

Voice Controlled Home Automation in Unlicensed Bands

The rising star in household appliances

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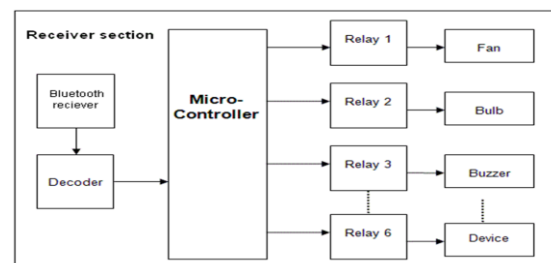
ABSTRACT:

This paper presents the design of the low cost voice recognition based home automation system for the physically challenged people suffering from quadriplegia or paraplegia (who cannot move their limbs but can speak and listen) to control the various home appliances just by the voice commands according to their need and comfort. The proposed system consists of a voice recognition module, microcontroller, relay circuit. The voice recognition module needs to be trained first before it can be used to recognize commands. This study focused to automate the home appliances using the Bluetooth short range communication in unlicensed band 2.4GHZ (IEEE 802.11) Sending the command signals using Android Bluetooth. Upon successful recognition of voice and text command the corresponding load with the help of the relay circuit. The accuracy of voice recognition module is also measured in different conditions. The experimental results validate the functions of the proposed system. The results show the system can provide great assistance to the physically challenged people without any third person's assistance.

I.INTRODUCTION:

The world has become a global village due to revolution in the technology; in this revolution the IT (Information Technology) played an important role. Similarly the revolution in IT makes mankind dream come true to have an automated home.

Home automation use microprocessor-based intelligence to integrate or control electronic products and systems in the home.



The fundamental of building an automation system for an office or home is increasing day-by-day with numerous benefits. Industrialist and researchers are working to build efficient and affordability automatic systems to monitor and control different machines like lights, fans, AC based on the requirement. Automation makes not only an efficient but also an economical use of the electricity and water and reduces much of the wastage. Automation is another important application of wireless technologies like Bluetooth. It is the monitoring of the energy consumption and the Controlling the environment in buildings, schools, offices and museums by using different types of sensors that control lights, temperature. To make it more operative and efficient, cost is reduced by low cost communication technology like Bluetooth. This technology allows to the users instantaneous connections of voice and information between several devices in real time. The way of transmission used assures protection against interferences and safety in the sending of

information in a range up to 100 meters. Building upon this theme; we propose a home automation system based on

II.LITERATURE SURVEY:

Utpal V. Solanki and Nilesh H. Desai[2011] designed a Hand gesture based remote control for home appliances. These hand gesture moments are recognised with infrared vision using Blobscanner. This Hand gesture moments are satisfied with a Image processing technique and Microcontroller development board, Arduino Atmega328 from ATMEL. This Processor is operated at frequency of 16MHz. 115,200 bauds/second data rate is useful for communication. In this an LED light beam is used to help the IR sensors placed in front of the camera to recognize the gesture commands of the user. Some predefined gesture commands are loaded into the software based on that TV may turn ON/OFF operation is performed. The microphone button is tapped and the voice command is given to switch the corresponding device on/off. The voice recognizer listens and converts what is said to the nearest matching words or text. The Bluetooth adapter present in the phone is configured to send this text to the Bluetooth module on the Arduino Uno board that would in turn control the electrical appliances through the relay boards.

Sukhen Das, Sanjoy Ganguly, Souvik Ghosh, Rishiraj Sarker and Debaparna Sengupta[2016] developed A Bluetooth Based Sophisticated Home Automation System Using Smartphone. For wireless communication purpose we use Bluetooth Module to control the external loads with the support of Arduino Uno. Once the connection is established, the Bluetooth module have the capability to exchange the data based on given inputs. The Bluetooth module contains of

Bluetooth technology available in smartphone.

6 pins that can be operated in two modes: Master and Slave. If the Bluetooth module is set to Master Mode, it can initiate the connection with other Bluetooth devices. If the module is set to Slave mode, it cannot initiate the connection with other Bluetooth devices.

III. RELATED STUDY

1.MICROCONTROLLER

- ✓ Introduced in 1981 by Intel corp.
- ✓ 8 bit microcontroller
- ✓ 4K bytes internal ROM
- ✓ 128 bytes internal RAM
- ✓ Four 8-bit I/O ports (P0 - P3).



- ✓ All four ports are bidirectional
- ✓ Max. of 64k bytes of on chip ROM

2.BLUETOOTH HC-05:

Communication device:-over project is based on wireless communication between micro controller and mobile phone. But alone micro controller is not able to communicate directly to the android mobile phone. Bluetooth Serial module's operation doesn't need drive, and can communicate with the other Bluetooth device that has the serial. But

communication between two Bluetooth modules requires at

Least two conditions:

- (1) The communication must be between master and slave.
- (2) The password must be correct.

