

# Innovative Real-Time Vehicle Monitoring and Tracking System based on Raspberry pi

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**Abstract-** Design of Vehicular monitoring and tracking system using RASPBERRY PI is suggested. The vehicular module is used to track, monitor, and surveillance and finds the accident spot and intimate to the monitoring station. The proposed design provides information regarding vehicle Identity, speed, and position on real time basis. The GPS gives 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 inside the file system of Raspberry pi. Hence 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 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.

**Index Terms-** Raspberry Pi, Sensors, Embedded system.

## I. INTRODUCTION

Thousands of automobiles are lost each year in the state and thousands of automobiles are also recovered by the Police from when they catch the culprits or even when the culprits leave the vehicles they have stolen after they have used them. The usual problem with the recovered vehicles reaching the actual owners is that the vehicle need not be found in the same jurisdiction as one in which the complaint was launched. So, when a vehicle is recovered, usually the Police try to trace out the actual owner of the vehicle from the RTO based on the license and chassis number. But this is a lengthy and time consuming process for the RTO to trace out the actual owners from the records and inform back to the Police stations. Because of these delays, vehicles that are recovered all long time to actually reach

their owners. Despite the various technologies that have been introduced in recent years to detect car thefts and tracking it, It was reported that as many as cars were stolen yearly in the world. According to NCIC, in 2006, 1,192,809 motor vehicles were reported stolen, the losses were 7.9\$ billion. Several security and tracking systems are designed to assist corporations with large number of vehicles and several usage purposes. A fleet management system can minimize the cost and effort of employees to finish road assignments within a minimal time. [1][2] This project consists of an android based remote vehicle disengaging system will provide effective, real time vehicle location, mapping and reporting this information value and add by improving the level of service provided. A vehicle tracking system will inform where your vehicle is and where it has been, how long it has been.

## II. RELATED WORK

Smart Surveillance Monitoring System Using Raspberry PI and PIR Sensor. In this paper author recommended that keen observation using so as to check framework is actualized Raspberry pi and PIR sensor. There is infrared sensor to identify the vicinity of number of persons in the room. Camera is naturally turned on when the vicinity of individual is distinguished. At that point the data is caught and sends it to the advanced mobile phone of approved individual through 3G Dongle.

Smart Automobile Security System Using Lab view. This paper manages the outline of the framework, which will give the arrangement on the best way to secure the vehicle with GSM innovation. The framework is utilized to control the outlet of the fuel injector by method for electronic solenoid valve, which will be controlled by the microcontroller

through the driver circuit. The secret key is given to the approved individual of the vehicle. The shut solenoid opens and the vehicle begins unless and until secret word will coordinate. In the event that it neglects to coordinate, the framework will send message to the approved individual by means of GSM modem. A caution is likewise joined to the framework. LABVIEW stage can reproduce the framework.

Ignition Alert Anti-Theft Security System for Motorbikes with Remote Control. In this paper author recommended that when somebody is attempting to take the motorbike it will stop the ignition of vehicle and caution the proprietor with alert. It is exceptionally troublesome for the criminal to take the vehicle by utilizing this gadget. Sensors are set on the vehicular body. It will stop the ignition of the vehicle when somebody touches it and when any one is attempting to touch for more than 3 times. Unless and until we deactivate the gadget with remote the ignition of vehicle won't begin.

Intelligent Anti-Theft and Tracking System for Automobiles. In this paper author proposed a productive car security framework is executed for hostile to robbery utilizing an installed framework involved with a Global Positioning System (GPS) and a Global System of Mobile (GSM). By utilizing Google Earth, The customer connects through this framework with vehicles and decides their present areas and status. The position of focused vehicles can be followed by client on Google Earth.

Microcontroller Based Anti-theft Security System Using GSM Networks with Text Message as Feedback. This paper proposed a framework with Dual Tone Multi Frequency (DTMF) and a GSM to screen and shield an auto. Sensors are set at the auto entryways and boot. The framework gets initiated when any individual is attempting to robbery through auto entryways or boot. At that point it consequently grounds the auto by disengaging the ignition key supply from the auto battery. Additionally send the ready message to the auto proprietor and also begins up an alert.

