

Voice Controlled Home Automation

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Abstract- In the past few years, technology has in a grown at high speed. Also human lives have become much more dependent on electronic devices and appliances. Now-a-days we use many electrical devices at homes, industries, offices, institutions that are controlled manually. Home automation allows us to control household electrical appliances like light, door, fan, AC etc. It also provides home security and emergency system to be activated. Usually conventional wall switches are located in different parts of the house and often require persons for their operations and, thus, manual pressing turn the on and off. Home automation not only refers to reduce human efforts but also energy efficiency and time saving. The main objective of home automation and security is to help handicapped and old aged people who will enable them to control home appliances. The main aim of the project is to control the home applications voice using Android OS smart phones with an Arduino board. This is an advanced technology in the home automation. This paper is about home automation system which would use a smartphone to enable any naïve user to operate all the appliances. This system is enhanced to control the home applications through an Android application of smart/ tablet phones by entering the selected number for corresponding load. This is upon a GUI(Graphical User Interface) based voice command. This Arduino based voice controlled home appliances sends voice command to the devices through the Bluetooth. A Bluetooth is interfaced to the Arduino board using Rx and Tx pins for communication. The electrical loads are controlled by the relay which is connected to the Arduino board .relay act as a switch operation. The main attraction of any automated system is reducing human labour, effort, time and errors due to human negligence. We can control all loads at a time from one place without connecting any physical wire between loads and control room. This project put forwards the implementation of home automation and security system using Arduino.

Keywords- Arduino Uno, HC-05 Bluetooth Module, Home Automation, Smartphone, Voice Control, Arduino software.

I. INTRODUCTION

In this modern era of development, automation of everything is the need of the hour. The basic aim of any development is to ease the human life. The main attraction of any automated system is reducing human labor,

effort and time. Home automation aims at automating the human lives. Voice controlled wireless smart home system has been presented for elderly and disabled people. Activating the home appliances without conventional switch but by using a smart phone is known as home automation. The concept of controlling home appliances using human voice is interesting, it makes it easy for a user to remotely access and control the appliances. A lot of research has been done and many solutions have been proposed to remotely access the home appliances. In modern era more importance is put on wireless technology. Due to wired networks are messy and complicated. Our system is a computer based system that can accept voice to direct commands and process them. The system provides us switching any device ON/OFF. These wireless technologies have great impact on human life in a positive manner and human development speed has increased. The main technologies used in home automation are GSM, Internet and Bluetooth. Each technology has its own merits and demerits. But Bluetooth based home automation systems have an upper hand. A Bluetooth model is interfaced with the control unit for sensing the signals transmitted by android application. The commands given through voice are conveyed to the control unit with switches on loads ON/OFF as desired. These voice commands sent are converted to binary sequence in Arduino. The Arduino unit takes decision and perform the required decision. The aim of the project “Arduino Based Voice Controlled Home Appliances Using Bluetooth” is to furnish a system that can respond to voice commands and control the ON/OFF status of electrical devices, such as lamps, fans, television etc., in the home.

