

Voice Controlled Smart Home Automation System

Sitaram Pal, Ashish Chauhan, Sanjeev Kumar Gupta



Abstract: The home automation is the future and important part of a house. The home automation is highly reliable in system for controlling house electrical appliances. As technologies improves the home automation system are becoming smarter and can regulate certain tasks automatically and autonomously. The home automation systems are cost effective and reduces the consumption of energy of household and cut the cost of electricity bills. In this paper a home automation system is discussed, the system controls the electrical appliance of house by using user interface device and speech recognition technology by using micro-controller device via a Bluetooth module and a mechanical relay acting as a switch for controlling electrical appliances.

Keywords: home automation, electrical appliances, speed recognition, micro-controller, Bluetooth module, mechanical relay, user interface device.

I. INTRODUCTION

The voice controlled smart home automation system[1] helps to control electrical appliances by using voice commands. The system uses Bluetooth module for transmitting data for controlling functioning of electrical loads[2]. The Bluetooth can receive input signal from any a device which have Bluetooth compatibility such as smartphone. The smart home automation is most beneficial for handicap or aged people. The system solve the problem of switching on/off electrical appliances because when user just have to give voice command to control the appliance or electrical loads. The system is designed in such a way user can control all appliance at once or can control each separately. The system works by interfacing the on/off switches of electrical appliance or loads by using mechanical relay or solid state replay, after connecting relays in system the electrical switch works as two way switch. The voice command is sent by using a software designed for controlling the system, a built in microphone and voice recognition system implemented in device such as Samsung's Bixby. A micro-controller (Arduino Uno) is implemented in system[3],

the micro controller receives input signal from user device and sent signal to respective relay for turning on/off electrical appliances connected with system such as bulbs, fan, air conditioner unit etc. The system works on 12V DC power which is converted from 220V AC power by using step-down transformer[4], rectifier for converting AC into DC and capacitive filter making fluctuating DC into pure DC power. This paper focus on the development of voice controlled based upon speech recognition system. The systems user interface device is a smartphone and software which interface with Arduino Uno to execute commands of user.

II. TECHNOLOGIES USED

Arduino Uno: is a hardware which have a programmable IC Atmega328P and programmed by using computer software Arduino IDE. The device have multiple input and output pins for controlling multiple unit and sensors, also for receiving input for multiple sensors and different input devices[5].

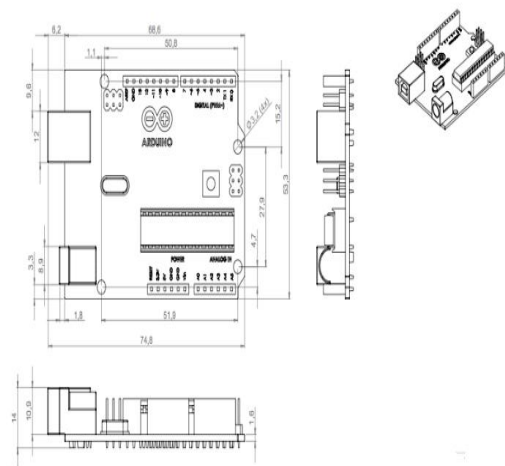


Figure 1: Arduino Uno

A. HC-05 Bluetooth Module

The HC-05 is an easy to connect and easy to used Bluetooth module, which is designed for wireless serial connection. The Bluetooth module can be used as master or slave configuration, making it best solution for wireless connection or communication. This module is version 2.0 Bluetooth communication technology which is great for transferring and receiving data in fast rate[6].

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Figure 2: HC-05 Bluetooth module

B. Mechanical Relay

The mechanical relay have capability for acting as switch for turning on and off electrical loads. They Works simply by providing small electrical power in form of electrical signal. This allow high power loads controlled by using small amount of power. The mechanical relay uses electromechanical coil to open and close the circuit. When small amount of current passes through coil it excites the coil and generates magnetic field and either pull the bar or release the bar which is used for opening and closing the circuit, here opening and closing means restricts flow of current and vice versa respectively[7].



Figure 3: Mechanical Relay

III. PROPOSED MODEL OF PROJECT

The system is designed by using three main components, first is microcontroller Arduino Uno, second is Bluetooth module HC-05 and third is mechanical relay. Firstly user gives the command to microcontroller by using speech recognition system of smartphone and system software application via Bluetooth module HC-05. The microcontroller acts accordingly to the command give user and control the functionality of mechanical relay. The Arduino Uno is programmed using Arduino IDE which is software, the user interface application is designed using MIT app inventor platform.

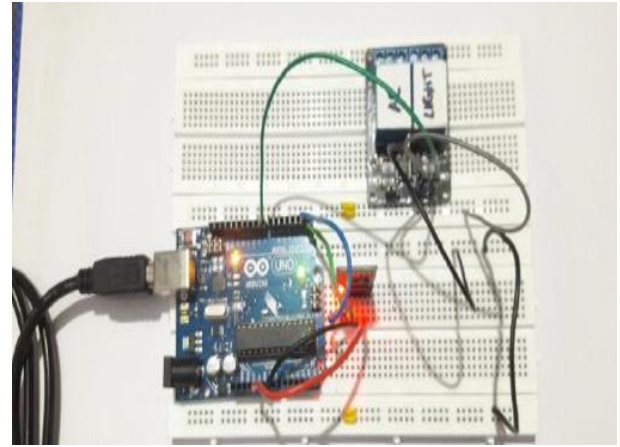


Figure 4: Smart Home automation system

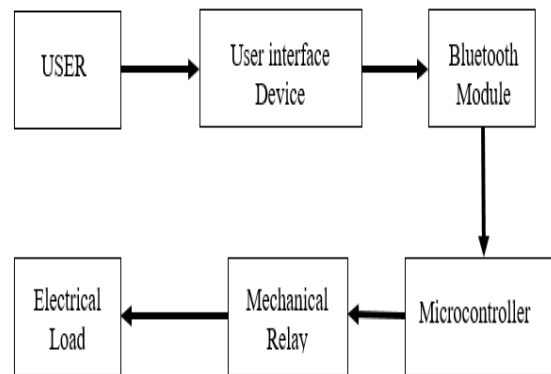


Figure 5: Block Diagram of system

IV. CONCLUSION

The project is designed by keeping in mind needs of all consumers for performing operation of turning on and off electrical appliance by using user interface device by giving voice commands wirelessly. The Bluetooth module can be removed and instead of Bluetooth module high range communication device can be implemented in system for better and reliable use of system.

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