A Review On PocketAmbulance : Emergency Service

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Abstract - *In the last decade, many useful applications for mobile devices are designed to deal with health care issues under Android platform. In this application, an emergency service for mobile devices will be designed. In this, the position function of Global Position System (GPS) and a user friendly interface which will track the location of ambulance is provided. The application is capable for sending emergency notification or phone calls are also included. Nearest hospitals which provides ambulance service are also enlisted with their respective contact details. We How to connect people with this provided service for emergency service.*

***Key Words*: Global Positioning System; FireBase; On-tap; Call System; CCR.**

1.INTRODUCTION

India is developing country and the technology is growing even faster here. We are surrounded by technology and it plays a vital role in our lives. People travel in variety of places and many new things are discovered. But, many people don't have the proper knowledge of place where they are going to travel. In this case, if there is a medical emergency, they can use this application. The aim of our study is to build a user friendly environment for the clients, so that the customers can efficiently use the services provided by application. The application uses GPS. [1]

GPS imparts coded satellite signals which are managed in a GPS receiver, enabling the receiver to calculate all the parameters, that are, time, velocity and position. To calculate positons in three dimensions, four GPS signals are used. The primary objective of installing GPS in vehicles is to accurately locate them. This project will will start a new application that will use GPS, a smart system to track and dispatch ambulance to the clients. The nearest ambulance vehicle is located, the routings and bookings are done transmitted to the ambulance driver using GPS. Errors in the cost or any operational errors are expected to be reduced, through the use of this satellite based computerized tracking system. The location of every ambulance is updated periodically. [1]

Emergency notification System is also designed for the personal safety and security of the client. [3]

The paper organizes the following sections:

- Literature survey is explained in Section 2
- System level description in Section 3
- Android Application in Section 4
- Working in Section 5
- FireBase (BaaS) in Section 6
- Conclusion in Section 7
- Future Scope in Section 8

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2. LITERATURE SURVEY

To determine the exact location of of an object Sanaan Saud, Irtsam Ghazi, Muhammad Rashid Maqbool and Ihtisham ul Haq proposed GPS based autonomous vehicle based system. [1] For vehicle tracking system using GPS and Android OS, Amol Dhumal, Amol Naikoji, Yutika Patwa, Manali Shilimkar and Prof. M. K. Nighot also contributed. [2] Sih-Ting Zeng and Ching-Min Lee proposed a model for personal mobile notification application design for mobile devices. [3]

3. SYSTEM LEVEL DESCRIPTION

3.1 Android Application

The android application that will be designed is called "PocketAmbulance". Android Application "PocketAmbulance" is relatively easy to use and very simple.

3.2 Central Control Room

The main function of CCR is to continuously receive the status of Ambulance as well as the requests from the clients.

From the status of the Ambulance, the CCR computes the minimum distance from the client to the nearest Ambulance and then dispatches the nearest Ambulance to the client. [1]

3.3 Navigation Control Room

The navigation control system is responsible for helping the ambulance driver to reach the client's place as soon as possible. Navigation Control System is also responsible to perform the series of tasks pre-allocated to it. [7]

3.4 Graphical User Interface

For monitoring purpose, a GUI (Graphical User interface) has been developed. The location of all the nearby hospitals and clients is displayed using maps. It also maintains a database, i.e. FireBase, a cloud database used to keep a track of logged in users. [3], [8]

4. ANDROID APPLICATION

Android Application, PocketAmbulance's graphical layout has two buttons. First is the calling button which displays the details such as name, contact number, location co-ordinates, address of the nearby hospitals which provide the ambulance service. Next is the On-tap button, which allows the client to call the nearest ambulance with just one tap. As soon as the application is started, it will first verify whether the GPS of the device is on, if not then the application will provide a toast notification indicating to turn on the location services of that particular device. Next it checks the internet connectivity of the device, if not then again it provides a toast notification indicating the same. Secondly, it waits for the GPS to lock the location of the device. The latitude and longitude co-ordinates are displayed on the GUI, once the location is locked. [1], [3], [5], [6]

4.1 On-CLick Listener

The code starts to execute when a button is pressed of the user interface using on click handlers. A class is needed to specify which contains the instance, which are the on click handlers. The system waits for the client to press the button, once the button is pressed it will go on to execution, where the GPS co-ordinates are fetched and sent to a hard coded mobile number. A ClickListener is a listener object that reacts to 'click' events triggered from an input device, such as a mouse. An event object is passed through to the listener when the user performs a click on any of the mouse buttons/wheels. The event contains information on the event, such as the button that was clicked and how often it was clicked (single-click, double-click, etc.) [1]

4.2 Fetching GPS Coordinates

We can use the Android's Network Location Provider and Global positioning system for developing a location-aware application. GPS is very accurate but only works outdoors. It consumes more power but does not return the accurate location as soon as the clients want. Android's network location provider can be used for indoor purposes. While the client is indoors, it provides the required coordinates by utilizing Wi-Fi signals and cell tower. Also it adds less battery consumption to it. The client location is obtained by using both Android's network location provider and GPS in "PocketAmbulance". [1], [2], [5]

In PocketAmbulance, for finding GPS coordinates, a Location Listener is implemented. By means of callback, the client's location was found. requestLocationUpdates is to be called and passed to "LocationListener". When the client's location changes or status of the service changes, the LocationListener should implement several callback methods that are called by the Location Manager. In the Android manifest file, to receive location updates form GPS_PROVIDER or NETWORK_PROVIDER, user permission are requested by declaring the ACCESS_FINE_LOCATION and ACCESS_COURSE_LOCATION permission. [1], [2], [4], [6]

