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Home Security System Using GSM

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ABSTRACT: Home security system is needed for convenience and safety. This system invented to keep home safe from intruder. In this work, we present the design and implementation of a GSM based wireless home security system, which takes a very less power. The system is a wireless home network which contains a GSM modem and magnet with relay which are door security nodes. The system can respond rapidly as intruder detected and GSM module will do alert home owner. This security system for alerting a house owner wherever he will. In this system a relay and magnet installed at entry point to a precedence produce a signal through a public telecom network and sends a message or redirect a call that tells about your home update or predefined message which is embedded in microcontroller. Suspected activities are conveyed to remote user through SMS or Call using GSM technology.

KEYWORDS: Home safety or Security, Arduino, IR sensor, SMS, GSM

I. INTRODUCTION

An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today. Embedded systems are controlled by one or more main processing cores that are typically either microcontrollers or digital signal processors (DSP). The key characteristic, however, is being dedicated to handle a particular task, which may require very powerful processors. Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

II. LITERATURE SURVEY

- [1] An Internet of Things-Integrated Home Automation with Smart Security System Sayeduzzama, Md, et al. "An Internet of Things-Integrated Home Automation with Smart Security System." Automated Secure Computing for Next-Generation Systems. The Internet of Things (IoT) is a cutting-edge technology in today's transformative age of Industry 4.0. While the IoT and its applications are expanding and improving, there is still opportunity for growth in the areas of social support and technological progress.
- [2] Microcontroller-based Security System for an Industrial Complex: Design, Fabrication and Testing Allison Chinedu Okolie Current Journal of Applied Science and Technology. In this 21st era, criminality is increasing, and everybody wishes safety for their home and assets. So that in this situation, everyone should have a secure system with developing and modern technology. So a person should not be worried when moving away from his home.
- [3]] TRENDSAFE: Intrusion Alarm System for Smart Home Protection and Security Using Arduino with SMS Notification Dequrios Recyy Anne C., et al. International Conference on Industrial Engineering and Operations Management. Conventional security systems which are the very common form of protection to lives and properties, have certain limitations such as real time monitoring and control of activities such as intruders in the form of human beings, fire, smoke, etcetera.
- [4]] Akanksha Singh, Arijit Pal, Bijay Rai, " GSM Based Home Automation, Safety and Security System Using Android Mobile Phone", International Journal of Engineering Research & Technology. In 21st century the tremendous advancement of science and technology which can be used to secure the assets and the home appliances of users. Many times we leave the room without switching off lights and fans. This way we waste most valuable electricity.



III. PROPOSED SYSTEM

Home/Bank/Office security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition there was a need to automate home so that user can take advantage of the technological advancement in such a way that a person getting off the office does not get melted with the hot climate Detecting Obstacle with Sensor: In our projects certain sensors are installed at room which is capable of detecting the intrusions taking place. The sensors senses the intrusion and it gives the information to the microcontroller and further the intrusion information are again directed to the phone number programmed through the GSM module via installed GSM SIM card in the form text message .Obtaining the intrusion information from remote area: The main aim of the project is to receive the intrusion information at any remote place from the installed device which we are developing in this project .Controlling or accessing the devices from a remote place: We are also aiming for the control of the installed device at the home through any phone number via text message which the GSM SIM installed will receive it as a code for controlling device.

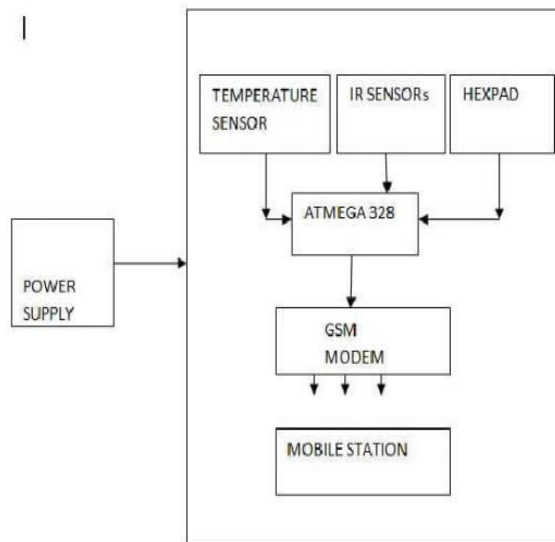


Fig 1.1 Proposed flow model

IV. OPERATION AND HARDWARE DESIGN

Hardware of the system contains sensors, Atmega8l microcontroller, sim300 (GSM module), Buzzer, in system programmer and relays to control the appliances. The system design is shown in Figure 1. IR sensor and Keypad are used as input devices. Motor driver, GSM modem, LCD- display are used as output devices. Input is given to Microcontroller, processing device which provides output to output devices in form of instructions that are to be performed by them.

Operation of the whole system gets initiated when IR sensor senses the presence of any human being within its range. When presence of human being is sensed it sends signal to microcontroller, which reads the status of the IR sensor and switches on the keypad and LCD display. LCD display shows what has to be provided by person as input to controller in order to open the door. User then enters the required information to controller via keypad, in this case password is required to be entered. This entered password is displayed at the LCD display. If the entered password is correct then signal is sent to GSM modem via USART which further inform the owner of the house on the registered number about presence of someone near his gate by sending a predefined message and signal is also sent to microcontroller which further provide instructions to the motor driver to open door.

