

Advanced Vehicle Security System with Theft Control and Accident Notification

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ABSTRACT: This Project introduces a programmed limitation framework utilizing GPS and GSM SMS administrations. The framework licenses confinement of the vehicles and transmitting the position to the proprietor on his cellular telephone as a short message (SMS) at his solicitation. This framework is likewise given crisis switch which can be squeezed when a man driving vehicle needs assistance. This switch assumes the liability to bolt the motor. The framework can be interconnected with the vehicle caution framework and alarm the proprietor on his cell telephone. This following framework is made out of a GPS beneficiary, Microcontroller and a GSM Modem. GPS Receiver gets the area data from satellites as scope and longitude. The Microcontroller forms this data and this handled data is sent to the client/proprietor utilizing GSM modem. The framework additionally comprises of liquor sensor and flex sensor. Liquor sensor recognizes whether the driver is inebriated or not. In the event that he's smashed then the signal is turned on, motor is killed and the message and additionally area of the vehicle is sent to the beneficiary versatile number utilizing GSM module. Flex sensor distinguishes the vehicle collision. On the off chance that an vehicle collision happens then instant message and area of the vehicle is sent to the beneficiary portable number through GSM module. The exhibited application is an ease answer for car position and status, extremely helpful if there should arise an occurrence of vehicle burglary circumstances, for observing pre-adult drivers by their guardians and in addition in vehicle following framework applications. The proposed arrangement can be utilized as a part of different sorts of use, where the data required is asked for once in a while and at sporadic timeframe (when asked). If there should be an occurrence of vehicle burglary circumstances the proprietor can know the vehicles current area and taking into account that he can stop the vehicle by sending a predefined SMS message to this framework. In the wake of getting SMS message from proprietor this framework consequently stops the ignition framework subsequently the vehicle won't work anymore.

KEYWORDS: DTMF,GSM,GPS,Speed,Vehicle,Adaptive control, vehiclemation, behavioural science, vehicle control, vehicle driving. Battery voltage, Controller Area Network, CO level in the exhaust, Microcontroller.

I. INTRODUCTION

Every one of the uses of GPS, Vehicle following and navigational frameworks have conveyed this innovation to the everyday existence of the normal man. Today GPS fitted vehicles, ambulances, armadas and police vehicles are basic sights on the streets of created nations. Referred to by numerous names, for example, Vehiclematic Vehicle Locating System (AVLS), Vehicle Tracking and Information System (VTIS), Mobile Asset Management System (MAMS), these frameworks offer a viable instrument for enhancing the operational proficiency and usage of the vehicles. GPS is utilized as a part of the vehicles for both following and route. Following frameworks empower a base station to monitor the vehicles without the intercession of the driver while route framework helps the driver to achieve the destination. Whether route framework or following framework, the design is pretty much comparable. The route framework will have advantageous, typically a realistic presentation for the driver which is not required for the following framework. Vehicle following frameworks join various all around created innovations. To outline our framework, we joined the GPS's capacity to stick point area alongside the capacity of the Global System for Mobile Communications (GSM) to speak with the vehicle proprietor's cellular telephone in a remote manner. The outline thinks about vital variables with respect to both position and information correspondence. In this manner, the venture incorporates area determination

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(GPS) and cell (GSM) – two unmistakable and effective advancements in a solitary framework. Vehicle burglary is an intense wrongdoing that influences each group. Stolen vehicles are regularly utilized as a part of genuine violations that outcome in property harm, physical wounds and death toll after a mischance. Robbery of vehicles constitutes a critical money related misfortune to society. In Canada, an vehicle is stolen at regular intervals. It just takes 90 seconds to take an vehicle. Seventy for every penny of all stolen vehicles have the key in the ignition with the motor running. Around 70 for each penny of stolen vehicles are recouped; numerous are discovered vandalized, stripped of their parts or stereo gear. Police say that whatever remains of the vehicles are either delivered abroad or sent to neighborhood "slash shops" where the parts are taken out and sold. Vehicles robbery and the taking of property left inside a car can be counteracted. In this proposed framework on the off chance that somebody tries to take an vehicle or any vehicle, it can be implied to the vehicle proprietor through SMS. At the point when an vehicle proprietor gives a missed call to the GSM module, GSM module will send the area of the vehicle to the proprietor.

