JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

SMART GLOVE: ENHANCED COMMUNICATION FOR MUTE PEOPLE

[1]Nagam Rangasai, [2]Sattubari Santosh kumar, [3]Lokku Prasanth,[4]Dabbeeru Kavyasree,[5]Kotni Anirudh

[1,2,3,4,5]Student

[1,2,3,4,5]Electronics and Communication Engineering,

Aditya Institute of Technology and Management, Srikakulam, India

Abstract : In our country around 2.78% of people are not able to speak. It's very difficult for mute people to convey their message to regular people. Since regular people are not trained on hand sign language, the communication becomes very difficult. In emergency or other times when a mute person travelling or among new people communication with nearby people or conveying a message becomes very difficult. Here we propose a smart speaking system and home automation that help mute people in conveying their message using hand motions and gestures. This glove is also used for home automation for disables. It will consist of two units, one is transmitter unit and other one is receiving unit which will be used for Home automation. Components include Arduino mega2560, 16*2 LCD, APR33A3 voice module, speaker and RF Transmitter module in Transmitter unit and Arduino UNO R3, RF Receiver and Home appliances in Receiver unit which helps to convert mute people signs to text, speech and also home automation.

IndexTerms- Arduino, Automation, Hand sign, LCD, RF Transmitter.

1.INTRODUCTION

We are perceiving a huge revolution in the Technology.Smart gloves have been under advancement process during the last few years to support regular people – mute people collaboration based on hand gestures and motions .Our proposed system is having two strategies ,Primarily on reducing communication barrier between normal people and mute people and second one is to help disable people to automate the things,we are adding this home automation unit to this smart glove which will be an additional scope.

Project Objectives include-

- To develop a micro controller based cost effective system to recognize gesture and convert into text and voice form so that it can be displayed if our hand movement matches with predefined codes.
- The Receiver unit arrangement makes the device more comfortable to be used by the disabled person for the purpose of Home automation.

2. LITERATURE SURVEY

Subhankar Chattroh [1] had made a gesture recognition system to recognize the hand motions made by mute people to communicate using scale-invariant feature transform (SFIT) algorithm that bridges the gap between the mute people and normal public. This system will focus on hand motions and human computer interface (HCI) system which will achieve accuracy and real time implementation of gesture processing.

Sakunthala Veguna [2] proposed a system called gesture based sensor device for mute people. This system uses flex sensors. The programming of microcontroller is done using MP lab software. The output will be displayed on lcd and in form of text also.GPS and GSM are used to track the location and to send the massage to care trackers.

Gunasekaran. K [3] in their paper proposed a system using the data glove technique. It consists of flex sensors that used to detect finger gestures and transmit the information to a PIC micro controller. He also used gyro sensors for providing a signal corresponding to the orientation of the motion of the hand. PIC micro controller processes the gesture of the user and plays the audio file corresponding gesture. The voice signals are stored in APR9600. It is a single chip used to store high quality voice recording and Non-volatile flash memory, playback capacity for 40 to 60 seconds. APR provides random and sequential multiple messages and designers can adjust storage time depending upon user needs. Basically, he used prerecorded voice and for communication between the transmitter and receiver side and used RF module

3. COMPONENTS

3.1 Arduino Mega 2560

The Arduino Mega 2560 is a micro controller board based on the AT mega 2560 . It has 54 digital input/output pins,16 Analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.
The Mega 2560 is an update to the Arduino Mega, which it replaces.

Fig 1 : Arduino Mega 2560

3.2 Flex Sensors

Flex sensors are the sensors that measure the amount of deflection or bending. They are often used in gloves to sense finger movement. They act as the source of input to the micro controller.

Fig 2: Flex sensors

3.3 LCD Display

Liquid Crystal Display screen is an electronic display module. A 16x2 LCD displays 16 characters per line and there are 2 such lines. This LCD consists of Command registers and Data registers. The command registers store the command instructions given to the LCD. The data registers stores the data to be displayed on the LCD. It is used for user interface.