GSM Based Car Security System. In this paper author suggested that the point of this framework is

to attempt to spare the auto in light of GSM innovation. when somebody attempt to take your auto it cautions the auto proprietor with alert and also send the ready message to the auto proprietor through GSM system. 8. Real Time Vehicle Tracking System using GSM and GPS Technology- An Anti-theft Tracking System. This paper gives the two route correspondence between the approve individual and introduced framework. More elevated amount of auto security components is given by this framework. At the point when interruption is recognized this framework will send the notice message to the auto proprietor. When the auto proprietor gets the message he has power to control any auto highlight through his PDA. This framework is additionally ready to distinguish the area of the auto by utilizing GSM situating idea.

### III. PROPOSED SYSTEM

In these days accidents and vehicle thefts are increasing very much all over the world. So many consumers are using anti-theft control systems installed in their vehicles, which are very expensive. So, in order to reduce the vehicle theft and accidents at low cost we are dealing with this base paper. The main aim of the paper is to control thefting problems and to know the location of the vehicle when an accident occurs. As shown in block diagram of the advanced vehicle monitoring and tracking using raspberry pi 3, it contains Raspberry Pi 3, GSM, and GPS, IR sensor, SMOKE sensor, Webpage and converters. In this design we are introducing raspberry pi into embedded systems. Sensors are used to detect the accident. If we want to monitor and trace a vehicle, we need keep this kit in that particular vehicle. Whenever accident occurs, GPS will give the longitude and latitude values to raspberry pi 3 and then it will send the SMS of the vehicle location to that particular person by using GSM. That person can see the location by putting those longitude and latitude values in web page which is created before.

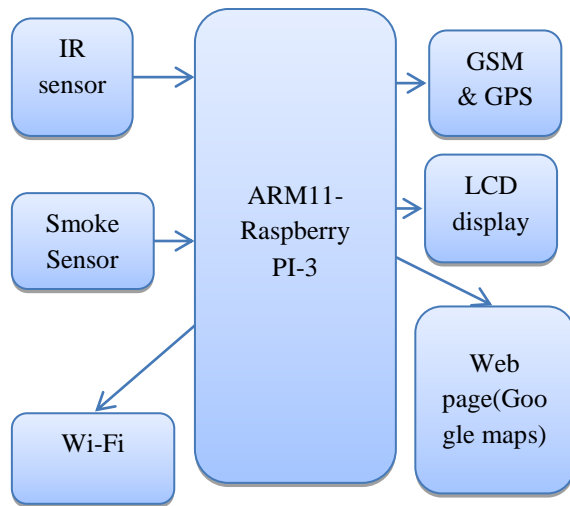


Fig.1 Block diagram

It is used to see videostream and also whenever a person comes it takes a snapshot of that person and transmit it to raspberry pi. Raspberry pi processes these inputs like whenever it gets a calling bell as input it transmits a signal to wireless camera to capture an image of the visitor.

**A. HARDWARE IMPLEMENTATION:**

**Raspberry Pi 3:** The Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst maintaining the popular board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster than the first generation Raspberry Pi. Additionally it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs. The main features of Raspberry pi 3 are[4]

**Processor:** Broadcom BCM2387 chipset. 1.2GHz Quad-Core ARM Cortex-A53 802.11 b/g/n Wireless LAN and Bluetooth 4.1 (Bluetooth Classic and LE)

**GPU:** Dual Core VideoCore IV® Multimedia CoProcessor. Provides Open GL ES 2.0, hardware accelerated OpenVG, and 1080p30 H.264 high profile decode.

**Operating System:** Boots from Micro SD card, running a version of the Linux operating system or Windows 10 IoT.

**GPIO Connector:** 40-pin 2.54 mm (100 mil) expansion header: 2x20 strip Providing 27 GPIO pins as well as +3.3 V, +5 V and GND supply lines.

