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GSM based Electrical Control System for Smart Home Application

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Abstract: *Home automation systems make the revolutionary changed in the human's comfortability and also make the life easier. In this system person can control all the appliances through the smartphones. There are many technologies through they can control home appliances according to their specific range. Such technologies are ZigBee, Wi-Fi, Bluetooth, En-Ocean and GSM. By Choosing any of technology appliances can be control. This system can save time and unwanted consumption of electricity. The system is based on the embedded system and can acts as a security guard of the home. In this system it can control the temperature, humidity, gas density, water immersion of the house. The purpose of this research paper is to controlled all the home appliances through smart phone.*

Keywords: GSM Based, Home Automation, Arduino, Automatic switching.

I. INTRODUCTION

"GSM based Control System" implements the applications of the GSM technology. Using GSM networks, a control system has been proposed that will act as an embedded system which can monitor and control home, industrial, agricultural appliances and other devices locally using built-in input and output peripherals. Remotely the system allows the user to effectively monitor and control the house/office appliances and equipments via the mobile phone set by sending commands in the form of SMS messages and receiving the appliances status. The main concept behind the project is receiving the sent SMS and processing it further as required to perform several operations. The type of the operation to be performed depends on the nature of the SMS sent. The principle in which the project is based is fairly simple. First, the sent SMS is stored and polled from the receiver mobile station and then the required control signal is generated and sent to the intermediate hardware that we have designed according to the command received in form of the sent message. SMS(Short Message Service):It is a service available on most digital mobile phones that permit the sending of short messages (also known as text messaging service).

II. LITERATURE REVIEW

In today's world scenario the things are day by day are getting easier for the humankind. There are many things which will be taking a revolutionary step towards the humankind. The
new inventions and technologies have been done in the world for easier life and comfort. There are technologies like remote automated system are implemented in the industries. However, in the past decade, the definition has been a lot of inclusive covering big selection of applications like healthcare, utilities, transport, etc. The extensive capabilities of this method arewhat create it thus attention-grabbing. From a simple cell phone, a user is able to control and monitor with virtually any electrical devices. This makes it possible for users to control appliances being anywhere across the world. The end product will have a simplistic design creating it simple for users to act with.

III. PROJECT METHODOLOGY

1. In this project, **Arduino** is used for controlling whole the process.
2. Here we have used **GSM** wireless communication for controlling home appliances.

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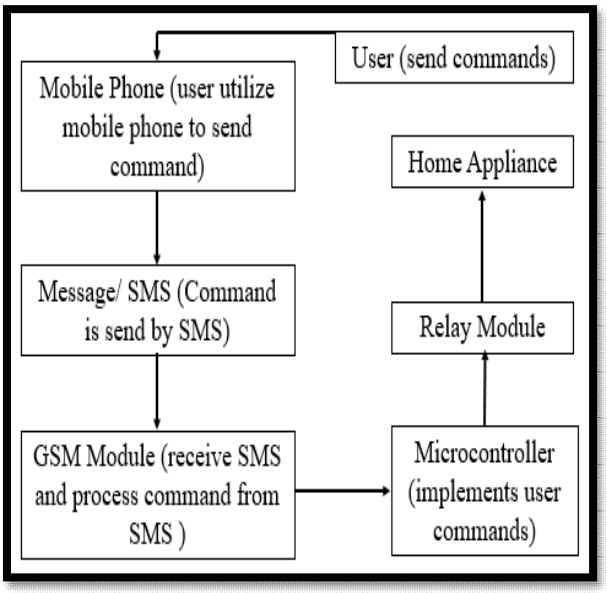
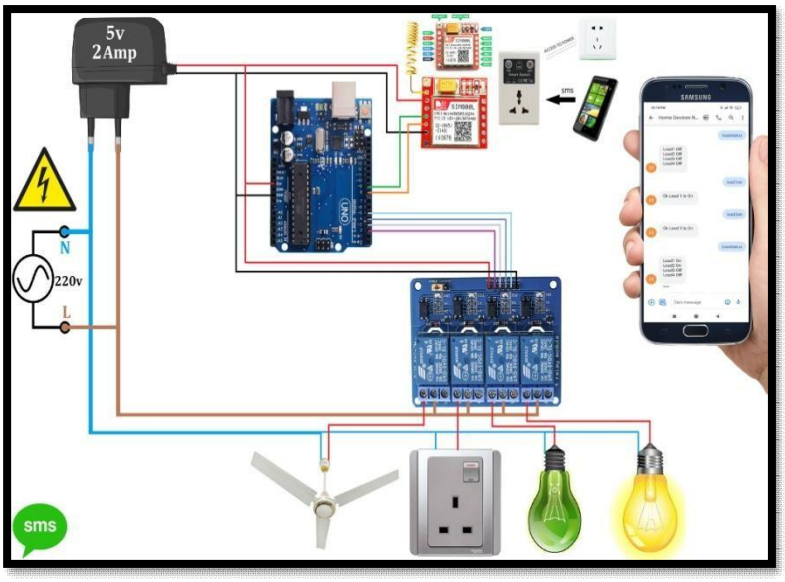
3. We send some commands like **"load1on", "load1off"** and so on for controlling AC home appliances.
4. After receiving given commands by Arduino through GSM, Arduino send signal to relays, to switch ON or OFF the home appliances using a relay driver.
5. Here we have used a prefix in command string that is "load". This prefix is used to identify that the main command is coming next to it.
6. When we send SMS to GSM module by Mobile, then GSM receives that SMS and sends it to Arduino. Now Arduino reads this SMS and extract main command from the received string and stores in a variable.
7. 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. And relative result is also sent back on the registered mobile number.
8. Here in this project we have used 3 bulbs and 1 socket for demonstration which indicates Fan, Light and TV.



