



Vehicle Tracking and Monitoring By computing geo-location information System on Raspberry Pi and Android Mobile

Basava S Dhanne, Mrutyunjaya S Yalawar
Assistant professor department of ECE, CMREC, Hyderabad Telangana
Assistant professor department of CSE, CMREC, Hyderabad Telangana

Abstract:

In this fast life, everyone is in hurry to reach their destinations. In this case waiting for the buses is not reliable. People who rely on the public transport their major concern is to know the real time location of the bus for which they are waiting for and the time it will take to reach their bus stop. This information helps people in making better travelling decisions. This paper gives the major challenges in the public transport system and discusses various approaches to intelligently manage it. The proposed system would make good use of new technology that based on Embedded Linux board namely Raspberry Pi and Smartphone android application. The proposed system works on GPS/GPRS/GSM SIM900A Module which includes all the three things namely GPS GPRS GSM. The GPS current location of the vehicle; GPRS sends the tracking information to the server and the GSM is used for sending alert message to vehicle's owner mobile. The proposed system would place inside the vehicle whose position is to be determined on the web page and monitored at real time. In the proposed system, there is comparison between the current vehicle path and already specified path into the file system of raspberry pi. If the vehicle's speed goes beyond the specified value of the speed, then also the warning message will be sent from system to the owner mobile. The proposed system also took care of the traveler's safety by using LPG Gas leakage sensor MQ6 and temperature sensor DS18B20.



I.INTRODUCTION

In final decade, we become aware of the drivers fatigue using and vehicle theft activity which causes social real time difficulty like accidents and many more hazards stipulations. We everyday see or read such type of movements that are elevating the query of our security and safety in both public and confidential sectors. So there is need of real time monitoring and tracking the automobile also storing and updating its database of designated occasions. In the city areas, human help is relatively problematic in providing the database of tracked vehicle. In the proposed procedure, the system supplies a wholly automatic tracking and monitoring of the vehicle which useful for school bus, their homeowners, children's defence and likewise it provides the correct arrival time of the vehicle at unique vicinity or discontinue. And accordingly making use of accuracy in time, kids can spend extra time in learning, napping, or relaxing instead than wait for a delayed bus. Spending less time waiting for a bus improves comfy and strong time administration of the pupil as well [4]. So as to shrink man energy and saving of cash, right here the approach presents handy monitoring solution utilising Embedded Linux Board. The proposed procedure get tracking understanding of the vehicle like car number (targeted identification), vicinity, velocity, Date, Time and retailer into the database of Raspberry pi. The procedure additionally provides students security mechanism with the aid of temperature sensor and gas leakage sensor. Hence within the case of raising the temperature inside the vehicle as a result of some purpose or leakage of the LPG fuel within the vehicle, the alert message get send to the driver as good as vehicle owner. For tracking the vehicle using GPS and maintain its database, MySQL database system is use which advanced feature of Raspberry-Pi. In the database base monitoring and updating mechanism, the GSM/GPRS module is used which transmit the updated vehicle database to the server and user access the database using web page in Smartphone. That shows the real time vehicle location in the Smartphone [3]. Thus, users will be able to continuously monitor a moving vehicle on demand using the Smartphone and determine the estimated distance and time for the vehicle to arrive at a given destination.



II. IDENTIFIED GAPS:

Vehicle tracking has become so advanced and simple with various upcoming technologies. But the cost effectiveness and its implementation have become high. The problem lies in maintaining high grade servers to backup the data for vehicle tracking and the use of internet to track these vehicles. Although real time tracking of vehicles through internet gives an fails to provide less cost of investment and maintenance. The system uses an internal database to look up the location of the vehicle with the GPS co ordinates received. So it doesn't use the GPRS and TCP/IP protocol for internet for data transfer between servers and the user device. Hence this reduces the cost of the tracking system. Also the location details are sent quickly through SMS via the GSM modem.

