

Implementation of Home Security System using GSM module and Microcontroller

Abhishek S. Parab
M.Sc Computer Science student
Mithibai College
Mumbai ,Maharashtra, India

Amol Joglekar
Professor
Computer Science, Mithibai College
Mumbai ,Maharashtra, India

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 take 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 response rapidly as intruder detect 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 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: GSM(Global System for Mobile Communications), Microcontroller, SMS, security.

I. INTRODUCTION

From last few year home security is an essential requirement of households to keep home safe from intruders to get rob. So the researchers and companies tries to implement an algorithms and make some gradates that keep your home safe from intruders. This leads to advance technology that make your home intelligent or modern this called as home automation system also. With this technology house owner can control other appliances as well like lighting system, dimming, electrical appliances and many more. Now a day's wireless technology is used to control home appliances instead of wired topological connection. GSM(Global System for Mobile Communication) technology makes used to communicate input signal from appliances to output message on device. That means after detection of any intrusion GSM Modem sends the appropriate message to house owner's phone. The signals or data which is comes from sensors or other equipment digitize it by GSM module and send it to receiver.

Home automation or home security system offers many benefits. After so many research I gave a mainly focused on GSM based home security. It is very easy to install and having a very less cost. Basically it installed over the entry door and that door consist with magnet which is connected to relay, as relay detached from magnet, signals will generate via relay and sends it to 8051microcontroller and action takes place according to piece of code written in the

chip and GSM module sends the message to owner's phone.

There has been much research done on various type of Home Security systems like Sensor based Home security System, Figure print, Palm print and keypad activation for authentication and so much. All type of Security system uses only a technique of GSM module.

In this paper the work mainly focuses on the security of home when the user is out from the place. GSM based technology proposed to keep updated owner about house security. In this security system is SMS based and uses GSM technology to send SMS to the owner. Normally the aim of this type of system is to keep secure home from intruders.

To increase the performances of a smart automated house, lots of research is going on. For an example; The **Aware Home Research Initiative (AHRI)** at Georgia Institute of Technology is an interdisciplinary research endeavor aimed at addressing the fundamental technical, design, and social challenges for people in a home setting[14].

A. System Diagram:

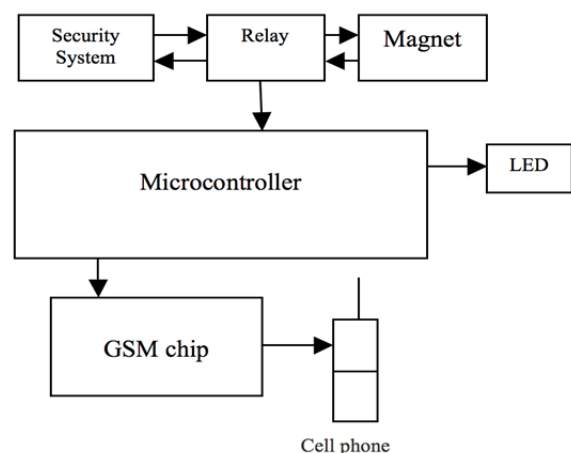


Figure 1: system overview

In this work we will be using components like Relay, Magnet, Microcontroller, LEDs, GSM chip, Device in which GSM technology used. Basically this device used to protect a house from unwanted things like theft or robbery. The door of the house contains with magnet. And magnet will be connected with a relay, if Relay is connected with a magnet there will be a yellow light and if it is disconnected the light flashes red light. It takes an appropriate action

through written(burn) code in chip. Because of that action GSM chip gets active and send SMS on the phone number which is declared in the piece of code embedded in Microcontroller. Because of that the house owner gets alert. The main function of relay is to switch between two terminals.

B. GSM Technology

GSM Modem:

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities.[11]

What is GSM?

GSM stands for Global System for Mobile Communication. It is a digital cellular technology used for transmitting mobile voice and data services. GSM is the most widely accepted standard in telecommunications and it is implemented globally. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates on the mobile communication bands 900 MHz and 1800 MHz in most parts of the world. In the US, GSM operates in the bands 850 MHz and 1900 MHz. GSM makes use of narrowband Time Division Multiple Access (TDMA)

GSM provides basic to advanced voice and data services including roaming service. Roaming is the ability to use your GSM phone number in another GSM network. GSM digitizes and compresses data, then sends it down through a channel with two other streams of user data, each in its own timeslot.

