HOME AUTOMATION USING GSM

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Abstract - *The controlling of any system remotely will be the most uncomplicated methodology. The aim of the project is to control any electronic load remotely. The load may be of any home appliances like AC machine, fan, tube lights..etc. This is an SMS based system. In which the load can be controlled wirelessly. For this to happen the user must have mobile phone which is associated with a SIM card and the system uses GSM technology thus providing universally access to the system for automated appliance control.Atmega328P Microcontroller is the vital component of this project. The main objective of this project is to explore controlling home appliances remotely and cost effectively. The motivation was to promote the users to automate their homes having remotely access to control the appliances.*

Keywords: Wireless Home Automation System, Internet of Things, Wireless Communication, Global Positioning System, Mechanical Switch (relay)

1. INTRODUCTION

We live in innovative time where everything is becoming smart. Appliances have sensors that could grab the inputs from user environment and also can communicate with other things (devices) and we call this terminology as INTERNET OF THINGS. The Internet of Things is in a huge way and people are rapidly inventing new gadgets that enhance lives. The price of microcontrollers with the ability to talk over a network keeps dropping and developers can now tinker and build things inexpensively. IOT based home automation project is done using low cost GSM Module, It uses relays and a few simple components.

2. OBJECTIVE

The main objective of this project is to design an IOT based home automation system in which an electronic device can be controlled through the commands sent from a mobile phone to the GSM which is to be considered as far field communication. This was an extension for the idea of controlling an electronic device using a Bluetooth module where it is considered as a near field communication. The system was designed to meet the requirement of controlling home appliances without any constrained path distance between user and the electronic device.

3. PROBLEM STATEMENT

The existing system also belongs to wireless domain but for a shorter range to communicate with its devices. The system can be controlled by sending the commands from a mobile through bluetooth connectivity. The system **(controller with input and output peripherals)** is associated with a HC-05 bluetooth module which then paired up with mobile Bluetooth. This creates a channel between system and user so that he can control the system using some operational commands. The user needs to install a mobile application called **"BLUETOOTH TERMINAL".** This interface is capable of sending text strings commands which essentially could control the system. Another mobile application **"BT VOICE CONTROL"** which is an another user interface which could be used to control the system through voice commands. But the only flaw with this concept is the range of Bluetooth to get paired is 10 meters, so the user cannot control the home appliance from far.

4. BRIEF DESCRIPTION OF PROJECT

4.1. PROPOSED SYSTEM

The proposed system is a distributed home automation system, where the system is associated with a GSM module which is configured with a SIM card. This makes the user to control his home appliance with irrespective of his/her distance from their home. Now the question might raised in your mind, that why might one choose to control the home appliance although he is not in his/her home?! There are some appliances that could even work in the absence of the person i.e, they do not need any manual controlling while functioning. For instance, consider an air conditioner at home, the functionality of AC is to carry the room atmosphere from warm to cool. The process might take at least 45minutes, and assume that the same time is required for the user to travel to his/her home from their office or some other place. Now to experience the breezy environment immediately after reaching home without any waiting time then this system can help him/her to switch ON the AC machine even when he/she is right in their office. Now the idea of operating an electronic device using his/her mobile phone by just sending an operational command through an SMS service makes the user to control his AC machine prior he reaches his home and can experience a room temperature that he is Wishing to have without any waiting time. Similarly, the user can

control his various electronic home appliances like washing machine and get his clothes dry right before he reaches his home and save time, can save electricity by switching off any electrical appliances if he was been notified to be ON. An automated system in which an electric appliance can be turned on or off remotely by sending an SMS from a mobile phone.

4.2. METHODOLOGY

WIRELESS HOME AUTOMATION SYSTEM (WHAS) using IoT is a system that can use mobile devices to control basic home appliances automatically through wireless medium from anywhere. It is meant to save the electric power and human energy. This home automation system differs from other systems by allowing the user to operate the system from anywhere around the world through wireless connection.

