

# GSM Based Home Automation System

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**Abstract-** Automation is a system that plays a significant role in the world. This paper represents a low cost, flexible and standalone home automation system. We can control home appliances from outdoor and from indoor. All Electrical loads are automated in this system. The systems also use GSM for control all appliance. Using this system, physically weak people can control home appliances from anywhere. This system can be implemented in houses, offices, hospitals, industries, or even in universities. The user interface is kept simple, so users from beginner to advanced level users can use the system without trouble.

**Keywords-** Microcontroller; GSM modem;

## I. INTRODUCTION

Mobile phone is a revolutionary invention of the century. It was primarily designed for making and receiving calls & text messages, but it has become the whole world after the Smart phone comes into the picture. In this project we are building a home automation system, where one can control the home appliances, using the simple GSM based phone, just by sending SMS through his phone.

In this paper, no Smart phone is needed; just the old GSM phone will work to switch ON and OFF any home electronic appliances, from anywhere. The automation market is mainly guided by flourishing need for efficient solutions in various household applications such as lighting, safety and security and energy legislation. The development of smart cities and high-tech homes in the North America and Middle East region is make an impression about the growth of overall home automation market. The home automation market is initially driven by increasing the necessity of effective solutions in several household applications such as lighting, safety and security, energy management, audio and video entertainment. Smart home based home automation has huge demand in market now-a- days. Smart phone based home automation apps are already running successfully in global market. Within 2020 year, home automation will run as expectations in Bangladesh as well as in whole world. Now we can say that, user's awareness and attraction for new technology are increasing the growth of home automation in North America, Europe and Asia pacific zone. Research for home automation will increase revenue and global

development within 2015-2020. Advantages of home automation will explore soon and the effect of it will develop the growth of society. So, this project will create a good opportunity at south Asian market.

## II. SYSTEM DESCRIPTION

Our designed home automation system is a flexible system that can control and make a communion between nearly all load appliances of the house. All appliances can control from indoor also outdoor from any places. Our automated home can be called a smart home. If one forgets to switch off the lights or other appliances while going out, it allows you to turn off the appliance with your cell phone. By using twitter, you can get status of your home and also can control your home power devices. This is a simple automation system which contains remote mobile host controller and several home appliances.

We have five features in this project. We implement home automation using Bluetooth, GSM-SMS, At first, we set up Bluetooth then GSM-SMS.

The main features of this system are:

- Control through android mobiles.
- Control by SMS where device is capable of recognizing the user.
- Through GSM modem, appliances can be controlled by DTMF (Dual-Tone Multi-Frequency) tone. All devices can be controlled using phone calls.
- The user can control appliances through Twitter.
- Another feature is detecting humans or intruders by using motion detector or PIR sensor.

While the development of the first three features of this system has been completed, the last two features are still under development.

## III. METHODOLOGY

We have combined the system with input processing and output that are shown in Fig. 1.

### A. GSM-SMS

The system allows household appliance control using cell phone through global system for mobile communication (GSM) technology. Cellular communications is a dynamic solution for such remote controlling activities. SMS (short message service) technology is a technology that can make all communication system in short and it can be used to control.

### B. GSM-calling

For this feature, we use a DTMF (Dual-tone Multi Frequency) module. The DTMF module is a very old device. We have found this device after a long search.

DTMF is what a conventional wired phone sends when you press its buttons to make a call, or navigate voice mail or corporate phone systems. It works by sending two tones for each button, one tone for each column of buttons, another tone for each row. The maximum guaranteed bandwidth extends from about 300 Hz to 3.5 kHz. DTMF is device that was not made for data transfer; it is designed for control the signals that generate from one device to another devices.

GSM module and connect with Arduino Uno. In GSM modules is a DTMF decoder included. The DTMF tones are controlled by Arduino AT commands. This feature is done successfully from our five features of this project.

He/she can control all appliances from anywhere. The proposed system makes use of wireless control hence can be effectively used in systems where unwired connections are desired. The system uses the user's mobile handset for control and therefore the system is more adaptable and also providing ubiquitous access for appliance control.

Actually using the GSM module for the SMS system is the simplest part of the project. We set the GSM module over the Arduino Uno microcontroller. Inside the GSM module we put a necessary SIM. If someone sends a message on GSM number like "A1B1" then all lights will be on for this message and if someone send a message like "A0B0" then all lights will be off by this sequence we can control all load connections such as fans, AC, TV, refrigerator etc. So it's a system that if someone can't reach on home on the right time. from mobile phone number set by commands (A1B1, A0B0, A1B0 and A0B1) in the form of SMS messages and receiving the appliances that is actually the GSM number for knowing Household appliances from long distance. Remotely control system allows the home owner to control the home appliances.

