

ANDROID BASED HOME AUTOMATION SYSTEM USING BLUETOOTH AND VOICE COMMAND

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Abstract: In the last few decades the technology has rapidly grown and the continuous improvements made our life easy. Due to this people are more dependent on it. So this paper brings an idea of android based Home automation technology which can be controlled by voice recognition. The system has three components: an arduino microcontroller for connecting the appliances, a Bluetooth module for signal transfer, and a smart phone running android application. Today almost everyone have a smart phone. So simply one can operate the home appliances with the help of the smart phone. An android application is installed in the phone and it is connected to home appliances with the help of Bluetooth module. Bluetooth has an encrypted 128 bit long shared key that keeps the data secure.

IndexTerms - Android, smart-phone, arduino, appliances, Bluetooth.

I. INTRODUCTION

The automation in various field become the basic requirement. The aim of development is to make human life easy and comfortable. Wired devices require a point to point connection but communication can be established between multiple devices with the help of Bluetooth. A group of Bluetooth devices is called a piconet and this technology is used for a Smart Home. Bluetooth innovation provides the opportunity to transmit voice recordings, pictures, music and text messages between devices.

Home automation aims at automating the human lives. A person can easily switch the home appliances without conventional switching but by using a smart phone as a voice commander. An android application is installed in the phone which can decode the voice signals into the digital signals which can control the home appliances.

The technologies which can be used in home automation are GSM, internet, cloud and Bluetooth. Home automation can be achieved with a combination of GSM, Bluetooth and ZigBee technologies. The user interfacing is done through an Android application. Each technology has advantages and disadvantages. But the Bluetooth based system has more advantages than disadvantages. The frequency of 2.4 Ghz is basically used in the Bluetooth which is globally available. The operating range is between 10m to 100m practically and it can further increase by using piconet technology which contains a group of Bluetooth devices. It serves a speed up-to 3Mbps.

II. LITERATURE SEARCH

Home automation was first introduced into the market in the 1970's but failed to match the people's expectations. As the system was neither cost efficient nor user friendly.

* K.Y.Lee and J.W.Choi defined the smart house in 2003, where all the appliances of the house are connected together and controlled with a remote.

* T.Tamura constructed techno houses in 2003 in Japan. His only motive behind the project was to develop an ease especially for old and disabled people living in the house.

* D.J.Cook successfully conducted the home project at the university of Texas, Arlington. His project includes sensors to detect the state of the environment. These sensors form an ad-hoc network to make the decisions. To maintain equilibrium he took the help of controllers.

* H.Kanma presents a wireless solution. His project made use of sensors and phones. It worked by making use of wireless protocols like ZIGBEE Bluetooth ,GSM.

III. PROPOSED SYSTEM

The block diagram of proposed system of home automation is shown in fig 1. The key components of this system are:

*Android based phone *Arduino UNO *Bluetooth module *Relay board

(a) Android Based Phone

Android is a mobile operating system (OS) based on Linux Kernel. The operating system uses the touch inputs that loosely correspond to real world action. Due to huge global market we have used this platform. The voice recognition which is an inbuilt feature of android phones helps us to decode the voice signal. By tapping the microphone button the voice command is given to switch the device on/off. The voice recognizer listens and converts the voice into nearest matching text and this text is send to the bluetooth module with the help of bluetooth adapter present in the phone.

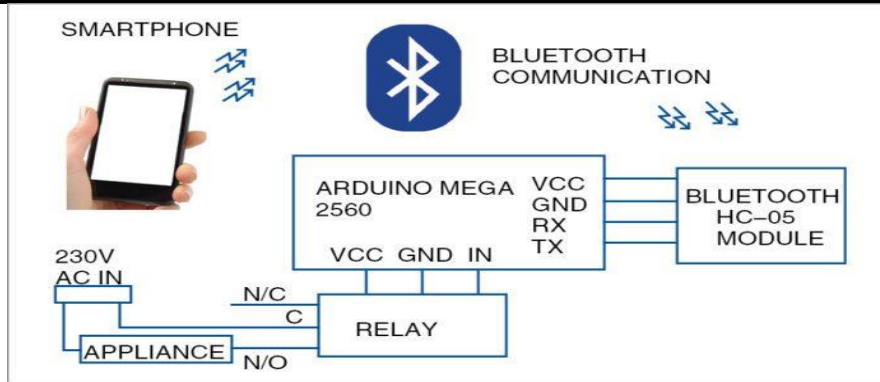


Fig 1: Block diagram of voice controlled home automation

(b) Arduino Uno

Atmega328 arduino Uno microcontroller used in this paper is shown in Fig 2. The arduino board is equipped with sets of digital and analog Input-Output pins that can be interfaced to various other circuits. The arduino circuit act as an interface between the software part and the hardware part of the project.