4.3 SMS/Telephony Manager

SMS messages are sent to the client from the android application itself. There are two different ways to do such type of things:

- Using Implicit Intent
- Using SmsManager class

In PocketAmbulance, SmsManager will be used to send messages. The SMS sending is facilitated by the use of SmsManager because it provides an opportunity to customize the functionality. On the other hand, the use of implicit intents means the use of SMS clients and built-in applications on that particular android device. [1], [5]

5. WORKING

Android Application, PocketAmbulance has two sides, client side and a server side. On the client's application, two systems are provided. On-tap System and other is Calling System. On the client's side 1st the login page will be displayed. The client has to login with the respective user ID and password. Further, the list of nearby hospitals is displayed. Then the list of hospitals is shown on map. The client requests for the service and the ambulance driver accepts the request via CCR (Central Control Room). The detail information of the hospital is displayed on the screen i.e., contact number, address, location coordinates, etc.

The working of CCR is as such that it already contains the numbers of both ambulances. As it receives a text message, it will perform a comparison test and detect whether the particular text message was from the ambulance or the client. If the ambulance is not busy, then CCR will receive the latest coordinates of the ambulance, after that the CCR will update the status of that particular cab as not busy, and then the ambulance will update its coordinates in every 10 seconds automatically. The flowchart of the CCR after receiving request from the user is shown in figure 2. [1]

5.1 Ambulance And Client

If the client requests for an ambulance and that particular ambulance is available, the CCR sends the client's coordinates to the nearest ambulance and also the CCR will send a confirmation text to the client, and after that the CCR will update the status of the ambulance as busy. Further, the ambulance will be guided by the GPS towards the client. [1]

5.2 No Vacant Ambulance, Only Client

If there is no vacant ambulance available and the client send request of the ambulance to the CCR using smartphone app, then the CCR will send a busy text or another hospital of the nearest location will be displayed to the client. The busy text can be set to something like, "Sorry, no ambulances available, please try again after sometime." [1]
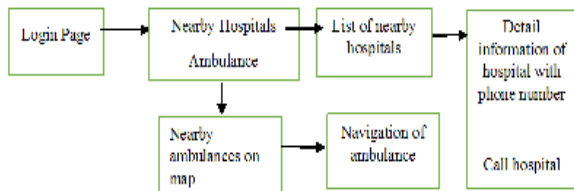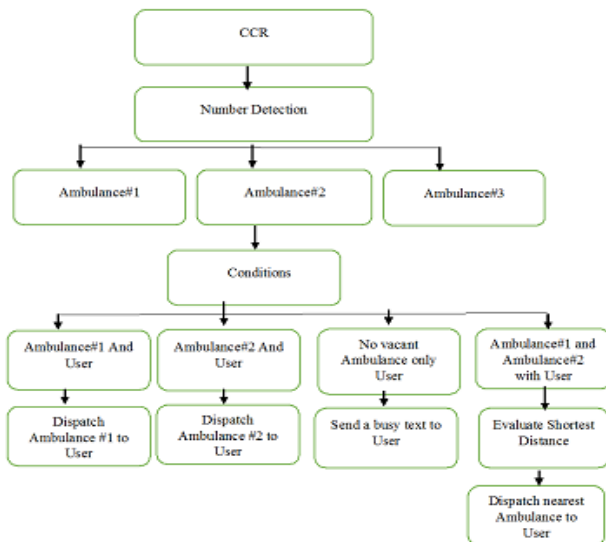

Fig – 1 : Application Module

Fig – 2 : Working Module at Back-end [1]

6. FIREBASE (BaaS)

FireBase is a backend service company and a cloud services provider which is based in San Francisco, California. The company produces a number of products for software developers building web or mobile applications. Firebase's main product is a real-time database which provides an API that allows developers to store and sync data across multiple clients. This service provides application developers an API that allows application data to be synchronized across clients and stored on Firebase's cloud. The REST API uses the Server-Sent Events protocol, which is an API for creating HTTP connections for receiving push notifications from a server. Secure file downloads and uploads for your Firebase is provided by Firebase Storage, regardless of network quality. It is backed by Google Cloud Storage, simple, a powerful, and economical object storage service. This cloud database is used to store images, audio, video, or other client-generated content by the developers. [8]

The main features of FireBase include the following:

- Cloud Messaging
- Authentication
- Real-time Database
- Storage
- Notification Alert

FireBase helps the user to develop the application, grow the client's user base. The main advantage of FireBase is each feature works independently. [8]

7. CONCLUSION

This proposed system will allow the central control room to track the locations of the ambulance driver and the client. The system allows to monitor the traveled routes via a web client which uses Google Maps API and indicate colors on the map to show if the device is on appropriate route. The general evaluation can be done by stating that this application will proved to be reliable in showing the positioning of the devices. It will also display the nearby hospitals with the detailed information such as the latitude and longitude co-ordinates, address of the hospital, contact information of the hospital so that the client can make a call to hospital. The general evaluation can be done by stating that this application will be proved to be reliable by calling the hospital programmatically. [1], [2], [3], [6], [7]

8. FUTURE SCOPE

There are several directions of future work. In future, analysis of the various aspects and variations of emergency services in different context is necessary. We would like to work on other emergency services such as fire brigade and police and expand the development of this application. We would also like to introduce the feature of offline maps, so that the client's job is easier. We would also like to introduce the feature of panic button. When the panic button is pressed the nearest ambulance will reach to the client without any hassle.

ACKNOWLEDGEMENT

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