

APPROACH TO DESIGN VEHICLE SECURITY AND MONITORING SYSTEM USING GPS AND GSM

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ABSTRACT :-This paper proposes designing of vehicle security and monitoring using GPS and GSM in a very simple and efficient manner.This system is designed to provide information about location and also the sensed value by sensors we are using in our project i.e. Accelerometer sensor,Heat sensor,Water level sensor.The GPS and GSM are designed using the hardware components like Microcontroller AT89S51. All information related to accident as collision data, Heat sensing data, Water level data are given to the GSM then read by the Microcontroller and displayed. This data with the location is then given to the Registered Mobile number.The advantage of being using this is the compact size and also visual display of data to the one driving using LCD, And also to the one whose mobile number is registered. All interfacing is done using serial communication.

Keywords: GPS-Global positioning system, GSM-Global system for Mobile, Monitoring, sensors.

INTRODUCTION

Security and monitoring has become important part of our life. Providing security and monitoring will intern gives us the safety. In today's world everyone have their source of transportation i.e. Two Wheeler or Four wheeler. So here our project is providing the security for this. Our project consists of GPS and GSM which will help to design this idea. We have different aspects for providing the security here by using the different sensors. [1] Because it has been seen that the people couldn't get help after the accident being occurred. So, the sensor here used i.e. Accelerometer sensor, Water level sensor, Heat sensor will sense the values and sends the message to the registered number, so that it will help the one. GPS will provide us with the Location of the accident been occurred through message. [2] [3] The Microcontroller used here is used to control and read values of the parameters we are using. Our basic aim is to provide help to the needy at a time, which is in trouble. Because it might not be possible of having the people to help at the place of accident. This would help to save one's life.

OVERVIEW OF THE SYSTEM



Fig. 1

1) GPS

The GPS is a constellation of 24 satellites that continuously transmit coded information, which is received by GPS receiver to precisely identify location on earth by measuring distance from the satellites. Our main aim is to design the GPS in an effective way that allows positioning and monitoring and provide location based emergency services information. The system proposed in this paper utilizes the GPGGA string format captured by the GPS receiver for providing exact location.



Fig.2

2) GSM:

GSM is built with Quad Band GSM/GPRS engine- SIM900, works on frequencies 850/ 900/ 1800/ 1900 MHzThe Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 (default baud rate is 9600) through AT command.

3) LCD:

LCD is liquid crystal display. This is used to display output of any system. A liquid crystal display is a flat panel display or other electronic visual display that uses the light modulating properties.LCD is used in wide range of applications including computer monitors, television, instrument panel, aircraft cockpit display, and indoor and outdoor signage.

4) AT89S51:

The AT89S51 is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out.

SENSORS:

5) WATER LEVEL SENSOR-LM324:

LM324 is a 14pin IC consisting of four independent operational amplifiers (op-amps) compensated in a single package. Op-amps are high gain electronic voltage amplifier with differential input and, usually, a single-ended output. The output voltage is many times higher than the voltage difference between input terminals of an op-amp. And in our project we are using single op-amp.

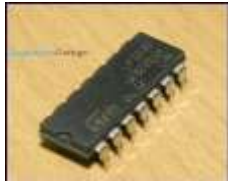


Fig. 3

6) Heat Level sensor-Thermistor:

A thermistor is a type of resistor whose resistance is dependent on temperature, more so than in standard resistors. Thermistors are widely used as current limiter, temperature sensors (Negative Temperature Coefficient or NTC) and self-regulating heating elements (Positive Temperature Coefficient or PTC).



Fig. 4

System Block Diagram

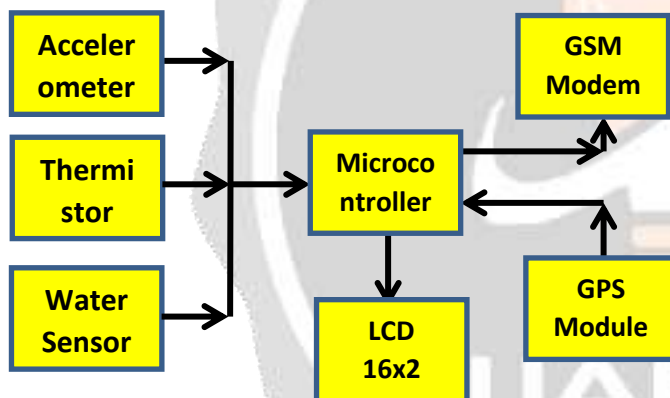


Fig. 5 shows Block Diagram of the Vehicle Security and Monitoring System

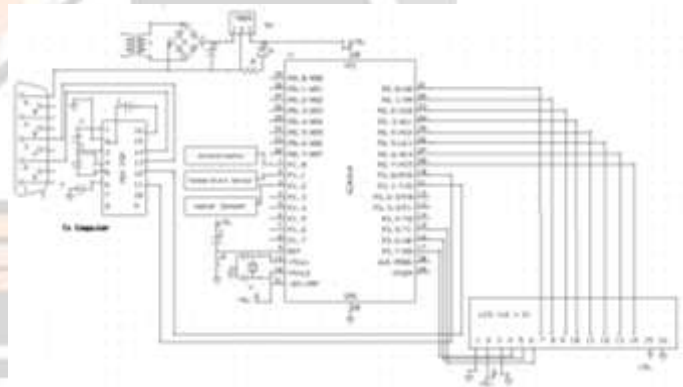


Fig. 6 shows Circuit Diagram of the Vehicle Security and Monitoring System

Working Principle

This project is thus designed to display the message using GSM by sensing the values of the sensors which are being used in our project i.e. Accelerometer sensors, Heat sensor and Water level sensor, after the accident being occurred, the location will also be send through that message. The AT89S51 will used to read the values send by GPS and GSM respectively. The RS 232 here is used for the serial communication between Microcontroller and GPS and GSM. The signal when sensed after the accident being occurred, the values will be given to RS232 i.e. the GPS values will be given to the pin of RS232 i.e. on P1in of pin11 and GSM values will be given to R1out of pin12.