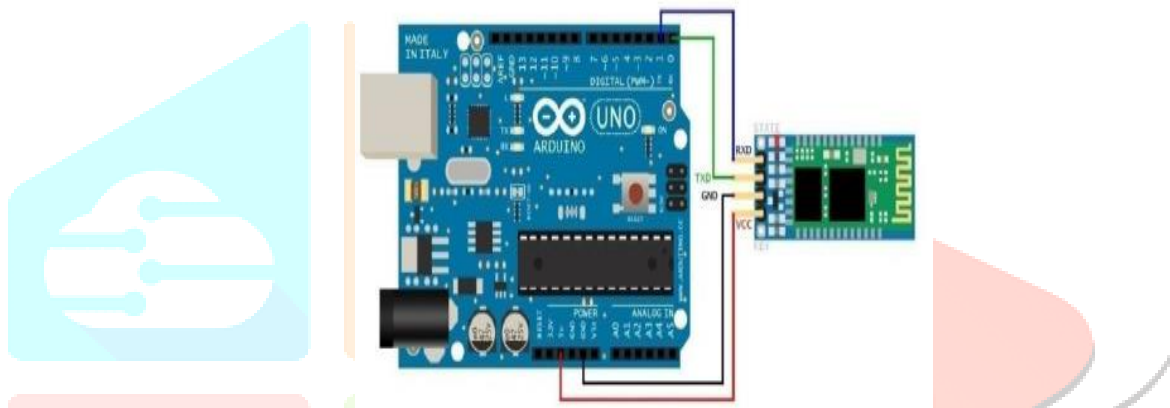


Fig 2: Arduino Uno used in proposed automation system.

The specifications of microcontroller used in proposed system are:

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage	7-12V
Digital I/O Pins	14
Analog Input Pins	6
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

(c) Bluetooth Module:

It is a wireless technology for the data transfer over short distances. It has a frequency of 2.4 to 2.485 Ghz. It receives the text from the android phone and transmits it to the arduino Uno serial port. In this proposed work HC-05 bluetooth module is used and shown in fig 3.

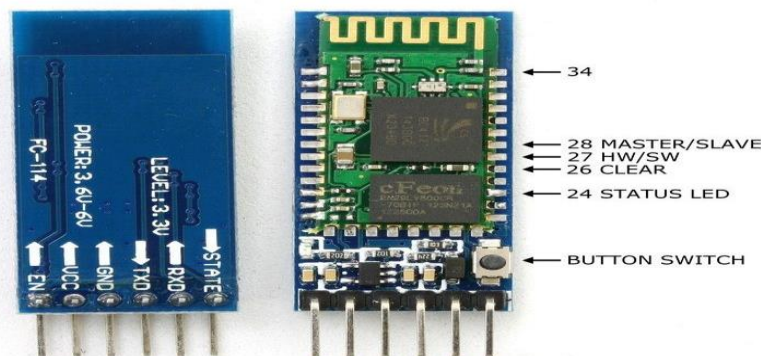


Fig 3: Bluetooth module used in proposed system.

(c) **Relay Module:**

A relay is an electromagnetic switch which gets activated on the application of the current. When low voltage is given to the relay of any appliance then it turned off and when a high voltage is given it is turned on. There are different type of relay and they operate at different voltages. We have used 6V relay in this proposed system.

IV. IMPLEMENTATION AND RESULT

We will use all the components which are mentioned above. Now we connect the microcontroller and Bluetooth module as shown in block diagram. Now an android application “Autohome” is installed in our smart phone. Fig 4 shows the paired devices via Bluetooth. Then we connected the entire required electrical appliance with the relay circuit for switching.

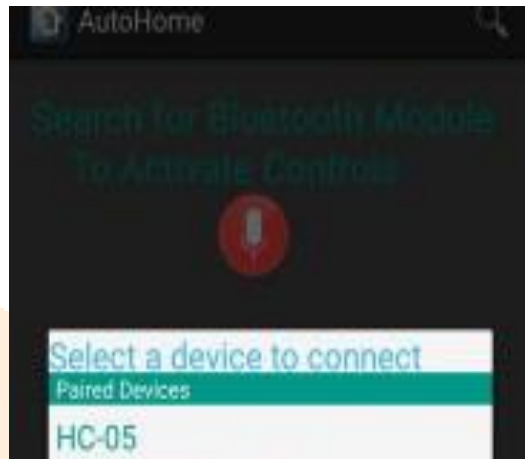


Fig 4: Paired devices of proposed system via Bluetooth

When the Bluetooth connection between the phone and the Bluetooth module is set then we protect the home automation system by setting a password. When a person gives any instruction in the microphone then that voice signal is decoded by the phone and converted it into the text and that text is transmitted to the arduino board with the help of Bluetooth. The text is then matched by the arduino board if the text is matched then the appliance is turned on or off but when the text is not matched then it shows the error message.

V. CONCLUSION

The automation in home appliances makes the life easy specially for the old and disabled person at home. The cost of the components and assembling is low. The connection is very secured and no one can easily monitor without permission. The application which is used in smart phone is very easy to handle and anyone can learn to operate. We can add any number of appliances when required. Electrical energy can be conserved by the instantaneous switching the appliances.

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