Ambulance Assistance for Emergency Services Using GPS Navigation

IRJET Journal

Ambulance Assistance for Emergency Services Using GPS Navigation

Shantanu Sarkar

School of Computer Science, VIT University, Vellore

---***---

Abstract – *Now-a-days the number of patients has significantly increased and in emergency cases the patients will have to be rushed to the hospital as early as possible so that they can be treated. Due to significant increase in the number of patients the hospital finds it difficult to send an ambulance from the hospital to every patient's location and if there is a serious case then the patient might even die if not taken to the hospital in time.*

This paper is to propose a GPS system in which the GPS tracker will be set up in the ambulance so that the hospital management can track down the location of the ambulance at any time and if they get a call for an emergency case they can track down the ambulance nearest to that location and send the ambulance to that location to pick up the patient, this will save time and will help the patient to reach the hospital as early as possible.

Keywords: GPS Module, Arduino Uno, CoolTerm, Python, Latitude, Longitude, Maps

1. INTRODUCTION

To detect emergency case and to send ambulance to the patient so that the patient can reach the hospital within stipulated time. In the existing system when the hospital receives call for an emergency case the hospital sends the ambulance which goes from the hospital to the patient's location and then takes the patient to the hospital, the factors like distance and traffic can affect the time taken by ambulance and in case of emergency anything can happen even in a small amount of time. The main aim of the project is to make sure that the patient reaches the hospital as soon as possible.

The main intention of the project is to create a GPS System in which the GPS tracker is set up in the ambulance so that the hospital management can keep the track of all the ambulances and in case of an emergency the ambulance nearest can be directly send to the patient's location. This will help save time. This system is implemented to overcome the drawbacks of

the existing system in which GPS technology is used to help hospitals provide better service to the patients.

2. LITERATURE REVIEW

In the paper Smart Phone Based Enhancement in Health Services Using GPS [2], they proposed a system in which they are using GPS to track the location of the victim and GSM to send a message in case of an accident, so that the victim can be taken to hospital and treated as soon as possible.

In the article Emergency Traffic Management for Ambulance using Wireless Communication [3], they proposed a system in which in case of an accident the control room or the rescue team will receive a message using GPS and GSM technology to indicate about the accident.

In the paper An Approach towards Traffic Management System using Density Calculation and Emergency Vehicle Alert [6], they proposed a system called Smart Traffic Light Control System that controls the change of traffic lights at intersection points and gives high priority to emergency vehicles and Smart Congestion Avoidance System which chooses the shortest routes to the destination having least congestions.

According to the paper GPS Based Shortest Path for Ambulances using VANETs [7], vehicles can be turned into efficient data collectors by getting them equipped with communication devices. Effective routing of ambulance will help to improve the performance during emergency.

In the paper Automatic Ambulance Rescue System Using Shortest Path Finding Algorithm [5], they proposed to create a system in which they will place a RF transmitter in the ambulance and RF receiver in the Traffic lights, using Bio sensor to detect the condition of patient while travelling and GPS to find out the location of the accident.

According to the paper Enhanced Functionality Emergency Call Application for Android [4], their idea is to create an application for smart phones which will use the GPS embedded in the smart phone to send the their location to their pre-registered contacts by pressing a single button in case of an emergency.

In the paper A GSM and GPS based system for automatic accident notification and severity estimation [18], their

main objective is to set up sensors inside the vehicle to detect any dangerous situation and then report it to the nearest control unit.

3. TOOLS USED

1. GPS Module – It gives the location i.e Latitude and Longitude of any particular place.

2. Arduino Uno – It is a microcontroller used to build digital devices and interactive objects that can sense and control physical devices.

3. Arduino Software – It is used to develop codes to provide input to the arduino kit to carry out different functions.

4. IDLE (Python) - Integrated Development Environment (IDLE) is an integrated development environment for python, which is bundled with the implementation of the language.

4. PROPOSED METHOD

Our Project is based on the location provided by the GPS Module i.e The Latitude and Longitude of the position to be located. The Arduino Uno and the GPS module are connected to the system. The Arduino Uno provides input to the GPS Module and the GPS returns the Latitude and Longitude as the output to the arduino which displays it on the arduino software in the system. A C Programming code carries out the above functions. The output of the Arduino Software in converted into a text file using a software called CoolTerm.

In the Final Stage we get the text file of the Latitudes and the Longitudes from arduino software using CoolTerm. The text file is connected to the IDLE (Python) software and a python code is writtern to get the location of the particular Latitude and Longitude by linking it with google maps. The exact location is then displayed in the Google Maps.
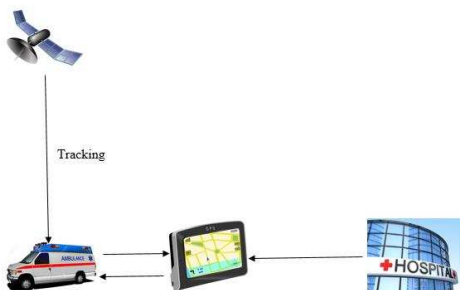

Fig.1 System Architecture

The above diagram represents the Architecture of the system. The GPS tracker is embedded in the Ambulance with the help of the Hospital management can keep the track of the Ambulance at all time.

