expected.

References

1. BajanNav, http://accu-nav.com/spaces/ (last lccessed February 28, 2013)
2. Chen, G., Kotz, D.: A Survey of Context-Aware Mobile Computing Research. Dartmouth College Hanover, NH (2000)
3. Blakstad, E.: Creating a Mobile City Guide, Project Report, Norwegian University of Science and Technology (2008)
4. iBarbados- Island Guide, http://mobileroadie.com/apps/ibarbados, http://accu-nav.com/spaces/ (last accessed February 28, 2013)
5. iLand Guide, http://www.ilandguide.com/index.php (last accessed February 28, 2013)
6. Norman, H.C., James, B., Paul, C., Maria, E., Barry, L., Archan, M., Wolfgang, S.: Building Context-Aware Applications with Context Weaver. IBM Thomas J. Watson Research Center, Hawthorne, New York (2004)
7. Schilit, D., Adams, N., Want, R.: Context-Aware Applications. In: IEEE Workshop on Mobile Computing Systems and Applications (1994)