And now the signals from RS232 of GSM and GPS will be send to Microcontroller i.e. on Port3 to give the values to Microcontroller, so it can read it. Now P1out of pin14 and R1in of pin13 of RS232 is given to Microcontroller Port3 pin3.0 as Receiver and pin3.1 as Transmitter. The given values will be read by the Microcontroller. After reading the values the data will be displayed through the LCD display. The control lines of LCD are connected to Port3 of Microcontroller i.e. pin4,pin5,pin6. The other pins of LCD display will be used as the data pins to display the data through these pins respectively. The sensors used here are connected to the Port1 of Microcontroller i.e. on pin1.0,pin1.1,pin1.2 respectively.

CASE No. 1 ACCIDENT CASE

The LM324 here used as accelometer sensor where the value of the LM324IC will sensed. In case if the collision of vehicle occurs and vehicle accidently turned to the angle 60 or more than 60 then the value of the angle will be sensed. Initially the value will be '0' and after sensing the angle it will be '1' and through GSM we will be getting the message with location provided by GPS .

CASE No. 2 WATER SENSOR CASE

When the water level crosses it's set level then the copper plate which we are using will be used to sensed it. And if the value will be initialized to '0' then the message through GSM will be given with it's location.

CASE No. 3 HEAT SENSOR CASE

The thermistor used for this is to sensed the temperature of an engine. The normal temperature of an engine is 195 to 220 degree of Fahrenheit it. So if the temperature rises beyond this values then the Heat sensor we designed will sensed its value. Normally it will be '1' and after sensing it will be '0' and this in turn will give us the message with its location using GPS and GSM.

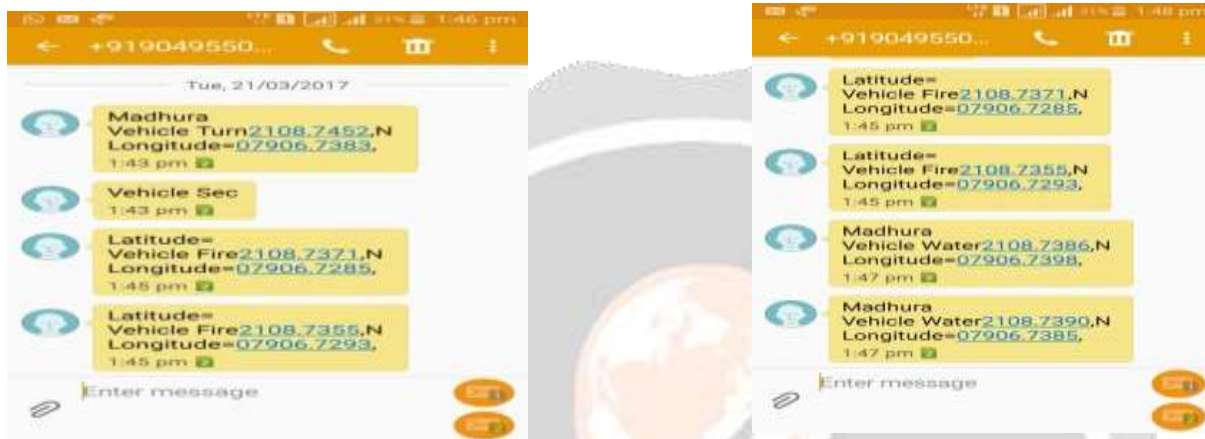
SYSTEM RESULTS

Fig.7 shows System Model a) Observation of reading at Mahal Nagpur(MH) b) Observation reading at Nandanvan Nagpur (MH)

APPLICATIONS:-

- It can be used in Public Transportation for security and monitoring purpose.
- It can be used with school Transportation vehicles.

FUTURE SCOPE:-

Use of GPS module with this system will be helpful in finding the accident location and take quick rescue operations. We can enhance the present system to check other parameters like fuel level, tire pressure and working of headlights before starting the vehicle. Many other critical parameters can be read and stored in the memory. [4] Another useful add-on to the present system could be cameras on front and backsides which keep recording live images and storing them in memory. This video data would be much useful for accident investigation

CONCLUSION:-

This design vehicle security and monitoring is very useful while car accident which is required to resolve many disputes related to accidents. The data of sensed values with location will help to provide the safety.

REFERENCE:-

- [1] S. Thong, C. T. Han, and T. Rahman, "Intelligent fleet management system with concurrent gpgsm real-time positioning technology," in Telecommunications, 2007. ITST '07. 7th International Conference on ITS, 2007
- [2] Ahmad Aljaafreh, MajdiKhalel, Islam Al-Fraheed, KafaAlmarahleh, Rwan Al-Shwaabkeh, Saja Al-Etawi and WaedShaqareen "Vehicular Data Acquisition System for Fleet Management Automation", Issue date: 12 Jul 2011.
- [3] Hu Jian-ming; Li Jie; Li Guang-Hui, "Automobile Anti-theft System Based on GSM and GPSModule," Intelligent Networks and Intelligent Systems (ICINIS), 2012 Fifth International Conferenceon , vol., no., pp.199,201, 1-3 Nov. 2012
- [4]Nagaraja, B. G.; Rayappa, R.; Mahesh, M.; Patil, C.M.; Manjunath, T. C., "Design & Development of a GSM Based Vehicle Theft Control System," Advanced Computer Control, 2009.

