

Sign Language to Speech Conversion Gloves using Arduino and Flex Sensors.

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Abstract-In general, deaf people have problem in communicating with other people, who unable understand sign language. Even those who do speak aloud typically have a "deaf voice" of which they are self-conscious and they can make them reticent. The Hand Talk glove is a normal cloth driving glove fitted with flex sensor. The sensor output a stream of data that varies with degree of bend made on the sensor. They convert the change in bend to electrical resistance, the more the bend, more the resistance value. The output from the sensor is converted to digital and processed by using controller (Arduino UNO) and then it respond in the voice using speaker. In this project we have used a controller (Arduino UNO), LCD display (16X2), flex sensor, power supply and Voice module, Bluetooth Module(HC-05). Software used is Arduino IDE, Bluetooth DTS (Android Application), Embedded 'c', Express PCB and ISP

Key Words: Flex Sensor, Gesture

1. INTRODUCTION

Impact of hearing and speech can cause people to become no friends or company and lonely, having worse effect on both their social and working life. Here Looking up the meaning of a sign is not a straightforward task. The Sign Language is a well structured code gesture where every gesture has a meaningful assigned to it. Sign Language is the only means of communication for hard of hearing people. With advancement of science and technology many research and technique have been developed not only to minimize the difficulty of deaf and dumb people but also to implement in different working fields. Sign language is a language which instead of voice or sound patterns uses human communication and body language to convey the meaning. This involves mostly the mixing of shapes, orientation and movement of the hands. Sign language is not only used by deaf but also who can hear, but cannot physically speak to any other people. The Sign language is the language used by deaf and mute people that uses gesturs instead of sound to convey or to express fluidly a speaker's thoughts. A gesture in a sign language is a particular movement of the hands with a specific symbol made out of them. The main objective of this paper is to present system that can efficiently translate Sign Language gestures to auditory voice. Several languages are being spoken all around the anywhere in the world. So this system aims to give the voice output in different regional languages.

2. PROPOSED SYSTEM

In the proposed system, the approach is used with microcontroller (Arduino UNO) and flex sensor based data glove. LED indicates while the data is transmitted. The glove is interanally equipped with flex sensors. For every particular gesture, the flex detector produces a proportional modification in resistance and measures the orientation of hand. The process of those hand gesture is exit in controller. The gestures made are compared with in database and output is generated in the form off voice audio and display data on LCD.

Block Diagram

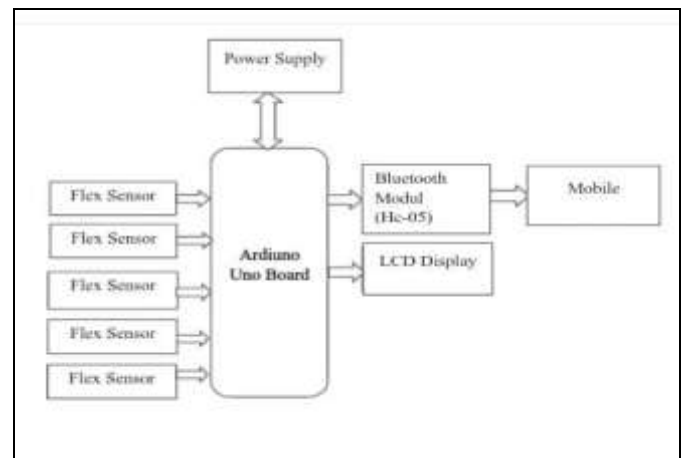


Figure No.1- Block Diagram

3. HARDWARE IMPLEMENTATION

3.1 ARDUINO UNO-



Figure No.2- Arduino Board

Arduino is the computer hardware and software device. Arduino UNO ATmega328 offers UART TTL-serial communication, and it is accessible on digital pins like TX(1) and RX(0). The software of an Arduino has a serial monitor that permits easy data. There are two LEDs on the board like receiver and transmitter which will blink whenever data is being broadcasted through the USB. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. The microcontrollers are mainly programmed using a dialect of features from the programming languages C and C++. In addition to using perfect compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

3.2 FLEX SENSOR-



Figure No.3- Flex Sensor

Working of flex sensor:

The Flex sensor are sensors that change in resistance depending on the amount of bend on the sensor. They extract the change in bend to electrical resistance the more bend the more the resistance value. They are usually in the form of a thin strip from 1"-5" long that vary in resistance. They can be made uni-directional and bi-directional.

3.3 BLUETOOTH MODULE (HC-05)



Figure No.4- Bluetooth Module(HC-05)

HC-05 module is an easy to use Bluetooth SPP(Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR(Enhanced Data Rate)3Mbps Modulation with complete 2.4GHz radio transceiver and baseband.

3.4 LCD DISPLAY (16*2)

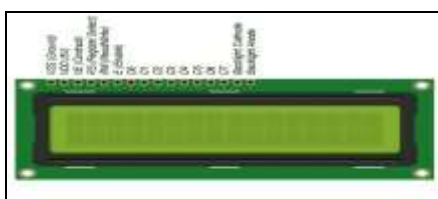


Figure No .5- LCD Display

The LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16x2 LCD display is very basic module commonly used in DIYs and circuits. The operating voltage of this module is 5v and current consumption is 1mA without backlight. It is a Alphanumeric LCD display module, It can be display alphabets and numbers. It consists of two rows and each row can print 16 characters. Each character is build by a 5x8 pixel box. LCDs can either be normally ON(positive) or OFF(negative), Depending on the polarizer arrangement.

4. SOFTWARE IMPLEMENTATION

4.1 ARDUINO IDE



Figure No. 6- Arduino IDE

The Arduino integrated development environment(IDE) is a cross-platform application(for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also with the help of third party cores, other vendor development boards. The source code for the IDE is released under the GNU (General Public License) version2.

The Arduino IDE supports the languages c & c++ using special rules of code structuring. The Arduino IDE supplies a software library from the wiring projects, which provides many common input & output procedures. User written the code only requires two basics functions, for starting the case and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

The Arduino IDE employs the program AVRDUDE to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

5. CONCLUSIONS

Sign language is a useful tool to easy the communication between the deaf and mute community and the normal people. As there is a communication barrier between these communities with normal people.

This project is useful for differently abled, speech-impaired and paralyzed patients who cannot speak properly.

This work is done to check feasibility of recognizing sign language using flex sensor and displaying the data, which proved to be an efficient system.

6. REFERENCES

- [1] Sign language recognition using sensor gloves Mehdi, S.A FAST-Nat.univ.of Computer & Emerging Sci.Lahore.
- 2] K. Hanumanthu, K. Harshit Sreevastcha, N. Manohar, G. Soumya Reddy. "Sign Language To Speech Conversion".
- 3] Ambika Gujrati, Kartigya Singh, Khushboo, Lovika Soral, Mrs.Ambikapathy."Hand-talk Gloves with flex sensor".
- 4] Heena Joshi, Shweta Bhati,KOmal Sharma, Vandana Matai."Detection of Finger Motion Using Flex Sensors for Assisting Speech Impaired".
- 5] Nisha Kawale, Pradnya Kaspate, Hruchika Vanjari, Prof. Prachi Sarod"Implementation Paper On Sign Language Using Flex Sensor".