ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

Sign to Speech Converter Gloves for Deaf and Dumb People

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ABSTRACT: Speech and gestures are expressions, which are mostly used in communication between human beings Getting the data is the first step. The second step is that recognizing the sign or gesture once it has been captured is much more challenging, especially in a continuous stream. In fact currently, this is the focus of the research. The objective of this paper is to design a simple embedded system based communicating device for deaf and dumb people. In our day to day life most of the task we carryout involves speaking and hearing. The deaf and dumb or paralyzed people have difficulty in communicating with others who cannot understand sign language and miss-interpreters. In this paper, we designed a simple embedded system based device for solving this problem.

KEYWORDS: Arduino uno board, Bluetooth module, Resistor box, Voice recorder & playback unit.

I. INTRODUCTION

Here two major problems are taken into consideration. First one is deaf and dumb people communicating with normal person and second one is communication between deaf and dumb people. To solve this problem we have use two modes of operation in this system. We are measuring the actions performed by the deaf and dumb people using resistors array (analog sensor) attached to gloves in a hand of the user.

Once the glove is placed in the hands, whenever an action for sign language is performed, the analog voltage value obtained and the corresponding action is identified by the arduino uno board. LCD display and BLUETOOTH is used as output device to convey the message from deaf and dumb people to the receiver. Also play-back is used to play the respective sound.

Arduino IDE and proteus software tools are used for compiling software coding and simulating the design.

This project detects the movements of deaf and dumb or paralyzed patients and result, action show on LCD screen and alerting notification as we desired, and plays the stored sound in the play

II. RELATED WORK

Sign language recognition system mainly have two well known approaches viz. Image processing technique and another is microcontroller and sensor based data glove. These approaches are also known as vision based and sensor based techniques. In the image processing technique camera is used to capture the image/video, in this static images are analyzed and recognition of the image carried out using algorithms that produce sentences in the display. The algorithms used in vision based sign language recognition system are Hidden Markov Mode (HMM), Artificial Neural Networks (ANN) and Sum of Absolute Difference (SAD). The disadvantage of vision based techniques includes complex algorithms for data processing. Visual based mostly techniques use camera chase technologies, whereby usually the user wears a glove with specific colours or markers indicating individual parts of the hands, specially the fingers. The cameras record the ever-changing image and position of the hand because the user signs and also the pictures are then processed to retrieve the hand form, position and orientation. Another challenge in image and video processing includes variant lighting conditions, backgrounds and field of view constraints and occlusion.

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Another approach is using a portable Accelerometer and tactile sensors used to measure the hand gesture. Accelerometer is used to capture movement information of hand and arms. EMG sensor placed on the hand, it generates different sign gesture. Sensor output signals are fed to the computer process to recognize the hand gesture and produce speech/text. In the instrumented approach of sign language recognition instrumented part of the system combines an Accele Glove and a two link arm skeleton. The existent systems have used a text-to-speech conversion for voice output. This brings a language constraint into picture as TTS output is in English only.

III. WORKING PRINCIPLE

A. *Block Diagram*

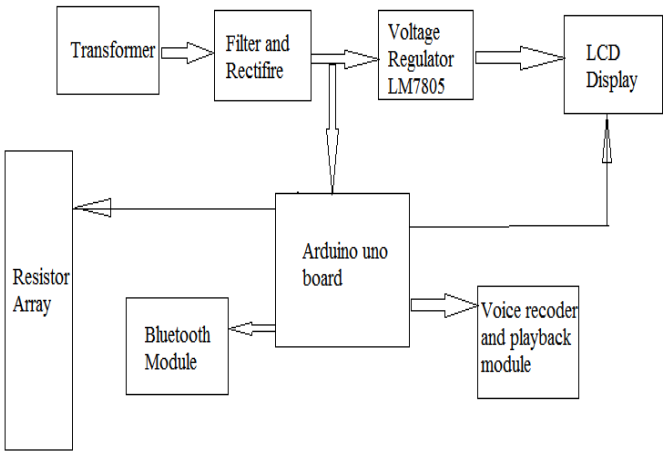

Fig. 1 Block diagram of sign to speech converter gloves for deaf & dumb

A. *Component Description:*

Fig.1 shows the Block diagram of Sign to speech converter gloves for deaf and dumb people . Each component in the block diagram is explained as follows:
1) Power Supply: Here arduino board operate with 12V DC, Bluetooth, LCD display circuit operates with DC 5V supply and this supply is provided by regulator of LM7805. 12V step down transformer with rectifiers and required to convert in to DC 5V by regulator.