BLOCK DIAGRAM –

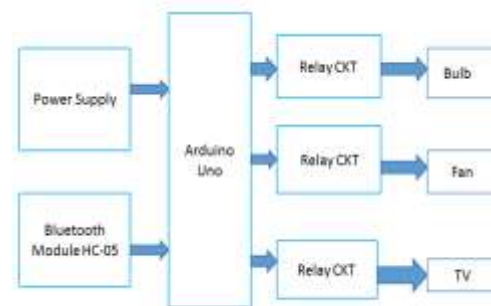
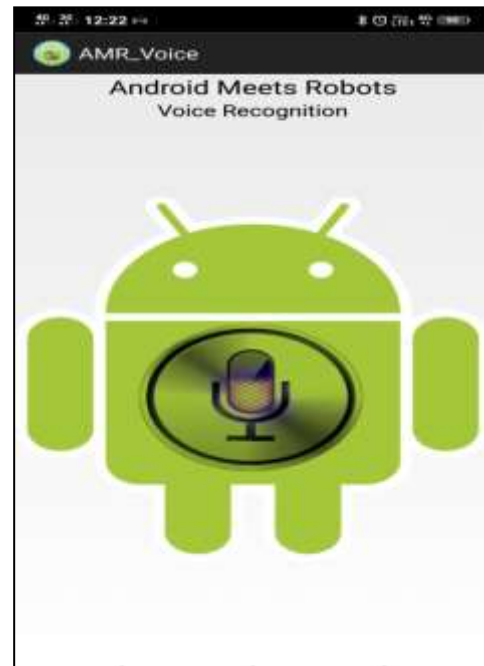
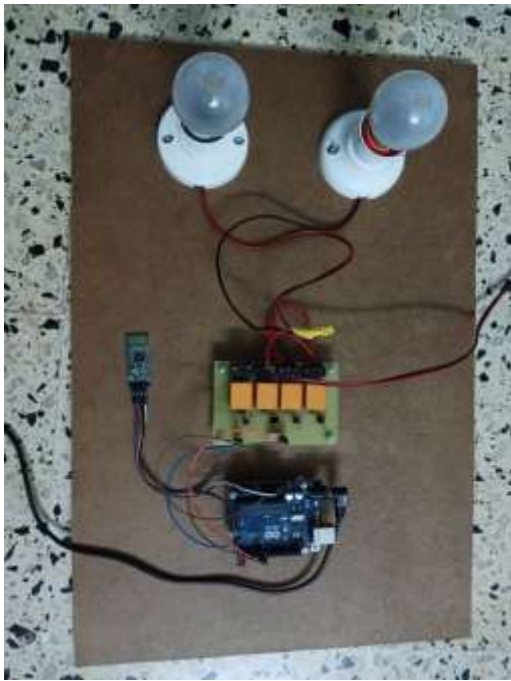


Fig. Block Diagram of voice controlled home automation

PROJECT OVERVIEW -



Next step is choose the option “Connect Robot” and select the appropriate Bluetooth Device. This is for connect the phone with the Bluetooth module as shown below. If the devices aren’t paired earlier, we need to pair them now using the Pin of the HC – 05 Bluetooth Module.

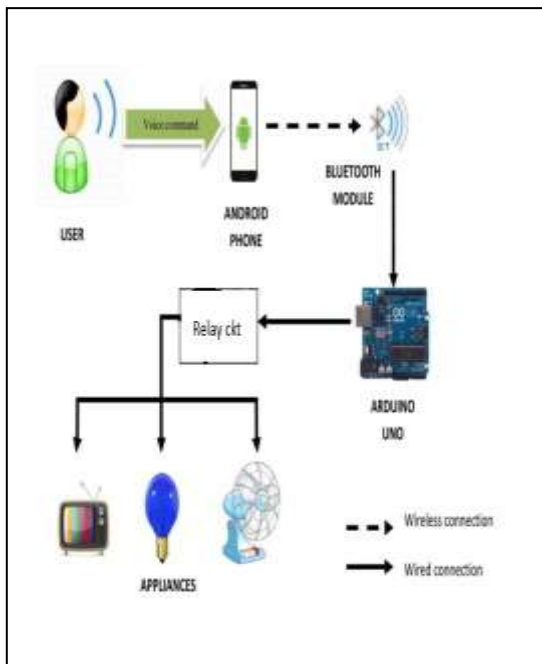
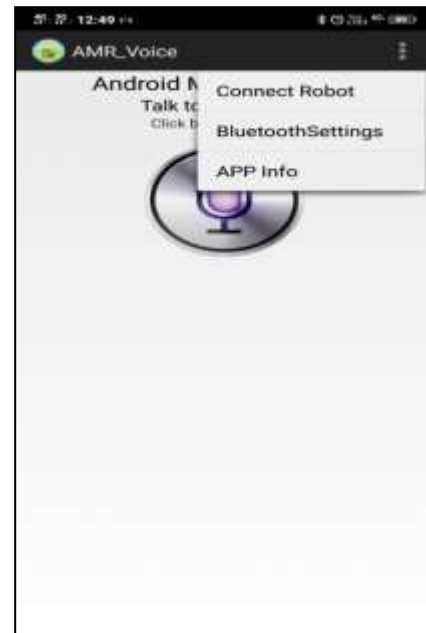


