

# ANDROID APPLICATION FOR MEDICAL HELP SYSTEM USING OSM

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## ABSTRACT:

With the growing social pressure, most people are facing health problems, especially a lot of high-level personnel problems and increased road accidents occur frequently. As mobile phones play more and more crucial role for people in day today life, it is the best choice that the system will be deployed for mobile devices, Mobile devices support Internet access, so when the user is not feeling well, he can log in the system using mobile devices, their status will be sent to the server. It observed that people are in unknown area and are in severe danger if they don't able to find hospital quickly. In emergency case a single minute counts so it is very important that applications must be used for decision making, maintain up to date status of the hospital. Saving the time which can be save life of the patient.

We have developed a location based emergency medical assistance system using OpenStreetMap (OSM) the healthcare centers or the nearest Hospitals are mapped by taking the waypoints of them. Our system comprises a database as central server of the detail information about Hospitals. Android device with application installed on it and its user. The application shows the markers of healthcare centers on the map along with audio information for visually impaired people and as per user requirements he/she chooses the nearest hospital and gets direction from current place to selected hospital using OpenStreetMap. So our main aim is to develop android application taking "Medical Emergency" into mind.

**Keywords:** *Android, Emergency Medical Service, Location Based Medical Assistance (LBMA), Location based service (LBS), OpenStreetMap, Tracking.*

## 1. INTRODUCTION

According to the World Health Organization, approximately 30000 people die due to road accidents every year and it is increasing year by year, while millions are injured or disabled each year. According to the research conducted by the Chief Researcher at the Abu Dhabi Department of Economic Development, Abu Dhabi, the capital city, alone saw 116,487 vehicle crashes in 2009 In addition, the Department noted that including both direct financial measurable objective cost and the indirect socio-physical cost, the accident cost in the UAE from 2009-2011 was about AED 17 billion which is equivalent to about US \$4.6 billion as per research results, the Arab region has been classified as the most prone to car accidents, including the UAE, and especially Abu Dhabi Despite having the proper response team, the problem arises in locating the accident.[1]

In our system we are dealing with the people who are affected in emergency as well as road accidents. We have developed an android application which help the people who stuck in emergency and they need medical help quickly, our application will guide to the user for getting proper help from nearest healthcare center or hospitals which is near to the location of user. It helps the user to save his valuable time at the time of emergency where he wants help immediately by using our application he will contact to nearest hospital as well as his family/friend members.



Figure 1: Road Accident

## 2. Developed system

Now a days everyone is dreaming for own vehicle's due to that road traffic is increasing in huge amount which causes for road accidents, not only number of vehicles but careless driving is also responsible for road accidents. So it is important that the person who caught in accident should get quick help which can be able to save his/her life. Now a day's almost 75% people are using smartphones which operates on android operating system, that's why it is great idea to develop an application for Android system. Our system mainly divided in two parts 1) Automatic accident detection and alarm sending mechanism 2) Navigation system.

In automatic accident detection and alarm sending mechanism, we are storing some information about user and some important contact numbers which will be helpful to user at the time of emergency. We are storing username, contact number, User E-mail id and emergency message as a user information for sending alarm to friends or its family member we are storing some important members of the user as emergency contacts for sending help messages. For detecting accident is happened we are using sensor system of smartphones. Every smartphone is having inbuilt sensor system, some system uses Accelerometer sensors, some system uses Proximity sensors. Our system supports both accelerometer sensor as well as proximity sensors.

When accident happens due to trash of vehicle's phone moves from its position in speed, sensor senses it and gives message to user that emergency system is activated if he accident is minor and user don't want any help then user is able to stop the system otherwise after 10 seconds of delay message will be send on users stored contact numbers with users current position. If user is in unknown area and he doesn't know anything about new area and he caught some medical emergency then, by using our application user will get proper information about hospitals, healthcare units, and medical clinics. For that if user is having our application installed on his phone it is too easy to find help.

When user opens our application he will able to see some options on home screen, by pressing on proper option he will get some names of the hospitals in this list nearest hospital will be on 1<sup>st</sup> position, when user selects any hospital then user will get proper map from its current location to the nearest hospital. For calculating minimal distance from user location to the hospital we are using Haversine formulae, this formulae calculates distance from user current location to the hospitals location after finding distance, the hospital which is having minimal distance our application gives list of hospitals in ascending order which is helpful to the user to choose nearest hospital. After selecting any of the hospital from the list user will get the proper map from its current location to the hospitals location. We are using googlemap for showing the route to the user but googlemap is having various routes to reach at one center, so we are using Dijkstra algorithm for finding minimum distance route which helps to the user to reach in hospital as early as possible. Dijkstra algorithm finds solution for a graph and gives result to the user which is minimum and this solution is considered as final result for traversing the graph so by using this this technique we are calculating the distance between user and hospital showing it to user in ascending order.

