

ANDROID BASED INTELLIGENT HOME ASSIST

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Abstract –The past decade has seen great improvement in the field of consumer electronics. Various brilliant appliances such as mobile phone, air conditioners, home security devices, etc. are set to realize the advancement of a smart home. In today’s world, each and every people have smart phones with them at every moment of time. So it makes sense to use these to control home appliances. In this home automation system by using a simple Android app, one can control any home appliances with your tongue. Commands are sent via Bluetooth to Arduino.

The Bluetooth is a wireless technology used for sharing the data in between the Android phones and the Arduino board. The Bluetooth module with Arduino is used to control the home appliances wirelessly. The relay drivers are used to switch the devices like switching lights, fans or TV on or off. We can also control various parameters of home appliances such as fan speed, brightness of light, volume up or down, channel up or down of TV, forward or backward the music, play a specific music in home theatre etc. by using voice commands instead of IR remote. In this way by using this system, we can control all the required home appliances by wire-less, from the any corner of our homes which are in the range of Bluetooth modules and thus this system provides a very efficient Home Automation System.

Key Words: Arduino, Bluetooth module, Relay, BC 547

1. INTRODUCTION

The main purpose of any automated system is to reduce the human labor, efforts, time and human negligence. With this system we can control our home appliances very efficiently. This paper is designed to control the home appliances using an Android Application with the help of a voice command sending through the mobile phones. Today everyone is having their own Android phones, and the people are using many Android Applications in it. This work presents microcontroller based text or voice controlled Intelligent Home Assist System using smart phones which enables the user to have a control on every appliance in their home, as per the user requirement. The system consists of a smart phone and a control circuit. The control circuit consists of Arduino UNO Microcontroller, which processes the user commands which are in the form of text messages. It compares that commands with the help of our smart phones towards the home appliances, wirelessly with the help of Bluetooth technology and using an Android application.

The Fig -1 shows the basic block diagram of the proposed system.

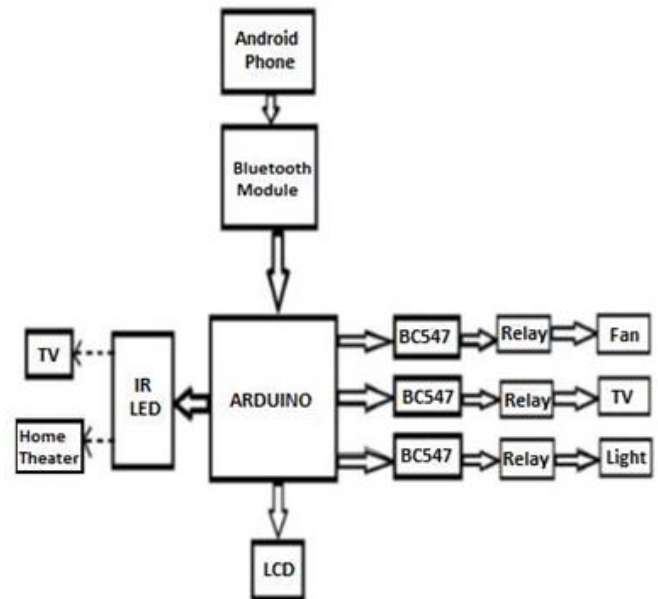


Fig -1: Block diagram

2. Voice to text conversion

Home assist.apk application uses Google's speech-recognition function and transmits the text to the MCU via the connected Bluetooth module(HC-05). This application is developed by using MIT App Inventor.

3. IR decoding

An infrared receiver, or IR receiver, is hardware that sends information from an infrared remote control to another device by receiving and decoding signals. In general, the receiver outputs a code to uniquely identify the infrared signal that it receives. This code is then used in order to convert signals from the remote control into a format that can be understood by the other device. It is the part of a device that receives infrared commands from a remote control.

In every IR Communication set up, there are two main components known as the IR Transmitter and the IR Receiver. As the name suggests, an IR Transmitter transmits IR Radiation. A simple IR Transmitter is an IR LED. It looks like a regular LED but emits Infrared Light. An IR receiver on the other hand, consists of a Photo Diode and an Amplifier

circuit to convert the detected IR Light in to electrical signals. An example of IR Receiver is the TSOP1738 IC. Now coming to the working of IR Communication.

Infrared Light is everywhere i.e. every object emits infrared radiations. The source of infrared light can be anything from Sun, Light Bulb to Humans and animals. This means that there is a chance of interference and noise while using IR Communication. Hence, we need to modulate the Infrared light and then transmit the IR Signals so that only the intended signal is transmitted. At the transmitter of the IR Communication i.e. at the IR Remote for example, an encoder is used to modulate a binary signal and the modulated signal is applied to the IR LED. Infrared Light from the IR LED is now modulated according to the modulated signal and is transmitted through air.

