Voice Recognition System for Home Appliances

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Abstract: Voice recognition is an expanding trend now days for automation. As speech is the preferred mode of operation for human being, this project involves the importance of human voice that activates electrical appliances at home in wireless environment. The user makes use of voice commands to perform certain actions such as switching the lights ON/OFF and regulating the speed of appliances. This system plays an important role for the elderly and physically disables people to control their appliances in intuitive and flexible way. Using AVR (Advanced Virtual RISC) studio, we will going to run program required for proposed system work. With this voice recognition technique accuracy of more than 90% is achieved. The key objective of this system design is to provide easy means for normal, handicapped and old age persons to control and operate home appliances. Since home automation is gaining popularity day by day in today's world, we require a system which is affordable and simple to implement. Both these qualities are present in our project which has the capability to replace existing technologies. Practical speech recognition kit is utilized in order to store and recognize the user's voice. Moreover, this project also helps in efficient use of the electricity which is an important constraint in day to day life.

Keywords: Home automation, Microcontroller, Voice Recognition, Power Supply.

I. INTRODUCTION

Today world is a global hub due to advancement in technology. Inventions an evolution in technology has made this possible. Home automation has an important role in people's life when it comes to their standard of living as it provides convenient and hassle free environment. We require the intelligence of a microcontroller ATMEGA 16 to control the devices and home appliances. There are various existing technologies available for similar purposes but their cost and complexity is major disadvantage.

In this project we have designed an affordable and simple to use system that takes the input from the voice recognition module and uses the microcontroller's intelligence to operate different devices. It is part of Atmel's Mega AVR family, it is an 8-bit microcontroller with high performance and has less power consumption . Atmega16 comprises of enhanced RISC architecture. Maximum frequency on which it can work is 16MHz.Atmega16 is a 40 pin microcontroller. There are 32 I/O (INPUT/OUTPUT) lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD.HM2007 is a 54 pin single chip CMOS voice recognition LSI circuit with on-chip analog front end , voice analysis , recognition process and system control function. A 40 word isolated-word voice recognition system can be composed of an external microphone, keyboard, SRAM and a few other components. When combined with a microprocessor, an intelligent recognition system can be built. A 7-segment display or 7- segment indicator is a form of electronic display device for displaying decimal numerical that is an alternative to the more complex dot matrix display. The seven segments are arranged as a rectangle of two vertical segments on each side with one horizontal segment on the top, middle, and bottom. Additionally the seven segment bisects the rectangle horizontally.

II. PROPOSED SYSTEM
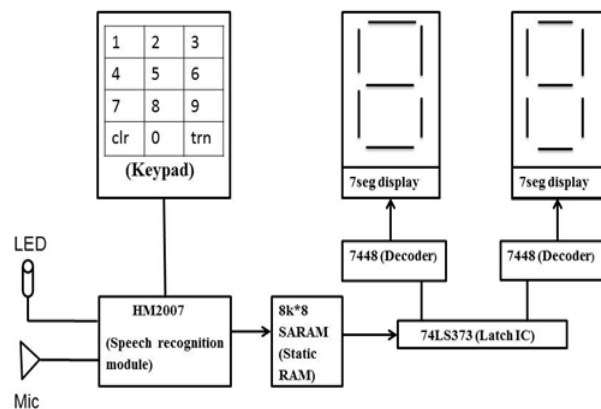
Fig1:-Connection of Hardware Kit

It is designed to control a home appliances by voice commands for remote operation. An Atmega series of microcontroller is used together with a speech recognition module for the desired operation.

At the transmitting end using voice commands are sent by RF to the receiver to control the Switch of the Appliance either to on or off the appliances. At the receiving end four relays are interfaced to the microcontroller where they are used for controlling of appliance.

The RF transmitter can take either switch press or voice commands which are converted to encoded digital data for the advantage of adequate range (up to 200 meters) from the appliance. The receiver decodes the data before feeding it to another microcontroller to on off the appliance.

HM2007 is a practical voice recognition system that is easy to train and implement. It means that the circuit will recognize the words when we train it by giving voice commands.