III. RESEARCH DESIGN AND METHODOLOGY

The proposed approach would get controlled with the support of Raspberry pi which placed throughout the vehicle. The GPS/GPRS/GSM SIM900A module get keep up a correspondence with raspberry pi utilizing USB interface. The longitudes and latitudes of the current path obtained from GPS get compared with the stored longitudes and latitudes in the specific file layout inside the database of raspberry pi. If that longitudes and latitudes no longer fit with the saved one then mistaken path detection alert message will get dispatched to vehicle's owner mobile. Also the longitudes and latitudes of the present route obtained from GPS will get dispatched to the server with the support of GPRS which helps to monitor the vehicle's present location on the net page utilizing Smartphone. Right here for monitoring the vehicle, the proposed approach provides login facility on net web page for automobile's owner, student and their parents. Also proposed system provides student's safeguard with the support of DS18B20 temperature sensor and gas leakage sensor MQ6. These sensors get interface with raspberry pi. If the temperature within the vehicle crosses the targeted value or LPG gas get leakage within the vehicle then the alert message will sent to the vehicle's owner. Likewise protection mechanism provided by method.

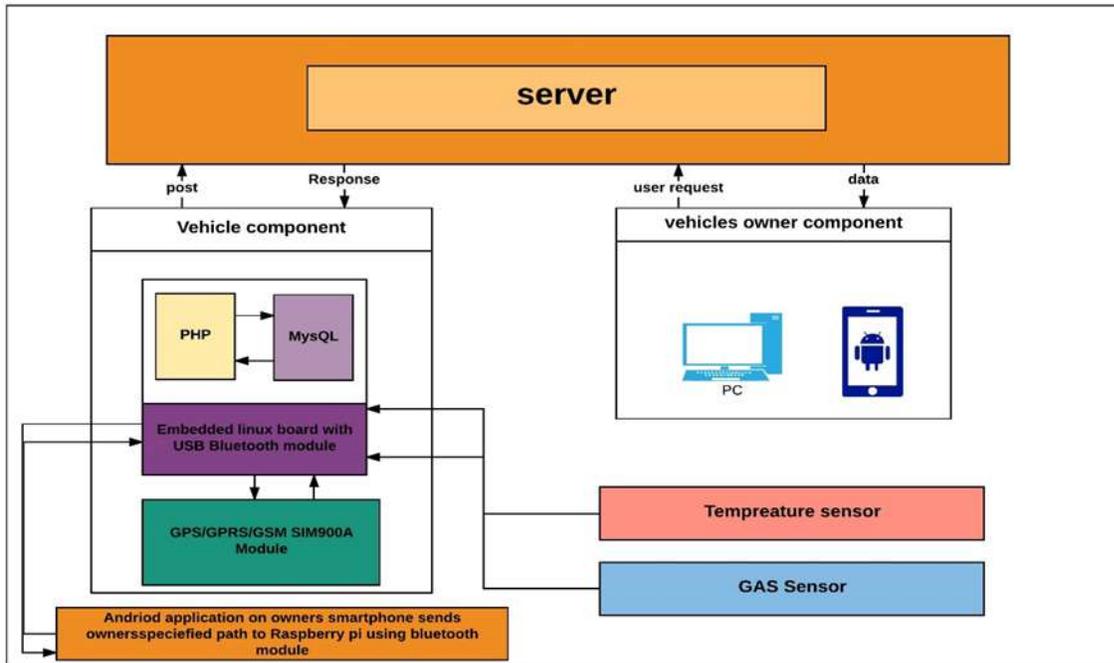


Fig.1. Proposed system block diagram

1.Real time vehicle tracking on the web page using GPS/GPRS/GSM SIM900A module and Rasperry pi:

SIM900A Module which gets interfaces with the Rasperry pi gives the real time tracking information of the vehicles such as longitude, latitude, speed, time of the vehicle. That information taken from USB interface get stored into the database and further sends to the server. The system gives tracking provision on web page for registered user only as follows:

- A) Super Login:** In this provision, the vehicle's owner can track the vehicle in his Smartphone using Super Login on the web page. Hence only owner can access this login.
- B) Primary Login:** In this provision, the registered student can track the school vehicle in their Smartphone using Primary Login on web page. Hence only those students who get registered into the system can access this login.
- C) Secondary Login:** In this provision, the student's parents can track the school vehicle in their Smartphone using Secondary Login on the web page. Hence only registered student's parents can access this login.



