An Intelligent automobile Anti-Theft Tracking and Calamity Detection System Based on IoT using RASPBERRY PI For Real Time Applications

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ABSTRACT

An efficient durable automobile security system and calamity detection using an embedded system consisting Wi-Fi module and GPS (Global Positioning System). As there is increase in population in India, so as the effect of it the number of vehicle are stolen and accidents are happening. In many cases, the owner could not get his/her vehicle even if they go to law enforcement. India has more than 20 million vehicles at the present, so intelligent anti-theft and accident detection system based on IoT technology is a splendid gift to owners. The proposed system is meant to send a predefined messages if vehicle get stolen and if calamity to vehicle happens. The owner can track vehicle position in real time on an android mobile using Gps Locator. The vehicle real-time location will be sent, along with various parameters via the internet with help of Wi-Fi module that is connected to the device. Since the Internet is the communication medium, this concludes the term as IoT is implemented. If the owner want to take immediate action to apprehend the thief. This feature will be present on the vehicle tracking app and will get images of thief driving the vehicle. The other side of our project is accident detection. The process is, as an accident happens the accelerometer reading and piezoelectric sensor reading with trigger the system and will send the coordinates to law enforcement authorities, hospitals and family members and appropriate actions can be taken by immediately by them.

Keywords Tracking system, Anti-theft, Internet of Things, Accident detection,Vehicle Tracker app

I.INTRODUCTION

As India is developing rapidly, an automobile Industry is growing and there is increase in use of automobiles as the population of India is very high. Due to this the accidents and larceny are happing .To get reed of the current concerns we have to developing the satellite communication technology is easy to identify the location of vehicle. Vehicle tracking technologies now are part of common person's amenities. Now a days Gps is used in automobiles also previously it was only used by ships, airplanes and military. In India generally the Gps in the automobiles is used for navigation purpose and it was only present in costly automobiles. IoT based technology is now important, with Gps and IoT we can track the vehicle in real time basis which will help to find the vehicle if stolen easily or calamity happens to it. The Internet of Things (IoT) means the network of physical objects or "things" embedded with electronics, sensors, software and network connectivity, it enable all these

objects to gather and interchange data. This will directly integrate with physical worlds and computer-based systems which will increase accuracy, efficiency and economic benefits. At present not all devices are connected to internet by IoT embedded technology it can happens. This will helps to communication between machines easy even they are place long from each other. The IoT technology will help to build smart Cities in which all physical aspects can be converted into digital.

II. PRESENT SCENARIO

In spite of the different Anti-robbery systems that exist in introduce cars, the instances of cars getting stolen regular. As indicated by a 2011 TOI post, about 1.51 lakh vehicles were stolen, In 2012 1.54 lakh and in 2013 1.65 lakh in India, 105 vehicles are stolen in Delhi every day TOI post April 5, 2017. As indicated by the dark market gauges, the stolen auto industry could produce a turnover of near two billion. Criminals are consistently formulating keen approaches to take that valuable bit of apparatus dear to each family unit who possesses them. The stolen car numbers have to some degree diminished by and by however their worry still remains a testing issue to address. Some of existing security systems that are executed in autos are given beneath:

1) Presently the vast majority of the vehicles utilize the customary remote locking vehicle security system which in various dependably barely gives any good security.

2) Some propelled systems are created which utilize sensor systems to accomplish security yet in the event that the sensor organize fizzles the whole system comes up short.

3) Some other security systems utilize some particular sensors which enact the crisis alert when a man is in its nearby region. They generally experience the ill effects of rehashed humming of alert notwithstanding when a man who is quite recently going by the said vehicle in this way enacting the caution.

4) Gps is present in several vehicles but it is only for navigation.

5) Vehicles having many security functions are expensive and not in reach of common people.So, we have to build the anti-theft system for existing vehicle and upcoming. It can be installed in all the exiting vehicle easily.