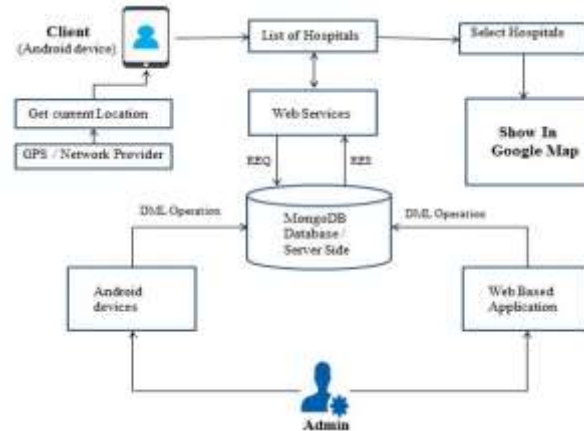


Fig 2. Activity diagram for hospital finder

As shown in the figure user is using an application which is developed by our team and when he searches for hospital he gets some results. After clicking on any of the hospital user will redirect to google map (OpenStreetMap) i.e. OSM. Then as google map guide to user on map same way our system will guide to the user towards hospital using navigation system

Discussing about Haversine formulae for calculating minimum distance, Haversine formulae is developed by some experienced scientists for calculating minimum distance.

$$d = R \cdot c \tag{1}$$

Here, R = earth's radius (mean radius = 6,371km)

$$c = 2 \cdot \text{atan}^2(\sqrt{a}, \sqrt{1-a}) \tag{2}$$

$$\Delta \text{lat} = \text{lat}2 - \text{lat}1$$

$$\Delta \text{long} = \text{long}2 - \text{long}1$$

$$a = \sin^2\left(\frac{\Delta \text{lat}}{2}\right) + \cos(\text{lat}1) \cdot \cos(\text{lat}2) \cdot \sin^2\left(\frac{\Delta \text{long}}{2}\right) \tag{3}$$

Where “d” is the distance between two places considering as two points. “lat1”, “lat2” stand for latitudes, “long1”, “long2” stand for longitudes of two points and “Δlat” stands for difference in latitude of two points and “Δlong” stands for difference in longitude of two points.

Prerequisites

- The application is first implemented on ADT in a 2.3.3 (Gingerbread) version environment. This application will also run on higher versions of android.
- Internet connection is required to load the OSM in different zoom levels.
- GPS must be available in handset. It enables to determine current location of user.

### 3. FEATURES OF APPLICATION

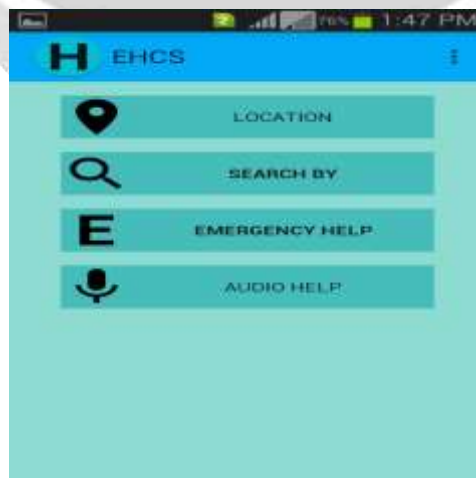


Fig 3. Home screen

As shown in figure home screen is having 4 options for user by tapping on appropriate option user will redirected to next screen which is shown in next figure.



Fig 4. Screen after pressing search button

As shown in figure when user press search button it will redirect to this tab which is having option of get nearest 10 hospital locations. When user press get nearest hospital location option then user gets 10 nearest hospital locations in ascending order from minimum distance to the increasing order. It is helpful to user to decide that which is near to the current location.

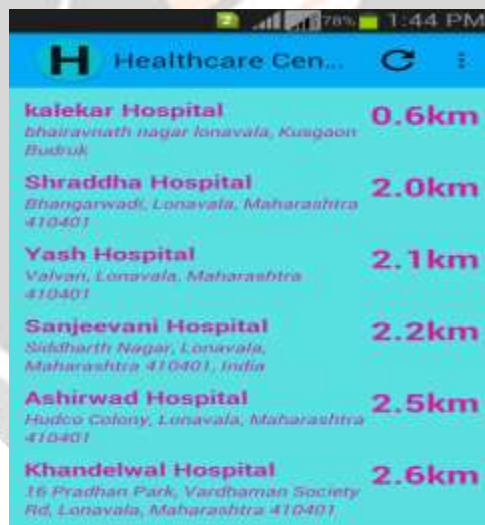


Fig 5. List of Hospitals

As shown in above figure when user press on get nearest hospital button then list of hospitals appears in ascending order, because of that user gets proper information about the distance between current locations to the hospitals location.