Fig. Overview



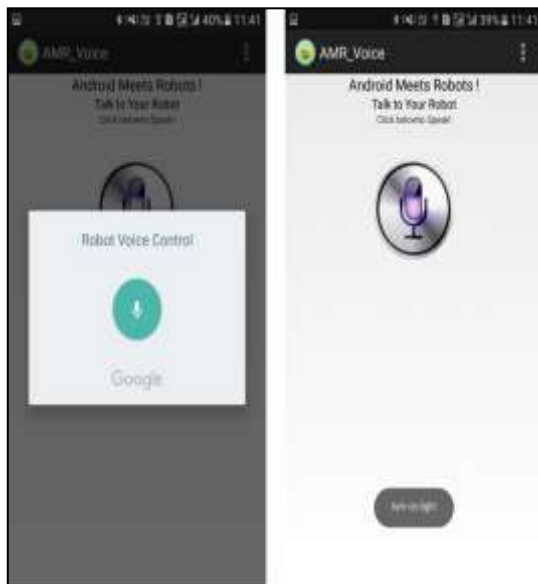
WORKING –

After making the necessary connections, we have to switch on the power supply to the circuit. Now, we have to install the App mentioned above in the phone. we need to pair the Phone’s Bluetooth to the HC – 05 Bluetooth Module. The home screen of the app looks something like this.



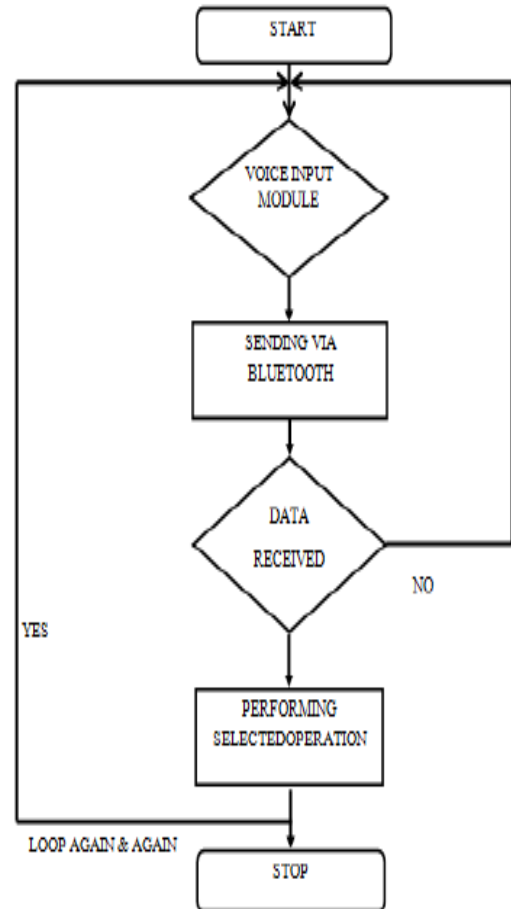
After successful connection, the devices are ready to transmit data. For that, press the press microphone icon on the app and start giving voice commands as shown below.

we have to press the microphone icon and say “light on”, the app will recognize the command and the transfers it to the Bluetooth Module. Also, the command gets displayed on the screen for our reference as shown below.



When the string “light on” is detected by the app, it will send the string as “*light on#”. So, the actual message received by the Bluetooth Module is in the format of “*Message#”. The received message is compared with some predefined strings and if the message matches with any of them, then corresponding action like turning on or turning off the load happens. We have used the following commands: “light on”, “light off”, “fan on”, “fan off”.

FLOW CHART –



HARDWARE AND DISCRPTION –

ARDUINO UNO –

Arduino/Genuine Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, 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 warring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