2. Vehicle's right and wrong path tracking algorithm using Smartphone:

The proposed method presents extra security and comfortable resolution making use of android application for faulty path alert. The vehicle owner's Smartphone having an android application that supplies the expertise involving selection of particular path from A to B through which the vehicle alleged to journey. And therefore driver drives the vehicle on the trail that decided through android utility of owner's Smartphone best. At first vehicle's owner trace the decided direction A to B on android application that offers longitude and latitude of that special path. Then android software saves that longitudes and latitudes of traced course in a designated file layout such that owner can send that file to the raspberry pi database making use of Bluetooth or USB port. And consequently the proposed system can method additional on that data.

3. Vehicle tracking information database monitoring system using LAMP (Linux, Apache, MySQL, and PHP):

The vehicle tracking system works upon an algorithm in which, real time information of vehicle such as Longitudes, Latitudes, Speed, Date, and Time get store into the database of Raspberry pi using Linux, Apache, MySQL, and PHP i.e. LAMP system. The GPRS of SIM900A Module will sent this vehicle information to the server, and at server side, updating and storing of this vehicle information takes place dynamically which make easier for monitoring and tracking a vehicle at real time on web page using web browser on Smartphone which gives more accurate result of current location.

4. Students Safety mechanism using temperature Sensor and LPG gas detect sensor:

The proposed system takes care of the children's safety by using LPG Gas leakage sensor and temperature sensor. The temperature sensor DS18B20 which works on the 1 wire protocol gives a digital output hence can be get directly interface with the Raspberry Pi. The threshold value of the temperature set in the program. If that threshold temperature value gets cross by output value of the temperature sensor due to some reason then alert message will be sent to the vehicle owner's Smartphone. Also the LPG Gas leakage sensor get interface with Op-amp LM358N which gives a digital output. That output voltage can be controlled by using current limiting resistors which helps the Raspberry pi's GPIO from damage. [7] proposed a system which is an innovative congestion control algorithm named FAQ-MAST TCP (Fast Active Queue Management

Stability Transmission Control Protocol) is aimed for high-speed long-latency networks. Four major difficulties in FAQ-MAST TCP are highlighted at both packet and flow levels. The architecture and characterization of equilibrium and stability properties of FAQ-MAST TCP are discussed. Experimental results are presented comparing the first Linux prototype with TCP Reno, HSTCP, and STCP in terms of throughput, fairness, stability, and responsiveness. FAQ-MAST TCP aims to rapidly stabilize high-speed long-latency networks into steady, efficient and fair operating points, in dynamic sharing environments, and the preliminary results are produced as output of our project. The Proposed architecture is explained with the help of an existing real-time example as to explain why FAQ-MAST TCP download is chosen rather than FTP download.

IV. THE DESIGN OF TESTING ENVIRONMENT

The proposed system provides more safety and secure solution using android application for wrong path alert. The vehicle owner's Smartphone having an android application that provides