Advantages of GSM

- Improved spectrum efficiency
- International roaming
- Low-cost mobile sets and base stations (BSs)
- High-quality speech
- Compatibility with Integrated Services Digital Network (ISDN) and other telephone company services
- Support for new services

Features of GSM

- Short Message Service which allows you to send and receive 126 character text messages.
- Ability to use same phone in a number of network-related countries.
- Allows data transmission and reception across GSM networks at speeds up to 9,600 bps currently.
- Forwarding of calls to another number. More capacity, ensuring rapid call set-up.
- Handsets also smaller and more robust.

- Place a call on Hold while you access another call.
- Encrypted conversations that cannot be tapped.
- Emergency Calls - In the majority of countries, the global 112 emergency number can be dialed *free*.
- No-static connections .[12]

II. LITERATURE SURVEY:

Nikhil Agarwal, G.Subramanya Nayak[1] uses password protected door system methodology in home automation system. The door lock is password protected with an LED based resistive screen input panel which operates by detecting difference in light intensity captured by the photo diode which is emitted by surrounding red LEDs and reflected by the finger. The display is a 16X2 LCD panel. IR Laser sensors are used to detect any obstacle while monitoring the windows and doors at night or when away. Fire alarm system uses temperature sensor LM35 which senses sudden considerable increase in temperature and raises alarm. They use the following components in those automation system i.e. IR sensors, LCD Display, Temperature Sensor, Microcontroller, Relay, Power Supply, GSM Modem.

Visa M. Ibrahim, Asogwa A. Victor, S. Y. Musa[2] constructs his security system for car protection. In that concept if thief tries to rob a car it automatically demobilizes the car by disconnecting the ignition key supply from the car battery. This now makes it impossible for anybody so start the car, let alone moving with it. In an attempt of theft through the car doors or boot, the system sends the message to the car owner and at the same time starts the alarm. This design popped out due to the increasing rate at which packed cars are stolen especially in our country, but with this design this packed car is being monitored irrespective of where it is packed, provided there is GSM network coverage.

Jayashri Bangali, Arvind Shaligram[3] says that Automated home or intelligent home which indicates the automation of daily tasks with electrical appliances used in homes and security is an important aspect or feature in smart home applications. The new and emerging concept of smart homes offers a comfortable, convenient, and safe environment for occupants. Conventional security systems keep homeowners, and their property, safe from intruders by giving the indication in terms of alarm. However, a smart home security system offers many more benefits. He proposed Two system in his project i.e. one is based on GSM technology and other uses web camera to detect the intruder. First security system uses a web camera, installed in house premises, which is operated by software installed on the PC and it uses Internet for communication. It detect motion of any intruder in front of the camera dimension and camera range. The second security system is SMS based and uses GSM technology to send the SMS to the owner. The proposed system is aimed at the security of Home against Intruders and Fire. In any of the above cases happens while the owners are out of their home then the device sends SMS to the emergency number which is provided to the system.

Aayush Aggarwal, R.C. Joshi[4] designed his WSN and GSM based Remote Home Security System by combining the advantages of Wireless Sensor Networks and GSM technology is presented. It can detect intrusion, fire etc. and inform the user remotely about the incidence with distance playing no barrier. In those security system intruder has detect if they comes under the dimension of WSN.

R.Anandan, Mr.B.Karthik, Dr.T.V.U.Kiran Kumar[5] says that they have tried to increase the standard by combining new design techniques and developed a low cost home and industrial automated security systems. They aim to overcome the flaws made by many other security device as it is most effective in security purpose. It is cheaper and can be maintained easily than any other security device. This device works in two way modes. i e.

- a) Internal mode
- b) External mode

When the internal mode is selected by the user when they are inside the wireless security area, the entire sensor except sensor will be activated and the buzzer connected with the microcontroller will give an alarm and the reason for the insecurity will be displayed in the LCD connected to the microcontroller. When the external mode is selected by the user when they are outside the wireless security area, all the sensor will be active and the security area address which is pre- programmed, along with the problem will be sent as SMS to the specified police station, fire station, security room and also to the user at the time of insecurity, fire accident, unwanted movement of persons etc. which is sensed by the respective sensor.

III. RESEARCH METHODOLOGY

A. proposed system:

This system construct with 8051 microcontroller which contains a piece of code for a specific action. The action will be taken by the GSM modem i.e. to alert an owner about intruder or danger to house. That device should be installed on the door, as the intruder opens the door the magnet which is situated in the door go away from Relay so LED glows with RED light and the appropriate action will be taken by GSM modem.

