International Journal of Engineering Inventions
e-ISSN: 2278-7461, p-ISSN: 2319-6491
Volume 11, Issue 3 [May.-June. 2022] PP: 193-196

EAS: Emergency Ambulance Service with Mapping

Anu Armstrong, Anwar Sahil C A, Finla N A, Godwin Simon, Dr. Sunder R
Department of Computer Science & Engineering
Sahrdaya College of Engineering and Technology, Thrissur, Kerala, India

Abstract-*The primary role of all ambulance services is emergency pre-hospital medical care and patient transfer, although they generally provide emergency response, patient transfer to a health sector is crucial. In the present world, India being one of the most populated country patient transfers is facing a lot of problems. Number of vehicles on the road is increasing day by day. Roads are managed using traffic signals and sometimes the passages of ambulance are delayed due to the red signal. Therefore, for simulating and optimizing traffic control to better accommodate this increasing demand arises. Unlike western countries, Indian cities cannot think of having separate lanes for emergency purpose due to lack of road planning and infrastructure. With the lives of the patients depending on the speedy arrival of the ambulance to hospital, an alternative solution to the above problem is the need of the hour. The problem of an ambulance getting stuck in a traffic jam can be addressed by ensuring that the lane in which the ambulance is travelling is cleared. Geofencing is a location-based service. The use of GPS technology to create a virtual geographic boundary enabling software to trigger a response when a system enters or leaves a particular area. Find the initial position and calculate the maximum distance and compare it. Using networking the patient details is sent to hospital server. For security, encryption and decryption is done at client and server side.*
Keywords*—Ambulance, Geofencing, Mapping, Patient*

Date of Submission: 29-05-2022 Date of Acceptance: 10-06-2022

I. INTRODUCTION

The rapid increase in the number of vehicles is a critical issue for smart cities. It increases the number of vehicles and adds various environmental and health hazards[1]. Getting real-time traffic information is an important step in improving efficiency. This information can be used for various applications such as traffic forecasting, vehicle routing, and traffic management. Getting real-time traffic flow information is challenging due to the lack of sensors and factors that can affect the flow of traffic. Another major issue that hinders the operation of traffic flow forecasting is the unforeseen factors that can impact the traffic flow. A geofence is a virtual perimeter for a real-world geographic area. Geofencing uses technologies like GPS, or even IP address ranges to build their virtual fence. These virtual fences can be used to track the physical location of the device active in the particular region or the fence area. The location of the person using the device is taken as geocoding data and can be used further for advertising purposes.

II. LITERATURE SURVEY

Transportation plays an increasingly important part in our global economy, transporting products and people through increasingly sophisticated, interconnected, and multimodal transportation systems. Because of the rapid expansion in automobiles and restricted transportation infrastructure, ITS has become a popular study topic, and traffic optimization has been explored in recent decades[4].

Mir and Hassan[5] developed a traffic light controller utilizing neural network and fuzzy controller to minimize AWT and QL for car vehicles. To tackle the emergency vehicles, Younes and Boukerche[12] developed heuristic-based algorithm and verified via simulation in SUMO, however, they ignored the other priority vehicles. In order to account the priority vehicles, Khan et al. [6] developed an EVP-STC protocol utilizing micro-controller, ZigBee, GPS and other IoT devices, and varied its performance effectiveness using PTV Vissim. However, authors considered line opening time but missed several important parameters in vehicular dynamics. Abadi et al. [2] parented a strategy to predict the traffic flow on road transportation vehicular networks but with limited traffic data. They utilized autoregressive model and Monte Carlo simulation technique; however, it fails to consider vehicle priority and make traffic light control decisions. Quek et al. [3] proposed a novel fuzzy neural approach in order to analyse and predict road traffic utilizing pseudo-outer-product fuzzy neural network using the truth-value-restriction. This work accounts the vehicle heterogeneity to analyse the traffic behaviour but not designed to flow traffic.

III. PROPOSED SYSTEM

A. Suggested Methodology

In this project "EAS: Emergency Ambulance Services with Mapping" we are trying to provide easy passage for the ambulance and also to help the driver to select the most suitable route to the nearby hospital with the help of an application. The list of hospitals nearby will be sorted, and the most suitable one will be selected. Here, wireless technologies are used for information transferring. When the ambulance reaches the traffic junction, the sensors placed in the ambulance passes a signal from the transmitter to the receiver in the signal. If the signal is red, it comes to green automatically, thus making easy passage for the ambulance.