2) Arduino Uno Board:

1 .POWER (USB / BARREL JACK): Every Arduino board needs a way to be connected to a power source. The Arduino UNO can be powered from a USB cable coming from your computer or a wall power supply that is terminated in a barrel jack. In the picture above the USB connection is labeled (1) and the barrel jack is labeled (2).The USB connection is also load code onto your Arduino board

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2. PINS (5V, 3.3V, GND, ANALOG, DIGITAL, PWM, AREF): The pins on your Arduino are the places where you connect wires to construct a circuit (probably in conjuction with a breadboard / PCBs and some wire. They usually have black plastic 'headers' that allow you to just plug a wire right into the board. The Arduino has several different kinds of pins, each of which is labeled on the board and used for different functions.

3. GND (3): Short for 'Ground'. There are several GND pins on the Arduino, any of which can be used to ground your circuit.

4. 5V (4) & 3.3V (5): As you might guess, the 5V pin supplies 5 volts of power, and the 3.3V pin supplies 3.3 volts of power. Most of the simple components used with the Arduino run happily off of 5 or 3.3 volts.

5. Analog (6): The area of pins under the 'Analog In' label (A0 through A5 on the UNO) are Analog In pins. These pins can read the signal from an analog sensor (like a light sensor) and convert it into a digital value that we can read.

6. Digital (7): Across from the analog pins are the digital pins (0 through 13 on the UNO). These pins can be used for both digital input (like telling if a button is pushed) and digital output (like powering an LED).

7. PWM (8): You may have noticed the tilde (~) next to some of the digital pins (3, 5, 6, 9, 10, and 11 on the UNO). These pins act as normal digital pins, but can also be used for something called Pulse-Width Modulation (PWM).

8. AREF (9): Stands for Analog Reference. Most of the time you can leave this pin alone. It is sometimes used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.

9. RESET BUTTON: The Arduino has a reset button (10) Pushing it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino. This can be very useful if your code doesn't repeat, but you want to test it multiple times.

10. POWER LED INDICATOR: Just beneath and to the right of the word "UNO" on your circuit board, there's a tiny LED next to the word 'ON' (11). This LED should light up whenever you plug your Arduino into a power source. If this light doesn't turn on, there's a good chance something is wrong. Time to re-check your circuit!

3) Bluetooth module: Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). We can transmit or receive data in the form of serial communication, with mobile to bluetooth module or microcontroller & bluetooth module with mobile bluetooth also.

4) LCD Display: LCD stands for liquid crystal display. They come in many sizes 8x1 , 8x2 , 10x2 , 16x1 , 16x2 , 16x4 , 20x2 , 20x4 ,24x2 , 30x2 , 32x2 , 40x2 etc. Many multinational companies like Philips Hitachi Panasonic make their own special kind of LCDs to be used in their products. All the LCD's performs the same functions (display characters numbers special characters ASCII characters etc). their programming is also same and they all have same 14 pins (0-13) or 16 pins (0 to 15)

5) Resistor Box: We can use multiple resistors in series with resistor box, to limit the current for different values for voltage divider. To obtain multiple values.

6) Voice Recorder & Playback Unit: It is a non-volatile flash memory technology, no battery backup required. In this Voice can be recorded with the help of on-board microphones and audio output to drive a speaker. There are 8 channels (M0-M7)each channel having 1.3 minutes recording length.

