International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 06, June 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

AN EFFECTIVE AMBULANCE SERVICE USING LIVE LOCATION SHARING AND TRACKING

Dr. D.S. Thenmozhi[1]

[1]*Assistant Professor, Department of Computer Science and Engineering, Institute of Road and Transport Technology, Tamilnadu, India.*

ABSTRACT:

Implementation of Ambulance Service Using Live Location Sharing and Tracking is basically an application which is made beneficial for the public in the case of tragic moments. This paper deals with upgrading the current ambulance service system in a drastic manner, in order to minimize the delay in the call of an ambulance to refine the smallest route to the place of tragedy occurred using the AI algorithms to reduce the time delay. In the existing system, thousands of people are involved in the call centre jobs for attending the calls towards ambulance request but in our refined system the work load of people would be minimal and also only a few people would be required as system administrator to maintain logs. Also it makes use of the AI algorithms instead of humans to short out the shortest route to the place of tragedy which reduces the arrival time of the ambulance to the needed spot. The sole purpose of this solution is to save the lives of as many people as possible. When it comes to human lives not even a single moment could be wasted that is why this system is completely built to eliminate any possible time delay.

Keywords: Ambulance Service, Artificial Intelligence, Latency, Location Sharing, Vehicle Tracking

1. INTRODUCTION

1.1 Android

Android is a mobile operating system developed by Google based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation using touch gestures that loosely correspond to real-world actions such as swiping, tapping and pinching to manipulate on-screen objects along with a virtual keyboard for test input. In addition to touchscreen devices, Google has further developed Android televisions, Android Auto for cars and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras and other electronics.

1.2 Mobile Network and Wireless Fidelity (Wi-Fi)

A cellular network is a radio network distributed over land through cells where each cell includes a fixed location transceiver known as base station. Wi-Fi is a technology for wireless local area networking with devices based on the IEEE 802.11 standards. 802.11 is the "radio frequency" needed to transmit Wireless Fidelity, it was defined by Vic Hayes who created the IEEE 802.11 committee. Wireless Fidelity is a trade mark of the Wireless Fidelity Alliance, which restricts the use of the term Wi-Fi certified to products that successfully complete interoperability certification testing. Devices that can use Wireless Fidelity technology include personal computers, video-game consoles, smart phones, digital cameras, Tablet computers, Digital audio players and modern printers.

1.3 Firebase

Firebase is a kind of Backend-as-a-Service (BaaS). It provides developers with a variety of tools and services to help them develop quality applications, grow their user base, and earn profit. It is built on Google's infrastructure. Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents. Firebase's first product was the Firebase Real-time Database, an API that synchronizes application data across iOS, Android, and Web devices, and stores it on Firebase's cloud. The product assists software developers in building realtime collaborative applications. The Firebase platform has 18 products split into three groups: Develop, Quality, and Grow.

1.4 GPS based tracking

Vehicle tracking solutions combine sophisticated GPS tracking technology with flexible, advanced mapping and reporting software. A GPS enabled vehicle tracking device is installed on each vehicle to collect and transmit tracking data via a cellular or satellite network, whichever works best for your operations. The device then delivers the data to Track your Mobile application, NetTrack, which you can access through the web at any time. You receive realtime vehicle tracking updates, including location, direction, speed, idle time, start/stop and more — allowing you to manage a tighter schedule and a more efficient fleet.

1.5 Realtime Asset Tracking

Asset trackers are an often required application for any company that has trucks, buses, or other assets that are on the move. In this codelab, you will build the components that are responsible for driving a Transport Tracker solution, based on the I/O Bus Tracker. We will show you how to use the Google Maps Android API, along with the Firebase Realtime Database, to build a mobile system that can be used to track assets in near real time.

1.6 Problem Definition

In the existing system, there is a huge time latency in the call of an ambulance to the arrival of the ambulance to the place of accident. This is mainly due to the centralised call centres where the peasant had to fill the details to the call centre person and then the call centre person has to find an ambulance which is nearer to that place and explain the situation to that ambulance driver and make him to move to that place as soon as possible. This take so much of time as well as the human power to sort out the lots of information in a short period of time and thus this system is inefficient to work to its full extent.

1.7 Overview of the Proposed System

Many applications have been introduced day by day in android. This application is to develop a digitalized method for the implementation of the ambulance service. In this fast moving world each and every second is valuable and we can't waste not even a single second and most importantly in the case of lives of humans that is why time is crucial in the implementation of the ambulance system. That's when our application comes into play. This app reduces most of the time consumed by the conventional system.

2. LITERATURE REVIEW

This section reviews the research works carried out by different researchers that are related to the proposed work.