II. RELATED WORK

In this cutting edge, quick moving and frail world, it is turned into a fundamental need to know about one's security. Most extreme dangers happen in circumstances wherein a worker goes for cash exchanges. Additionally the Company to which he has a place ought to know whether there is some issue. Imagine a scenario where the individual voyaging can be followed furthermore secured on account of a crisis. [2] Here's a framework that capacities as a following and a security framework. It's the VMSS. This framework can manage both pace and security. The VMSS (Vehicle Monitoring and Security System) is a GPS based vehicle following framework that is utilized for security applications also. The task utilizes two primary hidden ideas. These are GPS (Global Positioning System) and GSM (Global System for Mobile Communication). The fundamental utilization of this framework in this setting is following the vehicle to which the GPS is associated, giving the data about its position at whatever point required and for the security of every individual going by the vehicle. This is finished with the assistance of the GPS satellite and the GPS module appended to the vehicle which should be followed. The GPS reception apparatus present in the GPS module gets the data from the GPS satellite in NMEA (National Marine Electronics Association) configuration and in this manner it uncovers the position data. [4] This data got from the GPS receiving wire must be sent to the Base station wherein it is decoded. For this we utilize GSM module which has a reception apparatus as well. In this manner we have at the Base station; the complete information about the vehicle. Alongside following the vehicle, the framework is utilized for security applications also. The crisis catch is utilized by the driver or the traveller in order to caution the worried of crisis conditions. On squeezing this catch, a caution will be initiated which will help the traveller representative in crises and keep them secure all through the trip. [5] The vehicle can likewise be immobilized remotely. In the most recent couple of decades, India has advanced at such a huge rate, to the point that numerous organizations have firmly settled themselves here. These organizations carry an enormous measure of workforce with them. Orchestrating transportation to such a tremendous mass is a lumbering undertaking including numerous intricacies. By and large, this vehicle is masterminded through the nearby transport merchants on a yearly contract premise, as of late happen accidents, for example, thievery, assault cases and so forth. The improvement of satellite correspondence innovation is anything but difficult to recognize the vehicle areas. Vehicle following frameworks have conveyed this innovation to the everyday existence of the regular person. [2]

Today GPS utilized as a part of vehicles, ambulances, armadas and police vehicles are normal sights on the streets of created nations. The entire current innovation bolster following the vehicle spot and status The GPS/GSM Based System is a standout amongst the most vital frameworks, which incorporate both GSM and GPS advances. It is essential because of the a considerable lot of uses of both GSM and GPS frameworks and the wide utilization of them by a large number of individuals all through the world. This framework intended for clients in area development and transport business, gives constant data, for example, area, speed and expected landing time of the client is moving vehicles in a brief and simple to-peruse position. This framework may likewise valuable for correspondence process among the two focuses. [8] Currently GPS vehicle following guarantees their wellbeing as voyaging. This vehicle following framework found in customers vehicles as a robbery aversion and salvage gadget. Vehicle proprietor or Police take after the sign discharged by the following framework to find a burglarized vehicle in parallel the stolen vehicle motor pace going to diminished and pushed to off. After switch of the motor, engine can't restart without

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consent of secret word. This framework introduced for the four wheelers, Vehicle following generally utilized as a part of naval force administrators for naval force administration capacities, directing, send off, on board data and security. The applications incorporate observing driving execution of a guardian with an adolescent driver. Vehicle following frameworks acknowledged in shopper vehicles as a robbery anticipation and recovery gadget. In the event that the robbery recognized, the framework sends the SMS to the vehicle proprietor. After that vehicle proprietor sends the SMS to the controller, issue the vital signs to stop the motor.[5]

THERE ARE VARIOUS METHODS OF PREVENTING THEFT-

1. Sequestering of valuable items:

A very common method of preventing theft is the placement of valuables in a safe location. The definition of safe depends on the minimum threshold for theft as determined by the owner. Desk stationery is often considered to be secured if placed in an unlocked drawer away from view, while expensive jewellery might be placed in a safe behind a picture in a home.

2. Raising the awareness of theft:

Another common method is the alerting of other individuals to the act of theft. This is commonly seen in department stores, where security systems at exits alert store employees of the removal of unpaid items. Older car alarms also fall into this category; newer systems also prevent the car from starting. The revolution of mobile applications and wireless communication make possible to get notified by your phone, when your properties are stolen. Probably the first solution of mobile application based theft detection is BluCop, which was published in December 2010.

3. Preventing removal of items:

Yet another method is the attachment of items to a larger immobile object, usually furniture or walls.

4. Disabling the stolen item:

Items with specific functionality can often be disabled to prevent use of the item should it be stolen. The anti-theft system can require disabling on every use, or enabling when the item should be secured. Disabling the anti-theft system is usually done by requiring identification of the owner at some stage of use. Identification can occur physically or through other methods (physical keys, numerical codes, complex passwords, biometric identification). This can work even retrospectively: as a stolen credit card can easily be invalidated with a phone call to the issuing bank, the motivation to steal one is reduced.