III. LITERATURE REVIEW

Vehicles have been being used since time ancient and having said that, there had been a continuous advancement in making them more secure and more secure.Some literature as reviews follows:

1. The use of ARM 7 microcontroller, GSM and GPS module together with an accelerometer and temperature sensor is completed by Joshi and Mahajan[4]. The GPS and GSM module is being used for following the region of vehicle. The additional part is being incorporated is the accelerometer which basically contains the MEMS sensor offering a low pass channel and is on a very basic level used for Shake Recognition, Introduction Recognition and Tap Discovery. The use of temperature sensor is also being completed with a particular ultimate objective to gain the vehicle motor temperature which changes over the estimation of temperature into electrical flag.

2. A half breed GPS-GSM confinement of vehicles Following System has been created by Al-Khedher[5]that depicts a consolidated GPS-GSM structure to track vehicles using Google Earth application. The module has a GPS mounted on the vehicle travellingto locate and interchange the information about parameters

acquired by the automatic SMS to a recipient station. The got GPS bearings or directions are filtered using a Kalman channel to redesign the exactness of measured position. After data handling, Google Earth application is used to see the current zone and status of each vehicle. This goal of this system is to direct task force, squad cars scattering and auto theft cautions.

3. Shaikh[6] portrays arm7 based smart auto security system. The standard purpose of this endeavor is to offer an advancement security system in car, which includes a face location subsystem, a GPS module, a GSM module and a control arrange. The face area subsystem can find stands up to in vehicle in the midst of the period in which nobody should be in the auto, and make a caution uproariously or soundlessly. Exchange modules transmit crucial information to customers and help to keep eyes on vehicle always, really when the vehicle is lost. This system display depends on the base of one embedded stage Arm7 which controls all the forms

4. Smart Vehicle Security System Utilizing Lab see. This paper deals with the layout of the structure, which will give the course of action on the most ideal approach to secure the vehicle with GSM advancement. The system is used to control the outlet of the fuel injector by technique for electronic solenoid valve, which will be controlled by the microcontroller through the driver circuit. The mystery key is given to the endorsed individual of the vehicle. The close solenoid opens and the vehicle starts unless and until the point that mystery word will arrange. If it fails to arrange, the structure will send message to the endorsed individual by methods for GSM modem. An alert is similarly joined to the structure. LABVIEW stage can imitate the system

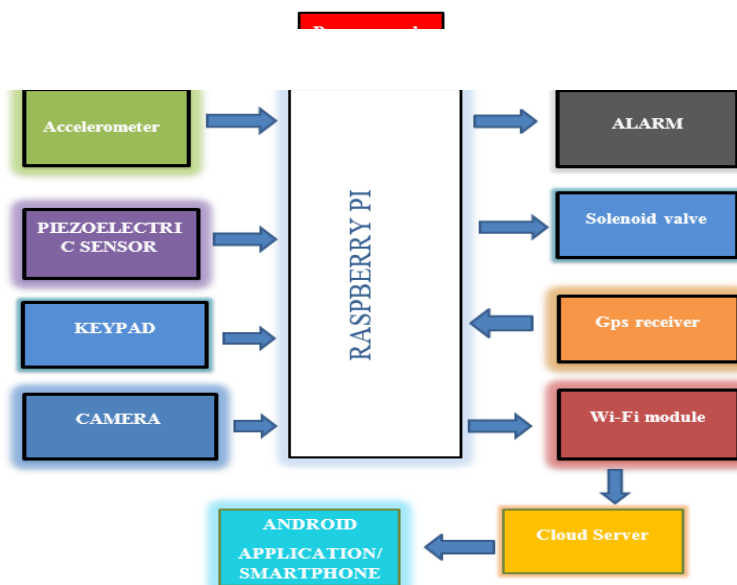1. **System Description**
2. **The Hardware system**

