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Iot Based Automatic Vehicle Accident Detection And Rescue System

[1]lalitha Bandaru, [2]poluri Vani, [3]dr.G. Srinivasa Rao, [4]veera Raghava Swamy Nalluri, [5]dr.D. Rajendra Prasad, [6]dr.P. Srinivasa Rao
[1]M.Tech Scholar, Dept. of ECE, St. Ann's College of Engineering & Technology, Chirala
[2]M.Tech Scholar, Dept. of ECE, St. Ann's College of Engineering & Technology, Chirala
[3]Assoc.Professor, Dept of ECE, St. Ann's College of Engineering & Technology, Chirala
[4]Assoc.Professor, Dept of ECE, St. Ann's College of Engineering & Technology, Chirala
[5]Professor, Dept of ECE, St. Ann's College of Engineering & Technology, Chirala
[4]Assoc.Professor, Dept of ECE, St. Ann's College of Engineering & Technology, Chirala

ABSTRACT
A high rate of motor-vehicle mortality is a serious challenge around the world, and an insufficient immediate provision of medical care often increases the level of injuries. The immediate project proposes a fully automatic vehicle impasse detection and rescue mechanism with the help of IoT that incorporates Arduino, vibration sensors, alcohol sample, GSM, and Global Position System (GPS) modules to increase road safety and to support and assist in prompting emergency care.
The mechanism of the design works through the real-time sensing of accidents and automatically alerting the emergency contacts, and rescue agencies. The vibration sensor detects any jerks or collisions, whereas the alcohol sensor persistently checks the rate of alcohol consumption by the driver and gives a warning prior to starting the vehicle in case one is drunk. At the same time, when an accident is detected the GPS module retrieves the exact location of the vehicle; the GSM module then sends an SMS message on the location using the stored contacts including emergency services and the family members. The accompanying of a buzzer running at the same time informs witnesses around them.
Keywords: *Arduino, Gps,Gsm & Vibration sensor.*

I.INTRODUCTION

As per the vehicle theft and burglary statistics of 2013 census study, the rate at which vehicle theft is on the increase with a steady average of 8.47 % per year. Therefore, vehicle theft countermeasures should also be improved accordingly. It is against this background that real-time system of theft and prevention of vehicle, designed using microcontroller, has been presented. The backbone of this has been formed by the Global System of Mobile (GSM) communication; hence it supports a widely accepted international cellular standard. Normally, the owner of the vehicle will simply insert his Subscriber Identity Module (SIM) card into a mobile phone where he would send messages to the GSM modem installed in the car. Such messages are transmitted to a GPS device that is also a major element of the theft-prevention system. This system can apply in any type of vehicle whether that be a bus, motorcycle, and car and it is inexpensive.

II. LITERATURE SURVEY

Kaushik et al p. 1 designed anti-burglary vehicle security system in which thumb impression of a person is identified to unlock the vehicle to take it into operation. Their fingerprint impressions in a central database are maintained by the system to give the authorized users. The car can be used only in case of approximately matched impression. In the event of an unapproved entry, a relay bolt that is attached to the fuel tank automatically empties the fuel supply thus making the vehicle standstill and awkward and it also produces an alarm signal.
This is in contrast with S S Pethakar et al. p. 2, who set up a GSM, GPS, and RFID security system applied to taxi-like vehicles. The RFID card should be presented by each of the workers, which should be matched with a unique identification number programmed into the database of the system. After a successful verification, embedded GPS and GSM modules are activated by a system and send location of the vehicle to

the owner of the vehicle through SMS messaging. In the event that the owner notices some intrusion in movement of the vehicle, another SMS initiates the locking of doors in the vehicle remotely.
GSM was combined with a microcontroller and relay switch by Nagaraja et al. p. 4 to make up an ignition-interruption mechanism. In the event of theft being detected, the microcontroller activates the GSM module so as to alert the vehicle owner. Having satisfied the owner through an acknowledgment, the relay switch deactivates the ignition system consequently immobilizing the vehicle.
Alkheder p. 5 has suggested a GPS-GSM-based framework that utilizes mapping platform of Google Earth. A GPS system built into the car swaps a position and speed data with a remote GSM unit that sends an SMS message with latitude, longitude and speed data to the owner of the car. The owner may watch the position of the car through Google earth after receiving the SMS.

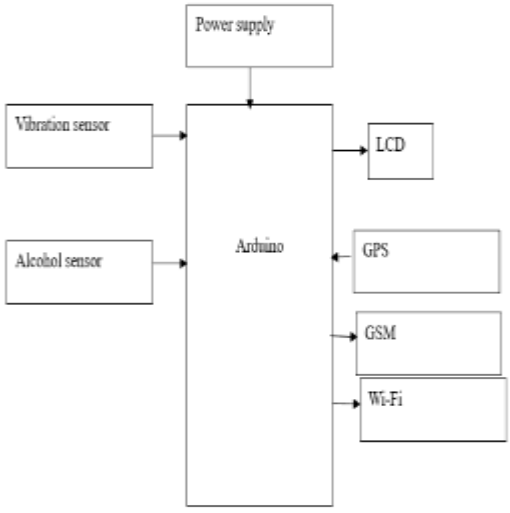
III.EXISTING SYSTEM

In the earlier system security lock and alarm is fitted in a car. If a burglar can smash open the lock, it's an opportunity for the burglar to steal the car. And in old woops system if cars atocked then it will be beyond the owner control. User doesn't know where the car is at the moment.

