GSM Based Home Automation

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Abstract- *Home automation makes it possible for electrical appliances (such as lighting systems, washing machines, and refrigerators) to be easily accessed and effectively controlled. The key reasons behind home automation are making peoples' lives easy, driven more by technology and effectively managed. Among others, home automation systems available are either based on Bluetooth technology, ZigBee technology, Infrared .*

Remote (IR) controller, or Radio Frequency (RF) technology. Though these systems are good, unfortunately, they are only effective for short distances (100 meters maximum) automation within a particular locality. This posed a big challenge/risk of electrical disaster (such afire outbreak) to people outside their vicinities that mistakenly left their appliances ON/OFF, as the case may be, and could also lead to energy wastage for appliances left connected to the mains for a period longer than required. Hence, the need for an effective means of remotely controlling home appliances beyond ones' vicinity. However, this paper proposed a GSM based home automation system as a means to address the aforementioned issues. The system uses SMS to send commands in order to remotely turn on and off electrical devices

Keywords- SMS Based, Home Automation, Microcontroller, Smart Home

I. INTRODUCTION

Home Automation is a concept that has been developing reasonably slowly when you compare it to how other technology such as televisions and smartphones have progressed. Whereas other technologies have developed and become much cheaper, home automation is still generally quite an expensive and exclusive concept for most people. Automation can be viewed as an option for luxury or as an aid for disable people. But, due to the cost factor, the technology has been seen as a luxury product rather than the disability aid. Home Automation can cover a lot of functions. It can be used to perform some small tasks just for convenience like opening and closing of gate just for convenience or for some complex tasks like security of the home using CCTV cameras, motion sensors, Heat sensors etc.

Home automation should function in such a way that it makes the tasks simple and easier. Everything can be done in just by the clicking or touching some keys. It wouldn't make any sense if the work done by automation is performed through more steps and complexity than the original tasks.

1.1 Background

A. Definition:

A smart home means your home has a smart home system that connects with your appliances to automate specific tasks and is typically remotely controlled.

B. Arduino Uno R3:

Fig 1: Arduino Uno R3

Arduino Uno R3 Arduino UNO is a microcontroller board grounded on the ATmega328P. It has 14 digital input/ affair legs(of which 6 can be used as PWM labors), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack(4). Arduino Uno can be powered through a USB connection or by an external power force, and the power source is named automatically. It can be operated at a voltage of 7V to 12V

C. SIM 800 L:

Fig 2: Sim 800 L

IM 800 L Fig 2 Sim 800 L The SIM800L GSM/ GPRS board features compact size and low current consumption. With power saving fashion, the current consumption is as low as 1mA in sleep mode. It communicates with microcontroller via UART harborage, supports command. Its operating voltage is3.7 42V, peak current is 1A.
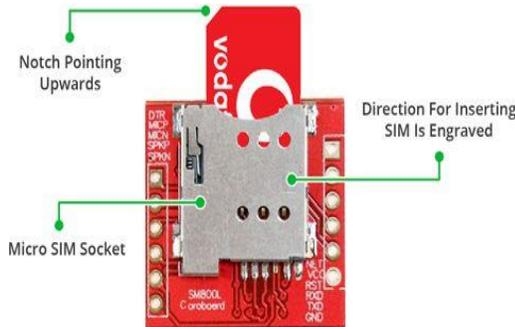
D. SIM Socket:

Fig 3: Sim Socket

There's a SIM socket on the back. Any activated, 2G micro SIM card would work perfectly. Correct direction for inserting SIM card is normally engraved on the surface of the SIM socket.This module measures only 1 inch² but packs a surprising amount of features into its little frame.
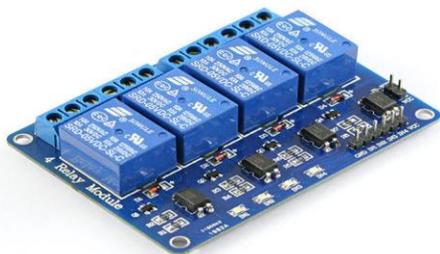
E. Channel Relay Module:

Fig 4: Channel Relay Module

The relay module for Arduino is one of the most powerful applications for Arduino as it can be used to control both A.C and D.C devices by simply controlling the relay by giving 5V. A relay is basically a switch which is operated electrically by an electromagnet. A relay can be used to control high voltage electronic devices such as motors as well as low voltage electronic devices such as a light bulb or a fan. We will be using the 4 relay Arduino module in our home automation project.

F. DC to DC Buck Converter:

Fig 5: DC to DC Buck Converter

A buck converter or step-down converter is a DC-to-DC converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). It is a class of switched-mode power supply. Switching converters (such as buck converters) provide much greater power efficiency as DC-to-DC converters than linear regulators, which are simpler circuits that lower voltages by dissipating power as heat, but do not step up output current.

1.2 Configuration of GSM Based Home Automation**:**
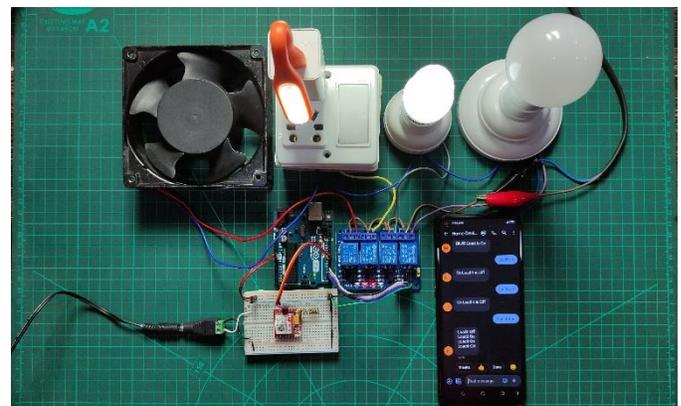

Fig -4 Configuration of GSM Based Home Automation

This system comprises of many components this on an overview has convertors Channel Relay Module as soon as gets a voltage or signal from the GSM module, its sends signal to the controller and buck convertor where the analysis and conversion occur. As we send the messages through the mobile using SMS.

1.2 Design Methods

A.   Material and tools:

Accoutrements used in the design of tackle, among others

1) Arduino Uno R3 Microcontroller as a data processor.
2) SIM Socket.
3) DC to DC Buck Converter.

4) Barrel Jack appendage for external power force for Arduino and peripherals.

5) SIM 800L.

6) The factors of electronics, lines, PCB(Printing Circuit Board), lead and connectors.

B. Software:

The supporting software's used in our work are

1) The Arduino IDE is used to produce the program in the microcontroller.

2)AdaFruit library and detectors perceptivity operation.

C. Hardware Design:

The general description of the system can be observed on block diagram below:

Fig -5 Block Diagram of GSM Based Home Automation

Fig -6. Actual GSM Based Home Automation

II. RESULT

The system was tested by remotely switching ON/OFF the loads connected to it. To switch ON/OFF a load, a code in the format ' *L(load number)ON ' for switching ON and ' *L(load number)OFF ' for switching OFF, is sent to the system. For example, Load 1 is switched ON by sending '*L1ON ' to the dedicated SIM Card number in the GSM System GSM Module and '*L1OFF 'is used when switching OFF.

III. CONCLUSION

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 refrigerators and water heaters) from anywhere in the world. This is achieved by simply sending an SMS command to a 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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