Figure 1 block diagram of system

Microcontroller: This segment frames the control unit of the entire task. This segment essentially comprises of a Microcontroller with its related hardware like Crystal with capacitors, Reset hardware, Pull up resistors (if necessary) etc. The Microcontroller frames the core of the undertaking since it controls the gadgets being interfaced and speaks with the gadgets as indicated by the program being composed. RASPBERRY PI. The Broadcom SoC utilized as a part of the Raspberry Pi is proportional to a chip utilized as a part of an old advanced mobile phone (Android or iPhone). While working at 700 MHz of course, the Raspberry Pi gives a certifiable execution generally proportionate to the 0.041 GFLOPS On the CPU level the execution is like a 300 MHz Pentium II of 1997-1999. The GPU gives 1 Gpixel/s or 1.5 of designs handling or 24 GFLOPS of broadly useful registering execution. The designs abilities of the Raspberry Pi are generally identical to the level of execution of the Xbox of 2001. The Raspberry Pi chip, working at 700 MHz as a matter of course, won't wind up noticeably sufficiently hot to require a warmth sink or exceptional cooling. The SoC is stacked underneath the RAM chip, so just its edge is unmistakable. On the more established beta model B loads up, 128 MB was allotted as a matter of course to the GPU, leaving 128 MB for the CPU. On the initial 256 MB discharge show B (and Model A), three unique parts were conceivable. The default split was 192 MB (CPU RAM), which ought to be adequate for independent 1080p video disentangling, or for basic 3D, however most likely not for both together. 224 MB was for Linux just, with only a 1080p casing support, and was probably going to fall flat for any video or 3D. 128 MB was for overwhelming 3D, perhaps at the same time with video unraveling .GSM

2.1 The Software System RaspianOs

The Raspberry Pi fundamentally utilizes Linux bit based working systems. The ARM11 chip at the core of the Pi depends on rendition 6 of the ARM. The present arrivals of a few mainstream variants of Linux, including Ubuntu won't keep running on the ARM11. It isn't conceivable to run Windows on the Raspberry Pi. Raspbian – Maintained autonomously of the Foundation; in light of the ARM hard-glide Debian 7 'Wheezy' engineering port initially intended for ARMv7 and later processors ordered for the more constrained ARMv6 guideline set of the Raspberry Pi. A base size of 4 GB SD card is required. There is a Pi Store for trading programs. Raspbian is a free working system in view of Debian streamlined for the Raspberry Pi equipment. A working system is the arrangement of fundamental projects and utilities that influence your Raspberry Pi to run. In any case, Raspbian gives more than an unadulterated OS: it accompanies more than 35,000 bundles, precompiled programming packaged in a decent arrangement for simple establishment on your Raspberry Pi .The underlying form of more than 35,000 Raspbian bundles, improved for best execution on the Raspberry Pi, was finished in June of 2012. Be that as it may, Raspbian is still under dynamic advancement with an accentuation on enhancing the steadiness and execution of however many Debian bundles as could be allowed.

5.2 Gps Module

Global Position System (GPS) is a space-based satellite navigation that provides location and time information in all weather conditions, anywhere on or near the Earth. The GPS receiver tracks 51 satellites simultaneously. The module is mounted on the PCB along with the 3.3V low drop voltage regulator, transmit, receive and power indication LEDs, Schmitt trigger based buffer for 5V to 3.3V logic level conversion. This GPS receiver gives data output in standard National marine electronics association (NMEA) format. The GPS receiver gives -157dBm.

2.2 Wi-Fi module

The main task of this module is to provide connection medium for sending location data obtained from GPS module to vehicle tracker app. The ESP 8266 Wi-Fi module will be connected to hotspots situated in surroundings which will enable the system to send data through Internet to the owner (Vehicle tracker app).

5.3 Accelerometer module

This module measures changes in g (acceleration) values in three axes viz. X, Y and Z and gives corresponding electrical voltage signals to the deviations in the said axes. This module is responsible with accident detection feature of the system. Whenever the vehicle meets with an accident, the sharp changes in g values occur and the corresponding digital values (digitization of electrical voltage signals is carried out by ADC built in microcontroller) are compared with predefined threshold values, if the values exceed those predefined threshold values, the GPS module is triggered and coordinates will be sent to law enforcement and hospital authorities through Internet. For this system the ADXL 335 accelerometer module is used.