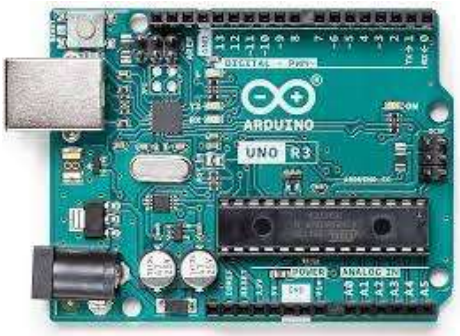
IV.PROPOSED METHOD:

The current proposal presents a solution, namely a vehicle tracking and locking system that enables tracking and locking the stolen automobiles using a mix of both GPS and GSM technologies. In cases where the car belongs to the owner or an authorized driver, the system stays inactive, or in a dormant or rather keeping it in a parking mode. In case of unauthorized connectivity, the module switches to an 'alert' or active mode. A change of state may be initiated by a presence visitor but it may also be by remote. In case any interruption is identified at one of the doors, the microcontroller module should be interrupted and an SMS message redirected to a SIM card stocked with the equipments. The controller in turn responds by sending out the current position of the vehicle to the registered recipient. Afterwards, when an SMS is received then it gives a command to the engine to slow down and power off. In the event that the power to the engine has been shut off, all of the doors communicate to become locked. The authorised person should log in with a password so as to reopen the vehicle or start the engine once again. In this arrangement, tracking and immobilization of the vehicle is easier and the vehicle can be prevented to be stolen by a thief.

V.BLOCK DIAGRAM



ARDUINO UNO



An Arduino Uno R3 is a micro controller development board that applies an ATmega328 micro controller. Its functionalities involve 14 general purpose input/output pins of which six may be used as PWM output channels, six analog input pins, an 16-MHz crystal oscillator, USB, a jack power, an ICSP header, and a reset button. All the required elements are incorporated on the board making them simple to start work just requiring connecting the device to a computer using USB cable or feeding it with a power source by using an AC-to-DC adapter or a battery supply.

Distinctively the Uno uses an ATmega16U2 (ATmega8U2 before R2) as its FTDI USB-to-serial conversion chip instead of using an FTDI USB-to-serial converter chip as it does in its predecessor models. As a result, the Uno is programmed through USB whereas the use of an extra USB-to-serial converter is not necessary.

GPS MODULE

Global Positioning System (GPS) is an independent satellite-centered regimen of navigation, which provides spatial and temporal information. There is no limitation to accessibility since anybody, who possesses a GPS receiver that has the ability to create a continuous line of view with at least four GPS satellites, can access locational information. The local estimation of the position is the comparison of signal interval received locally with that one broadcasted at the time. GPS later became an inevitable part of modern smartphones.

GTPA010 module is especially easy to use, via either RS232 and USB. It has a supply voltage of 3.2-5 V and may be easily combined with microcontrollers having 3.3 or 5 V internal logic. The data acquired is formatted in accordance with the NMEA0183 interface standard where the individual identifiers will be provided as the first characters of a line, followed by the character, dollar to identify it as a message. Parameters in a message are separated by commas therefore making the parsing of these data sets easy.

GSM MODULE

GSM/GPRS Modem-RS232 is a modular panel development board and it contains GSM / GPRS enabled engine (SIM900A) which could be operated on 900/1800 MHz frequencies. The modem features an RS232 interface, and thus can be connected to both personal computers and microcontrollers using a MAX232 RS232 chip. The Baud rate configuration is possible using AT command set and goes between 9600 to 115200. A regulated power supply is present on board and takes 611 V DC, so that the apparatus can be deployed with a broad variety of different power supplies that are unregulated.
It is capable of standard telecommunications features, voice, SMS, and data transfer, and the modem also features internal TCP/IP stack with ability to access the Internet using GPRS. It is also possible to conduct audio calls as well as the receipt and transmission of a Subscribed Message Service (SMS) along with the capability to process incoming calls and of connecting to the Internet using simple AT commands all through the modem.**WIFI MODULE ESP8266**

The ESP8266 WiFi Module is a single-chip System-on-Chip (SOC) supplemented with an embedded TCP/IP protocol stack that turns any microcontroller into a Wi-Fi enabled device. Depending on the configuration, ESP8266 may be configured to act as an application host, or as an offload engine that shifted all Wi-Fi networking functions to a different application processor. Each module contains a pre-programmed AT command set and allows immediate connection to a LPC 2148 device and provides similar WiFi functionality of a WiFi shield with no further programming. Since the module is low priced and with a lot of community support, it can be a preference in cost sensitive projects.
Its board-level processing and storage capabilities and an abundance of GPIOs allow easy plug-and-play connectivity with sensors and other device-specific inputs with a low development-time and runtime cost. Low external circuitry and low on-chip integration ; with the front-end module occupying minimal area of printed-circuit board estate requires a low degree of on-chip integration as well. Other capabilities encompass the provisioning of APSD to support VoIP applications, co-existence interfaces of Bluetooth, self-calibrated RF architecture and ability to operate in any environmental settings without external RF components.
RELAY