IV. BLOCK DIAGRAM



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V. OVERALL CIRCUIT DIAGRAM

Below is the list of messages which we send via SMS, to turn ON and OFF the Fan, Light and TV:

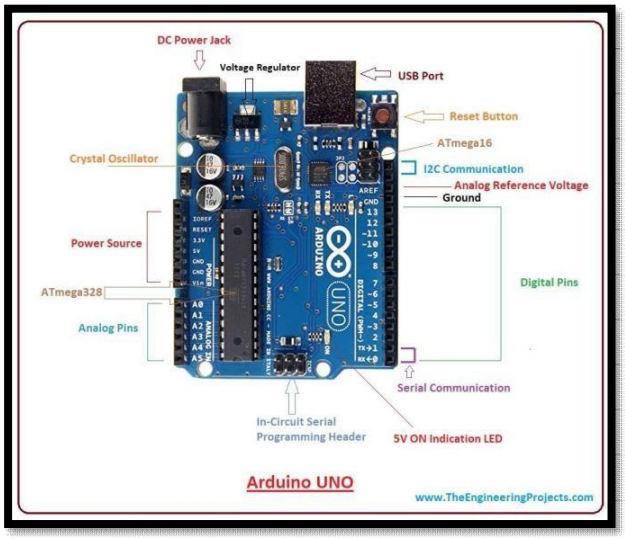
Sr. No.	Sent Message	Operation	Received Message
1	load1on	**Load 1 gets ON**	Ok Load 1 is On
2	load1off	**Load 1 gets OFF**	Ok Load 1 is Off
3	Load2on	**Load 2 gets ON**	Ok Load 2 is On
4	Load2off	**Load 2 gets OFF**	Ok Load 2 is Off
5	Load3on	**Load 3 gets ON**	Ok Load 3 is On
6	Load3off	**Load 3 gets OFF**	Ok Load 3 is Off
7	Load4on	**Load 4 gets ON**	Ok Load 4 is On
8	Load4off	**Load 4 gets OFF**	Ok Load 4 is Off
9	allon	**All Loads get ON**	Ok All Load is On
10	alloff	**All Loads get OFF**	Ok All Load is Off
11	loadstatus	**(operation is performed only in Arduino as per load status)**	Load1 Off Load2 Off Load3 Off Load4 Off

VI. HARDWARE COMPONENT

1. Ardiuno UNO
2. SIM 800l GSM Module
3. Single Channel Relay
4. Breadboard
5. Connecting Wires
6. Bulb with bulb holders

6.1 Ardiuno UNO

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your Uno without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.



