

# A CONCEPTUAL STUDY OF HOME AUTOMATION BASED ON BLUETOOTH USING VOICE CONTROL

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**Abstract:** Today, in 21<sup>st</sup> century, home automation plays an important role in human life. By using home automation, one can control one can control home appliances like light door fan AC etc. Home automation not only referred as the best technology, it also reduced human effort. The main objective of home automation using voice control is to help handicapped people and blind people. This paper puts forward the design of home automation based on Bluetooth using voice control. The design is based totally in bread board. We use arduino, Bluetooth module, and few jumping wires and the connection is set up on the bread board. The home appliances are basically connected to the Bluetooth module (HC05) by which the appliances are connected. This bluetooth device is connected to the arduino which consists of codes and thus programmed. This presents the design of home automation that can monitor and control home appliances.

**Keywords:** arduino, Bluetooth module(HC-05), smart home, LEDs, less human effort

## INTRODUCTION

Home automation system has been around for more than a decade. The main concept is to form a network connecting the electrical and electronic appliances in a house. This is a growing technology, which has changed the way people. It is also estimated by the same organization will have 90 million homes for employment in home automation systems by the end of 2018. There have been various commercial and research versions of smart home system introduced and built. But, none of the versions has broken through the mainstream yet other than security systems. Smart home systems have captured many disparate technologies so far and products have been in the market for more than one decade. Many companies have entered in this field including Google. Despite over a decade of disparate activity in the industry no company has yet succeeded to launch home automation as a popular technology.

## WORKING MODEL

Bluetooth module HC-05 transmits and receives data serially via Arduino board that can be read by the microcontroller. The following steps should be followed to run the project successfully:-

- Arduino UNO is the main component of this project. It performs the main function of the project.
- Arduino programming language is used to operate the Arduino UNO.
- Bluetooth module is used to receive and transfer the data through android mobile phone. It is connected to the Arduino UNO.
- A bread board is also working in this project where different kinds of electrical equipments are assembled which is connected to the Arduino and Bluetooth device.
- AMR voice recognition android application is used to act as voice application which is downloaded from app store.
- People can control their home appliances via home automation devices and set up the controlling actions in their mobile.
- Used voice commands

## Working component

Arduino:-

It is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board which is called microcontroller and a piece of software, or IDE (Integrated Development Environment) that runs on our computer which is used to write and upload computer code to the physical board. Arduino UNO is a microcontroller board 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. It contains everything needed to support the microcontroller; connection is simple and easy by connecting it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

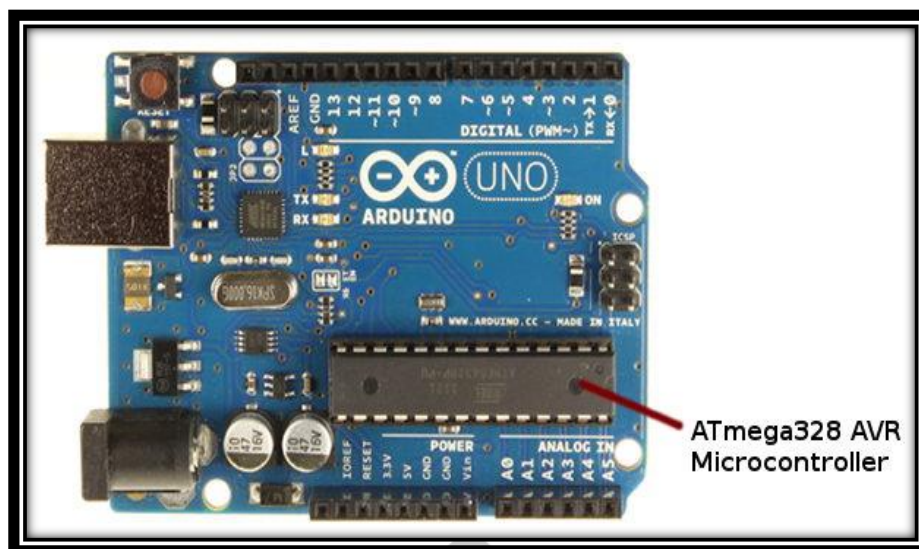


Fig1.0 Arduino UNO

Bluetooth Module(HC-05):-

**Bluetooth HC – 05:** For wireless communication, we used Bluetooth Technology and the module used for this is HC – 05. This module can be interfaced using UART protocol and it has a wide range of programmable baud rates but the default baud rate is 9600 bps. HC – 05 Bluetooth Module can be configured as either master or slave mode. The following image shows the HC – 05 Bluetooth Module used in this project. In this module, there are pins for VCC (5V), GND, TX and RX.

