Advanced Anti-Theft & Home Safety System Using GSM

Shivam Kansal[1], Rishabh Bansal[2], Shivam Chaurasiya[3]

[1,2,3] *Student, Dept. of EC, IMS Engineering College, Ghaziabad, UP, India*

---***---

Abstract - *Safety and security is of utmost importance in our day to day life. The approach to home security system design is almost standardized nowadays. In this paper, it is intended to improvise these standards by employing new design techniques and developing a low cost home security and safety systems. The design of simple hardware circuit enables every user to use this wireless home security system with ultrasonic sensor, Gas sensor, Smoke sensor and Motor driven door locking system at Home. The system is fully controlled by the Atmel Atmega8 microcontroller The microcontroller will constantly monitor all the sensors and if it senses any security issue then the microcontroller will send the SMS to the user mobile through GSM modem.*

Key Words: Security Systems, Ultrasonic Sensor , Gas Sensor, Smoke Sensor, Motor driver IC,   SMS (Short Message Service), GSM Communication

1. INTRODUCTION

Home security is the most vital aspect for every homeowner either in an individual house or an apartment. To get the absolute peace of mind whether you are at home or out of home you must ensure that your home is installed with the perfect home security monitoring system. This wireless home security system can be used to provide security system for residential, industrial, and for all domestic and commercial purposes using GSM technique The basic components of a home automation security system are motion detectors. LPG detectors and smoke detector.

In this paper, we emphasis to add more functionality to existing security design standards. The device has three subsystems

- Intrusion detection and door locking subsystem
- Fire safety subsystem
- Gas leakage safety subsystem

2. APPLICATION AND FUTURE SCOPE

- Following are the applications of this security system The Anti-Theft system detects the intrusion and inform the homeowner using an SMS, the added functionality is: at the same time outer door is locked using motors attached to door thus thief can't escape at all and there is complete security of vehicles or valuable assets.

- The Fire safety subsystem employs a smoke sensor, as soon as smoke is detected an SMS is sent using GSM to the house owner.

- The Gas leakage safety subsystem employs a gas sensor,

- As soon as the gas leakage is detected, an attached motor with regulator turns off the regulator preventing the further leakage, in case the leakage is due to human mistake.

The following points elaborate the future scope of this System:-

- ➢ In the present Model, a wired switch is provided to enable/disable motor driven door lock system, this can be improvised by employing Wireless control on Motor driven door locking system.

- ➢ An authentication mechanism can be a substitute to the switch as switch can be operated by a single person. In case there's need to disable the door lock for multiple persons (family members of owner) an authentication mechanism can be employed.

3. HARDWARE USED

- ➢ Atmel Atmega328 microcontroller
- ➢ Smoke Sensor
- ➢ Fire Sensor
- ➢ GSM Modem
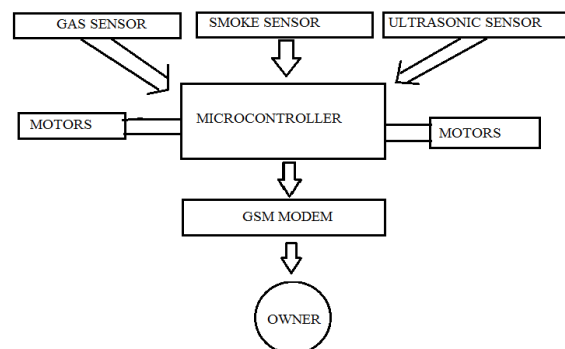- ➢ DC Motors

4. BLOCK DIAGRAM

Fig-1: Block Diagram

---

5. HARDWARE COMPONENT DESCRIPTION

5.1 Arduino UNO R3

The Arduino uno is a microcontroller board based on the ATmega328. Arduino is an open-source, prototyping platform and its simplicity makes it ideal for hobbyists to use as well as professionals. The Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

5.2 Atmega328 Microcontroller

Atmega328 microcontroller is extensively used in making various projects of the embedded system.