5. Security tags:

Security tags are devices that are attached to products to prevent shoplifting and are often used in conjunction with an Electronic article surveillance system. Select DNA or Smart water are such security tags - a forensic fluid which contains millions of tiny fragments which have a unique number called "SIN" ("Select DNA identification number"), and registered in a national police database together with the owner's details, is etched into each of those particles.

6. Tracking software:

Electronic devices such as laptops, cell phones and even gadgets such as iPods now have software that enable them to "phone home" with information regarding their whereabouts and other information that can assist law enforcement in tracking down the devices. If tracking software is not installed on gadgets like mobiles, laptops, and tablets, then database of lost, found, and stolen mobiles, laptops & tablets might help tracking down your lost gadget. Sites like 3gadgets.com are instrumental in tracking down lost mobiles, Tablets & Laptops using IMEI & Mac IDs.

7. Forensic marking

Assets can be marked with various forensic marking materials for law enforcement tracking of the item. An example of this type of marking includes Select DNA and Smartwater.

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III. REQUIREMENT ANALYSIS

The main components of the system are-

1. LPC2148 microcontroller
2. Alcohol sensor
3. Flex sensor
4. LCD
5. Power supply
6. Emergency switch
7. GSM module
8. GPS receiver
9. Relay
10. Motor
11. Buzzer