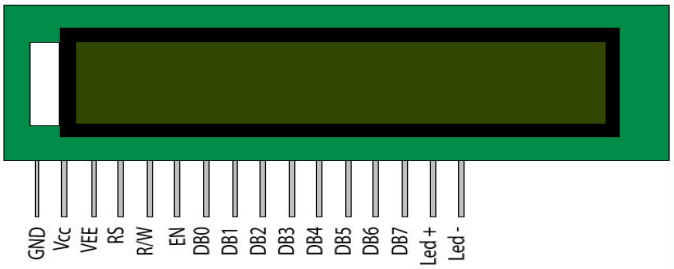

Fig 3: LCD Display

3.4 APR33A3 Voice module

It is a single chip voice recorder and playback device with 8 channels. Each channel can store upto 1.3 minutes speech message and total 11 minutes speech can be recorded and stored in all the channels (Fig-6). It takes the input from Arduino mega2560 and gives the voice as output.This can be interfaced with any micro controller and the audio output to drive a speaker

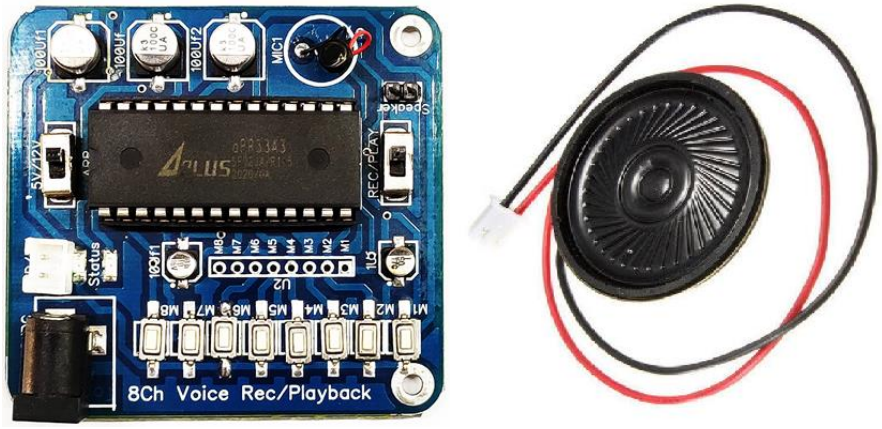

Fig 4 : APRRA3 voice module and speaker

3.5 RF Transmitter(HT12E) and RF Receiver(HT12D)

These are used in remote control applications.
HT12E is capable of Encoding 12 bit of information which consists of N address bits and 12-N data bits. Each address/data input is externally trinary programmable if bonded out. HT12E has a transmission enable pin which is active low
HT12D IC is a CMOS series 12-bit RF decoder. Mostly remote-control applications have this technology. It gets to interface with the third device and helps it to decode 12-bits data. In this decoder, only 4-bits are data the remaining part is the address. The address will describe the location but 4-bits combination could make 16 types of different combinations.The HT12D decoder cannot work alone. It works with another counterpart called an encoder.

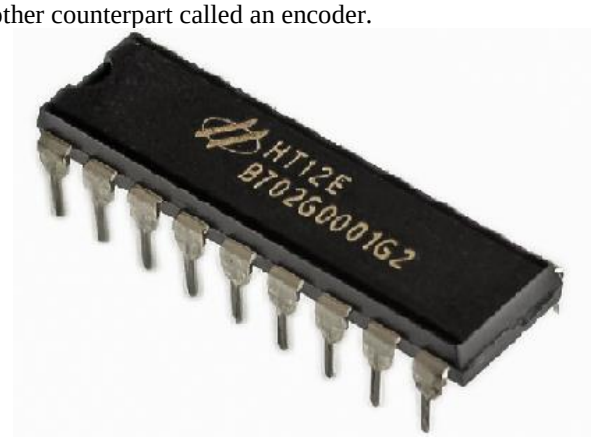

Fig 5 : HT12E Encoder

Fig 6: HT12D decoder

3.6 Arduino UNO R3

The Arduino Uno R3 is a micro controller board based on a removable, dual-inline-package (DIP) ATmega328 AVR micro controller. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs). Programs can be loaded on to it from the easy-to-use Arduino computer program. The Arduino has an extensive support community, which makes it very easy way to get started working with embedded electronics. The R3 is the third, and latest, revision of the Arduino Uno.

