SMART ANTI-THEFT SYSTEM FOR THE SECURITY OF VEHICLES- A REVIEW

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Abstract - *Today in the current global scenario safety and especially security of vehicle in common parking places has become a prime concern. In this system simple and cheaper vehicle tracking is implemented with the help of Global Positioning System (GPS), and Global System for Mobile Communication (GSM) technologies. Also tracking of any movable asset and determination of exact location of vehicle is done with the help of Smartphone application. The main components in the system are GPS module, GSM modem, web camera and microcontroller. The use of GPS system is to track the current location of the vehicle. As GPS system can only receive the vehicle location information from the satellites, GSM system is also installed in the vehicle for sending information to vehicle's owner. In case of accident this system automatically sends the SMS to ones relatives for help. This complete system is designed to provide better security for vehicle considering the low range vehicles.*

Key Words: Global Positioning System(GPS), Global System for Mobile Communication(GSM), microcontroller, mobile unit, On-demand location request, vehicle tracking.

1. INTRODUCTION

Security to all vehicles is the main objective of vehicle tracking system. Accident alert system is use to rescue people in accidents. In this system vehicle security is improved. Now days latest systems like GPS system is very useful and it helps the owner to observe and track the vehicle. This system also helps in finding out movement of vehicle and vehicle past activities. This latest technology which created many wonders in the vehicle security is called vehicle tracking system.

This hardware is assembled on the vehicle in such a way that it is invisible to the person inside or outside of the vehicle. If any interrupt to the system then it sends location information to the monitoring unit. To find the location of vehicle, location information from tracking system is used in case if the vehicle is stolen and can be informed to police for taking actions. It also alerts the owner by detecting unauthorized movement of vehicle.

1.1 FEATURES OF SYSTEM

Vehicle tracking: It is advantageous for the transport system based companies. In real time, system can show position of all the vehicles and essential data is created accordingly. The information like where the vehicle had gone, where did it stop, how much time it will take at each stop can be stored in the system. It has also advantageous applications in buses, trains to estimate how far that particular vehicle is, how much time it takes to reach to particular stop. The features like data capturing, data storage, data analysis, and data transfer is included in the system.

Accident alert features: The main motto of the accident alert system is to save one's life by detecting accidents. This is achieved by sending an sms through the GPS and GSM technology to the victim's relative. If this system is used for every vehicle then how many vehicles are included in particular accident as well as intensity of accident can be easily determined. This feature makes the system more useful and valuable and also identification of theft and accident detection is possible.

Need of tracking in India: In India mainly transport stetems, traffic operations, taxi companies use tracking system. This is used by taxi operators to estimate from particular area how far the vehicle is and send this information to call centres and they can inform public about the distance of taxi location and how much time it takes to come to them. If this system is located in every vehicle then traffic police can estimate the traffic by looking on the map and they can also route the traffic into another way if any accident is detected at particular location or area. As India is one of busy traffic countries tracking is useful which can control many of the traffic related problems.

2. COMPONENT USED

a) GPS RECEIVER:

GPS abbreviates Global Positioning System. Latitude and longitude of the particular position is detected and also exact time can be shown by using GPS. GPS detects latitude and longitude values anywhere on the earth. In this system it plays vital role for finding the accident occurred location, or even for theft tracking of the vehicle. It is the main component of vehicle tracking system.

b) GSM MODULE:

GSM abbreviates Global System for Mobile communication. For mobile communication this device is used in all over the world. It consists of SIM slot in which a SIM is to be inserted. It is having with a unique no. called as IMEI no. this unique no. is different. In this system data from GPS is transmitted to given Smartphone through GSM itself.

c) ARDUINO UNO R3:

The Arduino board is very popular and comes with either 1 of 2 microcontroller chips, the Atmega168 or the Atmega328. Out of these, the Atmega328 is the more advance and upgraded chip produced by Atmel which are used with Arduino board. The Atmega328 has 32k of flash program memory and 2k of internal SRAM. The Atmega328 has 28 pins. It has 14 digital I/O pins, of which 6 is used as PWM outputs and 6 analog input pins. The pin diagram of Atmega328 is shown in Fig. 3. 2. 1
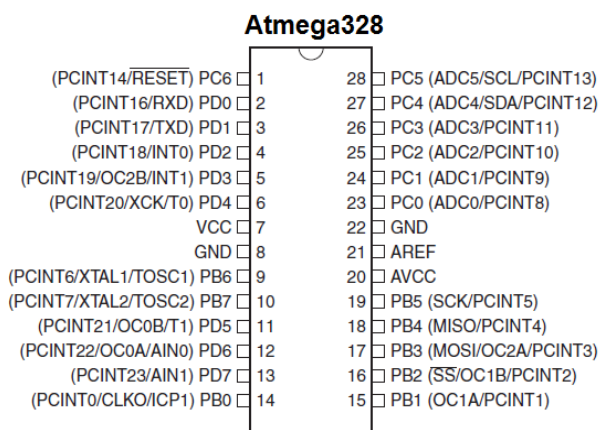

Fig. 2.1: pin diagram of the Atmega328

As previously stated, 20 pins function as I/O ports i.e. they can function as an input or as output. The pins whether input or output is set in the software. Out of 14 digital pins 6 pins can function to give PWM output, 6 pins can function for analog input/output,2 pins can function for the crystal oscillator. This is used to provide a clock pulse for the Atmega chip. For synchronization clock pulse is essential so that communication can occur in synchrony between Atmega chip and a device that is connected to. The 2 pins VCC and GND is provided with power so that device can operate. The Atmega328 requires 1.8-5.5 V of power for operation as it is a low power chip. The Atmega328 chip includes analog to digital converter (ADC) AVCC is the positive voltage, power supply for ADC. In order to work properly ADC needs its own power supply. GND is connected to the ground. ADC needs AREF which is the reference voltage used to convert an analog signal to its corresponding digital value. Digital value of 1 will be assigned if analog voltage is greater than the reference voltage. On the other hand, digital value of 0 will

be assigned if analog voltage is less than the reference voltage. Atmega328 needs 10-bit ADC which produces a 10-bit digital value. It converts an analog signal to digital one. The RESET pin is the last pin. This is the pin out information of an Atmega328 chip. The table below explains each pin with their functions.

d) WEB CAMERA :

Fig. 2.2: Webcam 6 light Night Vision

The system also consists of USB connected webcam. When there is an unauthorized movement this video camera located in the vehicle starts snapping the images or captures the video of the interior. This pictures or video is sent to the vehicle owner via internet networks as an email attachment. This data can be used for the theft identification. This webcam consist of an inbuilt sensitive microphone and high quality CMOS image sensor with 25 Megapixels of image resolution. In dark 6 lights can be automatically turn on with the help of light sensor which is also includes in this webcam. It has 30 fps frame rate and USB interface of 2.0.

e) RASPBERRY PI MODEL B:

This is a small sized and cheaper computer on chip that can be plugged into TV or monitor of computer. In order to program it keyboard and mouse is required. Its memory capacity is increased as it contains 512 MB DRAM memory and 2 to 16 GB SD card plugged into it. The Raspberry Pi is based on the Broadcom BCM2835 SoC, which includes an 700 MHz ARM 11 architecture, Videocore IV Graphics Processing Unit (GPU) and RAM. It promotes Python and Scratch as the official programming language. Linux Kernel based Raspian operating system includes Integrated Development Environment (IDLE).

f) VIBRATION SENSOR:

For security of vehicle rider vibration sensor is used and it is able for measuring vibrations. When any obstacle hits the vehicle signal is send to the sensor by indicating the intensity of motion. Vibration is sensed by sensor then it will give signal to the microcontroller. Further controller will send message to the vehicle owner's contact no. which is stored in the microcontroller.