IV. SYSTEM ARCHITECTURE

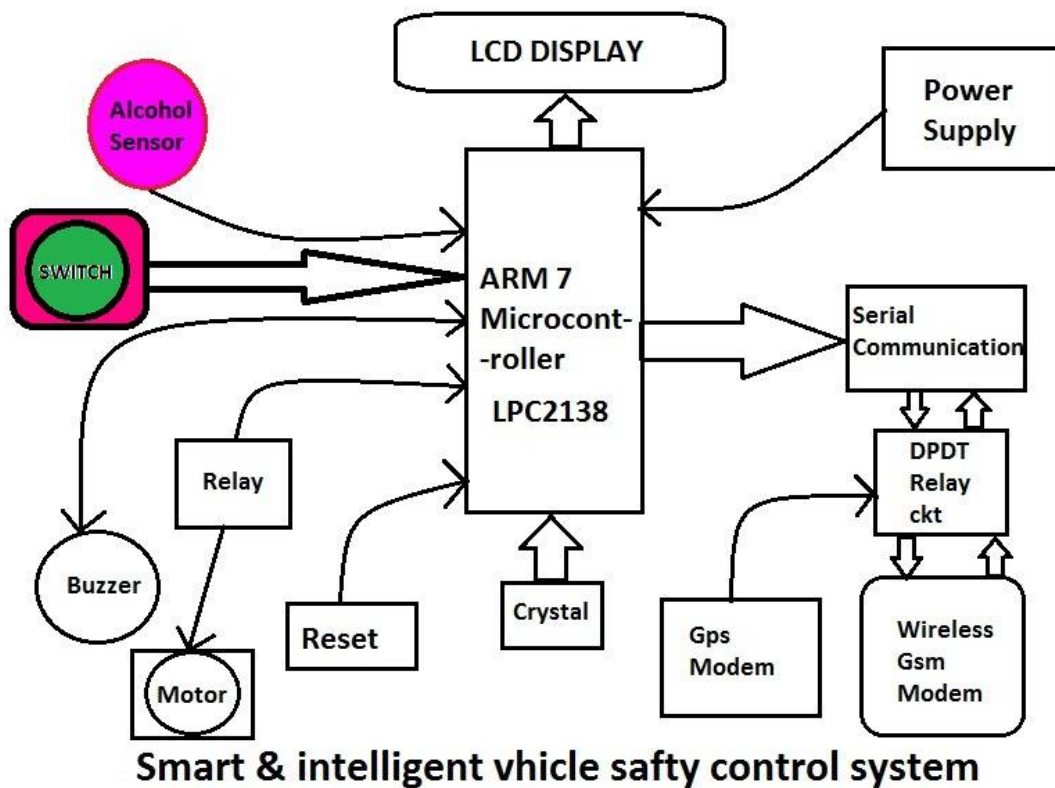


Fig No 01 System Architecture

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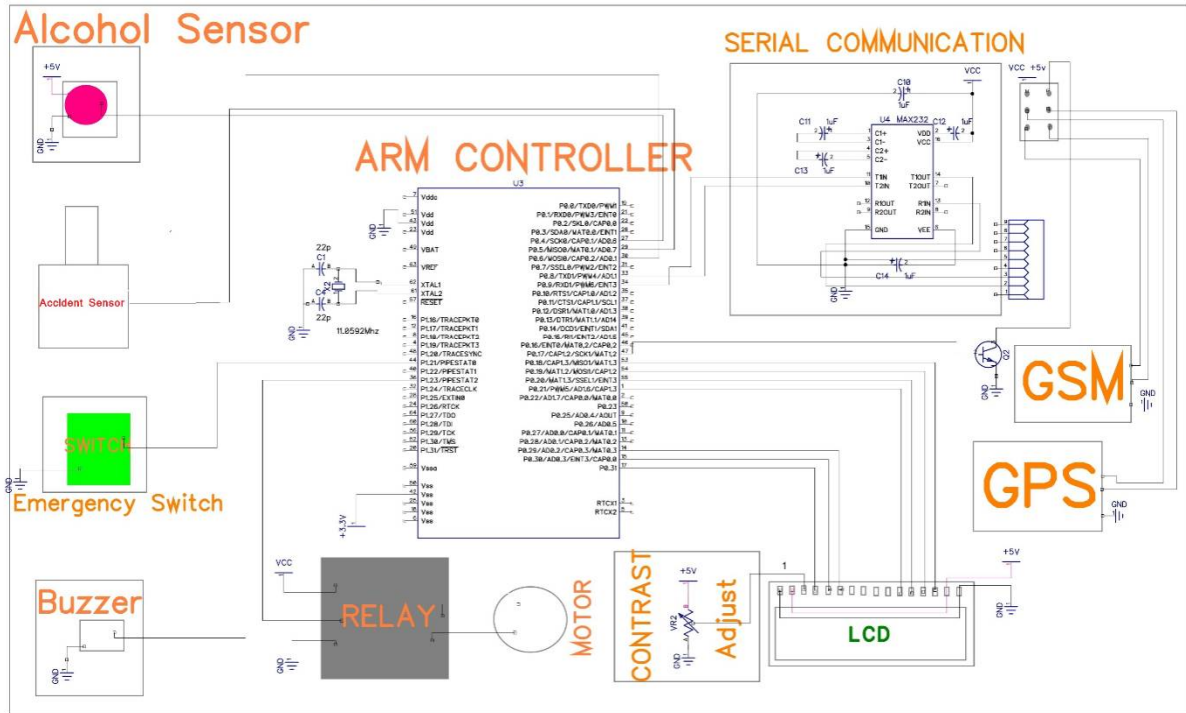


Figure2:circuit Diagram

COMPONENT EXPLANATION-

1. LPC 2158 microcontroller:

Description

The LPC2141/2/4/6/8 microcontrollers are based on a 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/2/4/6/8 is ideal for

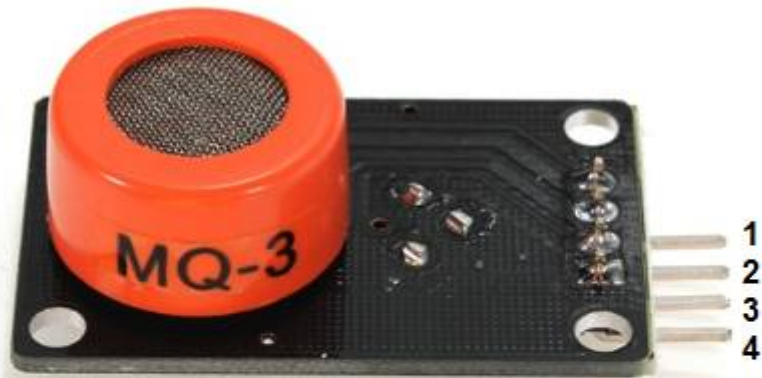
Applications where miniaturization is a key requirement, such as access control and point-of-sale. A blend of serial communications interfaces ranging from a USB 2.0 Full Speed device, multiple UARTs, SPI, SSP to I2Cs, and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both largebuffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.

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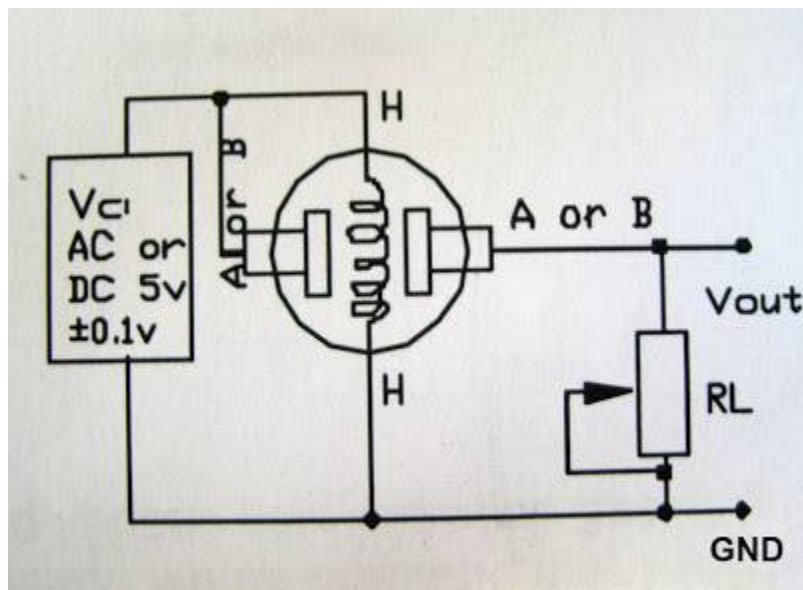
2. Alcohol sensor