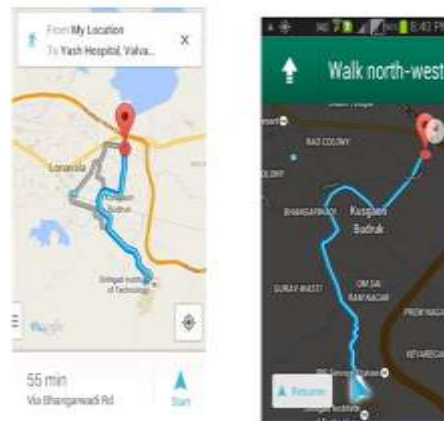


Fig6. Navigation map

When user selects the choice of hospital our system shows him actual route from current location to hospitals location. For this purpose we are using googles OpenStreetMap for navigation system. By using OSM we are able to show actual route to the user, which helps user to get proper direction same as GoogleMap system.

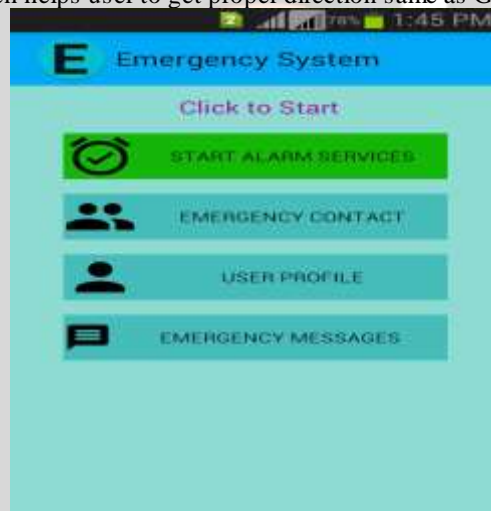


Fig: Alarm system

Now when accident happens immediately user gets one popup notification showing that emergency service has been activated with the remaining timing, when user opens it one screen appears as shown in figure, on the screen user is able to stop alarm service, before that user must have to activate alarm service. When mobile phone moved in high speed after trash of vehicles sensor senses the condition and service starts immediately. If mobile moves due to some other reason and user don't want to send emergency message then we provided service to stop message. Which avoids unwanted messages.

## 4. ANALYSIS

**4.1. OLD SYSTEM:** In previous system developers developed an application which locates the hospitals, ATM systems, but they are not showing the route because of that user has to search the route by own which consumes too much time. When user caught in emergency then each and every second is important to save his life so it is time consuming to contact family members and tell them actual condition after that if user is in unknown area then it is difficult to find routes because of that it took minimum 1 hour to reach at hospital. This 1 hour is crucial for user so we tried to remove some limitation of existing system and improved existing system. In

previous system sensors doesn't take part anywhere to detect accidents as well as old system doesn't have alarm system to notify user's family/friend members. Old application is having very poor user interface.

**4.2. NEW SYSTEM:** We developed new system with some improved features which reduces the limitations of old system firstly we implemented sensor system to detect accident which is helpful to notify user's family members that user is in trouble. Another feature is that we are showing actual route to user because of that time to reach in hospital reduces and it is important to get proper and immediate treatment after caught in accident. Alarm system plays important role to notify user's family member, if the notification is generated due to some other reason than accident then user is able to stop notification by tapping stop alarm service button. We are providing better user interface which is easily accessible to the user and user friendly. Overall we tried to reduce maximum number of limitations of previous system.

## 5. TEST CASES

We are using unit testing for testing the system we have developed. The objective in unit testing is to isolate a unit and validate its correctness. Automation approach is efficient for achieving the objectives of this testing and it enables the many benefits.

Following test cases were performed on the system developed.

**Table1.** Testing Activities

Activity	Description	Test Results
LoadingScreenTests	This activity is used to Fetching data from server	Passed
HomeActivityTests	This activity is used to Show home Screen	Passed
EmergencySystemTest	This activity is used to Start Alarm and Stop Alarm	Passed
EmergencyContactAddTest	This activity is used to Add emergency contact	Passed
ViewEmergencyContactsTest	This activity is used to Show All Emergency Contacts	Passed
SentMessagesTest	This activity is used to Send emergency Messages	Passed
UserLocationTest	This activity is used to get user location	Passed
UserLocationErrorTest	This activity is used to Show Error to User if Location not found	Passed
UserRegistrationTests	This activity is used to user registration	Passed
HealthcareListTest	This activity is used to Show Nearest health care list	Passed

## 6. CONCLUSION:

In our project we have developed a user friendly android application for getting the help in emergency situation for a needy person. When user stuck in any accidental situation or when android user is alone and nobody is present with it then, by using our application it is possible to get the help from its friends/family members immediately which contact user saved as emergency contact. And user is able to get location of nearest hospital/healthcare clinic by using our application with accurate path and distance.

## 7. FUTURE ENHANCEMENT

Now a day's providing solution for android system is very effective as compare to giving solution for PCs. So we are enhancing our system with adding some important places in a city like Police station, Food Courts, Restaurants, Public places etc. in short we are going to develop city map for a particular city as per googlemap system work. It will be beneficial for the user who is new in some unknown area and saves too much time to find various places.

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