The entire project is divided into five major sections which are:

- ARDUINO UNO
- RELAY
- GSM MODULE
- LED BULB
- MAX 232

The above sections are briefly described as follows:

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

RELAY

A relay is a mechanical switch used to control any load. The input of relay is around 5V and at the output the relay can control 250V supply to the load. Relay is a device that can turn ON or turn OFF power supplied to another device.
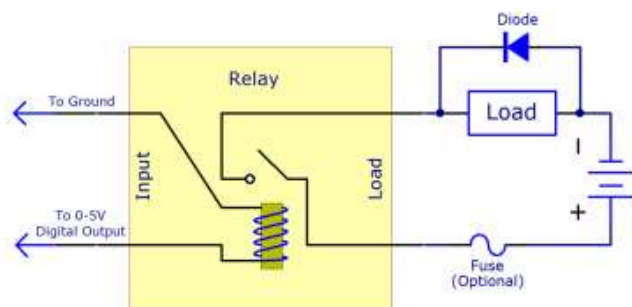

Fig-1: MECHANICAL RELAY

BULB: In this project the LED BULB is used as output load

GSM MODULE: GSM is a digital mobile network that is widely used by mobile phone users**.** A GSM modem is a wireless modem that works with a GSM wireless network. Various standard commands are used to communicate with GSM. The user when send a operational command to the system, the command first received by an intermediate base stations and then received by GSM which is already connected to the wireless network. The GSM process on the message and send it to the controller.

MAX232:MAX232 is an integrated circuit manufactured by Maxim Corporation. The ic converts TTL and CMOS voltage levels to TIA/EIA-232-E levels.

4.3. IMPLEMENTATION OF PROJECT

Fig-2: BLOCK DIAGRAM OF IMPLEMENTED   PROJECTED

The user sends the command from his mobile phone to the mobile network, then the message travels through intermediate base stations and finally reaches the base station for which the GSM has been already connected wirelessly. The GSM which is associated with a sim card receives the signal from its nearest tower in analog form. The GSM converts the analog signal to digital signal and transmits it to the Arduino. The Arduino controls the relay with respective the code given. The relay now depending upon its state of input controls the output. Here in my project the lamp is turned ON when the message with the character "*" is sent through SMS. The lamp is turned OFF when the message with the character "#" is sent through SMS.
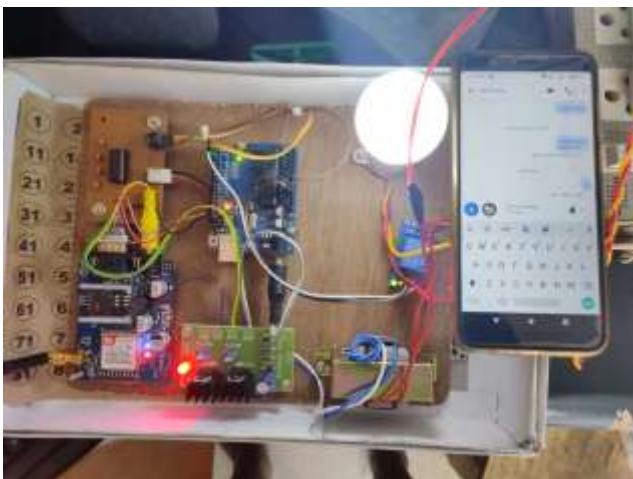
CONNECTION DIAGRAM
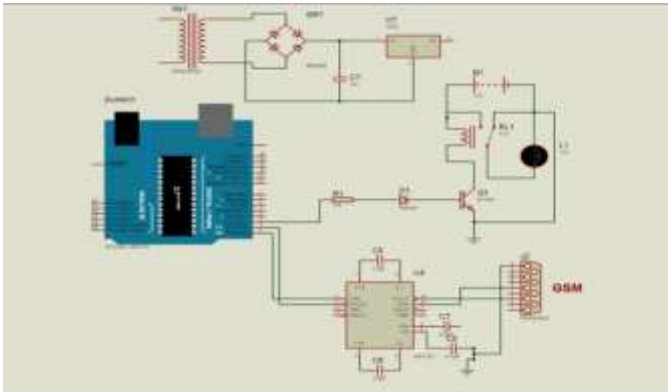
5. RESULT

The following are the images that depict the output

1. The following image depicts the system when the user sent the ON command from his mobile phone to the gsm associated to the system.

2. The following image depicts the system when the user sent the OFF command from his mobile phone to the gsm associated to the system.

6. CONCLUSION

The goal of this project is to implement a system which can be controlled remotely. Using GSM module the system is made to change its state from ON to OFF or vice versa with some essential commands sent by the user from anywhere in the world.

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