1 = +5V
2 = DOUT
3 = AOUT
4 = GND

This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

Circuit diagram:



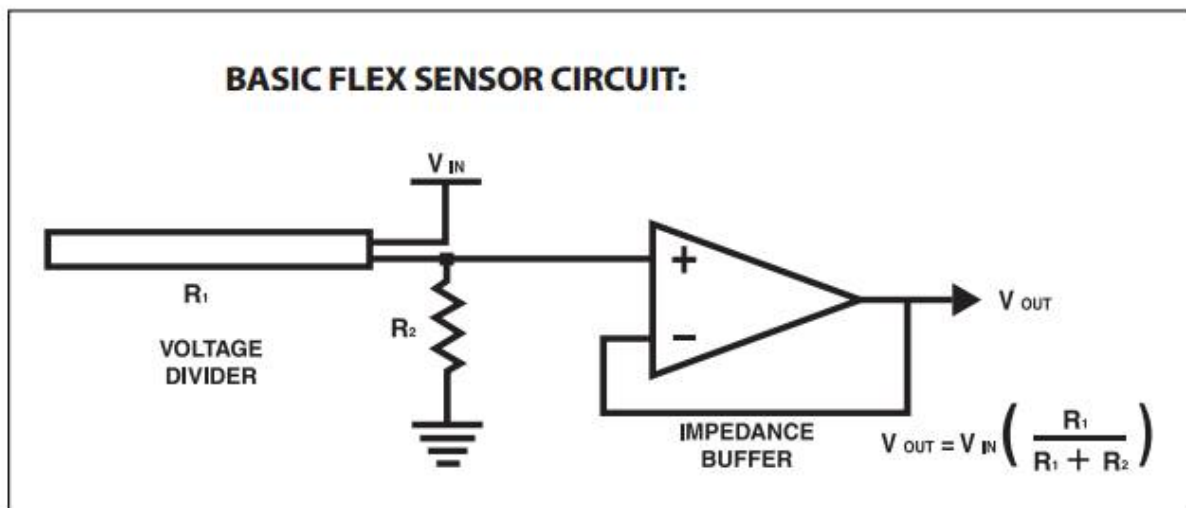
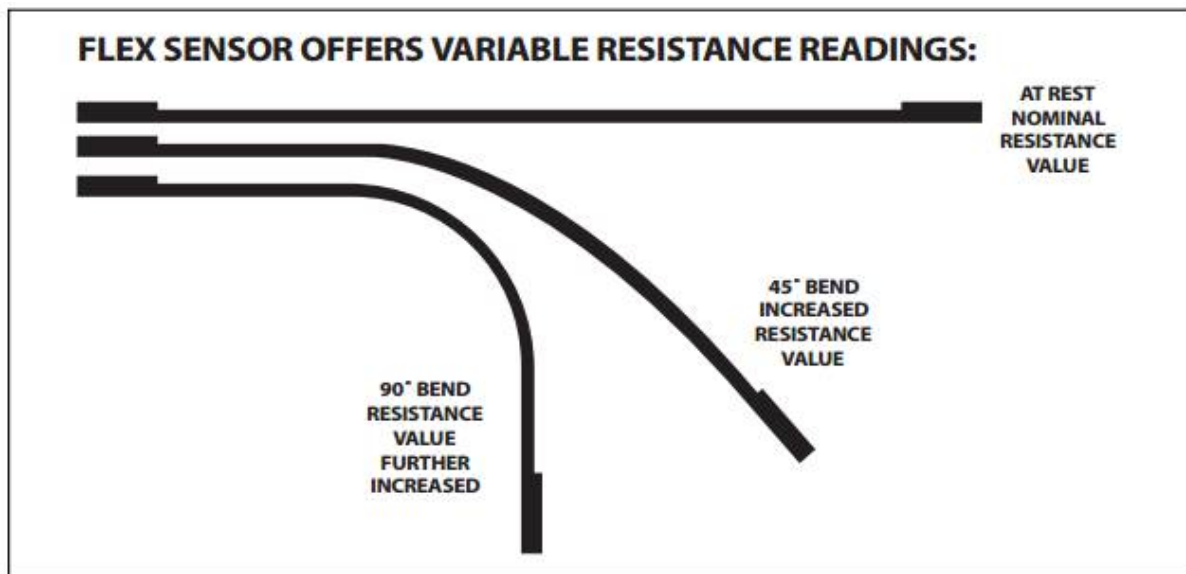
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3. Flex sensor

Flex sensors are passive resistive devices that can be used to detect bending or flexing. The flex sensor shown in this article is a bi-directional flex sensor that decreases its resistance in proportion to the amount it is bent in either direction.