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B. *Circuit Diagram:*

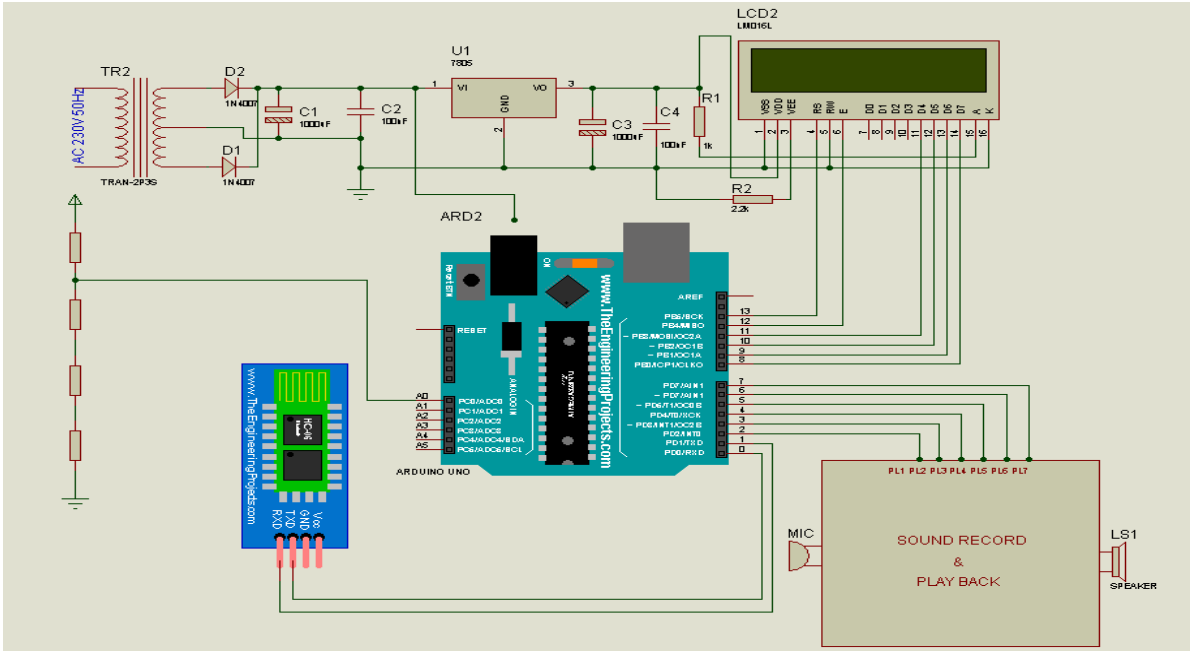

Fig.2 Circuitdiagram of sign to speech converter gloves for deaf & dumbpeople

C. *Working:*

Fig.2 shows the circuit diagram of sign to speech converter gloves for deaf and dumb people. The working of project from above shown circuit diagram is given below as:

Here circuit requires 5V and 12V regulated DC supply. We used 230V to 12V-0-12V step down transformer. The output AC of transformer 12V is rectified by center tap rectifier. Rectified output is pulsating it is pure by the capacitor filter of 1000uf 25V. Now the out of capacitor is DC 12V-15V given to the arduino board, which is required to convert in 5V regulated for microcontroller and other devices, here we have used LM7805 regulator for getting 5V regulated DC, For LCD display and BLUETOOTH.

In this arduino board (microcontroller) works with 16MHz frequency used for (timer configuration), the unwanted frequency produced is bypassed by the capacitor of 27pf capacitor. Reset pin is connected to resistor of 10K whenever reset requires the reset switch (2 lead push to ON switch/ micro push to switch) required pressing.

PORT PIN A0 is connected to the resistor array to detect the analog voltage from the resistors. Now depends upon programming conditions we can manage the respective voltages for respective numbers of text (as we wish to insert in program).

LCD data pins (AD4 to AD7) is connected to the pin 10, pin 11, pin12, pin 13 to send the data for theLCD display. The control pins of LCD display is connected to pin 8, pin 9, respectively take actionas RS, E. Variable resistor of 10K (or fixed 2.2K) is connected to the adjust contrast of 16X2 LCD display. 10uf capacitor is used to cancel loading effect and 0.1uf is used to bypass the unwanted Spikes produced in the circuit.

According to programming conditions in arduino board, when we touch exact point arduino detect and show on LCD and transmit data over Bluetooth module. Pin 0 RXD(0) and 1 TXD (1) are serial communication pins used to interface with BLUETOOTH modem. This modem has TXD and RXD pins for transmit and receive data or commands serially.

Microcontroller (arguing board) works with 5V DC and BLUETOOTH works with same supply so level shifter IC not required to communicate each other. In BLUETOOTH module fast LED blinking notify searching for its connectivity. Slowly blink notifies that Bluetooth is connected; now we can transmit text with location in longitude and latitude format.

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All capacitors of 0.1uf near analog/ digital/ microcontroller ICs are connected to reduce spikes in the circuit, spikes produced by inductive load/ sparking contacts of loads and capacitor of 1000uf/25V at regulator output is connected for the cancel loading effect in the circuit while driving the high current source.