Fig 7 : Arduino UNO R3

3.7 Relay

The relay circuit is used to switch on &off the electronic appliances. Which is controlled by the micro controller on 12v supply. Relay driver is used to convert 5v supply to 12v supply provide to their relay circuit.This component will be used in receiver circuit for home automation purpose.

Fig 8: Relay

4. WORKING MODEL

Transmitter Section

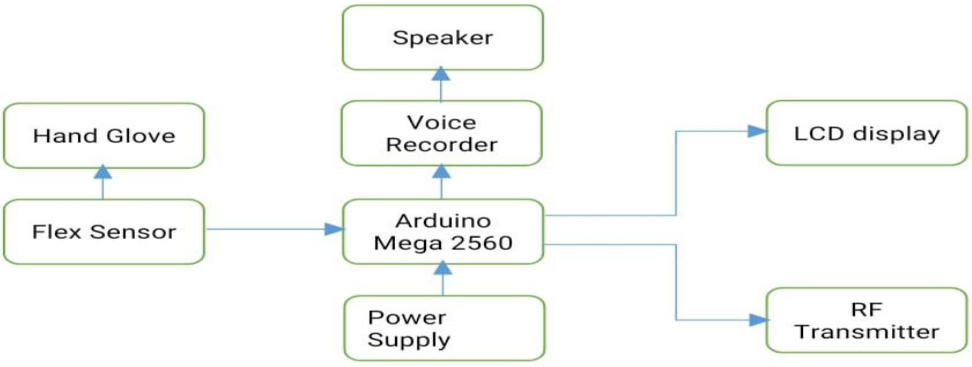

Fig 9 : Block diagram of Transmitter section

Receiver Section

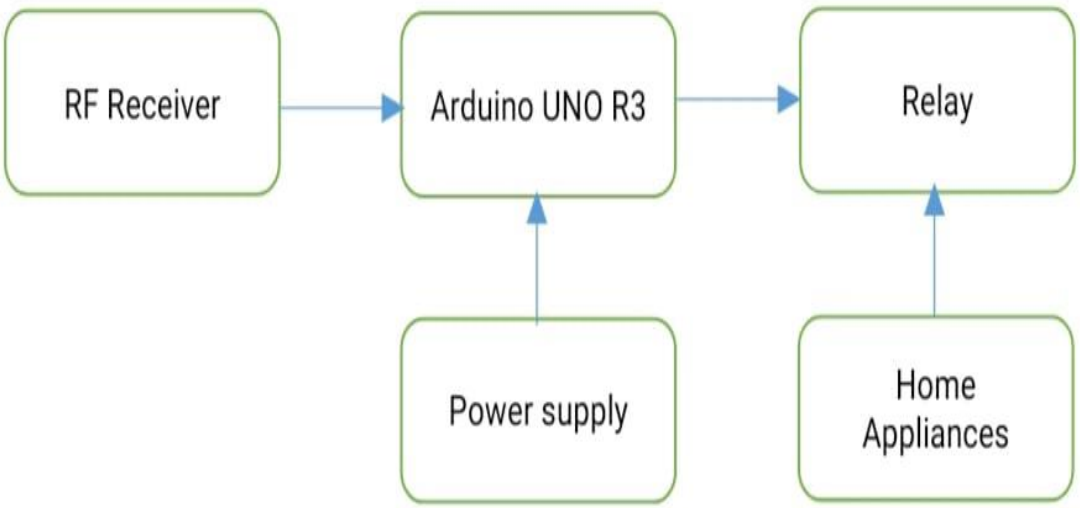

Fig 10 : Block diagram of Receiver Section

As we previously mentioned our project follows two strategies. One of them is Transmitter Section, where Arduino mega 2560 is heart of the project where it is interfaced with flex sensors and arduino mega 2560 is interfaced with LCD display as well as with APRR33A3 voice module.Five flex sensors are attached on the back of the each glove to detect human operator's finger activity We will record the pre defined instructions in the APRR33A3 module with the help of speaker. Later on respective connections will be given to flex sensor and arduino unit. Respective coding will be done, then by bending the finger we can observe the text in the LCD display and voice from the speaker. Here, Arduino mega 2560 is also connected with RF Transmitter which helps in process of home automation for disable people

