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Gsm Based Home Automation System Using Arduino

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ABSTRACT: In this modern world we are constantly developing technologies and smartly using it for our comfort as well as for the needy. So one of the ways to Automate our Home and control its appliances from anywhere we wish is suggested in this paper. We can switch on or switch off light, fan, television, ac or other appliances via text message using Global System for Mobile Communication. The concept of serial communication and AT commands has been applied towards development of the smart GSM based Home Automation system. Home owners will be able to receive feedback status of any home appliances switched on or off. Arduino will be used to control the whole system. This system will benefit us to save electricity if we forgot to switch off the appliances while leaving our home and even the handicapped persons.

KEYWORDS:. Home Automation, GSM, Arduino, AT commands, Text message

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 Smartphone 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 project, no Smartphone is needed, just the old GSM phone will work to switch ON and OFF.

1.1 SYTEM ARCHITECTURE

1.1.1 GSM

GSM module is used in many communication devices which are based on GSM (Global System for Mobile Communications) technology. It is used to interact with the GSM network using a computer. GSM module only understands AT commands, and can respond accordingly. The most basic command is “AT”, if GSM responds OK then it is working good otherwise it responds with “ERROR”.

AT commands are instructions used to control a modem. AT is the abbreviation of “Attention”. Every command line starts with "AT" or "at".

That's why modem commands are called AT commands.

1.1.2 ARDUINO UNO

Arduino Uno is a microcontroller board based on an 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists of other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

Arduino can be used to communicate with a computer, another Arduino board or other microcontrollers.

This board comes with all the features required to run the controller and can be directly connected to the computer through USB cable that is used to transfer the code to the controller using IDE (Integrated Development Environment) software, mainly developed to program Arduino. IDE is equally compatible with Windows, MAC or Linux Systems, however, Windows is preferable to use. Programming languages like C and C++ are used in IDE.

Apart from USB, battery or AC to DC adapter can also be used to power the board.

1.1.3 ULN2003

The seven NPN Darlington connected transistors in these arrays are well suited for driving lamps, relays, or printer hammers in a variety of industrial and consumer applications. Their high breakdown voltage and internal suppression diodes insure freedom from problems associated.

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II. PROPOSED SYSTEM

After doing lot of research and study some papers found out to be valuable resources for development of the project. There are many methodologies and techniques to automate our home.

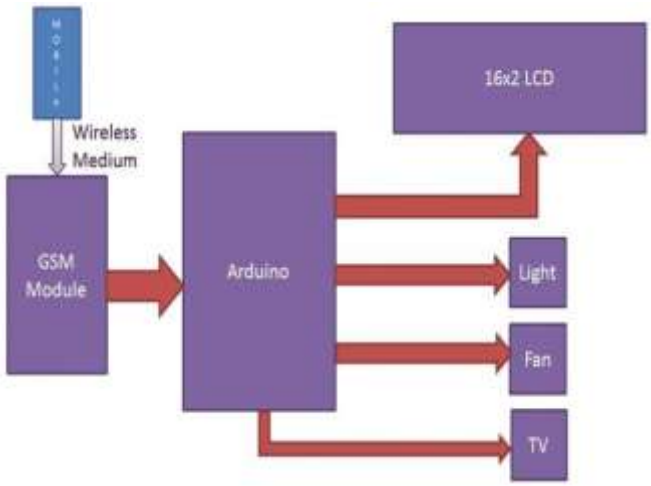

Fig- 2.1: Block Diagram

In our project we used mobile phone and GSM module which is a wireless medium to receive text messages. We proposed the system of automatic control of home appliances. We can switch on or switch off our fan, light, television. We will send a message in text form through mobile phone, even the old GSM phone will work. There is no compulsion of smartphones. This is a great advantage, the GSM module will receive it and send it to the Arduino. The Arduino reads this SMS and extract main command from the received string and stores in a variable. After this, Arduino compare this string with predefined string. If match occurred then Arduino sends signal to relay via relay driver for turning ON and OFF the home appliances. The result is also displayed on the LED screen.

III. WORKING PRINCIPLE

- We send some commands like "#A.light on*", "#A.light off*" and so on for controlling home appliances, which is then received by GSM.
- The Rx and Tx pins of the GSM module are directly connected to the Tx and Rx pins of Arduino respectively. The GSM module is powered by using a 12 volt adaptor.
- Arduino is used for controlling whole the process.
- Liquid crystal display is used for displaying status of home appliances which are directly connected to arduino in 4-bit mode. Data pins of LCD namely RS, EN, D4, D5, D6, D7 are connected to arduino digital pin number 6, 7, 8, 9, 10, 11
- 5 volt SPDT 3 relays are used for controlling LIGHT, FAN and TV. And relays are connected to arduino pin number 3, 4 and 5 through relay driver ULN2003 for controlling LIGHT, FAN and TV respectively.