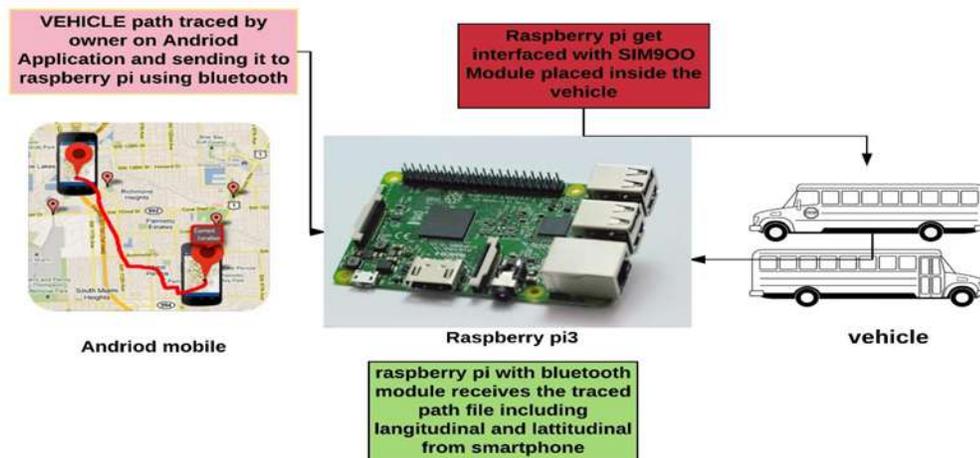


Fig.2. The longitudes and latitudes which are stored in the file format inside raspberry pi have been taken from android application using Bluetooth.

the information regarding selection of particular path from A to B through which the vehicle supposed to travel. And hence driver drives the vehicle on the path that decided by android application of owner's Smartphone only. At first vehicle's owner trace the decided path A to B



on android application that gives longitude and latitude of that particular path. Then android application saves that longitudes and latitudes of traced path in a particular file format such that owner can send that file to the raspberry pi database using Bluetooth or USB port. And hence the proposed system can process further on that data. Now whenever driver drives the vehicle on the owner's decided path i.e. A to B, GPS/GPRS/GSM SIM900A module inside that vehicle sends the longitudes and latitudes of current location to the raspberry pi through USB interface. Now using file system programming, the current longitudes and latitudes received from GPS of GPS/GPRS/GSM SIM900A module get compares with the longitudes and latitudes received from android application. Hence if this comparison gives less tolerance then we can say that driver drives the vehicle on the right path i.e. A to B else if there is large difference between longitudes and latitudes then system sends alert message on the The raspberry pi has a 3.5mm audio jack output facility. By using that audio jack facility, whenever driver drives the vehicle on the wrong path, then the "alert.mp3" file which already stored into the file system of raspberry pi will get call using "omxplayer alert.mp3" command and hence the wrong path detection alert message will be given using speakers. Hence the wrong pathdetection problem will get solve.

1. Testing results of GPS module using Raspberry pi:

The GPS Module testing gives the following results of all output sequence GPS data..

```
pi@raspberrypi: -
$GNRMC,093203.000,A,1650.3622,N,07435.7935,E,0.00,41.66,220115,,A*41MC,092831.081,V
$GNGSA,A,3,78,66,77,67,68,,,,,,,,,
$GPVTG,41.66,T,,M,0.00,N,0.01,K,A*091,T,,M,59.27,N,109.84,K,N*39
$GNRM
$GPGGA,093204.000,1650.3622,N,07435.7935,E,1,11,1.04,566.6,M,-70.4,M,,*42
$GNGSA,A,1,,,,,,,,,,,,,*
$GPVTG,41.66,
$GNGSA,A,3,31,22,14,01,04,32,,,,,,,,,1.99,1.04,1.70*1D
$GPGGA,093115.000,1650.3627,N,07435.7927,E,1,
$GNGSA,A,3,78,66,77,67,68,,,,,,,,,1.99,1.04,1.70*1E
$GPVTG,50.18,T,,M,6
$GNRMC,093025
$GNRMC,093204.000,A,1650.3622,N,07435.7935,E,0.00,41.66,220115,,A*460,,M,,*42
$GNGSA,A,3,78,66,77,67,68,,,,,,,,,
$GPVTG,41.66,T,,M,0.00,N,0.00,K,A*08
```