Fig.1 shows the architecture diagram for the proposed system make use of geofencing to obtain ambulance location. Geofencing is a location-based service. The use of GPS technology to create a virtual geographic boundary enabling software to trigger a response when a system enters or leaves a particular area. Find the initial position and calculate the maximum distance and compare it. Vital signs are also collected and monitored periodically. The vital data like temperature, blood pressure, Oxygen etc are collected. The data is continuously monitored and sent to the hospital server.

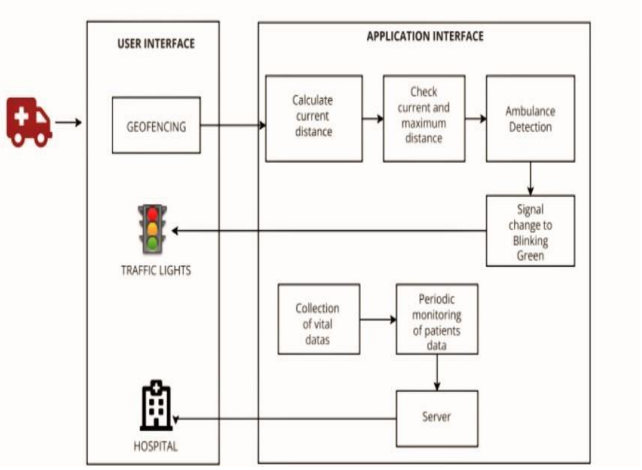

Fig. 1: Architecture Diagram

B. Geofencing

Geofencing refers to the use of GPS technology to create a virtual geographic boundary to help marketers to send location-based messages to the mobile devices of prospects inside or outside of a particular area, creating a virtual boundary in which a device, individual or asset can be tracked and monitored or detected if the boundary is violated. Geofencing combines awareness of the user's current location with awareness of nearby features, defined as the user's proximity to locations that may be of interest. To mark a location of interest, you specify its latitude and longitude. To adjust the proximity for the location, you add a radius. The latitude, longitude, and radius define a geofence.

C. Mapping

Mapping is used for finding an optimal path from the source to the hospital. So the chance of the patient to be at risk is low, since the patient can be admitted at the hospital within time.

D. Patient vital data collection

As soon as the patient is admitted into the ambulance his/her vital data are collected using various physiological sensors. The vital signs monitored are temperature and spO2.

E. Networking

A Network is established to transfer the collected vital data to the hospital. For this purpose, the hospital server is connected to this network. For security purpose we encrypt the data sent from the ambulance and perform decryption at the hospital server.

IV. CONCLUSION

In this world of busy roads, traffic signal plays the vital factor in saving a person's life. According to Times of India, about 30 percent of deaths are caused due to delayed ambulance to reach at hospital. Human life is affected due to delay in the arrival of ambulance. The ambulance is not able to reach the hospital in the golden hour. It gets stuck in the traffic signals. In the proposed system, we are trying to reduce the delay for the ambulance. In this project, we tried to provide a way to ambulance, so the time could be saved in the road. When an ambulance is detected, the signal is turned green. This can be extended to any number of signals along

the ambulance's path so that the emergency cases can be served immediately. We could also set the time for the signals to be green. This helps the ambulance to cross the traffic junction as soon as possible. Our project EAS: Emergency Ambulance Service with Mapping considers the heterogeneous vehicular traffic network of the developing counties with the aim of developing an interface app for the ambulance so as to select the nearest hospitals and to provide the patient details to the hospital beforehand also with the help of the map an optimal path is given to reach the hospital in time.

V. RESULTS

The first phase consisted of setting up geofencing to receive ambulance trigger. The below *Fig. 2* shows the trigger reaching the receiver and lighting up of the green LED indicating traffic signal.