**Infrared sensor:** An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detect motion. These types of sensors measure only infrared radiation rather than emitting it that is called as a passive IR sensor. The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The high precision IR receiver always detects an IR signal.[5]

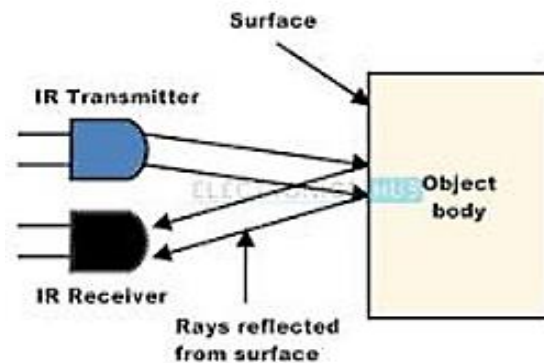


Fig.2. IR Sensor

**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.

**GSM module:** It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. The use of GSM to send health information to a webpage. This gives a patient the ability to leave the hospital but still he has to stay in some known places to ensure the ability to reach him in emergency cases. Even with this solution the patient can't move freely and be far from his home.

**GPS Module:** LS20030~3 series products are complete GPS smart antenna receivers, including an embedded antenna and GPS receiver circuits, designed for a broad spectrum of OEM systems.

applications. The product is based on the proven technology found in LOCOSYS 66 channel GPS SMD type receivers MC-1513 that use MediaTek chip solution. The GPS smart antenna will acquire up to 66 satellites at a time while providing fast time-to-first-fix, one-second navigation update and low power consumption. It can provide us with superior sensitivity and performance even in urban canyon and dense foliage environment. Its far-reaching capability meets the sensitivity requirements of car navigation as well as other location-based applications.[1]



Fig.3.GPS Modules

**Features:**

- o Ultra High Sensitivity and Low Power GPS Receiver Module
- o MediaTek high sensitivity solution
- o Support 66-channel GPS
- o Fast TTFF at low signal level
- o Support AGPS

**LCD Interfacing to Microcontroller:** A liquid crystal display (LCD) is a thin, flat panel used for electronically displaying information such as text and integers. Its major features are its lightweight construction, and portability. Date and time are continuously displayed on LCD when the sensor values are being stored in EEPROM. Four data lines are used to send data on to the LCD. When RS=0 and EN pin is made high to low command is sent to LCD. When RS=1 and EN pin is made high to low data is sent to LCD. VEE is used to adjust contrast.