## IV. EXPERIMENTAL SETUP

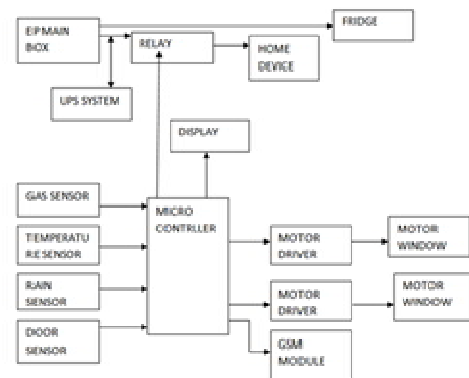
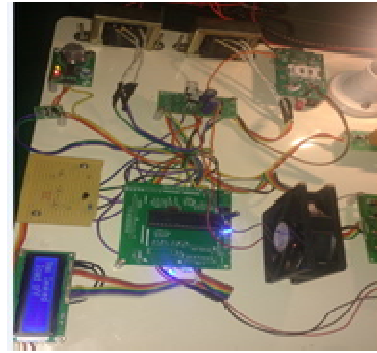


Figure 1. Block diagram of proposed system

### INTERFACING LCD TO 89S52

Now a day electronic project without LCD looks incomplete. Interfacing with Atmel microcontroller is very task. You just have to know the proper LCD programming algorithm. LCD used here has HD44780u dot matrix LCD controller. LCD modules have 8-bit data interface and control pins. One can send data an 8-bit or in pair of two 4-bit nibbles. To display any character on LCD microcontroller has to send its ASCII values to the data bus of LCD for e.g. to display „AB“ microcontroller has to send two hex bytes 41h and 42h respectively. LCD display used here is having 16x2 sizes. It means 2lines each with 16character.

LCD Initialization: This is the pit fall for beginners. Proper working of LCD depend on the how the LCD is initialized. We have to send few commands bytes to initialize the LCD. Liquid crystal display is also called as LCD is helpful in providing user interface as well as for debugging purpose. The most common type of LCD controller is HITACHI 4478 which provides a simple interface between the controllers as well as are cost effective.

### RELAY INTRODUCTION

The first relay was invented by Joseph Henry in 1835. The name relay derives from the French noun relays that

indicate the horse exchange place of the postman. Generally a relay is an electrical hardware device having an input and output gate. The output gate consist in one or more electrical contacts that switch when the input gate is power, a negation, and on the base of the past relays had a wide use, for instance the telephone switching or the railway routing and crossing system. Relays are usually SPDT or DPDT but they can have many more sets of switch contacts. This relay is used to control a high-voltage with a low-voltage signal, as in some type of modems, to control a high-current circuit with low-current signal, as in the starter solenoid of an automobile.

## V. WORKING OF THE SYSTEM

The objective of this project is to develop a device that allows for a user to remotely control and monitor multiple home /office appliances using a cellular phone. This system will be a powerful and flexible tool that will offer his service at any time, and from anywhere with the constraints of the technologies being applied. The application of our system comes into handy when people who forget to do simple things such as turn ON/OFF devices at their home or in their office they can now do so without their presence by the transmission of a simple text message from their mobile phone. This development, we believe, will ultimately save a lot of time especially when people don't have to come back for simple things such as to turn ON/OFF switches at home or at their office once they set out for their respective work. How we have implemented our project and the various parts involved in it, from the above representation the first mobile station is used as a transmitting section from which the subscriber sends a text message that contain command and instructions to the second mobile station which is based on a specific area where our control system is located. The mobile phone indicated in the block diagram is a Siemens GSM modem set. The received SMS message is stored in the SIM memory of the phone and then extracted by the microcontroller and processed accordingly to carry out specific operations. The LCD is used to indicate the status of the operation performed by the microcontroller and also its inclusion makes the overall system user-friendly. GSM receiver receives message sent from the user call phone, microcontroller issues commands to the appliances and the devices connected will switch ON/OFF.

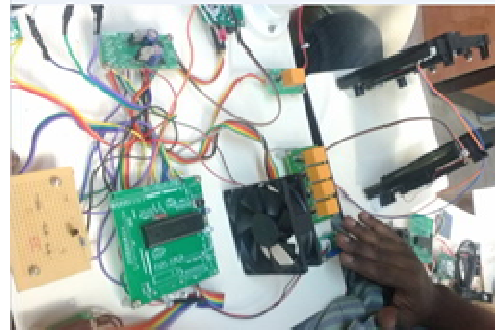


Figure 2.

## VI. FUTURESCOPE

The future implementation of this project is very great consideration the amount of time and resource it saves. The project we have undertaken can be used as a reference or as a base for realization a scheme to be implemented in other projects of greater level such as weather forecasting, temperature updates, devices synchronization, etc. The project itself can be modified to achieve a complete Home Automation System which will then create a platform for the user to interface between himself and his household.

## VII. RESULTS

In this paper we have undertaken has helped us gain a better perspective on various aspects related to our course of study as well as practical knowledge of electronic equipments and communication. We became familiar with software analysis, designing, implementation, testing and maintenance concerned with our project. The extensive capabilities of this system are what make it so interesting. From the conveniences of a simple cell phone, a user is able to control and monitor virtually any electrical devices.

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