Our project mainly includes important commands regarding water, food and few emergency commands etc. Coming to Receiver section, Arduino UNO is interfaced with RF receiver and relay, where by closing the hand he code gets resets and it converts home automation mode. Respective coding will be done and based on the commands the relay will turn on and off the appliances.

By bending each finger, the respective command will be the output in form of text and voice.

- **Normal sign mode**
  Index finger - I am thirsty
  Middle finger- I am hungry
  Ring finger- I need my medicine
  Pinky finger- I want to use washroom
  Index and middle finger- Hello, how are you?
  Middle and ring finger - Thank you
  Ring and pinky finger - Good bye

- **Home automation mode**
  Index finger - bulb on
  Middle finger-bulb off
  Ring finger-Fan on
  Pinky finger-fan off

5. RESULTS

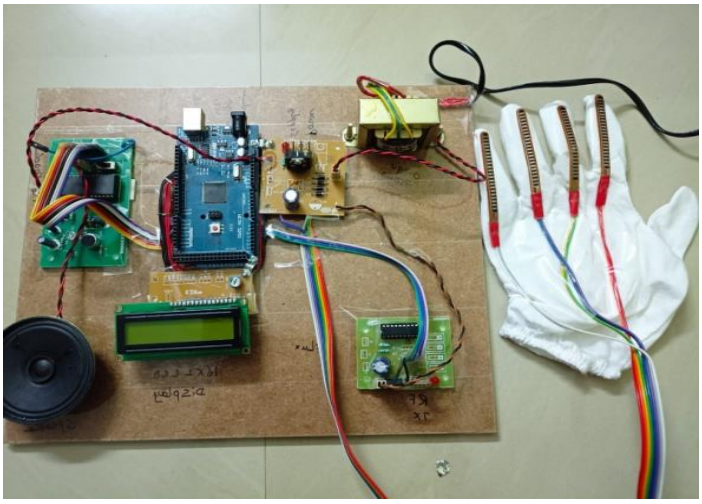

Fig 11 : View of Transmitter section

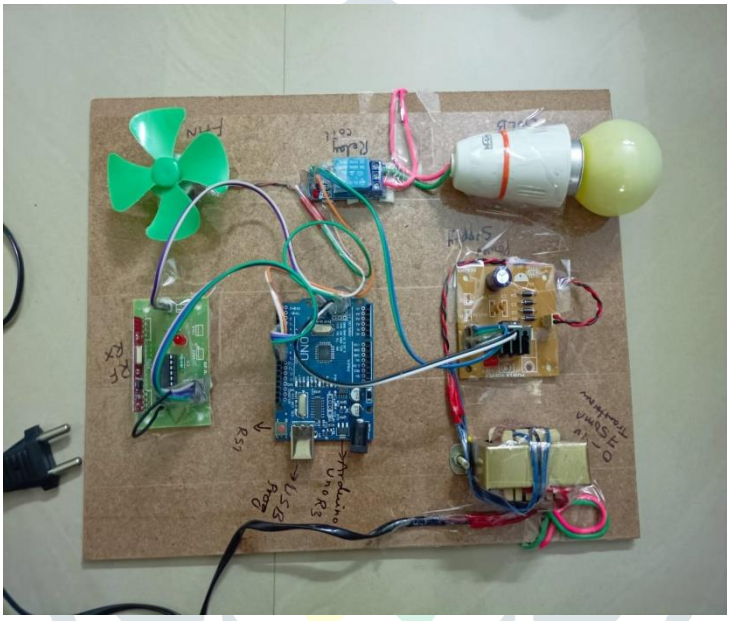

Fig 12: View of Receiver section

Few Results of sign modes are shown here in form of text.

