

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 7, July 2016

Emergency Medical Service and Management

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ABSTRACT: This paper proposes Mobile Based Tracking for EMS (Emergency Medical Service) on cloud, by pressing power button the app or shaking the phone will send alert to nearest ambulance driver which is available among registered users also send message to emergency contact number. This helps to find appropriate hospital for his emergency even in an unknown area. This app also provides facilities to store electronic healthcare data which can be accessed by hospitals. It is observed that people in unknown area are in severe danger if they didn't able to find hospital quickly. In emergency case a single minute counts. So it is very important that automatic applications must be used for decision making, Maintain up to date status of the hospital and saving the time which can save life of the patient. The proposed system locates nearest available hospital, contacts its ambulance emergency system, accesses a Electronic Health Record of emergency patient that can critically assist in pre-hospital treatments. The system will identify availability of the nearest available specialized hospital all through EMS server which provides continuous information about the incoming patient to the hospital.

KEYWORDS: Emergency Medical Service, Accelerometer, Google Cloud Messaging, Emergency Health Record.

I. INTRODUCTION

In the current social scenario, most people are facing with health problems and the accident rates increases day by day. Thus it is very important to design a health security system for people. As mobile phones play more and more important role for people, it is very effective if the system will be deployed on mobile phones. This System provides various facilities to the users of the system and the hospitals. In case of emergency, the system finds the nearest available ambulance and give the alert with location of the user. If the ambulance user accept this request then the application shows the path to the user location route to the nearby hospital. The path will be shown on google map. The system also provides different facilities to the users of the system. Users can upload their health record and prescription given to the user. These records will be useful to hospitals during the treatment. For the hospital's perspective the system will provide all the health related information of patient with prescription. This will be useful for senior people and chronic patients to give in case of emergency. So use mobile phones for deploying the system is undoubtedly a better choice. There are some advantages for cell phones as a carrier of emergency alarm and healthcare management system. Cell phone is very convenient to carry. Since people always carry cell phone with them, people can trigger at any they have an emergency. Even if the user is in an unknown location they can connect to system and utilize the service. User can make a phone call and messages to their emergency contact numbers. GPS is used identify location of the user. Android is used as platform which is developed by google, thus Google Cloud Messenger (GCM) is used to send message to the users of the system. Android is an open source system thus we can modify it to specific needs by changing or rewriting the source code.

II. RELATED WORK

EMS is an essential part of the overall healthcare system as it saves lives by providing care immediately. It's this recognition that has led to research and development in EMS. Over the years several advancements have been made and research is underway to create services that provide medical assistance to patients at the earliest. However, the state of EMS varies drastically from developed to developing countries like India. Due to high population in India it is very

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difficult to implement an Emergency Medical Service which is accessible to everyone. Nation of a billion people has been deprived of a decent EMS for too long now and it is high time to implement a system which is accessible to everyone very easily. Even if India has a emergency number for getting ambulance, it is not that much effective in Indian because of high population.

III. PROPOSED SYSTEM

The main purpose of EMS to provide for immediate medical care to the people who most need it, without which, heart attacks and accidents would lead to many more fatalities. The EMS simply exists in order to give us all a better quality of life. This system will maintain emergency health record of the users. In emergency situations it will identify the location of the user and optimal path to the nearest hospital also request for service of nearest ambulance user.

System should provide medical services to those who need urgent medical care. Huge database will be maintained of all users of the system. The User or Patient will first register to the application and his data will be saved over the cloud. User authentication is done according to the role based access control. A new user has to register him-self for accessing the content of our system. Registered user logins with the registered username and password. Using the information over the server EHR of the patient will be automatically generated and also user can upload their medical files to the server. Emergency Medical Service uses two services of google. Cloud Messaging is used for the send notification message between user and ambulance. In case emergency user send request to ambulance and reply to user uses cloud messaging. Maps android API gives the map and finds the path between the given coordinates. Accelerometer is used for the accident detection. A webserver is used to control the entire system which can access by an administrator and hospital for accessing the user details. Use call and message services for access the ambulance in the normal case. System also track out the optimal hospital for the patient by using hospital details in the server and google map API.

The proposed system can also use as a fully automated by turning on automatic accident detection feature of the system. In this mode even if the user is in an isolated area mobile phone of the injured will detect the accident with the help of accelerometer. The message will first shown to the injured that a message is about to be send to the server. If nothing has happens user can abort the message otherwise within a few seconds that will be sent to the server. This tags the location to a message and message will send to the server. The server then searches for the ambulance. Then it sends alert to the first ambulance which is nearest to the accident location. If the ambulance driver accepts the request, then a map will be shown to the driver which shows the directions to the accident area. If the driver refuses or rejects the request or if he didn't respond within a threshold time then the alert will be passed to the next nearest ambulance. When the ambulance reaches the area then the server searches for the nearby hospitals and the route.

The system will also maintain Health record and prescription given to the user. For hospital's perspective, the system will provide all health related information of patients with prescription to the hospital. Unlike, other healthcare systems this is useful and helpful for the senior people and chronic patients to give alert in case of emergency by alarming to nearby hospital while the other systems are separated from the emergency alarm system, so deploying the systems on cell phone is undoubtedly a better choice. As a carrier of emergency alarm and healthcare management system, there are some advantages for cell phone. The cell phone is convenient to carry. As People always carry a cell phone with them, in case of emergency people can trigger an alarm and can get emergency service irrespective of the location familiar to them or not.