In case wrong password is entered three time by some intruder then also signal is sent to GSM via USART to send message of Security alert to registered user and in this case microcontroller provide instruction to motor driver to not to open the door. This helps in informing the owner of the house about the presence of some known person or some intruder around the house. USART here is used as a serial protocol for communication between microcontroller and GSM modem.

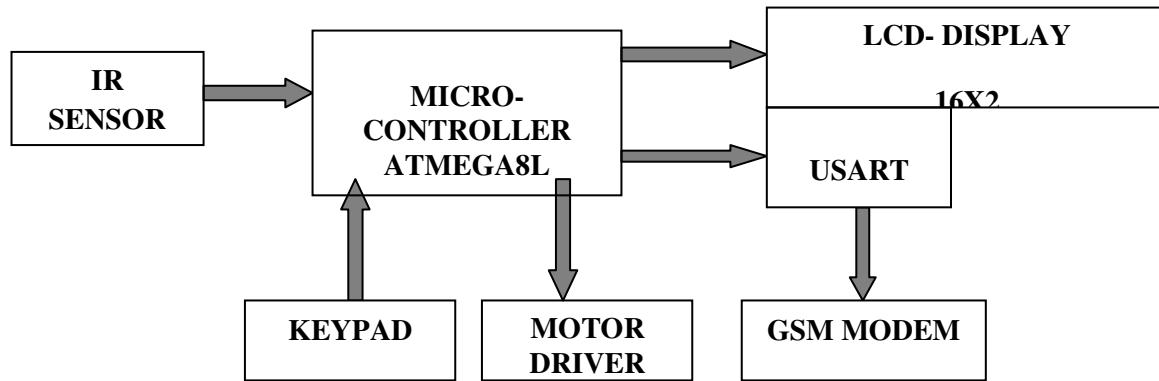


Fig. Hardware Design

A.MICROCONTROLLER UNIT

The control module is built with the microcontroller IC. The central controller is Atmega8l which is 8-bit Microcontroller with 8K in-System Programmable Flash. It is having advanced RISC architecture. It consists of Two 8-bit Timer/Counters with separate prescalers and Compare Modes, one 16-bit Timer/Counter with separate pre scalar, compare Mode, and capture Mode, Real time counter with separate oscillator, three PWM channels, 8-channel i.e six- channels 10-bit accuracy and two-channels 8-bit accuracy and 23 Programmable I/O Lines. Some special features of this microcontroller are Power-ON resets and Programmable Brown-Out Detection, Internal calibrated RC oscillator, External and Internal Interrupt sources and Five Sleep modes (Idle, ADC Noise Reduction, Power-save, Power-down, and Standby).

B.GSM MOBILE UNIT

A SIM300 based quad band GSM module which supports GPS technology for satellite navigation is used. It provides GPRS multi-slot class10 / class8 capabilities and supports GPRS coding schemes CS-1, CS-2, CS-3, and CS-4. This module takes care of all your GSM-GPRS based communication requirements as well as provides live GPS data.. AT Command is a set of commands or instructions which can be used to communicate (talk) with a GSM modem/mobile phone. AT commands are used to automatically receive the call on system from the preconfigured number and system also sends the message to preconfigured number about the intrusion indication through AT commands [9]. The AT commands of GSM-GPRS modules are given below-

The AT commands for GSM-GPRS support is as follows:

- +CMTI: SMS has been received
- +CREG: Network registration indication
- +CMGS: To send the message
- +CMSS: To Send Message from Storage
- +CMGW: command writes an SMS to the first location available.
- +CPMS: command allows the message storage area to be selected (for reading, writing, etc.).
- +CMGR: Read Message
- +CCLK: Clock Management

V. RESULTS

GSM based security system provides better security. This system includes microcontroller as the heart of the system which controls and monitors all devices. Whenever sensor occurs signal this signal passes to the microcontroller, microcontroller send command to send message to owner's mobile to take necessary action.

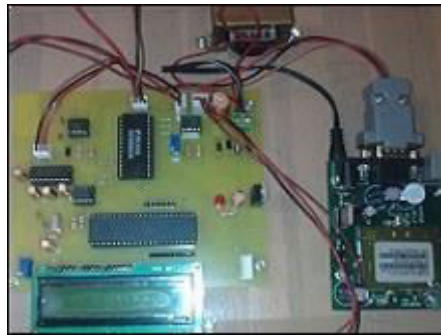


Fig . Home Security system using GSM kit

- This project makes a use of GPS, GSM, DC motor and LCD module. GPS module is used for location tracking and GSM module is used for sending alert SMS.
- It sends a message to the user when the theft is detected or when fire occurs.
- GSM module received that message and passes this information to the microcontroller then microcontroller will stop the ignition and also sending the alert SMS along with location to the predefine mobile number via GSM.

VII. CONCLUSION

This project has helped us to gain a better understanding of the future events and the need of creating a secure environment so that there may be a crime free world. It has also lead to the conclusion that one can easily monitor the house via simple procedure of receiving an SMS if anything comes up and there is an urgent or immediate need to act accordingly. This project might not only help in maintaining the home but also can be used to protect offices and industries around the world. Due to its easy installation and low cost of establishment, it must be widely used to form a secure atmosphere.

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