The Flex Sensor patented technology is based on resistive carbon elements. As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius.

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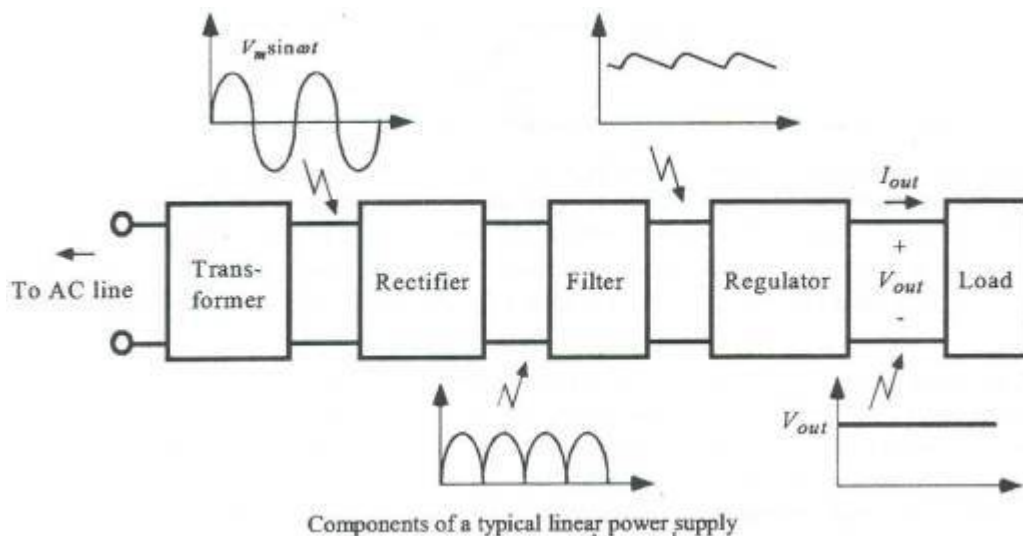
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4. LCD



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 (LCs). LCs do not emit light directly. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have replaced cathode ray tube (CRT) displays in most applications. They are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are, however, susceptible to image persistence. LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically modulated optical device made up of any number of segments filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome. The most flexible ones use an array of small pixels.

5. Power supply



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Power supply unit consists of the following units:

- a. Step down transformer
- b. Rectifier unit
- c. Input filter
- d. Regulator unit
- e. Output filter

6. GSM module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules.



GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

7. GPS receiver

When people talk about "a GPS," they usually mean a GPS receiver. The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails). The U.S. military developed and implemented this satellite network as a military navigation system, but soon opened it up to everybody

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else. Each of these 3,000- to 4,000-pound solar-powered satellites circles the globe at about 12,000 miles (19,300 km), making two complete rotations every day. The orbits are arranged so that at any time, anywhere on Earth, there are at least four satellites "visible" in the sky. A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location.

8. Relay

A **relay** is an electrically operated switch. 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 (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

9. Motor



A **DC motor** is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

10. Buzzer

A buzzer or beeper is an audio signalling device,^[1] which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