The modulated IR Signal is then received by the IR Receiver, which demodulates the IR Light and converts it back to the original binary signal. This binary signal is then transmitted to a Microcontroller. During Modulation, the IR Light is made to turn ON and OFF at a particular frequency called Carrier Frequency. Only the IR Receiver which is tuned to this frequency can receive the modulated IR Signals.

Some of the common Carrier Frequencies used in modulation of Infrared Light are 30KHz, 36KHz, 38KHz and 56KHz. The most common carrier frequency for IR Light Modulation is 38KHz. The pattern in which the infrared light is modulated is defined by Infrared Transmission Protocols. Some of the common protocols are Sony, JVC, NEC, RC5, RC6 and RCA.

4. Arduino IR receiver interface

Before interfacing an IR Receiver to Arduino, let us take a brief look about the IR Receiver in focus i.e. TSOP1738. TSOP1738 is a very common and popular IR Receiver, that is tuned for a carrier frequency of 38kHz. Externally, it consists of three pins namely: GND, Vs and OUT. Internally, it consists of a Photo Diode, Automatic Gain Control unit, Band Pass Filter and Demodulator.



Fig-2 Arduino IR receiver interface

The demodulated output of the 1738 IR Receiver can be directly decoded by Arduino Uno and can be obtained from the serial monitor.

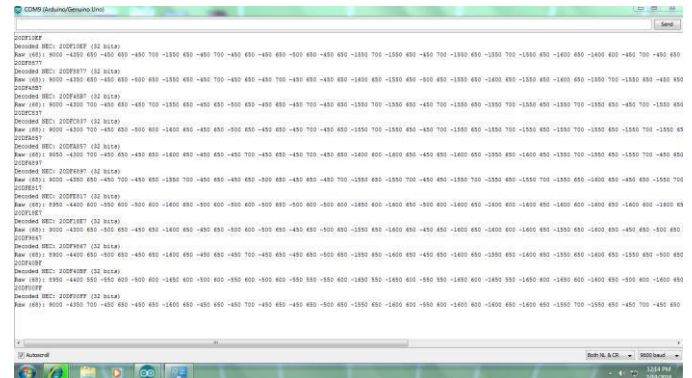


Fig-3 IR decoded signals obtained from serial monitor

5. IMPLEMENTATION

The first step in implementing our system was to develop an android application to convert the voice commands to text form.

As per the commands that given through this application which are sent to the processor through Bluetooth. The processor chooses the appropriate action as either sending IR codes through ir led interfaced with it or controlling corresponding relays through relay driver.

5.1 Android application development

In this section the analog signal from EMG module is intended to be converted to its digital value for controlling the servomotor. For the purpose of simulation here we used variable potentiometer for giving different voltages. Digital value as well as the voltage is displayed on the LCD provided.

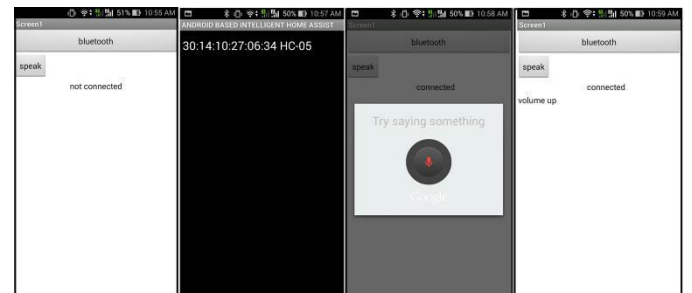


Fig-4: Voice to text conversion by android application

6. RESULT AND DISCUSSION

The project details the specification, hardware and implementation of Android based intelligent home assist using voice. The aim of this project is mainly to help disabled and elderly peoples. This project is an advanced version of voice controlled home automation. Here using our system,

we can control the intensity of light, speed of fan, all IR remote controlled parameters of TV, home theatre by simple voice commands.

A smart home is a home that incorporates advanced automation systems to provide the inhabitants with sophisticated monitoring and control over the building's functions. Such systems make use of different types of sensors to examine the environment and maintain a control over home appliances using latest communication and networking methods.

The main aim of the project is to help old age and elderly peoples who cannot operate the home appliances very easily. Energy efficiency is one of the major advantages of the smart home system as compared to the traditional systems.

7. CONCLUSIONS

It is based on design and implementation to control the home appliances using voice commands. The app can be notified by implementing speech recognition voice control to control the appliances with voice commands. This makes the system more secure. It is evident from this work that an individual android based smart home assist can be cheaply made from low cost using locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire lighting housing system. The components required are so small and few that they can be packaged into a small inconspicuous container.

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