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Advanced Car Security System

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Abstract - The first car been stolen was reported in 1896. Since then, car safety tools and after that car security system faced a fast rapid development. The security system has become one of The key factors in car manufacturing as the demand from the buyer. The main objective of this project is to secure and monitor the car based on combination of mainly the Arduino, GPRS, GSM and RFID finger print scanner. With significant improved in range and reliable data accuracy in real time, this project promise a bright future with a high commercial value. In addition, with its compact and robust feature it attract future user in buying the product and the same time have good application value in future as well as reducing the statistic of stolen cars. Along with some more features are added like CNG gas leak detection, car tilt sensor, obstacle sensor, car vibration sensor and panic alarm switch is given. A gas detector is a device that detects the presence of gases in anarea, 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 driver, 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. Gas leak detection is the process of identifying potentially hazardous gas leaks by sensors. These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. MQ4 sensor is used to detect CNG gas.

Keywords: Arduino, GSM, MQ-4, GPRS, Tilt sensor, vibration sensor, obstacle Sensor.

I. INTRODUCTION

Every year, nearly 36,000 vehicles, which amount to Rs.115 crore, are stolen in India out of these; only about 14,500 are traced, often in un-roadworthy conditions, with many components missing. These vehicles are stolen only because thieves are provided with the opportunity to steal them. Very often, cars are left improperly secured and unattended. It is only with the installation of anti - theft devices that a thief's attempts can be frustrated. Combination of high-affectability GPS units in vehicle following frameworks has empowered these gadgets to work in different varieties of situations, for example, characteristic ravines, urban gulches and much under substantial foliage, the length of system scope is solid. Right now, GPS vehicle following guarantees their wellbeing as voyaging. This vehicle following framework found in client's vehicles as a burglary counteractive action and salvage gadget. Vehicle manager or Police take after the sign emitted by the following framework to place a victimized vehicle in parallel the stolen vehicle motor rate going to diminished and pushed to off. In the wake of exchanging on the motor, engine can't restart without consent of watchword. This framework introduced for the four wheelers, Vehicle following generally utilized as a part of naval force administrators for war fleet administration capacities, directing, send off, ready for and security. The applications incorporate observing driving execution of a guardian with a teenager driver. Vehicle following frameworks acknowledged in shopper vehicles as a burglary avoidance and recovery gadget. If the burglary recognized, the framework sends the SMS to the vehicle holder. After that vehicle manager sends the SMS to GSM modem appended to the controller, issue the important signs to stop the robbery.

The principle point of the present exploration work is to outline and create a shrewd and strong security framework for vehicles that can avert robbery and give data on mischances. The framework being produced through the present work utilizes GPS and GSM innovation and can be made moderate so it can be utilized as a part of ease vehicles even in bikes.

This study aims on minimizing the accidents caused due to gas leakage in vehicles world as CNG is commonly used. As in most cases these gases are odorless making detection in leakage impossible for human olfactory senses, thus this paper basically deals with the sensing and alert system in cooperated with an automatic gas regulator control using a servomotor with a high tightening torque. A tin oxide sensor MQ4 is used for detection of leakage and buzzers, GSM, relay, and other components for alerting the neighborhood

about the leakage and also cutting of the supply from regulator and a power supply with the help of relay takes place. The system during leakage follows a series of steps i.e. the sensor generates a charge which further gives a driving current to the ARDUINO system which is connected to buzzer, GSM, relay and servomotor, which perform their immediate actions of informing the person concerned by sending text message, alarm generation, switching of power supply, and releasing the knob from cylinder valve.
People have worked in hazardous atmospheres since before recorded history. The open flame light sources of pre-historic cave painters were sources of potentially deadly carbon monoxide and consumers of life giving oxygen, and in a poorly ventilated area could have eventually proved fatal.

II. LITERATURE SURVEY

HISTORY

In many previous research works, the authors have given some analytical view of the circuit used in the various projects, while in some other global positioning system (GPS) is commonly used as global navigation satellite system is used to locate the vehicles and to stop the vehicle if stolen. The location information is sent in the form of message containing latitude, longitude and speed information to the owner of the vehicle or location can also be traced using internet through Google maps. A number of developments have taken place in anti-theft systems for vehicles and some of the relevant ones are as follows. A hybrid GPS-GSM localization of vehicles Tracking System has been developed that portrays an incorporated GPS-GSM framework to track vehicles utilizing Google Earth application. The remote module has a GPS mounted on the moving vehicle to recognize its present position, and to be exchanged by GSM with different parameters procured by the car's information port as a SMS to a beneficiary station. This objective of this framework is to oversee police cars dissemination and auto burglary alerts.A security system based on RFID, GPS and GSM consolidate the establishment of an electronic gadget in a vehicle, with reason planned machine programming to empower the organization to track the vehicle's area. At the point when the car pics the worker; he/she needs to use fingerprint. The arduino matches the Fingerprint with its database records and sends the representative's id, taxi id & the taxicab position co-ordinates to the organization unit by means of GSM module. The GSM Modem will get the message through GSM in the organization unit. On the off chance that worker ends up/herself in an issue, he/she will press the catch. Arduino will distinguish the activity and sends a signal to the GSM which will arrange with to the organization unit and police. The configuration and advancement of a burglary control framework for an automobile, which is being utilized to anticipate/control the robbery of a vehicle. The created framework makes utilization of an implanted framework focused around Global System for Mobile correspondence (GSM) engineering. The planned and created framework is introduced in the vehicle. An interfacing portable is additionally associated with the arduino, which is thusly, joined with the engine. Once, the vehicle is being stolen, the data is being utilized by the vehicle manager for further handling. The data is passed onto the focal handling protection framework which is as the sms, the arduino unit peruses the sms and sends it to the Global Positioning System (GPS) module and utilizing the triangulation system, GPS module sustains the precise area as scope and longitude to the client's versatile.