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IV. METHODOLOGY

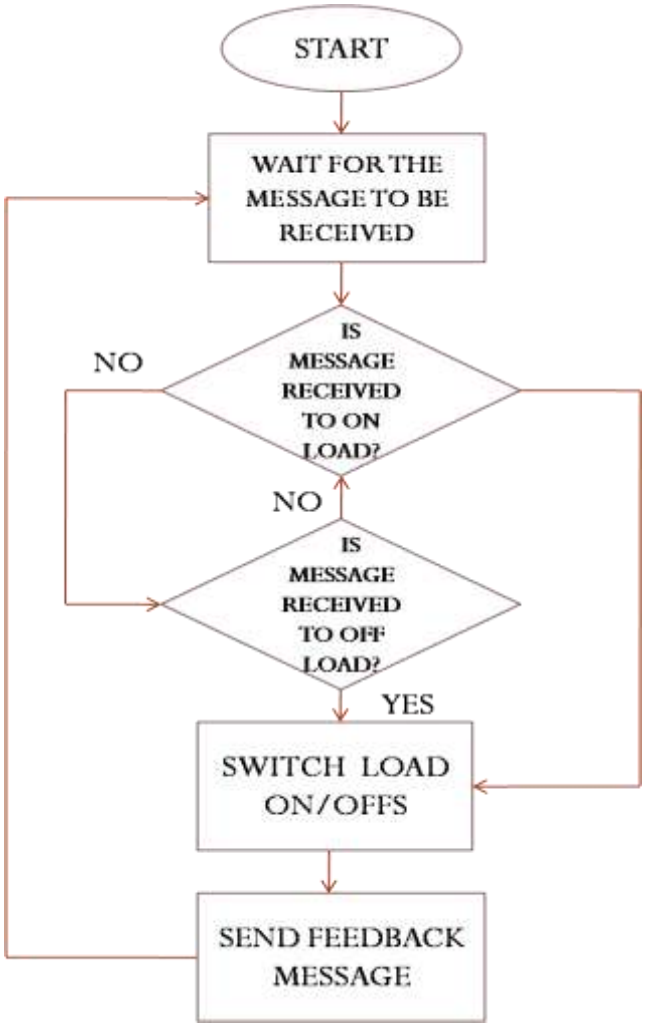

Fig-4.1 : Flow chart

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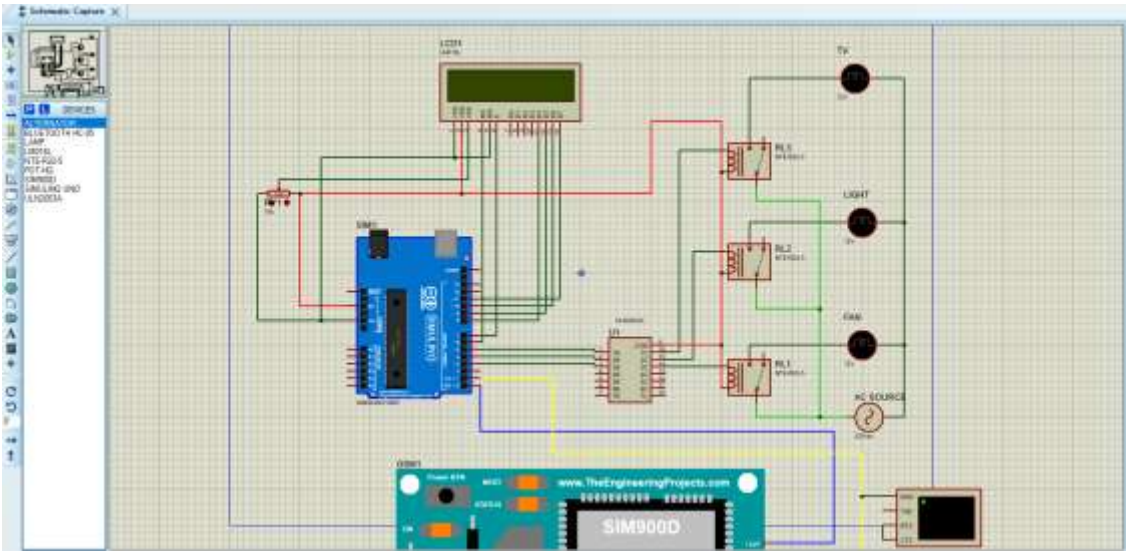
V. CIRCUIT DIAGRAM



VI. CONCLUSION

The project "GSM BASED HOME CONTROL" is intended to automate the certain functions of home appliances.

Smart home technologies have been around for about 30 years, mostly relying on some proprietary technologies and applications.

With the recent expansion of communication networks, smart home applications can be further enhanced with new dimensions of capabilities that were not available before.

In particular, wireless access technologies will soon enable exotic and economically feasible applications.

The device is very helpful in controlling the home. It reduces the wastage of valuable time and our daily life becomes easier and more flexible.

VII. FUTURE SCOPE

There are some drawbacks in this system which can be further improved and modified. Instead of text messages a touch screen system can be developed. As if the user makes a mistake in message format , it will not be acknowledged by the arduino and the system will not work. This project can even be used in Irrigation systems when modified a as peruse..

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