System Architecture Client Side and Server Side Client Side

- Graphics User Interface of Electronic Health Record for filling personal and medical information on cloud.
- Graphics User Interface for editing the information and updating it on server.
- In Emergency situations request can send to the server either by automatic detection or by manually pressing the emergency button.

Server Side

- Then client accepting request, server gets activated and searches out nearest hospital.
- It tracks out location of patient.

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- It fetches the coordinates and type of emergency from client.
- Search Nearest hospital depending upon variables.
- Add the all hospital information into database which is present on cloud and update it regularly.

IV. SIMULATION AND RESULTS

Emergency Medical Service uses two services of google. Cloud Messaging is used for the send notification message between user and ambulance. In case emergency user send request to ambulance and reply to user uses cloud messaging. Maps android API gives the map and finds the path between the given coordinates. Accelerometer is used for the accident detection. A webserver is used to control the entire system which can access by an administrator and hospital for accessing the user details. Call and messaging service is used as another method to access the ambulance in the normal case.

A. GOOGLE MAP API

Google Maps API is service provided by google which allows developers to use map in their applications. The API also allows developers to add these graphics to a map:

- Icons anchored to specific positions on the map (Markers).
- Sets of line segments (Polylines).
- Enclosed segments (Polygons).
- Bitmap graphics anchored to specific positions on the map (Ground Overlays).
- Sets of images which are displayed on top of the base map tiles (Tile Overlays)

In this system Google Map is used to show the path from ambulance location to users location and to the nearest hospital.

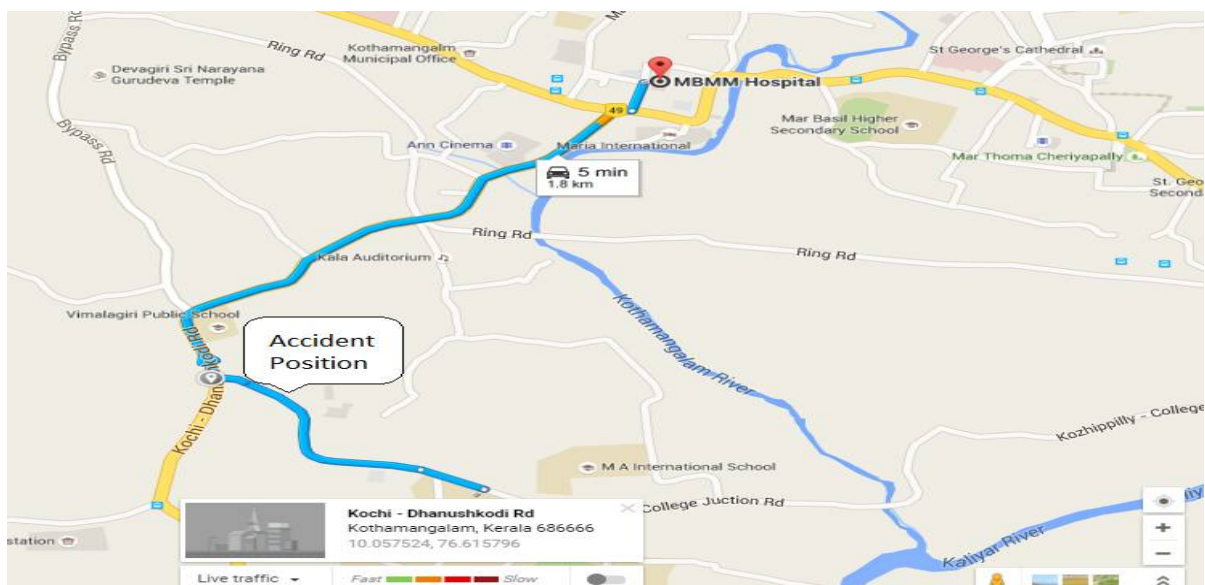


Fig 1. Map with path between user and hospital

Fig 1 shows one of the result during the simulation of the project. This is the map which ambulance user can see in his phone if he accept the result from the client. It shows the current accident spot from where the client is requesting and the nearest hospital from the accident spot.

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B. GOOGLE CLOUD MESSAGING (GCM)

GCM is a service which allows developers to send push messages to Android devices from the server. GCM handles the queuing of the messages as well as delivering those messages to the target applications on the devices. GCM is a free service by Google, and it has no quotas. It is the default push messaging solution for the Android platform.

In this system it is used for sending notifications. Whenever user faces an emergency situation, user send notification to the available ambulance by using GCM. The ambulance user also use GCM for replying to the notification.

C. ACCELEROMETER

An accelerometer is a sensor which measures the tilting motion and orientation of a mobile phone. An accelerator looks like a simple circuit for some larger electronic device. Despite its humble appearance, the accelerometer consists of many different parts and works in many ways, two of which are the piezoelectric effect and the capacitance sensor. The piezoelectric effect is the most common form of accelerometer and uses microscopic crystal structures that become stressed due to accelerative forces. These crystals create a voltage from the stress, and the accelerometer interprets the voltage to determine velocity and orientation.



Fig 2. Accelerometer

Fig2 shows concept of accelerometer. It is used in EMS system for automatic accident detection. Accidents are detected by using x, y and z values provided by the accelerometer. Accelerometer values will measure in an interval of 200 millisecond and calculate the shake happens to the device. If it is more than the threshold value system will automatically send emergency notification to the server.

V. CONCLUSION

The importance of Emergency Medical Service System cannot be avoided, Electronic Health Record and medical record are very important for providing more convenient and safe medical treatment to patients. EHR can be also used by people to keep and maintain their health record on cloud for convenience and safety. Hospital Information Maintenance and database update, Deployment on Cloud Improve the Graphics User Interface.

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