M. Ferreira et al. [1] proposed a Virtual Traffic Light system by incorporating new local rules. Their method detects the presence of an emergency vehicle, the proposed scheme, namely Virtual Traffic Lights with Priority Intersection Control , assigns priority to the road on which the emergency vehicle travels. RFID traffic control [2] deals with a multivehicle, multilane, multi road junction area. It provides an efficient time management scheme, in which a dynamic time schedule is worked out in real time for the passage of each traffic column.

A mobile application [3] that the users can use for booking an ambulance, by this user can send accident location to admin. In turn admin get address of received GPS coordinate from the user side. This location will be shared to the ambulance driver. Ambulance driver will send notification to admin and then admin will send location of the nearby hospital to the driver where he has to reach. The driver can clear signal for upcoming ambulance route by changing red signal to green.Simulation technique [4][5] is proposed for the movement of emergency vehicles in least time using shortest path. This technique helps in selecting emergency vehicles from m-Number of Fire Brigades and n- number of Ambulances available in a city. Dijkstra's algorithm is used for directing the shortest, safest and least crowded path for the vehicles so that it can reach the accident point in most efficient time.

Intelligent Accident Detection and Rescue System [6] is suggested with the use of Restful Web Services. Itis a service that is being offered by one electronic device to another electronic device, to help communicating with each other via the World Wide Web.Arunmozhi and Joseph William [7] proposed an Automatic Ambulance Rescue System. In their system, each and every ambulance is attached with special Radio Frequency IDentification (RFID) tag which is placed at every traffic signals and not visible to the general public, which makes it impossible to remove or destroy the RFID tag. Vikas and Immanuel [8] gave the method which emphasises to make the ambulance available to a nearby user or patient in the least possible time which will help to save many lives.Duffany [9] suggested a method for modifying a GPS navigational system to incorporate a simple learning paradigm using velocity profiles is described. It is assumed to be completely autonomous which means that it requires no user input or intervention.

3. SYSTEM ANALYSIS

3.1Existing System

In the existing system the persons at the place of tragedy would make a call to 108 which is a generalized toll free number to call the ambulance. From where the call would be connected to a centralized call centre where the call would be picked up by the workers. And there they would enquire about the tragedy that occurred and make an available ambulance which is nearby the place to reach that place as quick as the possible. And hence make a record of every event that occurs. Drawbacks in this system are follows: it takes a lot of time, increase in human effort and misleading information.

3.2 Proposed System

The aim of the proposed system is to develop a digitalized method of the ambulance service. Here an android application is created that maintains the complete ambulance system over the cloud environment [3]. This would be user friendly. Where, the normal peasants could easily call an ambulance by clicking a button on the mobile phone just by filling some basic information. This application helps the receiver end which is an ambulance and not a call centre to get precise location the person who invoked the call of the ambulance with the help of the GPS location [6]. And, this app also provides the application of AI algorithm to find the shortest path from their current location to the place of tragedy occurred by which the time of reaching the place could be reduced.Modules in the proposed system are Registration, Login, User Homepage, Driver Homepage, Location Fetching.Each module along with their functionality are described in the following sections.

3.2.1 REGISTRATION

This is the starting module for the both public and the ambulance drivers. However the mode of registration would be different. Fig.1 and Fig 2 show the details being collected from the common public user and the ambulance driver respectively. In the case of regular public who would call the ambulance has to register in this app by providing the mail id or mobile number and a secure password which should consist of a number and a special character. But in the case of the ambulance driver more information has to be given at the time of the registration such as their driver licence , experience in driving, their permit to drive ambulance, and mostly their vehicle number along with password. Once they have registered, their identity will be confirmed by the system admins. This module ensures the authenticity of the users by making sure they are the legitimate users. Also this the first module to be viewed in the app this would highly user friendly and made easy to use. After the registration is successful, the data entered by both the divers and the users are stored into the firebase database for further use and authentication.

International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 06, June 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

Figure 1. User Register Screen

Figure 2. Driver Register Screen

3.2.2 LOGIN

This is module is used to login the users as well as the drivers. This module needs the user name or the mail ID to be entered along with the password for the system to allow them to enter into their next module respectively. When the person enters the respective fields and click the login button the system compares these fields with the information available in the firebase database for the correctness and once it confirms that this is the registered person then it allows the user to move to the next phase. This module also has the functionality in which the user don't have to login each time they use instead if the users checked the checkbox for Remain Logged in option then they would be logged in the account until they logout by choice.

