

GSM and GPS Based Smart Security System for Vehicles

Miss. Harsha P. Pawar,
Assistant Professor,
Department of Electronics and
telecommunication Engineering;
Dr. Dulatrao Aher college of Engineering,
Karad, Dist-SATARA; Maharashtra, India

Miss. Snehal A. Chavan, Miss. Sayali S. Chavan and
Miss. Tejasvi S. Yadav,
B.E. student,
Department of Electronics and telecommunication
Engineering;
Dr. Dulatrao Aher college of Engineering, Karad,
Dist-SATARA; Maharashtra, India

Abstract— Main aim of this project is to find out the vehicle which is met with an accident and find out vehicle which is stolen. By using Vibration sensor, GPS, GSM and ARM processor. Using GPS locator vehicle can be tracked anywhere on the earth. In this project ARM LPC2148 is used to control the LCD, GPS module and GSM modem. This system will be placed in a moving vehicle. The ARM LPC2148 will poll GPS module in prefixed intervals and sends the vehicle location information. Whenever any accident occurs Vibration sensor detects the vibration of the vehicle and accordingly force is applied to ARM, by using GPS, we will get particular location where accident occurs, and then GSM sends message to authorized members & ambulance [2].

An efficient security system is implemented for anti-theft using an embedded system occupied with a Global Positioning System (GPS) and a Global System of Mobile (GSM). The user interacts through this system with vehicles and determines their current locations and status using Google map. The user can track the position of targeted vehicles on Google Map. Using GPS locator, the target current location is determined and sent via Short Message Service (SMS) through GSM networks to user by sending SMS user can automatically demobilizes the car by disconnecting the ignition key supply from the car battery [5].

Keywords—GSM, GPS, ARMLPC2148, Vibration sensor, LCD.

INTRODUCTION :

Now a day the vehicle accident rate has been increasing day by day, when compared to previous decade the theft rate has been increased. In order to avoid this vehicle accident this system provides security to the vehicles. In this work the advanced ARM LPC2148 is used.

C programming is used for better accuracy, GPS and GSM modules which helps use to trace the vehicle anywhere on the globe. GSM is used to send the exact location of the vehicle and send alert or relax message to mobile phone.

To detect the accident, Vibration sensor used. So, when accident happens, this sensor will be active. And the information sends to processor. At the same time, GPS and GSM modem will also active which are interfaced to the same processor. Through GPS the exact latitude and longitude of the accident location is obtained. And through GSM modem the same data send to the contacts which are stored in the database. So with this system, information is send to the Police Stations, friends etc. and also decrease the total action time and save the lives in emergencies. In a situation where there is high level of theft, there is need for better security system. It is much safer to have a system that monitors and communicates to the device owner without putting human life to risk in the name of "Watchman on any attempt of theft the system sends a text message to the device owner, demobilizes the system (vehicle) and then starts up an alarm. With this, the vehicle is always protected [4].

PROPOSED PROJECT WORK:

We are proposing a system which will play important role in tackling such transportation problems

- 1) Location of vehicle will be shown on mobile handset.
- 2) Vehicle owner can get accidental indication & locations.
- 3) When the vehicle is lost, owner can lock the engine by sending the message.

Vehicle Tracking: In the proposed system, location of vehicle is tracked by using GPS receiver. This location is displayed on mobile handset.

Accident identification system: This system installed in the vehicle that sense the accident using vibration sensor. If vehicle met an accident, this system immediately sends the location of the accident to control unit. From the control unit, a message is sent to the nearby ambulance.

Antitheft system: When vehicle is lost at that time current location of vehicle is displayed on the mobile phone. Also owner can lock the engine by sending the message.

SYSTEM ARCHITECTURE:

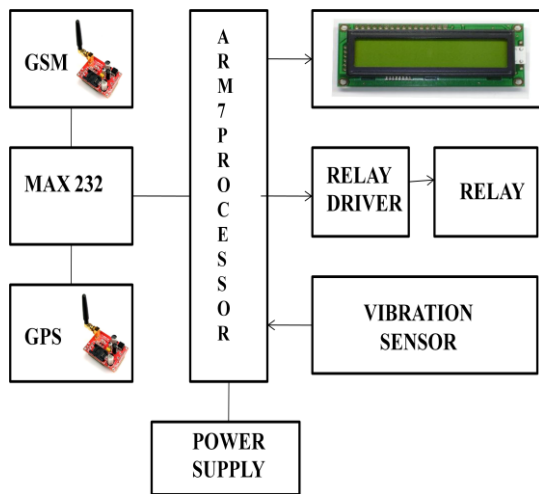


Fig.1 System block diagram

The system is mainly divided into four parts.