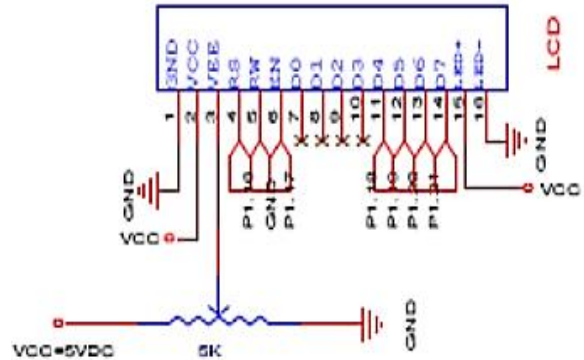


Fig.4. LCD connection

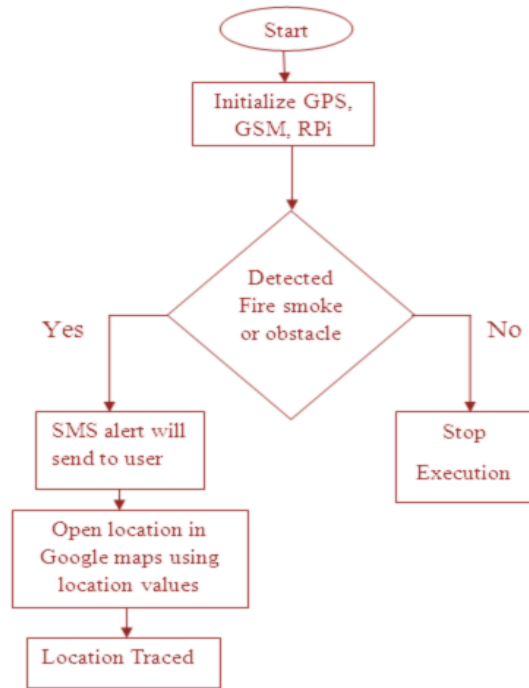


Fig. 5. Flowchart of proposed system

By using the above flow chart we can easily explain the working. We have to start the project and initialize the GSM, GPS and Raspberry Pi. The decision box clearly tells that if it detects any fire smoke or obstacle, the SMS alert will send to user. User can open the location in Google maps by using those values. Thus, location will be traced easily. Otherwise stop execution. The result are as shown in below Fig.8 and Fig.9.

## B. RESULT AND DISCUSSION

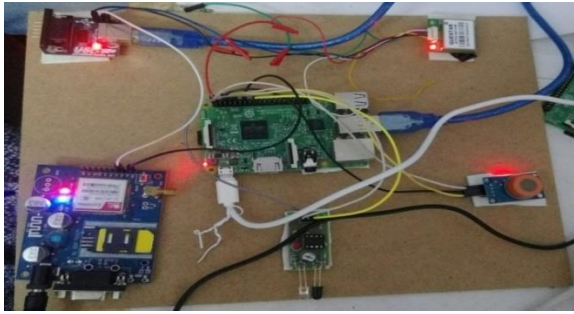


Fig.6.Kit with all connections and powersupply  
We have to connect the kit according to block diagram as shown. Insert SIM card in GSM after that give power supply to it. Connect the raspberry pi to Wi-Fi. And then run the program in order to get out put.

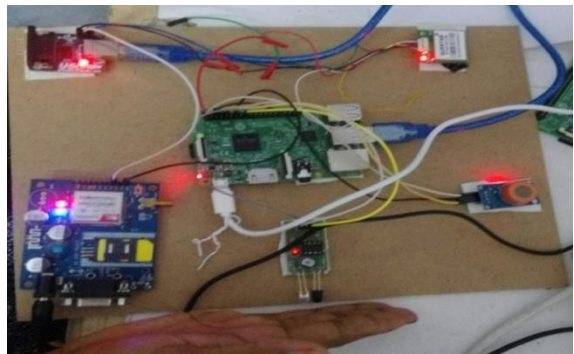


Fig.7. IR sensor sensing the accident  
When accidents occurs due to colliding vehicle,IR sensor will sense it and gives the information to raspberry pi,GPS will trace the longitude and lattitude values.these valuse will be sent to that person by GSM.