.

Fig 13 : Images of the Sign mode

Here commands of Home automation are shown

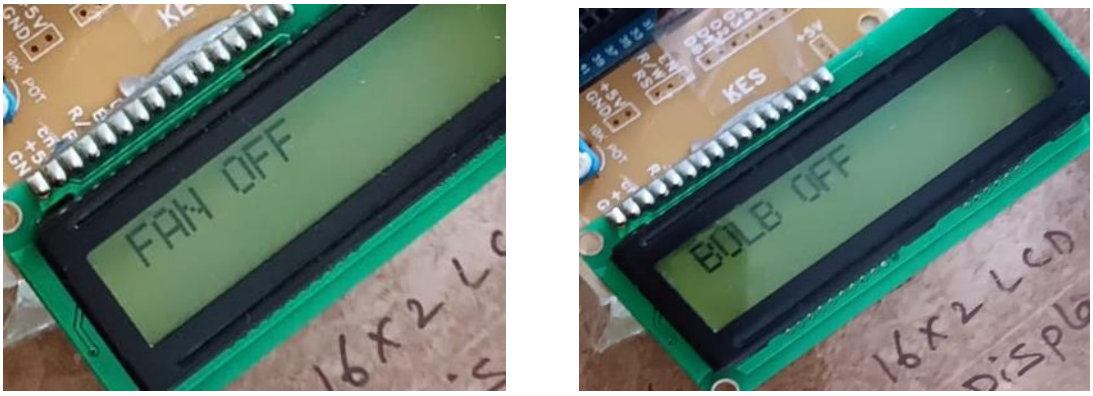

Fig 14 : Images of the Home automation

6. CONCLUSION

The main objective of the project is to reduce the communication gap between mute and normal people and to help disable people in form of home automation and to improve their life style. When the device was tested it turned out to be working well and its experience was previously displayed with images in the results section. Basic commands like “I am Hungry”,”I need medicine” and “ thank you” etc are used.The output is in form of text and speech which can be easily understood by others. The proposed idea can also assist disable people in form of Home automation. The challenges faced are Flex sensors are sensitive and to implement system with more gestures is difficult.

7. FUTURE WORK

The completion of this prototype suggests that sensor glovescan be used for partial sign language recognition. More sensors can be employed to recognize full sign language. A handy and portable hardware device with built-in translating system, speakers and group of body sensors along with the pair of data gloves can be manufactured so that a mute person can communicate to any normal person anywhere.

- To reduce the size of unit we can use SMD.
- High quality sensor can use.
- The range can be increased.

8. REFERENCES

[1] Subhankar Chattoraj, Karan Vishwakarma,Tanmay Paul, “Assistive System for Physically Disabled People using Gesture Recognition”, IEEE 2nd International Conference on Signal and Image Processing, 2017.

[2] Sakunthala Vegunta, A.B.Bhavani, M.Mallikarjun, “Gesture Based Sensor Device with GPS and GSM Technology for Dumb People” ,ICCES, 2017.

[3] Rastogi, K., &Bhardwaj, P. (2016). A Review Paper on Smart Glove-Converts Gestures into Speech and Text. International Journal on Recent and Innovation Trends in Computing and Communication, 4(5), 92-94.

[4] Flex Point Inc. USA, “http://www.flexpoint.com”, Last Accessed on September 06, 2010 Magnevation SpeakJet Inc. USA, “http://www.speakjet.com”

[5] N. Praveen, N. Karanth and M. S. Megha, “Sign language interpreter using a smartglove,” International Conference on Advances in Electronics, Computers and Communications (ICAECC), Bangalore, 2014, pp. 1-5.