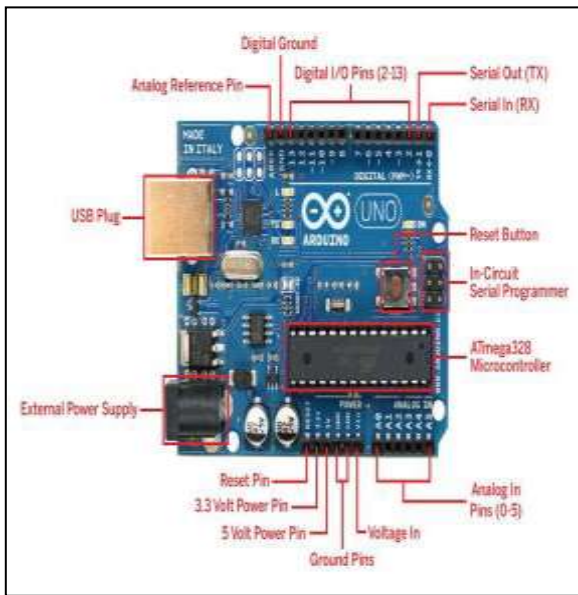


Fig. Arduino Uno

BLUETOOTH MODULE –

Bluetooth wireless technology is becoming a popular standard in the communication. it is one of the fastest growing fields in the wireless technologies. It is convenient, easy to use and has the bandwidth to meet most of today’s demands for mobile and personal communications. Bluetooth technology handles the wireless part of the communication channel; it transmits and receives data wirelessly between these devices. It delivers the received data and receives the data to be transmitted to and from a host system through a host controller interface (HCI). The most popular host controller interface today is either a UART or a USB .Here, I will only focus on the UART interface, it can be easily show how a Bluetooth module can be integrated on to a host system through a UART connection and provide the designer an optimal solution for Bluetooth enabled systems.

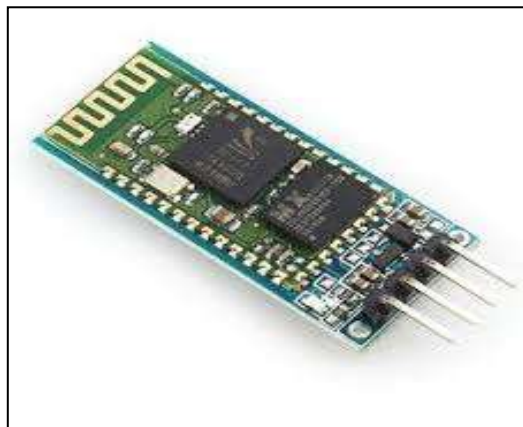


Fig. Bluetooth Module

RELAY CKT –

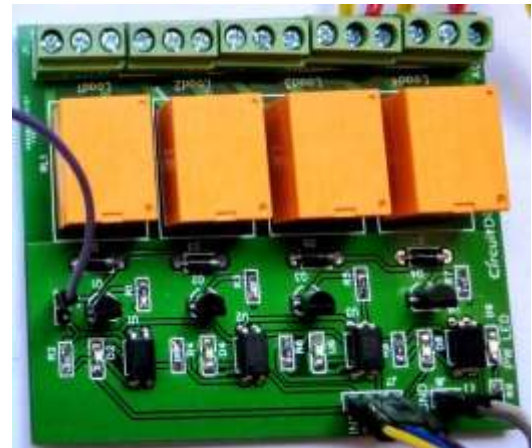


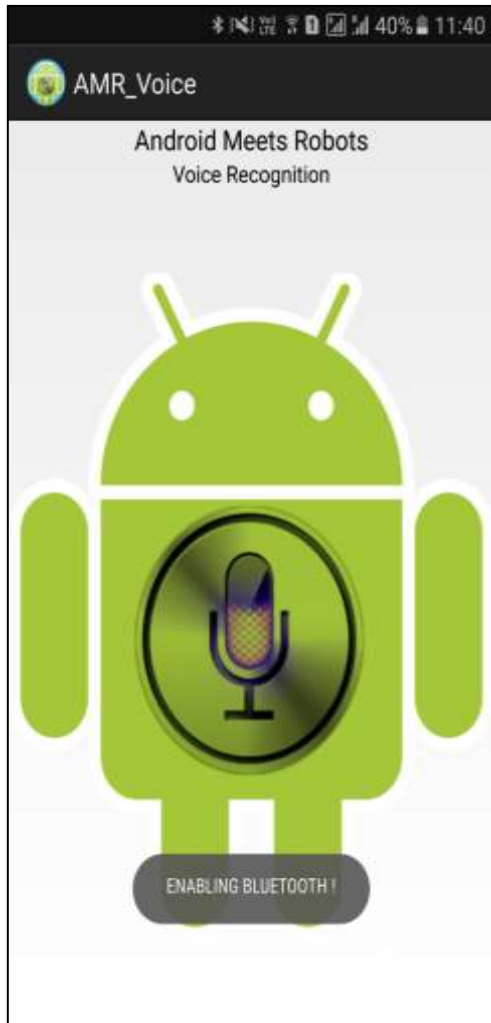
Fig. Relay ckt

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state.

