Sign Language Translator

Raheman ,Suheb, Sahi l, Aftab*, Mr.Shetti

Sharad Institute of Technology Polytechnic, Yadrav (Ichalkaranji),India

A B S T R A C T

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), flex sensor, power supply and Bluetooth Module(HC-05). Software used is Arduino IDE.

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1. Introduction

Sign language is a visual language initially used by people who are aurally impaired by making gestures with hand and facial expressions. There are about 300 different gestures in Practise around the world which have resemblance and difference with each other. British and American sign languages are considered as different spoken languages. Some countries have more than one sign language. This diversity leads to confusion when people travel from one country to other. Even in their own country, normal people may not be familiar with the sign language which may limit the communication with the aurally impaired pepole, especially in dark it becomes even hard to interpret the gestures. Several projects to translate the sign language have been developed in these years but are poorly deployed.

HARDWARE USED

Arduino
Accelerometer ccc ADXL335
Bluetooth Module HC-05
Flex Sensor

1.1. Working

The project was inspired with the idea of controlling robotic arm with the help of hand movements. Most of the working is same but implementing the remaining part is rather a complex task. Accelorometer is used to measure the tilt in the palm. Five bend sensors are placed on a glove, four for the fingers and one for the thumb. These sensors measure the bend in the fingers and thumb and palm and according to the bend angle value the Arduino Nano microcontroller understands which set of value represent which symbol and transfer the appropriate outcome value to the Android app via Bluetooth which displays and speaks the symbol generated. Representing the first few symbols was quite easy and fun, but there were few symbols that were hard to distinguish such as "U" and "V" which are very slightly different form each other and gave almost same value. The earlier prototype failed drastically to

* *Corresponding author.*
E-mail address: kalawantsahil13@gmail.com

represent the same but the problem was solved using a metallic strip between the finger, which was used to tell if they are in contact or not. The accuracy was increased by continuously updating the data set for each symbol from time to time.

1.2. Tables

The input values for the different set of sensors which is placed in the hand gloves may differ for each and every signs. The input matrix for the signs which is considered in this approach is given below

Table 1 - An example of a table.

Signs/finger	Thumb	Index	Middle	Ring	Little
I	0	1	1	1	1
Hello	1	0	0	0	0
Thank you	0	1	1	1	0
Sorry	1	1	1	1	1
Know	1	1	0	0	0
Yes	0	0	1	1	1
No	1	1	1	0	0

1.3. Literature Survey

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 internally 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 exiting controller. The gestures made are compared with in database and output is generated in the form off voice audio and display data on LCD.

1.4. Scope of Project

- Further integrated with various services and help to generate employment for the deaf and dumb people.

- Geared up with the controller to provide home automation on finger tips.

- Paired up with fitness sensor to monitor health of the individual.

1.5 Methodology

Sign language is a natural way of communication between normal and dumb people. Sign language is mostly dependent on hand gesture recognition. It is sometimes not easy for normal people to recognize the signs properly and understand what they want to say. So the intension of the gloves is to make the life style of the dumb and deaf people easy. The gloves translates the hand gestures to text and further speech so that the normal people can read the recognized gesture and hear to the voice and understand what that person wants to tell, which will make the communication more efficient. The system consists of both physical and non-physical communication. Sign language differ from country to country it is not universally same. America developed American Sign Language (ASL); British developed British Sign Language and so on.

1.6 Algorithm for ardiuno code

1. Start

2. Assign Ardiuno pins for various functions using const keyword.

3. Assign the variable for reading the Flex sensor

4. Assign the string for hold incoming data from accelerometer.

5. Set serial baud rate

6. Initialize input and output pins

7. Take a input string

8. Take input from accelerometer and process it

9. After processing it gives to output pins.

10. End

Conclusion

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.

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