Hence the Hospital management can track down the Ambulance nearest to the Patient's Location and redirect it to the patient instead of sending the Ambulance present at the Hospital, this will help the patient to reach the hospital as soon as possible specially in critical condition.
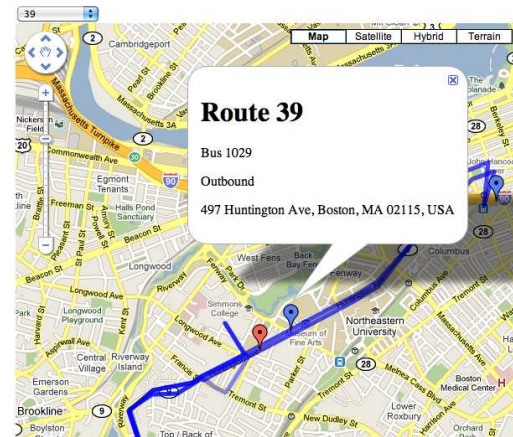

Fig.3 Navigational Path

The above picture is the snapshot of the location of Ambulance in the Google Maps. The GPS receives the Latitude and Longitude through the satellite and transfers the values to its receiving end and the location can be displayed in the Google maps using python code.
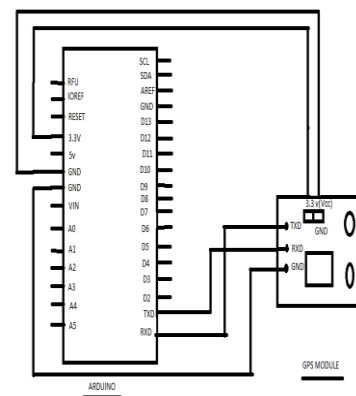

Fig.2 Circuit Diagram

TXD - Transfer Data
RXD- Receive Data
GND - Ground
VIN - Voltage Input
SCL - Serial Clock Line
SDL - Serial Data Line

AREF - Analog Reference
IOREF - Input/Output Reference
RFU - Radio Transiver

For the connections between the GPS module and Arduino Uno the TXD end of the GPS should be connected to the RXD end of the arduino uno and vice versa, GND ports of both the modules are connected and the voltage supply are connected. The above diagram shows the connections between the Arduino and GPS.

5. RESULT

The output of our system will be the location of the Ambulance which will be displayed in the Google maps based on which the hospital management can redirect the ambulance to the location of the nearest patient.

Fig.4 Source to Destination

In this way patient can be taken to the hospital as early as possible as the ambulance dosen't have to travel from the hospital as per the current system. The might reduce the deaths of the critical patients by taking them to the hospital in time.

6. CONCLUSION

The proposed system is used by the hospitals to track down their ambulances. The main aim of the project is to minimize the deaths of critical patients by making sure that they reach hospital in time for treatment. GPS technology is used so that the hospital can take immediate action which might reduce the severity. This system is accurate and the main advantage is that it saves a lot of time.
Hospital can use GSM technology to send the message to the ambulance regarding the location of patient.

7. REFERENCES

[1] A Smart Phone-Based Pocket Fall Accident Detection, Positioning, and Rescue
System IEEE Journal of Biomedical and Health Informatics 2014

[2] Smart Phone Based Enhancement In Health Services Using GPS
Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-3, 2016
[3] Emergency Traffic Management for Ambulance using Wireless Communication
IPASJ International Journal of Electronics and Communication 2014
[4] Enhanced Functionality Emergency Call Application for Android
International Journal of Engineering Sciences & Research Technology 2015
[5] Automatic Ambulance Rescue System Using Shortest Path Finding Algorithm
International Journal of Science and Research (IJSR) 2012
[6] An Approach towards Traffic Management System using Density Calculation and Emergency Vehicle Alert
IOSR Journal of Computer Science (IOSR-JCE)
[7] GPS Based Shortest Path for Ambulances using VANETs
International Conference on Wireless Networks (ICWN 2012)
[8] E. Commission, ecall: automated emergency call for road accidents mandatory in cars 2014
[9] Vehicle positioning using gsm and cascade connected ann structure
IEEE transaction on intelligent transportation system volume 14 No.1 March 2013
[10] Accident Emergency Response and Routing Software (AERARS) using Genetic Algorithm
International journal on Computer Science and Engineering 2011
[11] Implementation of Location based Services in Android using GPS and Web Services
IJCSI International Journal of Computer Science Issues, Vol. 9, 2012
[12] Hi-Fi Traffic Clearance Technique for Life Saving Vehicles using Differential GPS
System World Academy of Science, Engineering and Technology 2011
[13] Automatic Accident Detection And Ambulance Rescue with Intelligent Traffic Light System
International Journal of Advanced Research in Electrical, Electronics and
Instrumentation Engineering 2013
[14] An Information System for the Effective Management of Ambulances
Department of Computer Engineering and Informatics

[15] An Intelligent Transportation System Using Wireless Technologies for Indian
Railway India Journal of Mechanics & Industry Research 2013

[16] Vehicle Accident Automatic Detection and Remote Alarm Device International

Journal of Reconfigurable and Embedded Systems (IJRES) 2012

[17] Impact of Ambulance Dispatch Policies on Performance of Emergency Medical Services

IEEE Transactions on Intelligent Transportation Systems, Vol. 12, No. 2 2011.

[18] A GSM and GPS based system for automatic accident notification and severity estimation

International Journal of Innovative Journal and Research Engineering (IJIRAE) 2014

[19] Evaluating the Impact of a Novel Massage Dissemination Scheme for Vehicular Networks using Real Maps Transp. Res. Part C: Emerg. Technol. Vol. 25 2012

[20] Prototyping an Automatic notification scheme for traffic accidents in Vehicular Networks

Proc. 4th IFIP WD, Niagara Falls, ON Canada 2011