5.4 Solenoid valve

Solenoid valve is an electromechanically worked valve. The valve is controlled by an electric current through a solenoid: on account of a two-port valve the stream is turned on or off; on account of a three-port valve, the surge is exchanged between the two outlet ports. Various solenoid valves can be set together on a complex.

5.5 Camera module

Camera module is an official of product raspberry foundation. The original 5-megapixel model was released in 2013. Its weight is 3g, still resolution-5Megapixels,videomodes 1080p30,720p60and 640x480p60/90,linux integration V4L2 driver availables,sensorOmnivison OV5647.

5.6 Keypad

It is a 4x4 matrix keypad with 8 input and output port for interfacing isused. As an e.g Rows are connected as output. Columns are connected to pins configured as input with interrupts.

5.7 Piezoelectric Sensor

Piezoelectric sensors are adaptable gadgets for the estimation of various strategies. They are used for quality affirmation, process control, and for creative work in various endeavors. Pierre Curie found the piezoelectric effect in 1880, yet just in the 1950s did producers begin to use the piezoelectric effect in mechanical identifying applications. From that point forward, this measuring standard has been progressively utilized, and has turned into a develop innovation with magnificent characteristic unwavering quality.4.7 camera module –It is an image sensor integrated with a lens, control electronics, and an interface like CSI, Ethernet or plain raw low-voltage differential signaling.

5.8 Battery Bank

The battery bank suffices the power requirements for the entire working of the system. Although the system will originally use the power supply from the vehicle's battery pack but having an auxiliary power supply will help in uninterrupted functionality of system in the event of vehicle battery pack failure or in case it gets damaged thereby maintaining the security of the vehicle at all times.

5. 9 Power supply

The power supply allows AC signal to DC signal which is required to run the system components (Prototype model only). It consist of step down transformer which reduces the 230V mains supply to just 12V which is then applied to Bridge rectifier and filtering circuits. At the output of said circuits pure DC (without ripples and constant amplitude) is obtained. This DC signal is further applied to two voltage regulator ICs. One of them is fixed voltage regulator IC 7805 which provides a constant 5V and the other IC is LM317 which is variable voltage regulator. IC LM317 output voltage can be adjusted by using 20 kilo ohm potentiometer. The potentiometer is adjusted to obtain 3.3V required by the microcontroller

VI. SYSTEM OPERATION

• The security system will dependably be online 24x7. That is the system will get nonstop power from an outer battery bank. This is on the grounds that robbery or mischance can happen whenever and the system ought to work consistently with no interference or power disappointment.

• Now consider the situation where the proprietor is beginning his vehicle, on turning the start with real key, the system detects that the vehicle's motor has begun and sends a predefined message to the proprietor that the vehicle has been begun. Additionally the GPS module begins sending directions to the cloud server so they can be utilized finding the area of the vehicle on the off chance that it meets with a mischance.

• But since the proprietor himself is utilizing the vehicle he/she will overlook the message as this is unmistakably not an instance of vehicle getting stolen.

• Now think about that as a criminal by one means or another gets section into a similar vehicle and by one means or another figures out how to begin the vehicle (say by shorting wires to begin start), the same predefined message will be sent to proprietor of that vehicle. The proprietor will off base understand that his vehicle is getting stolen. Now the proprietor has two alternatives:

.1. Either instantly press the 'Motor FUEL OFF ' highlight display on the 'Vehicle application' on android smart phone. Introduced on proprietor's advanced mobile phone to stop and catch the hoodlum from escaping with the vehicle in the event that he/she wishes to.

.2. Or, on the other hand begin following the vehicle's position in view of the directions sent by the GPS module (the directions are as of now put away in cloud server and are sent to application on proprietor's demand) show in the vehicle, start area following on maps and contact the law implementation specialists instantly to secure the criminal and recoup the vehicle.

•There is another component that if auto get stolen the proprietor will get a picture of the individual driving the auto.

• The same process is appropriate in the event that the vehicle gets engaged with a mischance.