3.2.3 USER HOMEPAGE

This is the main page for the users. Various possible options to the user are shown in the Fig. 3. This is highly refined page with no unnecessary information. This page is user friendly by which even a children can use it easily. This module has one option pane where it has certain options about the sort of tragedy occurred. These options have the selections like road accident, house fire, cardiac arrest, etc. This is every important in case of the tragedy and there is also a description box available in the case if the option pane is not precise in your case. This is not mandatory but optional. This helps the ambulance driver to know more about the incident and become prepared to dispatch. The next main thing available in this module is the 'call ambulance' button this helps to invoke the call of the ambulance. On clicking the button the exact location of the user is recorded and stored in the firebase database along with the type of incident selected in the option pane. And using that information gathered, the nearby ambulance is identified using the AI algorithm and those information is sent to that ambulance driver.

3.2.4 DRIVER HOMEPAGE

Like users home page this is the main page for the divers. This provides with a toggle button which help the drivers to update their active status. If they are available they would make the toggle button switched on and would off if they aren't available this would avoid the commotion in requesting an ambulance which is already in a ride. Also this module has a text view where the type of the tragedy will be displayed by which the driver can make some prior steps for the first aid. And finally the main key element available in this module is the map view which shows the exact location of the person who invoked a call and then it short out the easiest and the traffic less route to that exact location using the AI algorithms. By which the driver can reach the place as quick as possible to save the lives.

Figure 3.User Homepage

Figure 4.Location Fetching

3.2.5 LOCATION FETCHING

The parameters needed to feed GPS tracking system are shown in Fig. 4. Navigator.geolocation method based on RestFUL Web Services [8] is used. This enables the ambulance location to be updated in the database so that it can be seen by the user who is using this application and makes it easy for him to book the ambulance. The suggested solution makes use of AI [9] algorithm to find the shortest path to reduce the time and find the traffic in the way to avoid unnecessary delay in the travel.The client's location will be pin pointed on the google map and even the ambulance which is nearby the user will be pin pointed on the map, once the patient is on board. Normal way of location fetching and the result of applying shortest path algorithm are depicted in Fig. 5 and Fig. 6 respectively. Advantages in the proposed system are follows: reduction in time consumption, easy retrieval of information, precise location can be identified and information can't be misled.

Figure 5. Location Finding

Figure 6. Finding the Shortest Path

4. CONCLUSION

This project has been developed using the android studio and the real time database Firebase. In which the android studio makes use of the java code for the development of the application. This project has proved that it is practically possible to improve the current ambulance service system and reduce the deaths occurred by reducing the time delay of the arrival of the ambulance. This is made possible because of the real time database Firebase which is a kind of faster when compared to the conventional database. Since it is a cloud server we can easily access to those servers remotely from wherever we require. Currently we make the ambulance service possible in the mobile phone using the android application but in the future we would try to implement it in the android watch platform and also in the car's infotainment system which would make the invoking of the call of ambulance much easier for the public. And also we would implement the driver side of the application in the ambulance's infotainment system so the driver can easily drive to the place without worrying about handling the phone while driving.

REFERENCES

[1] M. Ferreira, R. Fernandes, H. Conceic¸, W. Viriyasitavat, and O. K. Tonguz, Self-organized traffic control, *ACM international workshopon VehiculArInterNETworking (VANET)*, pp. 85–90, 2010.

[2] Suresh Sharma, AlokPithora,Gaurav Gupta,MohitGoel,Mohit Sinha, Traffic Light Priority Control For Emergency Vehicle Using RFID,*International Journal of Innovations in Engineering and Technology (IJIET), Vol2, issue 2, April 2013*.

[3] SabyasachiPatra, KarishmaVelisetty and Prathamesh Patel, Location Based Tracking, *International Journal of Engineering Research and Development, Feb 2014*.

[4] G. Singh et al, Automatic Movement of Emergency Vehicles to Accident Spot, *International Journal of Computer Science and Technology, 2014, Vol 5, Issue-01:PP.97-100.*

[5] Guddi Singh, Jyoti Singh, Richa, Movement of Emergency Vehicles - Using Shortest Path Simulation Method, *IJCSMC, Vol. 6, Issue. 7, July 2017, pg.160 – 165*.

[6]Bhandari Parchi, DalviKasturi and Chopade Priyanka, Intelligent Accident Detection And Ambulance Rescue System, *International Journal of Scientific and Technology Research, June 2014*.

[7] P. Arunmozhi and P.Joseph William, Automatic Ambulance Rescue System Using Shortest Path Finding Algorithm, *International Journal of Science and Research(IJSR), May 2014.*

[8] C. S. Vikas, Immanuel A. Ambulance Tracking System Using Restful Api. Orient.J. Comp. Sci. and Technol;10(1) March 2017, Vol. 10, No. (1): Pgs. 213-218.

[9] J. L. Duffany, "Artificial intelligence in GPS navigation systems," 2010 2nd International Conference on Software Technology and Engineering, 2010, pp. V1-382-V1-387, doi: 10.1109/ICSTE.2010.5608862.