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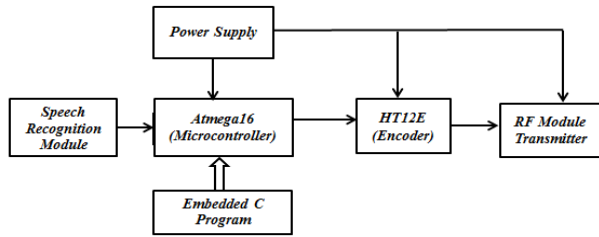## III. WORKING OF THE SYSTEM

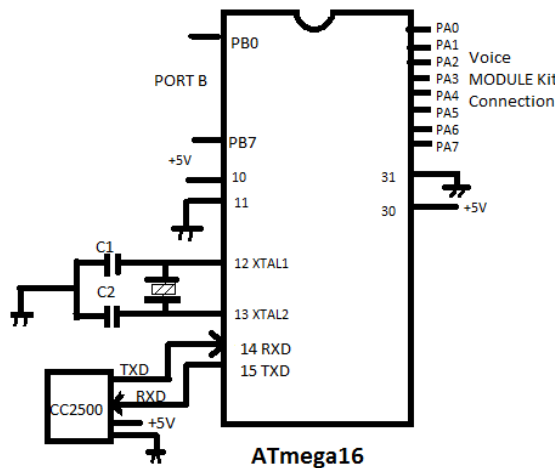**Fig 3.1: Block diagram of transmission section**

Fig3.2: Connection of Atmega16 transmission section

Supply is given to Atmehg16, encoder IC and RF module. Voice command is given to the speech recognition module HM2007 which is then transferred to microcontroller Atmega16 in which voice command is stored in the RAM of voice recognition kit. Microcontroller is run with the embedded C programming. Then encoders IC HT12E encodes the analog data to digital form and given to the RF module transmitter with frequency 433MHz in which we are using ASK with range 20m.
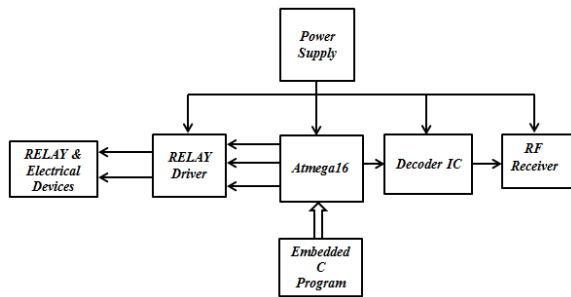

Fig 3.3: Block Diagram of Receiver section

Similarly, in receiver section power supply is given to all the blocks. RF receiver receives the data from the transmitter part, which given to the decoder IC. Decoder converts the digital data again into the analog form and store it in microcontroller Atmega16 which is the heart of our project. Atmeg16 is run with Embedded C programming. Then relay driver is used to gain sufficient amount current & voltage which required for their operation. Relay driver is an electromagnetic device which makes and breaks the circuit. Minimum 450 mA current is required for it. At last the is received and applied to the relay and electrical devices which is to be controlled and operated by users.
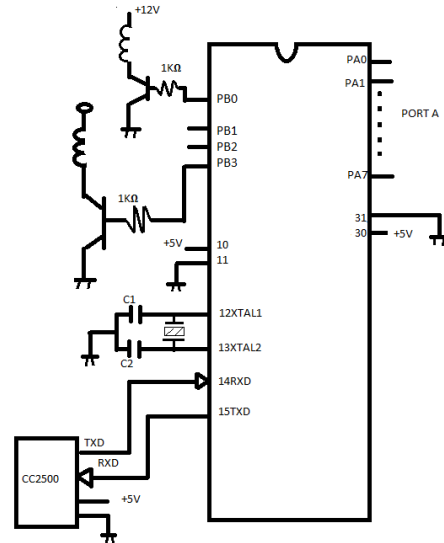

Fig 3.4: Connection of Atmega16 Receiver section

Fig.3.5 System output

When the voice command is given to the receiver part it will operate according to command. The fan will be ON/OFF when the command "Fan ON/OFF" is given. And the process is same for all the devices.

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