1. Sensing system.
2. Tracking and identification system.
3. Controlling system.
4. Locking system.

1. Sensing device: Vibration sensor is used as sensing device to detect an accident. Processor continuously monitors the output of Vibration sensor, if output voltage of vibration sensor is above threshold level then processor gets interrupted and also it comes to know that accident is happened [6].

2. Tracking and identification system: GPS will trace the position of vehicles where accident is happened. If user is in safe condition then message is displayed on the LCD 'Drive safely'. If user is injured then GSM module will inform the numbers stored in SIM-card which is inserted in GSM module. So vehicle owner can get accidental indication & locations [3].

3. Controlling system: ARM7 processor is used as controlling device. The data obtained from the GPS receiver is in the ASCII format acceptable by the processor. Required 'C' language programming is done in order to parse the data obtained from the GPS receiver and extract necessary information regarding the position (latitude and longitude) and time of recording the position of the GPS receiver. To actually interface the processor with the GPS receiver we use the MAX232 IC since the processor uses Transistor-Transistor Logic (TTL) [2].

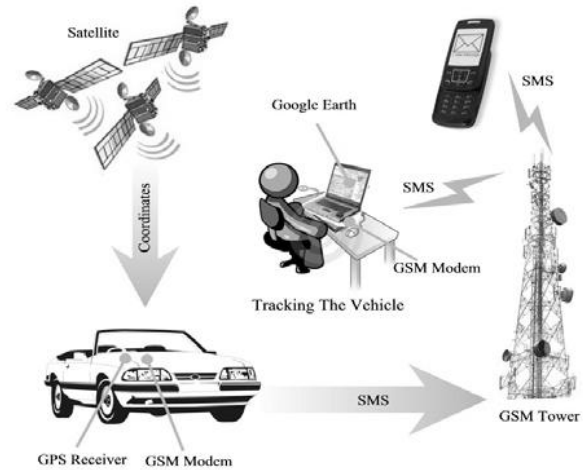


Fig.2 Block diagram of the system which is used to found lost vehicle [5].

4. Locking system: Vehicle owner can lock/unlock his vehicle by breaking system with the help of a simple SMS. When vehicle is lost, we will send the message as 'data' to the GSM. Then GSM modem receives the message through the SIM card present in the modem. The GSM forwards this message to processor. Then processor verifies whether the received message from user or not (the mobile number is already fed in the processor). At the same time the GPS receiver continuously calculates its location where it was on the earth with the help of satellite signals from the space and sends this information to processor in the form of longitude and latitude. After seeking this information processor sends this to the user via GSM [5].

When the location is detected then user sends a message as 'lock' to lock the engine of the vehicle. This message is forwarded to processor through GSM. Then the processor demobilizes the system (vehicle) and then starts up an alarm [5].

HARDWARE DESCRIPTION:

The circuit consists of following components:

1. Vibration sensor
2. GSM modem
3. GPS module
4. ARM LPC2148

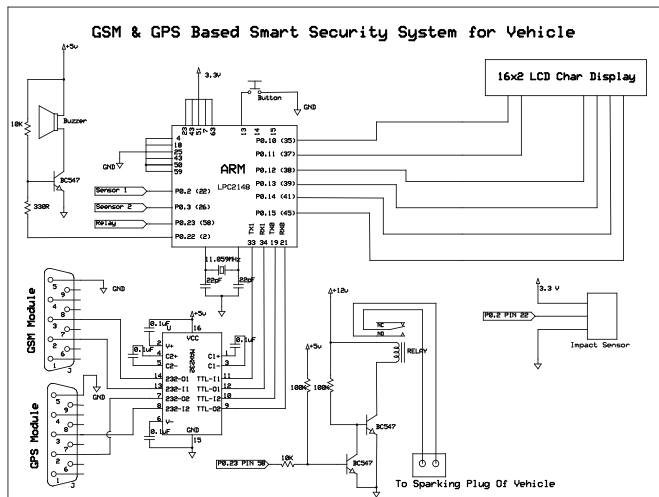


Fig.3 Circuit diagram

1. Vibration sensor:

The vibration sensor is used for testing the vibrations. It has high vibration detection sensitivity and the environmental ability of sound signal suppression. Sensitivity of vibration sensor is 10mv/10mm/sec acceleration.

2. GSM modem:

This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232. Supports features like Voice, Data/Fax, SMS, GPRS and integrated TCP/IP stack [6].