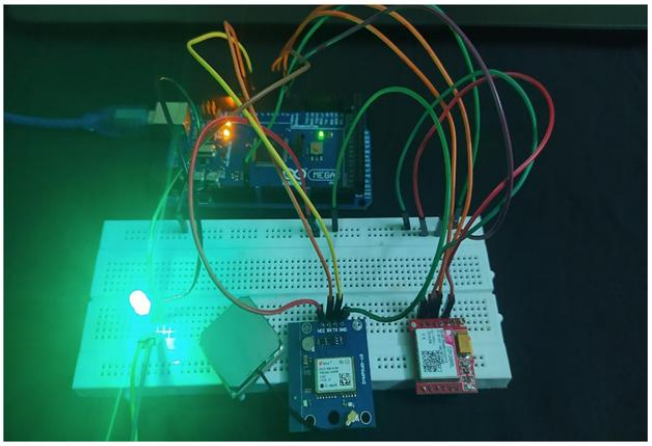

Fig. 2: Geofencing

Fig. 3 indicates the directions from the source(home, colleges, institutions etc...) to the destination(hospitals). A customised route with less traffic is mapped. The driver selects the corresponding destination and takes the patient.

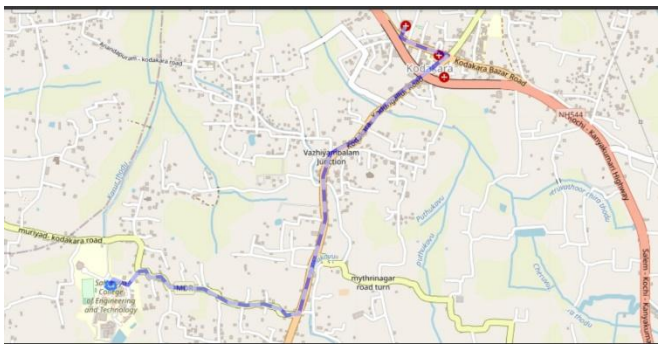

Fig. 3: Mapping

The *Fig. 4* indicates that the server is connected to 2 hospitals in which both can accept the patient with the specified condition. The maximum number of hospitals that can be connected depends on how many clients the server is listening to. The specified condition is set based on the patient's situation. The responding hospitals change according to the condition of the patient. Subsequently the hospital name and other details are then sent to the server in an encrypted format which is then decrypted and outputted.

```
socket created
waiting for connection
Connected with ('192.168.1.212', 63695)
Rajah Hospital 679562

Connected with ('192.168.1.212', 63698)
Royal Hospital 680005
```

Fig. 4: Connection establishment

ACKNOWLEDGEMENT

Anwar Sahil C A, Anu Armstrong, Finla N A, Godwin Simon would like to give our sincere thanks to our project guide Dr. Sunder R for his support for the project.

REFERENCES

[1]. N. Kumar, S. S. Rahman and N. Dhakad, Aug. 2021, "Fuzzy Inference Enabled Deep Reinforcement Learning-Based Traffic Light Control for Intelligent Transportation System", in IEEE Transactions on Intelligent Transportation Systems, vol. 22, no. 8, pp. 4919-4928.

[2]. Abadi, T. Rajabioun, and P. A. Ioannou, Apr. 2015 "Traffic flow prediction for road transportation networks with limited traffic data", IEEE Trans. Intell.Transp. Syst., vol. 16, no. 2, pp. 653–662.

[3]. C. Quek, M. Pasquier, and B. L. B. Lim, (Jun. 2006) "POP-TRAFFIC: A novel fuzzy neural approach to road traffic analysis and prediction", IEEE Trans. Intell. Transp. Syst., vol. 7, no. 2, pp. 133–146.

[4]. F. Belletti, D. Haziza, G. Gomes, and A. M. Bayen, (Apr. 2018.), level control of ramp metering based on multi-task deep reinforcement learning, IEEE Trans. Intell. Transp. Syst., vol. 19, no. 4, pp. 1198–1207.

[5]. A. Mir and A. Hassan, (Aug. 2018), inference rule based neural traffic light controller, Proc. IEEE Int. Conf. Mechatronics Automat. (ICMA), Changchun, China,pp. 816–820.ght,.

[6]. A. Khan, F. Ullah, Z. Kaleem, S. U. Rahman, H. Anwar, and Y.-Z. Cho, (2018), -STC: Emergency vehicle priority and self-organising traffic control at intersections using Internet-of-things platform", IEEE Access, vol. 6, pp. 68242–68254, doi: 0.1109/ACCESS.2018.2879644.

[7]. M. B. Younes and A. Boukerche, (Mar. 2018.), "An efficient dynamic traffic light scheduling algorithm considering emergency vehicles for intelligent transportation systems,", Wireless Network., vol. 24, pp. 2451–2463.