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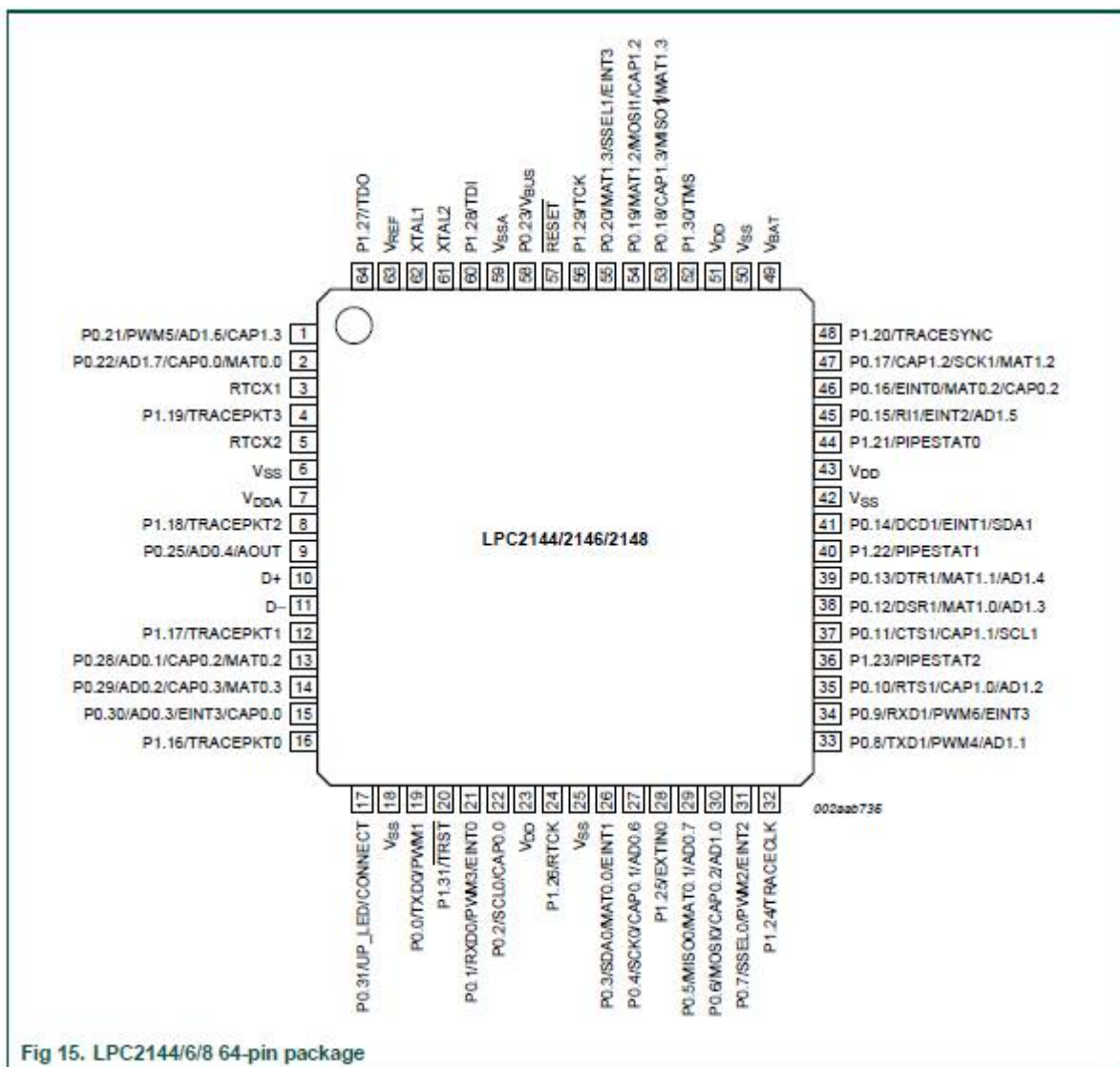
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V. PROJECT DESIGN