　1. To accomplish this, the accelerometer introduce on system on detecting sharp or substantial developments (if the module gets to survey i.e. at the point when deviations in g esteems surpass as far as possible) will trigger the GPS to begin sending the directions got from satellites to close-by doctor's facilities, law implementation specialists and relatives with the goal that they can take crisis measures promptly. The most extreme vital thing is that the gadget must be associated with web at all the circumstances.

2. To accomplish this the piezoelectric sensor display on the system sense parameters above edge limits it will trigger the GPS to begin sending thedirections got from satellites (The directions are as of now put away in cloud server) to adjacent healing facilities and law requirement experts with the goal that they can take crisis measures instantly. The most extreme vital thing is that every one of the gadgets (system, advanced mobile phone, establishments and so forth.) must be associated with web at all the circumstances.
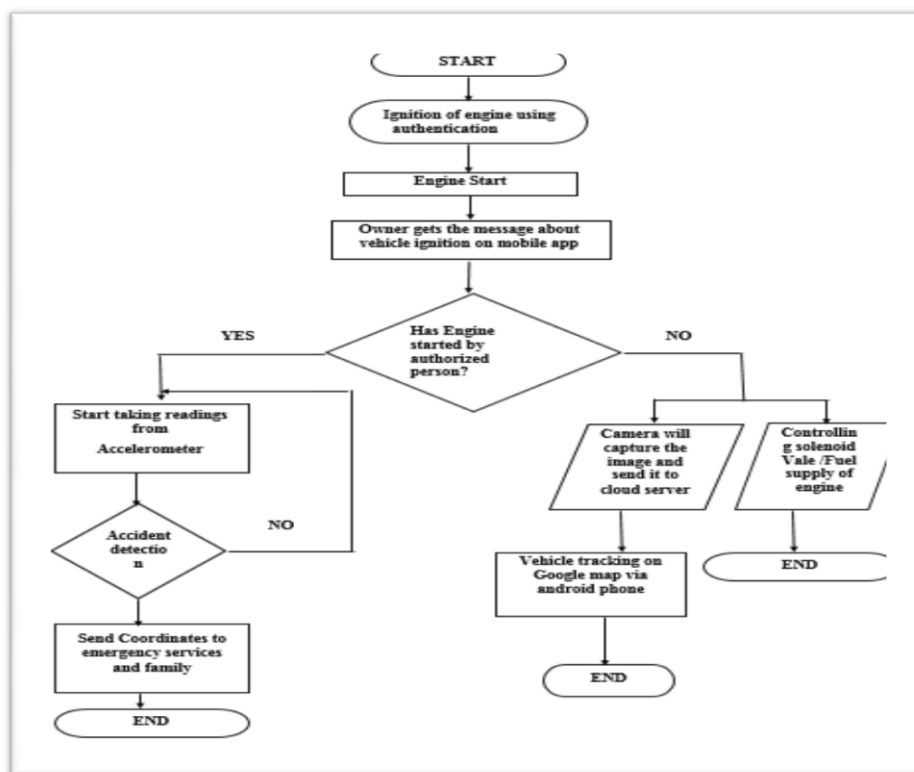
6.1 System flow chart

Figure 2 system flow diagram

VII. CONCLUSION

As our proposed system is in primary stage and executing it practically but, from proposedthesisthe proposed system henceforth made great utilization of Smartphone innovation by giving wellbeing and secure going by ready component. The proposed system assumes an essential part progressively following and observing of vehicle by refreshing vehicle ongoing data on the server side after certain interim of time with a specific end goal to checked vehicle persistently. At whatever point driver drives vehicle if there should be an occurrence of vehicle's mishap circumstance happens, the proposed system will gives the vehicle's ebb and flow area, speed to the vehicle proprietor's versatile. Subsequently this advantages to track the vehicle as right on time as could be expected under the circumstances. Understudy's wellbeing instrument likewise gets gave utilizing temperature and in this specific circumstances, according to understudy's security concern, the proposed system additionally gives ready back rub on understudy guardians portable with the goal that guardians additionally think about their youngsters' security

VIII. ACKNOWLEDGEMENTS

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