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# Real Time Vehicle Monitoring and Tracking System based on Embedded Linux Board

R. Surender Reddy<sup>1</sup>, M. Hymavathi<sup>2</sup>, E. Shilpa<sup>3</sup>

Assistant Professor, Department of ECE, Lords Institute of Engineering and Technology, Telangana, India<sup>1,2,3</sup>

**ABSTRACT:** The proposed method would make just right use of latest technology that situated on Embedded Linux board particularly Raspberry Pi and Smartphone android utility. The proposed method works on GPS/GPRS/GSM SIM900A Module which entails all of the three matters specifically GPS GPRS GSM. The GPS present vicinity of the vehicle; GPRS for sending alert message to vehicle's owner cellular. The proposed approach would situation inside the vehicle whose position is to be determined on the internet web page and monitored at actual time. In the proposed procedure, there is evaluation between the current vehicle route and already designated route into the file method of raspberry pi. Right here within the proposed approach the already particular direction throughout the raspberry pi's file procedure taken from vehicleowner's android smartphone using android utility. Means the determination of route from place A to B takes position from car owner's android application which gives extra safety and secures touring to the visitor. Henceforth the driver drives the vehicle only on the vehicle owner's specified path. If the driver drives the vehicle on the wrong path then the alert message will be sent from the proposed system to the vehicle's owner mobile and also speakers alert driven using Raspberry pi's audio jack.

**KEYWORDS:** Raspberry Pi, Sensors, Embedded system.

### 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.

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## II. RELATED WORK

The smart phone application is developed in java Programming Language by using the Eclipse Integrated Development Environment (IDE). We use the Android Software development kit (SDK) which includes a verity of custom tools that help us develop mobile application on the android Platform. The most important of these are the android Emulator and the Android Development Tool (ADT) plug-in for Eclipse. In project android application is used to access the sensors information based on the Bluetooth technology. Within the application program one set point is fixed for each sensor. If the received sensor value is greater than the set point value then android application is accessing the inbuilt GPS and finds the vehicle position. Then one message is transferred to the one specific number which includes the vehicle position and sensors information.

## III. PROPOSED SYSTEM

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 despatched to vehicle's owner mobile. Also the longitudes and latitudes of the present route obtained from GPS will get despatched to the server with the support of GPRS which helps to monitor the vehicle's present location on the net page utilising 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.

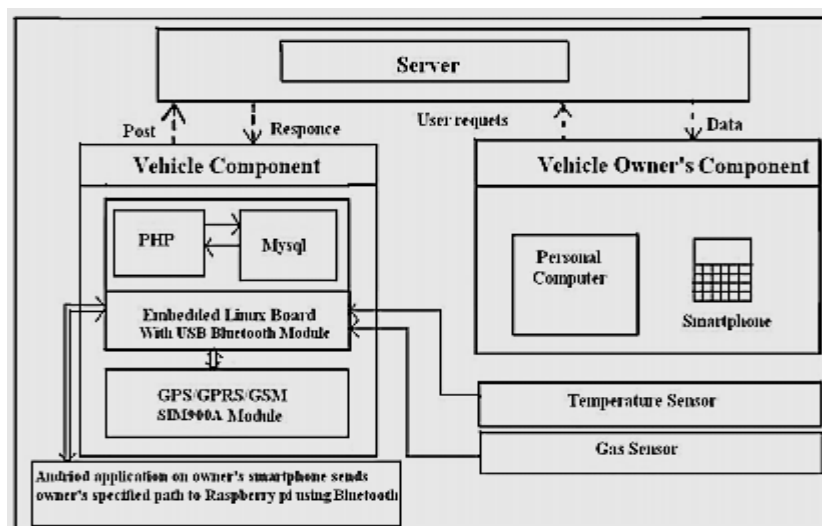


Fig. 1. System Block Diagram

### A. ONE WIRE DIGITAL TEMPERATURE SENSOR - DS18B20:

This is the latest DS18B20 1-Wire digital temperature sensor from Maxim IC. Reports degrees C with 9 to 12-bit precision, -55C to 125C (+/-0.5C). Each sensor has a unique 64-Bit Serial number etched into it - allows for a huge number of sensors to be used on one data bus. This is a wonderful part that is the corner stone of many data-logging and temperature control projects.



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## Features:

- Unique 1-Wire® interface requires only one port pin for communication
- Each device has a unique 64-bit serial code stored in an onboard ROM
- Multidrop capability simplifies distributed temperature sensing applications
- Requires no external components
- Can be powered from data line. Power supply range is 3.0V to 5.5V
- Measures temperatures from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  ( $-67^{\circ}\text{F}$  to  $+257^{\circ}\text{F}$ )
- $\pm 0.5^{\circ}\text{C}$  accuracy from  $-10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Thermometer resolution is user-selectable from 9 to 12 bits
- Converts temperature to 12-bit digital word in 750ms (max.)

## B. GAS SENSOR:

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector can sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.

## C. GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM):

GSM is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM Time Division Multiple Access (TDMA) is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA) and operates in the 900 MHz, 1800 MHz, or 1900 MHz frequency bands.

It is composed of following information:

1. An international mobile subscriber identity (IMSI) that uniquely identifies a subscriber within GSM.
2. A secret subscriber authentication key (Ki).
3. A cryptographic algorithm A3, which provide security functions for authenticating the SIM.
4. Temporary network related data: temporary mobile subscriber identity (TMSI), Location Area Identity (LAI) and Kc.

## D. GPS MODEM

A GPS modem is used to get the signals and receive the signals from the satellites. In this project, GPS modem get the signals from the satellites and those are given to the microcontroller. The signals may be in the form of the coordinates; these are represented in form of the latitudes, longitudes and altitudes. Position (longitude, latitude) identity and temperature to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft. We are intended to make this monitoring wireless using Raspberry Pi hardware platform. In today's world accidental deaths are increasing day by day in all most all accidents the death caused due to lack of treatments in time, because of not getting information to the nearest hospitals and police station immediately due to the present existing method of calling any person to the hospital and police station.

### 1) Real time vehicle tracking on the web page using GPS/GPRS/GSM SIM900A module and Raspberry pi:

SIM900A Module which gets interfaces with the Raspberrypi gives the real time tracking information of the vehicle 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:



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**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 students 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.

## IV. CONCLUSION

The proposed system for this reason made excellent use of Smartphone technology through offering safety and secure touring to the traveller 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



**R. Surender Reddy** presently,working as Assistant Professor, Department of ECE, Lords Institute of Engineering and Technology, Telangana, India. His research interests are in area of low power VLSI, DSP and FPGA architectures.



**M. Hymavathi** presently,working as Assistant Professor, Department of ECE, Lords Institute of Engineering and Technology, Telangana, India. Her research interests are in area of low power VLSI, FPGA architectures.



**E. Shilpa** presently,working as Assistant Professor, Department of ECE, Lords Institute of Engineering and Technology, Telangana, India. Her research interests are in Microwave Engineering, radar engineering and Wireless Mobile communications.