A hostile to burglary security framework that uses an installed framework outline with Dual Tone Multi Frequency (DTMF) and a GSM to screen and shield an automobile. It secures the auto or vehicle against burglary. Upon actuation, it naturally grounds the auto by detaching the ignition scratch supply from the auto battery. In an attempt of theft through the car doors or boot, the system sends text message to the car owner and at the same time starts up an alarm.

The outline and improvement of a GSM based vehicle robbery control framework for a car. The created framework makes utilization of an inserted framework focused around GSM innovation. An interfacing mobile or GSM modem is associated with the arduino, which in term is joined with the engine through relay. In the event that the vehicle is stolen, the data is sent to the owner that somebody has stolen his vehicle. After that the user or owner will send the message to GSM modem or mobile which is joined with motor ignition through transfer or relay to switch off the engine.

A GPS based tracking system that keeps track of the location of a vehicle and its speed based on a mobile phone text messaging system. The system can provide real-time text alerts for speed and location. The present location can be locked and the system will alert the owner if the vehicle is moved from its present locked location. In every one hour, the GSM modem or mobile will inform the owner by messaging its location in the form of latitude, longitude and speed information. The owner or user can control or stop the vehicle by simply sending the message stop to GSM modem or mobile connected to circuitry board. After receiving that message ignition system will turn off.

For gas leak detection, gas monitor was introduced. The first gas monitor was a device with a valve that analytically showed how much methane was present in the atmosphere. The methane was detected through a sensor called the catalytic diffusion sensor. This sensor would burn the gas inside it, but never allowed the burning process to occur outside of the sensor. In this way, the instrument was able to

accurately give a reading of how much gas was present. The problem with this type of meter was that each time you wanted to see how much methane was present; you had to manually press a button on the monitor. Today, gas detectors have batteries, which enable the instrument to run for long periods of time without having to be turned off. Also, modern-day monitors not only measure oxygen and methane, but can measure several gases simultaneously.

III. BLOCK DIAGRAM

FIG 1:BLOCK DIAGRAM

3.2 HARDWARE AND SPECIFICATION

ARDUINO: Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control the physical world.

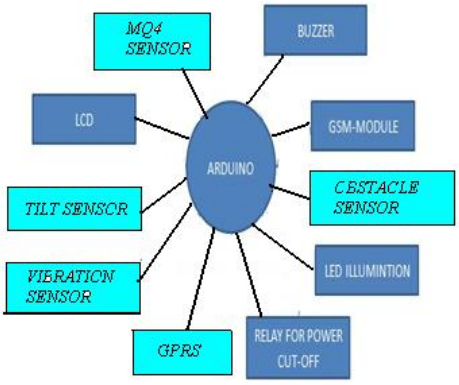

FIG 2:AURDINO WITH GSM

GSM MODULE: GSM (Global System for Mobile Communications, originally Group Special Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991.

With the Arduino GSM Shield, this library enables an Arduino board to do most of the operations you can do with a GSM phone: place and receive voice calls, send and receive SMS, and connect to the internet over a GPRS network

The GSM shield has a modem that transfers data from a serial port to the GSM network. The modem executes operations via a series of AT commands. The library abstracts low level communications between the modem and SIM card. It relies on the Software Serial library for communication between the modem and Arduino.

Typically, each individual command is part of a larger series necessary to execute a function. The library can also receive information and return it to you when necessary

MQ-4 sensor: MQ-4as the sensitive component and has a protection resistor and an adjustable resistor on board. The MQ-4gas sensor is sensitive to CNG, I -butane, propane,

FIG 3:GAS SENSOR

methane, alcohol, Hydrogen and smoke. It could be used in gas leakage detecting equipment in family and industry. The resistance of the sensitive component changes as the concentration of target gas changes

LED's: A light-emitting diode (LED) is a two -lead semiconductor light source. It is a p–n junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

LCD: A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly.

Relays: A relay is an electrically operatedswitch.**Many** relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal or where several circuits must be controlled by one signal

Tilt Sensor: This AT407 basic tilt switch can easily be used to detect orientation. Inside the can is a ball that contacts the pins when the case is upright. Tilt the case over and the balls don't touch, thus not making a connection. There are numerous uses for these basic sensors, but keep in mind you might need to use some debouncing code, as the sensor isn't immune to small vibrations and such.