A relay is an electrically controlled switch. Most relays have a coil-operated electromagnet that swings a mechanical switching lever; but there are also other operating principles. Relays are widely used where a small signal must be able to command a circuit but keep the circuit and controlling circuit under electrically open conditions. They are employed as well when one signal has to control several circuits. The first relays were used in long-distance telegraph systems to regenerate an incoming signal and then relay it on to another circuit. Relays later found wide usage in telephone exchanges and early computers and had the ability to meet, but not exceed, logical requirements.
VIBRATION SENSOR:

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The Vibration sensor is otherwise known as piezoelectric sensor and it is a non-linear, flexible transducer having a capability of measuring various processes translating mechanical vibrations to electrical signals. It is operated by piezoelectric effect, which states that, changes in acceleration, pressure, temperature, force or strain result in deformations that trigger the electrical charges to be produced. Sensitivity may range between 10 mV/g to 100mV/g although the customer may choose to have a lower/higher sensitivity as may be required by the application. It is essential therefore to select a sensitivity that will be suitable to the expected amplitudes of vibration before proceeding with measurement.

The sensor identifies the vibrations of the system with optical or mechanical principles, which makes it an extremely versatile device in wide scenarios. Furthermore, it may be implemented to identify smells in a background environment through variation of capacitance and subjective excellence. Therefore, the vibration sensor plays a central point in de-monitoring and analyses of vibrations on diverse systems with maintenance, safety, and optimization of performance as motives.

DC MOTOR

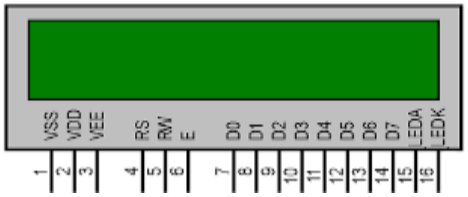
The electric motors may be considered as a kind of machine the main purpose of which is the transformation of electrical energy into mechanical.

Principles of operation

In electromechanics, electric motors rely on a basic principle of electromagnetic induction: a current-carrying conductor creates a magnetic field, and when such a magnetic field superposes outside the magnetic field, a force is exerted on the conductor which is linearly proportional to the current, and to the intensity of the applied field. The phenomenon is intuitively thus founded upon the behavior of magnets, i.e., that opposite poles attract whereas similar poles repel.

The design of direct-current (DC) motor is designed to utilize the effect of the magnetic field generated by the conductor to the external field imposed on the device and thus generating rotational motion.

LCD



The design of the device under discussion is a 16 x 2 Liquid Crystal Display, that is attached to a microcontroller. It serves to demonstrate any messages created by the controller thereby giving an interactive user interface. Operation of the unit is error-free with +5 V DC. The use of this module is to show the present condition of the entire system.

VI.RESULT

The implementation of Internet of Things (IoT) technology can allow constant surveillance of the climatic conditions related to the greenhouses and assist in spreading the associated relevant information through the global network. With the creation of the IoT-based connectivity, the unrelated devices are, in fact, brought into a single network that extends across the geographical areas. The arrangement allows gathering of sensor-derived data in the greenhouse settings and later relaying of the data to be viewed on the other end remotely, which in turn facilitates the higher remote management and monitoring of the ecosystems in any foreign country.

VII.CONCLUSION

The current project is the proposed automated system of detecting vehicle accidents and alerting them using GPS positioning and GSM-based communication. The system tracks the location of the vehicle constantly and when it finds that an accident has occurred; it sends an immediate SMS to a set of mobile that has been designated beforehand. It has been tested empirically and implemented successfully to a great degree of rigor consistently proving its effectiveness and reliability as a safety mechanism to the occupants, and allowing timely emergency response.

VIII.FUTURE WORK

The project-vehicle accident-alert system outlined by the paper is quite flexible and can be complemented with additional features which will add reliability and usability. The system that stands out to be integrated is the airbag mechanism in the vehicle that when coupled with slight changes in the system will not only reinforce the current safety systems in the car but will also serve as a parking aid that would direct the car into a parking slot with more finesse. In addition to these, the integration of a proximity sensor will warn the operator of obstacles just directly in front of them thus enhancing the overall behaviour of the vehicle with respect to collision-avoidance.

It also has the advantage of the use of a GSM modem that aids in tracking of vehicles in case of theft. This would add yet another layer of safety, as well as speed up recovery processes. Overall, these innovations increase the utility and flexibility of the Accident Alert System, which makes it a complete and solid product regarding vehicle maintenance and safety.

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