SMART INTRUSION DETECTION SYSTEM

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Abstract - we will deliberate how to control safety and security system using GSM technology by using android application through android mobile phone. For the home security system we are using an antitheft reporting system which will report the owner by ringing an alarm and by sending an SMS. Also for the safety system in case of fire or gas leakage it will report the owner by sending a SMS and also by ringing an alarm. Thus by using GSM technology, it provides the wireless access to the devices to be controlled.

Key Words: Microcontroller, GSM modem, sensors, control ,camera module

1.INTRODUCTION

Home automation is a process for improving the quality of resident's life by facilitating a flexible, comfortable and secure environment. Home security system is the most prominent feature for home automation. Traditional techniques of alarm based security have gained much popularity in past decades. Nowadays, embedded system is designed to provide security due to tremendous improvement in microcontroller unit and widespread applications of GSM technology. In this paper we describe a
simple security and safety system using GSM SMS (Short Messaging Service).

1.1 Component Description

Atmega 2560

The high-performance, low-power Microchip 8-bit AVR RISC-based microcontroller combines 256KB ISP flash memory, 8KB SRAM, 4KB EEPROM, 86 general purpose I/O lines, 32 general purpose working registers, real time counter, six flexible timer/counters with compare modes, PWM, 4 USARTs, byte oriented 2-wire serial interface, 16-channel 10-bit A/D converter, and a JTAG interface for on-chip debugging. The device achieves a throughput of 16 MIPS at 16 MHz and operates between 4.5-5.5 volts.

GSM SIM 900

SIMCom is an ultra compact and reliable wireless module-SIM900. This is a complete Quad-band GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions.

Sensors

MQ6: This is a simple-to-use liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm
.
Vibration SW-420: SW-420 normally closed type vibration sensors. comparator output signal clean wave well, driving ability, 15mA

Temperature Sensor (DS18B20): The DS18B20 digital thermometer provides 9-bit to 12-bit Celsius temperature measurements and has an alarm function with nonvolatile user-programmable upper and lower trigger points. The DS18B20 communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with a central microprocessor.
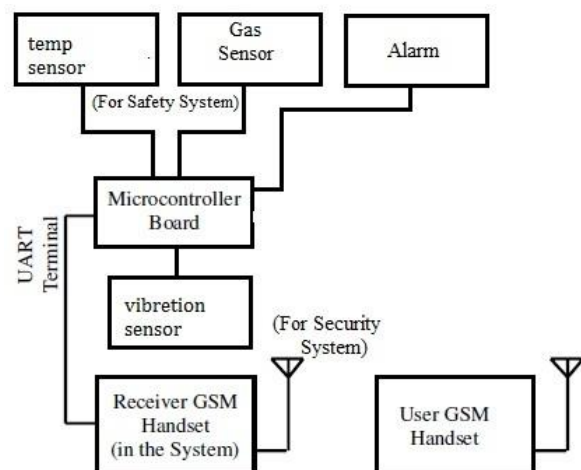

Fig. 1 Block Diagram of the System

1.2 SYSTEM DESCRIPTION

The system has two parts, namely; hardware and software. The hardware architecture consists of a stand alone embedded system that is based on 8-bit microcontroller (ATMega2560), a GSM handset with GSM

Modem (SIM900,sensors MQ2, MQ7, DS18B20). The software part consists of programming in arduino. The GSM modem provides the communication media between the home owner and the system by means of SMS. The SMS consists of commands to be executed. The format of the message is predefined. The SMS message is sent to the GSM modem via the GSM public networks as a text message with a definite predefined format.

Once the GSM modem receives the message, the commands sent will be extracted and executed by the microcontroller. For the home security and safety system, in case of security breach, fire and gas leakage microcontroller will ring the alarm and send a feedback message through the GSM modem to the GSM handset.

2. PROCESS DESCRIPTION

The circuit of the project consists of three different parameter sensing sensor mainly GAS, VIBRATION ,TEMPERATURE and a camera module. All of these sensors have predefined set points given individually in the program code of arduino. These hardware and software compatibility is achieved by the circuit interfacing as described.
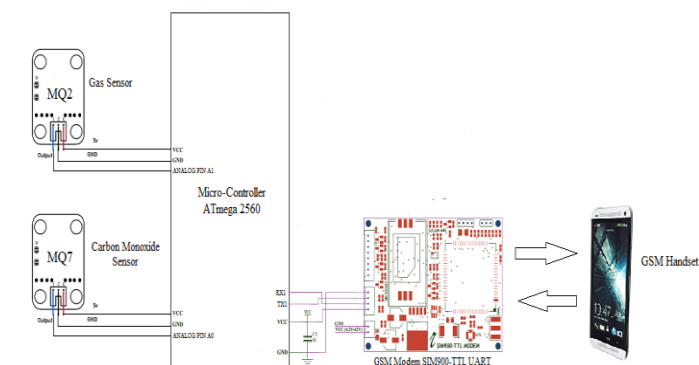
When the change in the parameter is detected on any of the sensors the appropriate manipulated signal is generated by the arduino controller. Henceforth the gsm module is activated as described below :

Cellular phone containing SIM (Subscriber"s Identifying Module) card has a specific number through which communication takes place. The mode of communication is wireless and mechanism works on the GSM (Global System for Mobile communication) technology. Here, the user transmits instructions to the system to control the appliances in the form of SMS through an android application. The receiver GSM handset is used to receive the SMS sent by the user and then to transmit an acknowledgement or status to the user"s mobile. The receiver handset has to be equipped with an AT Modem and a valid SIM card.

A sensor is a transducer whose purpose is to detect some characteristic present in the environment. It detects events or changes in quantities and provides a corresponding output, generally as an electrical or optical signal; for example, in our project we are using gas sensor (MQ7), which sense the gas, temperature and vibrations and send a certain voltage output to the microcontroller.

When the set point of any of the sensor or all of the three sensors are reached externally then camera module would take a snap of the surrounding area and it would be send to user through gsm module.

3. SOFTWARE

The open-source Arduino environment allows user to write code and upload it to the I/O board. The Arduino development environment contains a text editor for writing code, message area, text console, and toolbar with buttons for common functions, and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them. Arduino programs are written in C or C++. Arduino features, capable of compiling and uploading programs to the Board with a single click. Software written using Arduino is called sketches.
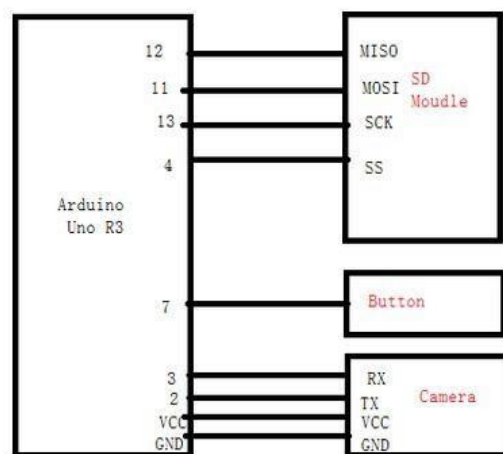
4. CONCLUSIONS

In this paper we discussed our project on GSM based home automation, safety and security system which is very useful and also very economical. It provides simple and easy way to control over the detection system. Also the safety and security system can be easily installed in the house and used. It informs the owner in case of fire, gas leakage and theft even when the owner is not in the house.

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