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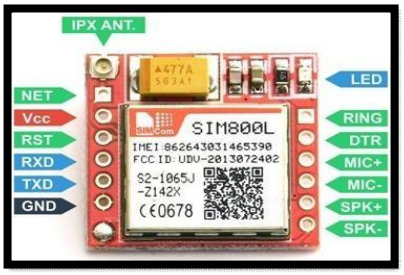
6.2 SIM 800l GSM Module

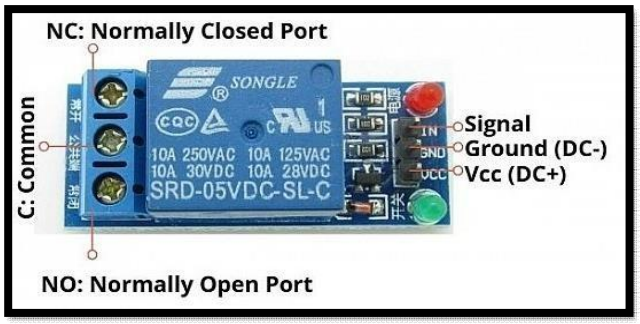
A customized Global System for Mobile communication (GSM) module is designed for wireless radiation monitoring through Short Messaging Service (SMS). This module is able to receive serial data from radiation monitoring devices such as survey meter or area monitor and transmit the data as text SMS to a host server.

SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls. Low cost and small footprint and quad band frequency support make this module perfect solution for any project that require long range connectivity.



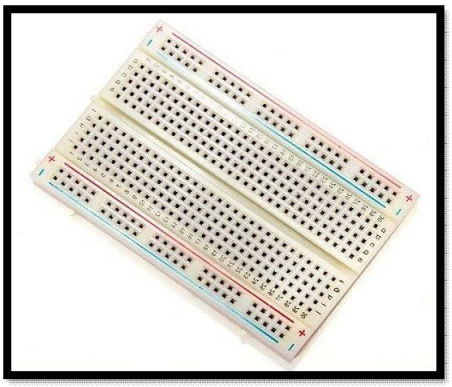
6.2 Single Channel Relay

The 1 Channel 5V Relay Module provides a single relay that can be controlled by any 5V digital output from your microcontroller. The relay is accessible using screw terminals and can handle up to 2A of current. A handy LED indicates the status of the relay. The Single Channel Relay Module can be usedasa convenient board which can control high voltage, high current load such as motor, solenoid valves, lamps and AC load. It is designed to interface with microcontroller such as Arduino, PIC and etc



6.3 Breadboard

A breadboard (sometimes called a plugblock) is used for building temporary circuits. It is useful to designers because it allows components to be removed and replaced easily. It is useful to the person who wants to build a circuit to demonstrate its action, then to reuse the components in another circuit.



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6.4 Connecting Wires

A connecting wire allows travels the electric current from one point to another point without resistivity. Resistance of connecting wire should always be near zero. Copper wires have low resistance and are therefore suitable for low resistance.

6.5 Bulb with bulb holders

A lightbulb socket, lightbulb holder, light socket, lamp socket or lamp holder is a device which mechanically supports and provides electrical connections for a compatible electric lamp base. Sockets allow lamps to be safely and conveniently replaced (re-lamping).

VII. CONCLUSION

As today's era is moving towards being digitalized and automated with a great speed, the youth want everything very easily and smart. Not only the youth but the people of all generation are finding it very easy to be smart effort. So, we thought of using this model and adding more to it for our final year project.

In this report, we discussed how different electronics components can be used to bring ease to our day-to-day life. Further we explained each component which is used in our capstone project. Also we paste some pictures to show how our project model works as well as define some merits, Demerits and application of our project.

The system as the name indicates, "Home Automation" makes the system are more flexible. In this Report, the development of a GSM-based home automation system is presented. The system enables one remotely control electrical appliances requiring 220/240V 50Hz power source (such as Phone charging , Bulb and Fan) from anywhere in the world. This is achieved by simply sending an SMS command to dedicated SIM card embedded in the system. It is recommended that the system is enhanced to provide feedback to the user in other to know the system status after each controlled operation carried out

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