II. SOFTWARE DESIGN AND DESCRIPTION



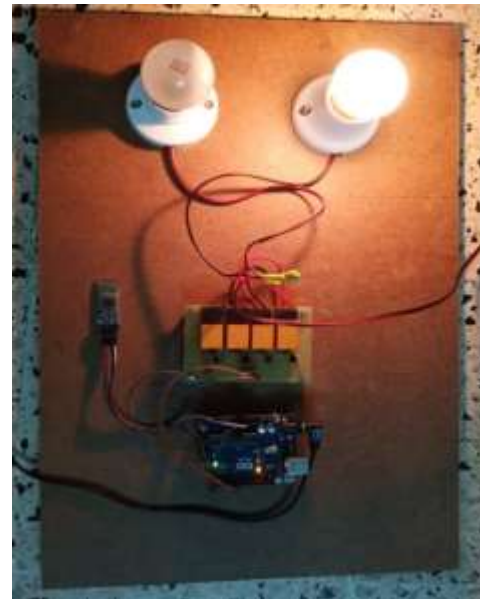
AMR VOICE APK –



Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, the OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. We have used the Android platform because of its huge market globally and it's easy to use user interface. Applications on the Android phones extend the functionality of devices and are written primarily in the Java programming language using the Android software development kit (SDK). The voice recognizer which is an in built feature of Android phones is used to build an application which the user can operate to automate the appliances in his house. The user interface of the application is shown above.

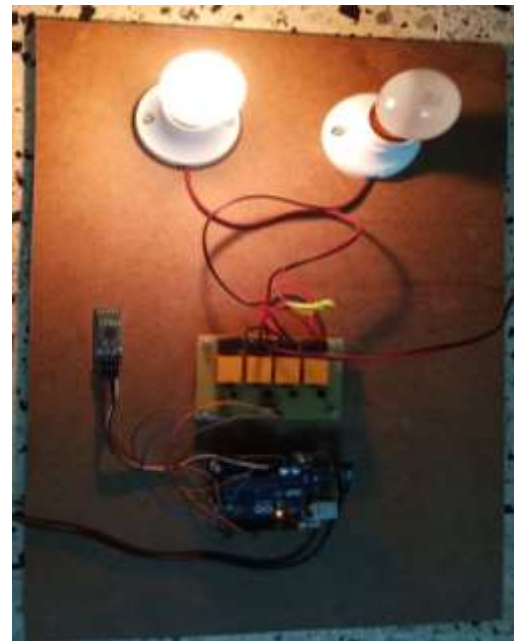
III. RESULT

If the command is the given “light on” then bulb will be ON.



If the command is the given “light off” then bulb will be Off.

If the command is given “fan on” then fan will be ON.



the command is given “fan off” then fan will be Off.

ADVANTAGES –

- Code compatibility and expandability across different Arduino boards.
- Cost is less as Arduino is open source.
- The schematic of Arduino is open source. So for future enhancement of the project, the board can be extended to add more features.
- Bluetooth does not require a clear line of sight between the synced devices. This

means that the devices need not be facing each other.

APPLICATION –

- Industrial Home automation
- Lighting Control
- Kitchen Appliance
- Control Different loads with simple voice command

IV. CONCLUSION

Voice Controlled Home Automation is a very different concept than what is presently available in the market. This would make automation easier. The people will be able to interact with the system. Voice recognition Home Automation System is a very useful project for the adults and physically disabled persons, who are not able to do various activities efficiently when they are at home and need one's assistant to perform those tasks. It is easy to use. The functionality of the system is easy to understand. It is very useful for winter season and more useful who are physically injured. The cost of the system is not very high.

- Bluetooth based voice control of appliances proves to be a better remote controlled operation.
- Android based voice control applications comes handy in home automation.
- The design system was implemented with reasonable number of features.
- The system was realized using Arduino And Bluetooth module.

The proposed project undertakes a viable solution the need of automation at the very basic level, that is, in our homes. The project will enable us to bring every appliance at every corner of our home under our control from a single point without having to get up and manually switch on or off the appliance. The use of a Bluetooth module assists the use of this system from various locations in our house.

So every user can choose the system for their home automation system without any hesitation.

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