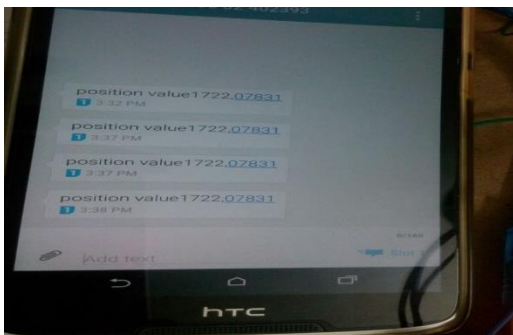


Fig.8. A message regarding vehicle position

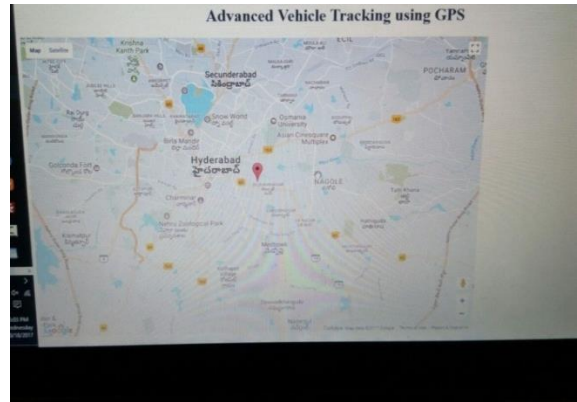


Fig.9. The accurate location of the vehicle in Google maps

## IV. CONCLUSION

This project places a vital role in our day to day life. By using this we can monitor and track the vehicle, thus it provides safety. Since we can use this in many ways like in school bus, so that we can monitor and trace the vehicle easily by using internet. Whenever the accidents occurs it will send a message to the authorized person's number with location details, by using those values we can monitor and track the vehicle using Google maps. By using this project we can track the vehicle very fast. As a future scope, we can use a camera module interconnecting with raspberry pi to make tracing easy. We can use airbags system to prevent person from striking steering wheels or windows. We can use external EEPROM to store previous 256 locations. We improve the accuracy by increasing the cost. We can add ambulance contact numbers and police station contact number so that they can reach very fast to that location.

## REFERENCES

- [1] Tarapiah, S.; Atalla, S.; Alsayid, B., "Smart on-board transportation management system Geo-Casting featured,"Computer Applications and Information Systems (WCCAIS), 2014 World Congress on , vol., no., pp.1,6, 17-19 Jan.2014.
- [2] Kumar, R.; Kumar, H., "Availability and handling of data received through GPS device: In tracking a vehicle,"Advance Computing Conference (IACC), 2014 IEEE International, vol., no., pp.245, 249, 21-22 Feb. 2014.

- [3] SeokJu Lee; Tewolde, G.; Jaerock Kwon, "Design and implementation of vehicle tracking system usingGPS/GSM/GPRS technology and smartphone application," Internet of Things (WF-IoT), 2014 IEEE World Forumon , vol., no., pp.353,358, 6-8 March 2014.
- [4] Pengfei Zhou; Yuanqing Zheng; Mo Li, "How Long to Wait? Predicting Bus Arrival Time with Mobile PhoneBased Participatory Sensing," Mobile Computing, IEEE Transactions on, vol.13, no.6, pp.1228, 1241, June 2014.
- [5] Liu; Anqi Zhang; Shaojun Li, "Vehicle anti-theft tracking system based on Internet of things," VehicularElectronics and Safety (ICVES), 2013 IEEE International Conference on, vol., no., pp.48, 52, 28-30 July 2013.
- [6] Hoang Dat Pham; Drieberg, M.; Chi Cuong Nguyen, "Development of vehicle tracking system using GPS andGSM modem," Open Systems (ICOS), 2013 IEEE Conference on , vol., no., pp.89,94, 2-4 Dec. 2013.
- [7] Al Rashed, M.A.; Oumar, O.A.; Singh, D., "A real time GSM/GPS based tracking system based on GSM mobilephone," Future Generation Communication Technology (FGCT), 2013 Second International Conference on , vol.,no., pp.65,68, 12-14 Nov. 2013.
- [8] Zhigang Shang, Wenli; He, Chao; Zhou, Xiaofeng; Han, Zhonghua; Peng, Hui; Shi, Haibo, "Advanced vehiclemonitoring system based on arcgis silverlight," Modelling, Identification & Control (ICMIC), 2012 Proceedings ofInternational Conference on , vol., no., pp.832,836, 24- 26 June 2012.
- [9] J. Xiao, and Haidong Feng, " A Low-Cost Extendable Framework For Embedded Smart Car Security System",in Proc. Int. Conf. on Networking, Sensing and Control, Okayama, 2009, pp. 829- 833.
- [10] B.G. Nagaraja, Ravi Rayappa, M. Mahesh, Chandrasekhar M. Patil, Dr. T.C. Manjunath, "Design &Development of a GSM Based Vehicle Theft Control System" 978-0-7695- 3516-6/08©2008 IEEE, DOI10.1109/ICACC.2009.154, pp.148-152.