FIG 4:TILT SENSOR

Vibration sensor: This basic piezo sensor is often used for flex, touch, vibration and shock measurements. A small AC and large voltage (up to +/-90V) is created when the film moves back and forth. A simple resistor should get the voltage down to ADC levels. Can also be used for impact sensing or a flexible switch.Comes with solder able crimp pins and a mass attached to the tip. This mass increases the sensitivity to motion.

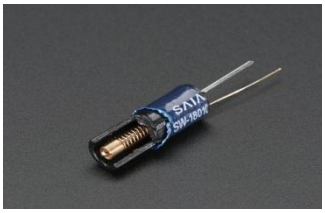

FIG 5:VIBRATION SENSOR

Fingerprint Scanner: Fingerprint scanners are awesome. Why use a key when you have one right at the tip of your finger? Unfortunately, they're usually unreliable or difficult to implement. Well not anymore! We've found this great fingerprint module from ADH-Tech that communicates over TTL Serial so you can easily embed it into your next project.

FIG 6:FINGERPRINT SENSOR

The module itself does all the heavy lifting behind reading and identifying the fingerprints with an on-board opticalsensor and 32-bit CPU. All you need to do is send it simple commands. To get started, just register each fingerprint that you want to store by sending the corresponding command and pressing your finger against the reader three times. The fingerprint scanner can store different fingerprints and the database of prints can even be downloaded from the unit and distributed to other modules. As well as the fingerprint "template," the analyzed version of the print, you can also retrieve the image of a fingerprint and even pull raw images from the optical sensor.

IV. GSM AND AURDINO INTERFACING

The data regarding the geographical coordinate is extracted from the GPS output with the help of the Arduino. The Arduino can be used as a stand-alone board of which the output or inputs can be taken from the boards or given to the board. They can communicate using standard communication ports like USART, TWI, SPI etc. which enables them to be connected with various kinds of devices. The Arduino board is designed for easy prototyping and the IDE used for coding is very simple and provides so many libraries for interfacing with common external devices. Connect your modules as shown in the circuit. Here Tx and Rx pin of GSM TTL modem is connected to the Rx and Tx pin of Arduino board i. e, D0 and D1. VIN(5V), V INTERFACE is connected to the 5V pin of Arduino board and GND to the any of the GND pin of Arduino. Some of the USB ports on computers are not able to give all the current the module needs to work, if your module goes down when it tries to connect to the network, you can use an external power supply (12V – 2A) on the Arduino. Before powering SIM900A module user should insert the SIM into the module.

V. WORKING

To start the ignition of the fourwheeler one should enter the authorized fingerprint. If anyone enters an unregistered fingerprint, the owner will immediately receive a message and the local alarm system will be turned on. For theft prevention, we can also trace the four-wheeler by giving a call to the GSM modem which is embedded on the system. Then real time tracking begins and the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehicle can also be controller through notifications to the system. In this proposed project we are using GPS module to find the current latitude and longitude of the present location, the GPS module is UART (Universal AsynchronusReciever/Transmitter) with a baud rate of 9600 bps. We are using two serial ports. One, for the GSM modem and another one for the GPS modem. The coding is written in embedded c language and Arduino IDE was used to program it. It is a fitted device on the automobile. The

whole monitoring of entire device is done by the mobile phone which delivers wireless connection amongst the vehicle tracking system device and the customer. The vehicle tracking device also has a dedicated sim card slot in which a GSM SIM card is inserted in to receive and send SMS. The user can send an SMS through his mobile phone, know the location of its vehicle and also the facility to safeguard the vehicle. So for the understanding of the whole operation of this vehicle tracking system is distributed in two parts:

1. Tracking the position of vehicle.

2. To provide security to vehicle.

The vehicle tracking system consists of a GPS receiver which provides real time position of the automobile.

FIG 7: IMPLEMENTATION IN CAR

GSM module takes the information from the Memory and sends this information to the registered user's mobile cell phone. This data consists of longitude, latitude and altitude. By using Google maps we can then locate the exact location of vehicle. The vehicle tracking system also has another singular feature which tells not only the whereabouts of vehicle but also securing the automobile. To know the location of the automobile, it is necessary to stop the automobile as soon as possible. For repossessing the automobile, we are using to convey the message in such a way they are allied to the buzzer and other is associated to the power supply of the engine of automobile. User can simply deactivate the engine of automobile by sending a message from his cellphone and we can get the automobile back very soon.

VI. CONCLUSION AND FUTURE SCOPE

This paper provides an appropriate method of designing and assembling a low cost and essential theft control system for automobile using GSM, RF modules and biometrics implemented with arduino. This system provides reliable security for cars. By installing this system in cars an unknown person cannot start the engine of car. In future, Cameras can be incorporated into the system to identify the person.

We have designed such a system which can detect Gas Leakages effectively using a gas sensor and alert people either by using GSM to send a message to their mobile phones or by activating the LED, Buzzer.

This system can provide safety to automobile and even the driver as well as the passenger as tilt sensor and vibration sensor are used, if the car gets tilt or vibrated the message will be send to the owner .If the driver feels insecure he can press the panic switch and the message will send to the owner and hospital and the buzzer will be activated.

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