3. DESCRIPTION OF THE SYSTEM

If vehicle is started by pressing the interrupt switch then microcontroller will not give any alert. Because switch location is only known by the owner of vehicle. If vehicle is start by theft without pressing an interrupt switch then microcontroller will send an SMS alert to owner, with location via GSM. By sending back SMS 'stop' to microcontroller via GSM the engine of vehicle can be stop by the owner. Vehicle location can be found out by the owner of vehicle by sending SMS ("Location") to the GSM which is interfaced with microcontroller1 and as microcontroller1 received SMS then through the GPS microcontroller sends the coordinates to user as an SMS. Google Maps Application is then used for finding the location of the vehicle. For security purpose of owner the vibration sensor is used. It gives an accidental alert in case of any mishappening. If accident is occurs then that time SMS is sent to the stored no. through GSM. It provides the accident information and exact location of accident.

Fig. 3: Flowchart

4. APPLICATIONS

The vehicle tracking system is becoming progressively vital in expensive urban areas. It has applications and benefits in various fields such as:-

- Fleet Management
- Military applications
- Navigation
- Anti-Theft and Stolen Vehicle Recovery systems
- Route monitoring
- Accident alert
- Security systems
- Tele services
- Aircrafts

5. CONCLUSION

Tracking framework or system is getting to be progressively vital in expansive urban areas and it is more secured than different frameworks. It has continuous ability, rises with a specific end goal to fortify the relations among individuals, vehicle and street by assembling present day data advances or technologies and ready to structures a real time accurate, compelling exhaustive transportation framework. Updating this setup is simple which makes it open to future a prerequisite which likewise makes it more efficient. This system is cost-effective, reliable and has the function of preventing theft and providing accurate tracking system. A smart anti-theft system is one of the essential systems that homogenize both GPS and GSM systems. It is fundamental because of the huge numbers of uses of both GSM and GPS frameworks and the wide use of them by a great many individuals all through the world.
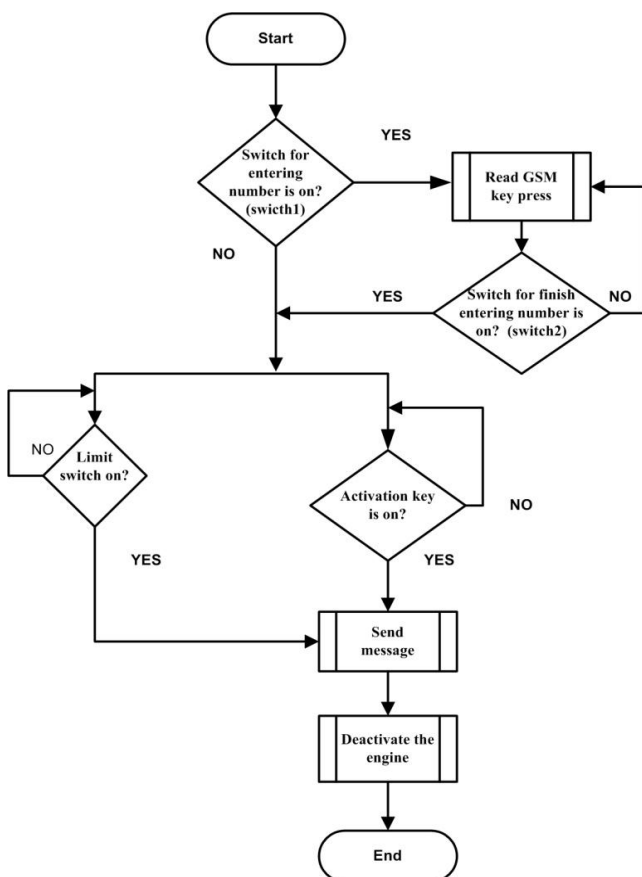
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