B. Flow chart:

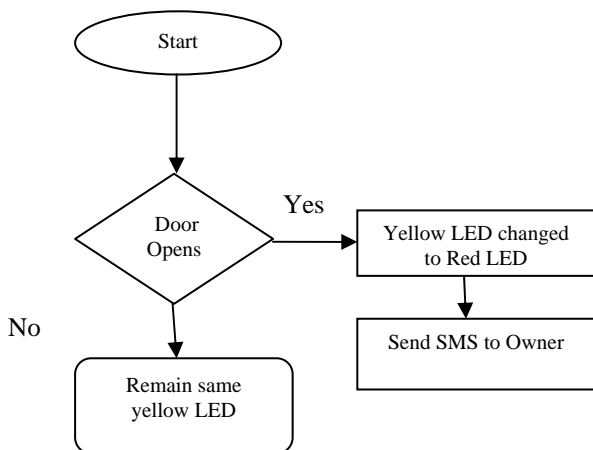


Figure 2: flowchart

C. Algorithm

- Step1:Initialize 8051µc, rely ,GSM module with connection.
- Step2:Switch on the circuit and keep it on .
- Step3:If magnet attached to rely then keep as it is.
- Step4:else if magnet detached from Relay then GSM module will send SMS to owner

D. Software Design

This Proposed System uses microcontroller 8051, C programming language embedded within it and compile using C-compiler and to burn the program using Flash Magic software. ".HEX" file will be burn in microcontroller.

Test Data

Figure 3.a dummy model

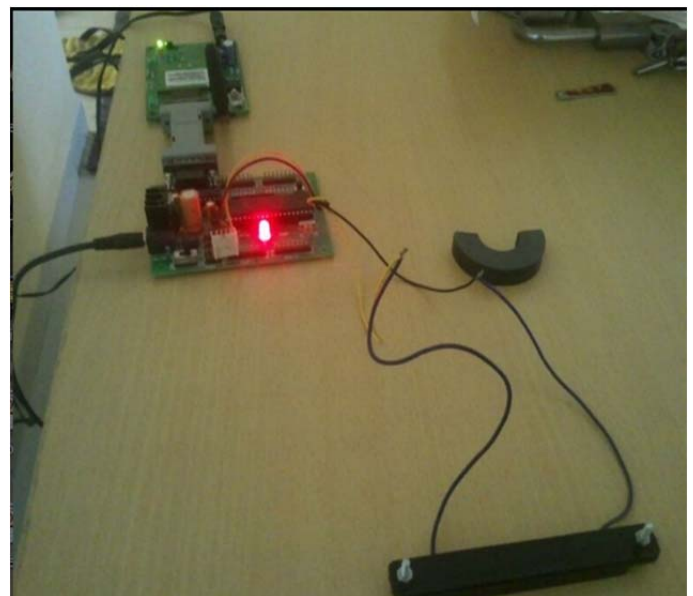


Figure 3: Detection of intruder.