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the

Foot print as small as 12.7mmx27mm.

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Bluetooth Wireless networks for short range communications have a wide spread usage of Bluetooth radio transmissions between 2400–2480 MHz Modern mobile devices embed small, low-powered and cheap integrated chips

functioning as short-range radio transceivers for Bluetooth radio communications. Device pairing, authentication, encryption and authorization techniques have given recognition to Bluetooth technology due to its vital security mechanisms.

Different types of Bluetooth applications can be developed using Android platform architecture using the Bluetooth profiles. The device manufacturers provide the services using the support of these profiles in their devices to maintain compatibility for the Bluetooth technology



Figure 6.3 HC-05 Bluetooth

3.RELAYS

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. A relay is able to control an output circuit of higher power than the input circuit, it can be considered to be, in a broad sense, a form of an electrical amplifier.

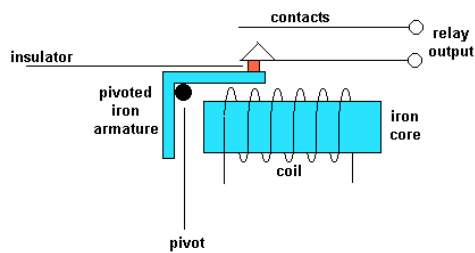


Figure 6.5 Relay internal design

Relays are usually SPDT (single pole double through switch) or DPDT (double pole double through switch) but they can have many more sets of switch contacts, for example relays with 4 sets of changeover contacts are readily available.

4. DC MOTOR

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source -- so they are not purely DC machines in a strict sense.

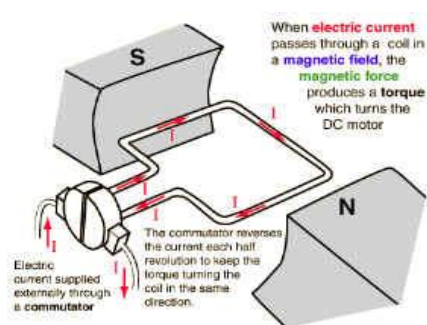
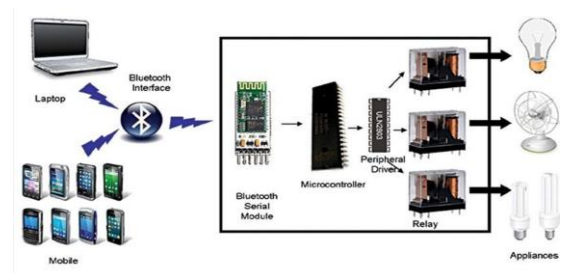


Figure 6.9 DC Motor

IV. WORKING

In this project we have used 8051 microcontroller for controlling the whole process of this project. And a Bluetooth module is used for controlling the home appliances wirelessly. Home appliances will turned ON and OFF when user will touch button in the Bluetooth mobile app in Android mobile phone. To run this project, first we need to download Bluetooth app form Google play store. We can use any Bluetooth app that can send data using Bluetooth. Here are some apps name that can be used:

First Bluetooth module connected to the phone by the Bluetooth. phone already have a application to provide the interference between mobile and the Bluetooth module. By using the application ,the mobile send the command signal to microcontroller by the Bluetooth. Bluetooth and relay ICs connect to the microcontroller by its pins. The relay is connected to the load by its pins. When microcontroller receives the command from mobile ,it operate the load.



To pair the bluetooth module to android phone by using a ghost remote

controller app, then the connection is established between the kit to the android device, then open the application in android and give the voice or text command it reaches to microcontroller then the desired load is activated.

V. APPLICATIONS

This section discusses the various appliances and applications where the testing of the system designed is implemented to make a complete automation system. In this work five appliances and three applications are tested using the text and voice control. They are the switches to

ON/OFF

1. Tube light,
2. Fan,
3. Television,
4. Music,
5. Motor,
6. Computer and etc.,

*We can control more appliances by adding more relays.

VI. FUTURE SCOPE

The current work is very close to real world, it is capable of counting the number of persons inside the room and it should be displayed on LCD display. The main theme for adopting this autosensing technique is to reduce the usage of power consumption. Majorly the Bluetooth android app is most suitable for elderly and physically challenged person those who have difficulty in surviving one to one place. Based on these two themes we developed this work. There is a chance to

extended the work by incorporating a GSM module on the system to enable the transmission of required data over longer distances. Using this GSM module to evaluate the status of the home appliances, when a person is out of his/her home.

VII. CONCLUSION

This system works well in the range of 20m, as it is the range for the Bluetooth. This project was targeted mainly for the elderly, physically challenged and for the convenience of controlling the switches without actually reaching for it. This system has the scope for modifications, and also installing more devices to it. Voice recognition systems of Google have enhanced. It is now possible to develop the applications that are highly capable of detecting the correct voice commands and also to use it with various languages and different slang or accent.

VIII. REFERENCES

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