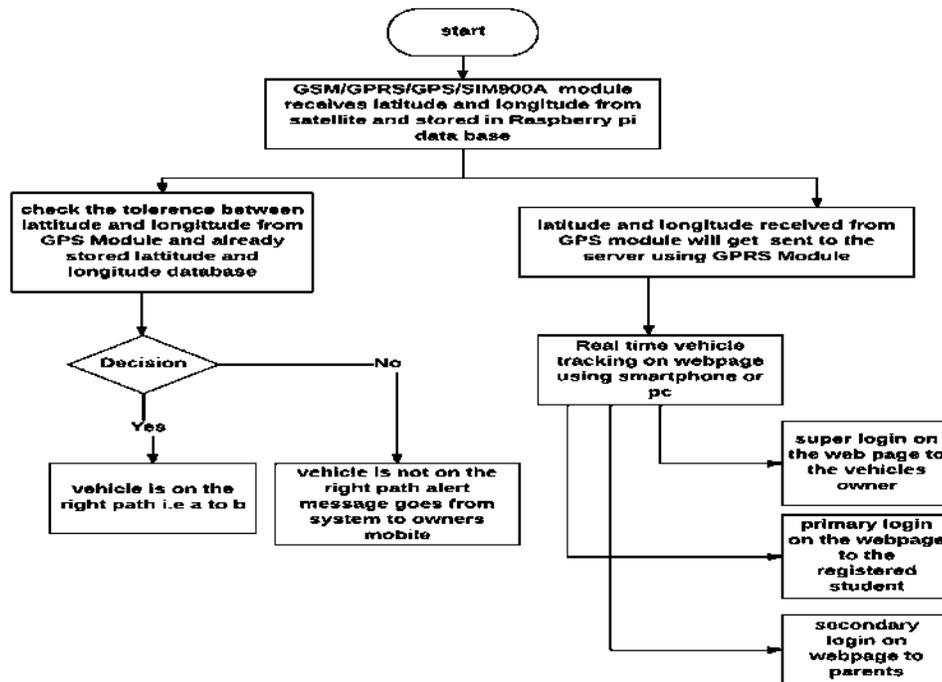
But we need to separate the required GNRMC data format which is received from GPS and GLONASS satellite out of all data formats. Because it gives us longitude, latitude, speeds, date and time which is useful in our application. The GNRMC data format is shown below:

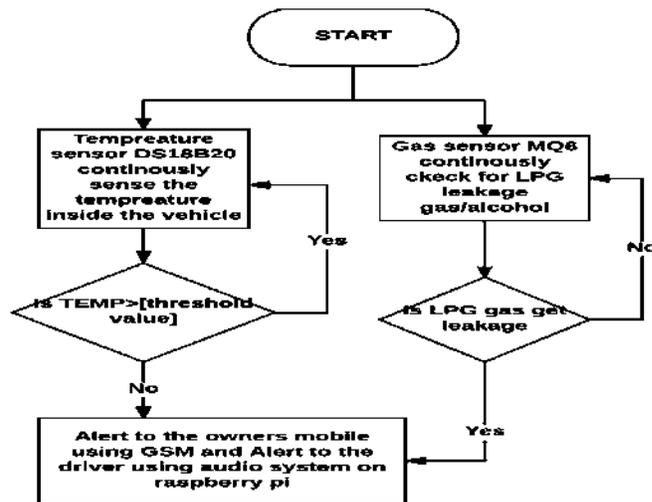


\$GNRMC,093204.000,A,1650.3622,N,07435.7935,E,0.00,41.66,220115,,A*460<CR>

The following table shows meaning of each data in the GNRMC data format received from GPS and GLONASS satellite.

V. FLOW DIAGRAM OF PROPOSED SYSTEM





VI. CONCLUSION

The proposed system for this reason made excellent use of Smartphone technology through offering safety and secure touring to the traveler making use of faulty path alert mechanism. The proposed system performs a major role in actual time monitoring and monitoring of vehicle by updating auto actual time expertise on the server part after distinctive interval of time in order to monitored vehicle continuously. Each time driver drives vehicle on the erroneous path or in case of vehicle's accident disaster occurs, the proposed system presents the vehicle's present location, speed to the vehicle owner's mobile. Therefore this benefits to monitor the vehicle as early as possible. Student's defence mechanism also gets supplied making use of temperature and LPG fuel leakage sensors.

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Biography :



Mr. Basava S Dhanne presently working as Assistant professor, Department of ECE, CMR Engineering college Hyderabad, Telangana India his research area are in embedded system, IOT and Real time operating system