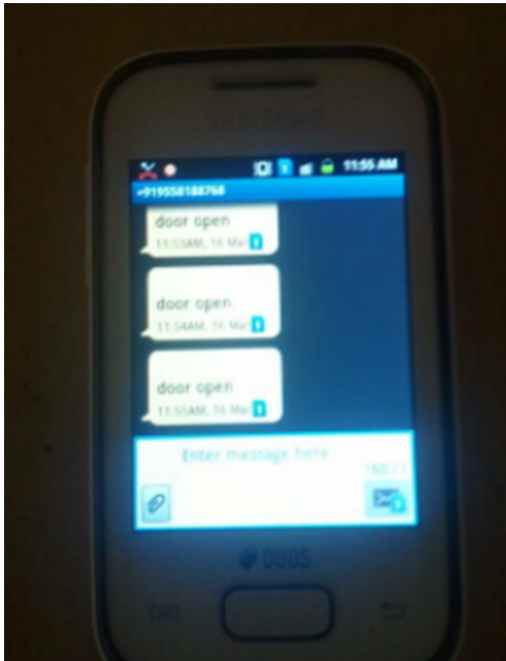


Figure 4: Receiving a message on mobile phone

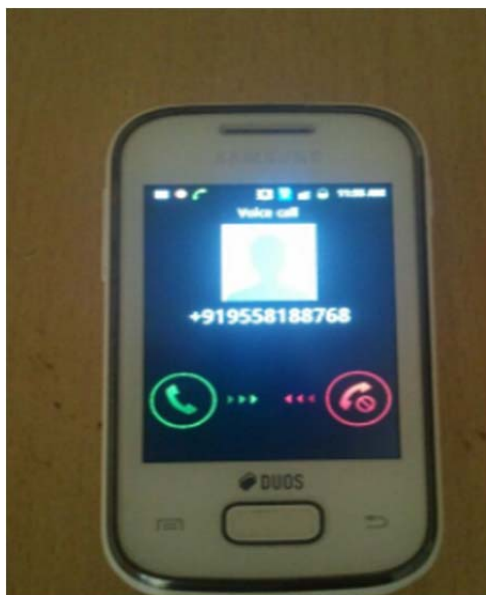


Figure 5: calling facility

IV. RESULTS AND DISCUSSION

This system tested on the latest technology available in smartphone which gives a proper result. This system is easy to use and very simple. The model can be installed with a economical cost. The GSM technology gives a good response after received a message of particular action from microcontroller. SMS received time to house owner is basically depend on the signal strength range that you have got through mobile tower. We have developed and tested the model using C language further the same model can be enhanced with the help of some high end language and which would be more portable.

V. CONCLUSION:

The GSM based home security system has been designed and tested with the mobile network. The user can get alerts anywhere through the GSM technology thus making the system location independent. A flexible way to control and explore the services of the mobile, AT commands is used in the system. The communication of home is only through the SMS which has been tested with the mobile networks and is working on any mobile network.

REFERENCES

- [1] Nikhil Agarwal, G.Subramanya Nayak "Microcontroller based Home Security System with Remote Monitoring" Special Issue of International Journal of Computer Applications (0975 – 8887) International Conference on Electronic Design and Signal Processing (ICEDSP) 2012,
- [2] Visa M. Ibrahim, Asogwa A. Victor "Microcontroller Based Anti-theft Security System Using GSM Networks with Text Message as Feedback" International Journal of Engineering Research and Development e-ISSN: 2278-067X, p-ISSN: 2278-800X,
- [3] Jayashri Bangali, Arvind Shaligram "Design and Implementation of Security Systems for Smart Home based on GSM technology ", International Journal of Smart Home Vol.7, No.6 (2013), pp.201-208 .
- [4] Aayush Aggarwal, R.C. Joshi, "WSN and GSM based Remote Home Security System", International Conference on Recent Advances and Future Trends in Information Technology (iRAFIT2012) Proceedings published in International Journal of Computer Applications® (IJCA)
- [5] R.Anandan, Mr.B.Karthik, Dr.T.V.U.Kiran Kumar " Wireless Home And Industrial Automation Security System Using Gsm"
- [6] http://www.researchgate.net/publication/260155423_Smart_GSM_Based_Home_Automation_System
- [7] Mohammad Arif Hossain, Md. Nazmul Hasan, "Modern Home Automation System Based On AVR Microcontroller"International Journal of Scientific & Engineering Research, Volume 5, Issue 1, January-2014 1864 ISSN 2229-5518
- [8] http://www.academia.edu/9331497/GSM_Based_Intelligent_Home_Security_System_for_Intrusion_Detection
- [9] C. K. Das, M. Sanaullah, H. M. G. Sarower and M. M. Hassan, "Development of a Cell Phone based Remote Control System: an Effective Switching System for Controlling Home and Office Appliances", International Journal of Electrical & Computer Sciences IJECS-IJENS Vol.: 09 No: 10.
- [10] Sadeque Reza Khan, Ahmed Al Mansur, Alvir Kabir, Shahid Jaman, Nahian Chowdhury, "Design and Implementation of Low Cost Home Security System using GSM Network", International Journal of Scientific & Engineering Research Volume 3, Issue 3, March - 2012 1 ISSN 2229-5518
- [11] http://www.tutorialspoint.com/gsm/gsm_overview.htm
- [12] <http://www.cellular.co.za/gsm-features.htm>
- [13] Z. Ahmed, "HOME AUTOMATION", Zeeshan Ahmed (2009) Aero Fighter – 2D Gaming In: 9th National Research Conference on Management and Computer Sciences, SZABIST Institute of Science and Technology, Pakistan
- [14] <http://www.awarehome.gatech.edu/>