The main features of atmega328 microcontroller are-
The high-performance chip 8-bit AVR RISC-based microcontroller that combines 32KB ISP flash memory with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

5.3 Ultrasonic sensor

The Ultrasonic Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to reflect back. This sensor is used here to detect the position of the car. The Ultrasonic Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to reflect back. The sensor has 2 openings on its front. One opening transmits ultrasonic waves, (like a tiny speaker), the other receives them, (like a tiny microphone). The speed of sound is approximately 341 meters (1100 feet) per second in air[3]. The ultrasonic sensor uses this information along with the time difference between sending and receiving the sound pulse to determine the distance to an object.
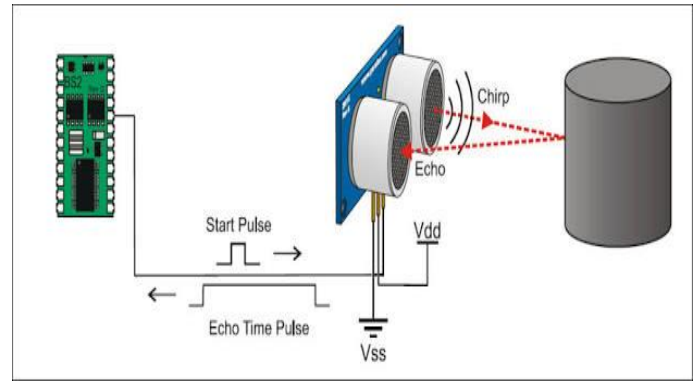

Fig-2: Ultrasonic Sensor

5.4 Gas and Smoke Sensor

This sensor is used to detect the gas leakage and smoke occurring in home industry or in malls. This is used to detect gases like LPG/I butane/propane/methane/ alcohol/hydrogen/ smoke. There are different types of gas sensor which detects different gases according to different concentration parameter. Here we are using MQ-5 & MQ-2 gas and smoke sensors which detect coal gas/ methane/ LPG and combustible gas/smoke respectively.

5.5 GSM Modem

A GSM modem is a device which can either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. GSM is a cellular network. GSM network operate in four different frequency ranges. Most GSM network operates in 900 MHz or 1800 MHz bands [4]. The transmission power in the handset is limited to a maximum of 2 watts GSM 850/900/300 and 1watt in 1800/1900. The longest distance the GSM specification supports in practical use is 35Km (22 mi)[1]. In this paper we use SIM300 based GSM modem to receive and send short message to the owner and other concerned persons.
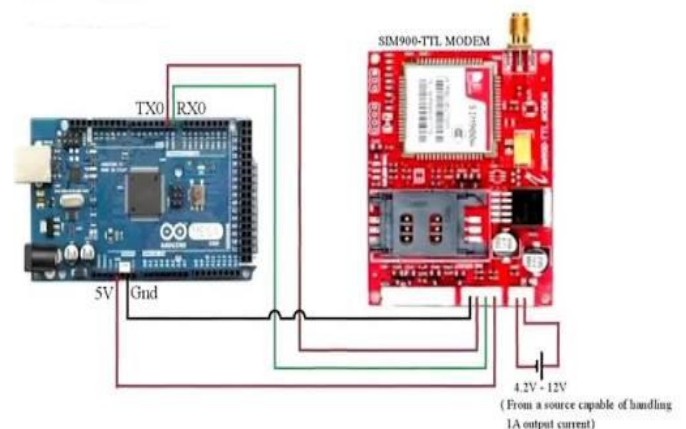

Fig-3: Interfacing of GSM Module with Arduino Board

6. CONCLUSION

This paper acknowledges user friendly, low cost, augmented home security system. After a researched study of literatures of many topics that consist of home automation design and wireless networks, simple system to improve the standards is developed.[5] It is a real-time monitorable and remote controlled system developed with simple hardware which simplifies the possibility of error free security system. This system can be easily implemented with maximum reliability and the high security with lesser cost is a special enhancement from the existing systems for Home security.

7. ACKNOWLEDGEMENT

8. REFERENCES

[1]. R. Hariprakash, G. Venkatramu, S. Ananthi, "University of Madras, K. Padmanahan "Some Problem and Methods for Remotely Controllable Automatic Home Security System" Systems and Networks Communications. ICSNC, 3rd International Conference Publication, ISBN: 9780-7695-3371-1, (2008) 400-403

[2]. Hosticka, B. J. "Analog Circuits for Sensors" Inst. Of Fraunhofer Microelectronic. Circuits & Syst., IEEE Publication, E-ISBN: 978-1-4244-1124-5, (2007) 97-102.

[3] Moshiri B., Khalkhali A. M., Momeni H. R., "Designing a Home Security System Using Sensor Data Fusion with DST and DSmT Methods". Tehran Univ., Tehran; IEEE Publication, (2007) 1-6.

[4] Rifat Shahriyar, Enamul Hoque, S.M. Sohan, Iftekhar Naim; Remote Controlling of Home Appliances using Mobile Telephony, International Journal of Smart Home,Vol. 2, No. 3, July, 2008