3. GPS module:

GPS is mainly used to enable a location processing logic to transmit the positioning data to the SMS-GSM module. GPS (Global Positioning System) is a worldwide radio-navigation system formed by a constellation of 24 satellites and their ground stations. With four satellites, a GPS receiver can provide very accurate clock (time, date) and position information. The Module must be used outdoors. It uses patch antenna. Provides current time, date, latitude, longitude, altitude, speed, and travel direction [1].

4. ARM LPC2148 processor:

The LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory of 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, LPC2148 are ideal for applications. It consist of multiple UARTS, SPI, SSP to I2Cs and on-chip SRAM of 40 kB, Various 32-bit timers, 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 [2].

IMPLEMENTATION:

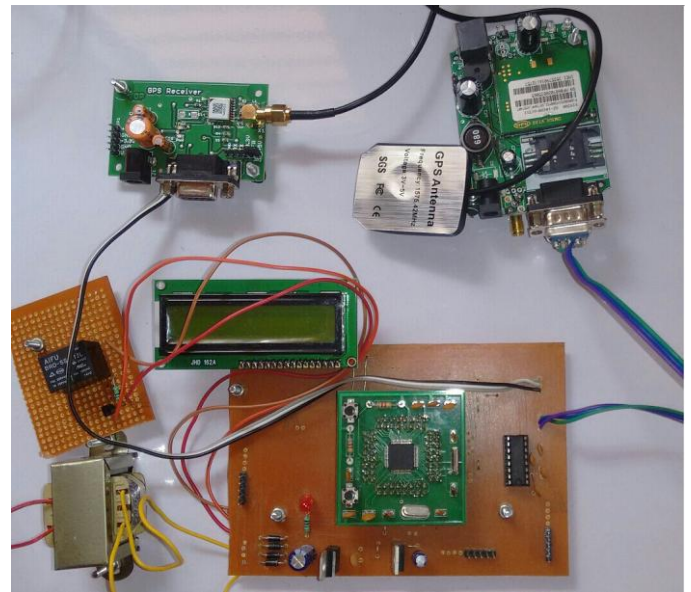


Fig.4 Hardware implementation

ADVANTAGES:

- The vehicle which is undergone to an accident can be identified by using tracking technology without any delay.
- The immediate medication will be provided to the accident victims in remote areas.
- From this system we can try to save our car from anywhere in this global world.
- System can be implemented externally.

APPLICATIONS:

- Ship custom duty.
- Root navigator.
- In very important courier services.
- For tracking purpose in different fields.
- Useful in many industries and institutes such as School bus, dairy.
- Accident Identification.
- Locking security.

CONCLUSION:

Combination of GSM and GPS devices is used to retrieve location, vehicle status information and send it to the other stationary module. Action time can be minimized in accident identification system and exact location of an accident is defined with GSM and GPS service and also the information regarding accident can be sent to particular contact numbers e.g. Ambulance, Police stations etc. In anti-theft system major input is like an interrupt and upon reception by ARM7 processor it goes through the iteration of demobilizing the car, sending text message and starting up an alarm. The

system exhibits a satisfactory performance. Because of the flexibility of embedded system, this system is very much compatible to any kind of vehicles. Overall this system is very much affordable to a common man and this system can be easily implemented.

REFERENCES:

1. S.Sonica¹, Dr.K.Sathiyasekar², S.jaishree³ Intelligent accident identification system using GPS, GSM modem International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 2, February 2014
2. Aashish Lokhande¹, Suraj Bahe², Bipin Kumar³ Accident Identification Using ARM-7, GPS and GSM Discovery, Volume 18, Number 53, May 9, 2014
3. Nandaniya ,Viraj Choksi ,Ashish Patel ,M B Potdar. Ph.D Automatic Accident Alert and Safety System using Embedded GSM Interface International Journal of Computer Applications (0975 – 8887) Volume 85 – No 6, January 2014
4. Visa M. Ibrahim¹. Asogwa A. Victor². S. Y. Musa³. GSM Based Anti-theft Security System Using AT&T Command. International Journal Of Computational Engineering Research (ijceronline.com) Vol. 2 Issue. 5
5. Montaser N. Ramadan, Mohammad A. Al-Khedher, Senior Member, IACSIT, and Sharaf A. Al-Kheder Intelligent Anti-Theft and Tracking System forAutomobiles International Journal of Machine Learning and Computing, Vol. 2, No. 1, February 2012
6. Ruchita J. Shah, Anuradha P. Gharge GSM Based Car Security System ISSN: 2277-3754 ISO 9001:2008 Certified International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 4, October 2012 203