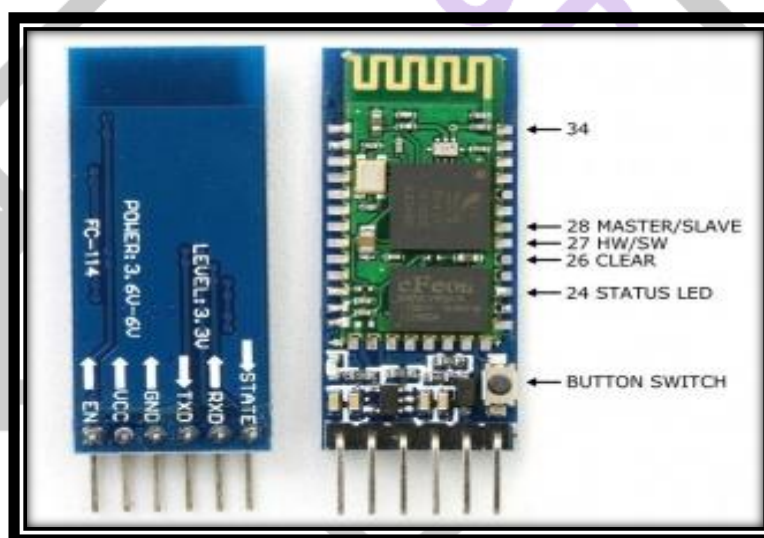


Fig.2.0 Bluetooth Module(HC-05)

### Experimental Analysis:-

In this section we will discuss about the home automation systems which has been done and their all common advantages and disadvantages are highlighted. All above discussed system have a main module that is connected features, with home appliances. Different types of communication techniques are used to transmit commands from the user interface to the main controller board. Comparison of cost, speed and real time application of above discussed systems.

Bluetooth based home automation system gives complete control over home appliance as long as the user is in range of Bluetooth network. The Bluetooth system uses a PC or smartphone as receiver device. It has a high communication rate, great security and low cost, so it can be implemented as a real time system and it has a limited range of 10 meters if the smartphone is out of range, then it will not be able to control the home appliances, this is one of the main disadvantages of Bluetooth based home automation system.

Voice recognition based home automation systems are most useful for handicapped and blind people, who wants to control home appliances by speaking voice commands. Voice of every human contains unique features so this such system has greater security. An operating system for Android smartphones has built-in voice recognition feature that can use for voice recognition tool for home

automation system. The main drawback of this system is that communication between user and voice recognition tool depends on signal to noise ratio (SNR), if voice signal is noisy then communication can highly effect and the system will fail to show accuracy. This system has a limited remote control range due to use of Bluetooth but it can be increased by using the internet but this solution will not be cost efficient<sup>[6]</sup>.

### **FUTURE EXPANSIONS:-**

Using this system as framework, the system can be expanded to include various other options which could include home security feature like capturing the photo of a person moving around the house and storing it onto the cloud. It will reduce the data storage than using the CCTV camera which will record all the time by storing it. The system can be expanded for energy monitoring, or weather stations. This kind of a system with respective changes can be implemented in the hospitals for disabled people or in industries where human invasion is impossible or dangerous, and it can also be implemented for environmental monitoring.

### **ADVANTAGES**

In recent years, wireless systems like Wi-Fi have become more and more common in home networking. In home and building automation systems, the use of wireless technologies gives several advantages that could not be achieved using a wired network only. They are:-

- 1) Reduced installation costs: First and foremost, installation costs are significantly reduced since no cabling is necessary. Wired solutions require cabling, where material as well as the professional laying of cables (e.g. into walls) is expensive.
- 2) System scalability and easy extension: Deploying a wireless network is especially advantageous when, due to new or changed requirements, extension of the network is necessary.

### **CONCLUSION**

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and all the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud as well as Gmail in a timely manner. This will help the user to analyze the condition of various parameters in the home anytime anywhere.

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