1. Hardware design:

Pin Description

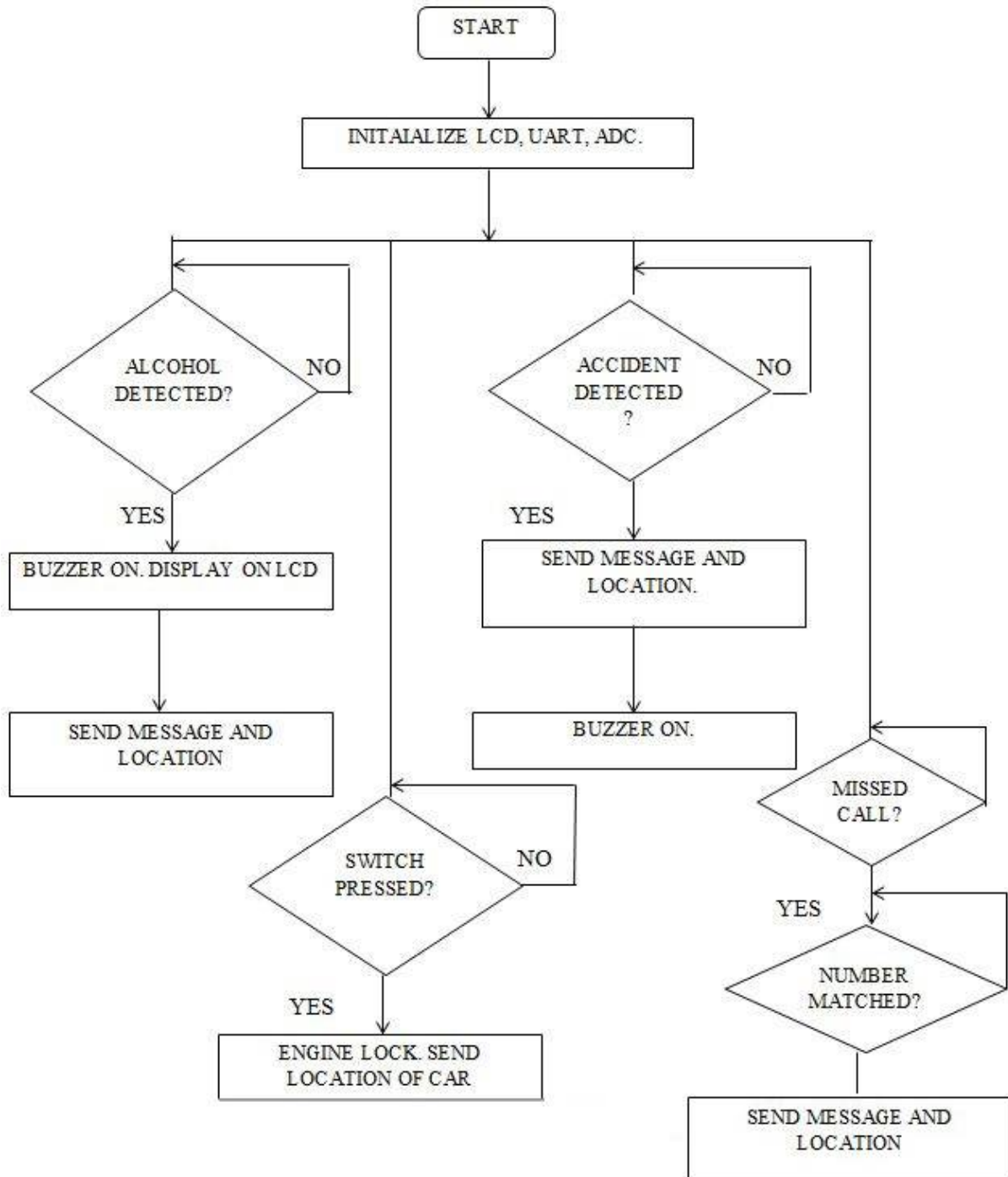


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2. Software design:



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VI. WORKING

The system consists of microcontroller, sensors, lcd, buzzer, relays, motor, GSM and GPS. The system responds only in any one or all of the following cases:

1. Alcohol sensor detects whether the driver is drunk or not. If he's drunk then the buzzer will be turned on and the message is displayed on LCD. GSM module will send the message and if owner give missed call to GSM module it will send location to the recipient mobile number.
2. If an emergency switch is pressed indicating that the driver needs help, it will cause engine to lock. GSM module will send the message and location to the recipient mobile number.
3. If flex sensor detects the occurrence of accident then the buzzer is turned on. GSM module will send the message and if owner give missed call to GSM module it will send location to the recipient mobile number.
4. In case of car theft, owner gives a missed call to the GSM module. GSM module will send the message and location to the recipient mobile number.

1. TESTING

All components are tested individually. If they work fine then all of them are connected according to the circuit diagram. Testing of GSM module using hyper terminal is very easy. AT commands are entered on hyper terminal. Its shows "OK" message if the commands are executed correctly.

2. ADVANTAGES

1. The system is simple to design and easy to use.
2. The system is reliable and consumes less power.
3. Installation of the system is very easy.
4. We get the exact co-ordinates of location. So there is no chance of errors.
5. **Improved Security:** From this system we can try to save our vehicle by anywhere we are in this global world. As this system gives us the information about the our vehicle's front doors (open/close), anyone on the front sit, any type of vibration on the car, anyone try to start the car and anyone take car by pushing or revolving. If anything is happened we can get the information about all parameters including detected parameter. So this system is more advanced and useful than the simple car security system which available in today's Indian market.
6. **Better Customer Service:** Here wet better service plus also benefited with cost wise because its cost is very less compared to car cost.

3. FUTURE SCOPE

1. Camera can be interfaced to the current system. It will capture the image of driver. In case of car theft, image of thief will be sent to the owner.

4. APPLICATIONS

This project is applicable in following fields:

1. GPS Car theft detection can be used in transportation vehicles of Companies, schools, colleges and industries.
2. This project can be used in our cars and even in bikes.
3. VIP vehicle tracking
4. Can also be used for Child or animal tracking
5. Vehicle Security Applications
6. Ambulance tracking
7. Navigation systems

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5. CONCLUSION

Thus, by implementing these vehicle security system projects by using GPS and GSM technologies, a vehicle can be protected from thefts. In future, this security system will be improved to function as an integrated-data-security system for car communication systems. It would ensure that all the data exchanged within the vehicle and outside the vehicle is protected.

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