D. *Actual system:*

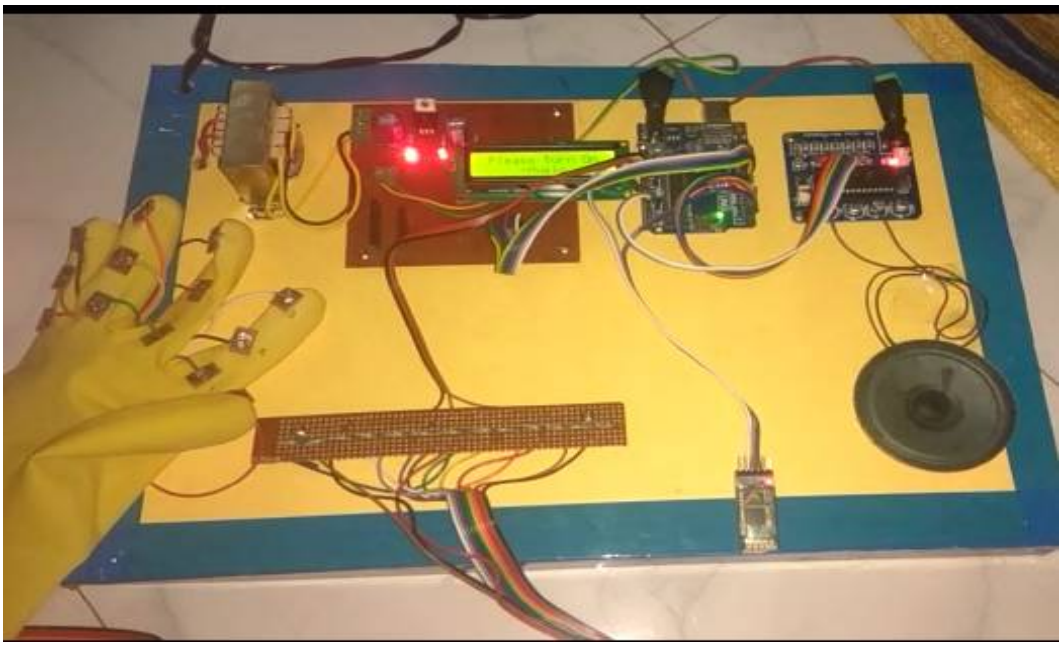

Fig. 3 Actual System

Fig.3 shows the Actual system of sign to speech converter gloves for deaf and dumb people after the hardwarecompletion and program installation in the Arduino Uno Board.

IV. CONCLUSION AND FUTURE WORK

The Proposed Gesture Reorganization system converts indian sign language to speech with the help if variety of sensors like flex sensor, Gyroscope & accelerometer in order to successfully determine the position & orientation of the hand gesture .This system also aims at integrating the results of the sensors with a smart phone that map the sensor reading to a corresponding sign which is stored in a data base . The output is the form of speech which can be understood by others. This system is autonomous, user friendly & completely mobile system.

We would like to extend applications of these gloves in the field of Education by making the gesture Recognizable under Virtual Reality. The Gloves can also be used for interacting with set of Electronic devices across house using centralized IOT Hub. We also believe that by introducing the concept of machine learning we can teach the gloves to understand the gesture**.**

REFERENCES

1] Sunitha K. A, Anitha Saraswathi.P, Aarthi.M, Jayapriya. K, Lingam Sunny, Deaf Mute Communication Interpreter- A Review, *International Journal of Applied Engineering Research ,Volume 11, pp 290-296 , 2016.*

[2] Mathavan Suresh Anand, Nagarajan Mohan Kumar, Angappan Kumaresan, An Efficient Framework for Indian SignLanguage Recognition Using Wavelet Transform *Circuits and Systems, Volume 7, pp 1874-1883, 2016.*

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[3] Mandeep Kaur Ahuja, Amardeep Singh, Hand Gesture Recognition Using PCA, *International Journal of Computer Science Engineering and Technology (IJCSET), Volume 5, Issue 7, pp. 267-27, July 2015.*
[4] Sagar P.More, Prof. Abdul Sattar, Hand gesture recognition system for dumb people, *International Journal of Science and Research (IJSR)*
[5] Chandandeep Kaur, Nivit Gill, An Automated System for Indian Sign Language Recognition, *International Journal of Advanced Research in Computer Science and Software Engineering.*
[6] Pratibha Pandey, Vinay Jain, Hand Gesture Recognition for Sign Language Recognition: A Review, *International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 3, March 2015 .*
[7] Nakul Nagpal,Dr. Arun Mitra.,Dr. Pankaj Agrawal, Design Issue and Proposed Implementation of Communication Aid for Deaf & Dumb People, *International Journal on Recent and Innovation Trends in Computing and Communication ,Volume: 3 Issue: 5,pp- 147 149.*
[8] Neelam K. Gilorkar, Manisha M. Ingle, Real Time Detection And Recognition Of Indian And American Sign Language Using Sift, *International Journal of Electronics and Communication Engineering & Technology (IJECET), Volume 5, Issue 5, pp. 11-18 , May 2014*
[9]Neelam K. Gilorkar, Manisha M. Ingle, A Review on Feature Extraction for Indian and American Sign Language, *International Journal of Computer Science and Information Technologies, Volume 5 (1) , pp-314-318, 2014.*
[10]Ashish Sethi, Hemanth ,Kuldeep Kumar,Bhaskara Rao ,Krishnan R, Sign Pro-An Application Suite for Deaf and Dumb, *IJCSET , Volume 2, Issue 5, pp-1203-1206, May 2012.*
[11]Priyanka Sharma,Offline Signature Verification Using Surf Feature Extraction and Neural Networks Approach, *International Journal of Computer Science and Information Technologies, Volume 5 (3) , pp3539-3541, 2014.*
[12] www.google.com
[13] YouTube