International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 03 | Mar -2017 www.irjet.net p-ISSN: 2395-0072

SIGN LANGUAGE DETECTION FOR DEAF AND DUMB USING FLEX SENSORS

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Abstract :- *Today the main problem faced by the deaf and dumb people is the communication part, to convey their thought with other deaf and dumb people and with other normal people.Normal people can absorb new information and knowledge through the daily noises, conversations and language that is spoken around them. Deaf and hard-of-hearing people do not have that luxury. This system will help those people by providing a medium to communicate. It is implemented using devices like flex sensors, and microcontroller.*

KEYWORDS: Gesture, flex sensor, microcontroller.

1. INTRODUCTION

People who are deaf and dumb often tend to feel uncomfortable around other people, when drawing attention to their hearing problem. Those people wants to be like their friends with good hearing, so this drives a thought in them to mainly keep to themselves and to not take part in activities with those normal people. Sign languages are used by mute people as a medium of communication. Sign languages are used to convey thoughts with symbols, and objects etc. They also convey combination of words and symbols(i.e. gestures). Gestures are different patterns made by the curls and bends of the fingers. Gestures are the best medium for their communication .

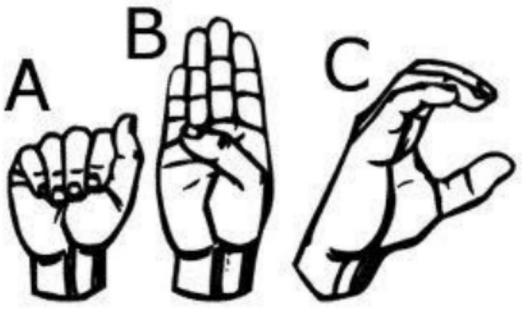

Fig.1: simple gestures

- As per shown in image every word/character has predefined pattern of finger and palm combination.

• This system is to identify this pattern or combinations electronically.

Fig.2: Various Patterns

2. Language Detection System

In this system glove is implemented to capture the hand gestures of a user. The gloves are having flex sensors along the length of each fingers and the thumbs. The flex sensors output a stream of data that varies with degree of bend. The analog outputs from the sensors are then fed to microcontroller. It processes the signals and perform analog to digital signal conversion. The gesture is recognized and the corresponding text information is identified. The user need to know the signs of particular alphabets and he need to stay with the sign for two seconds. There are no limitations for signs it is hard to

build a standard library of signs. The new gesture introduced must be supported by the system.
These sensors are attached along the fingers and thumb. The degree of bending of fingers and thumb results in the output
Of voltage variation, which while converting to analog form, produces required voice.
A pair of gloves along with sensors enables mute people to interact with the public in the required language

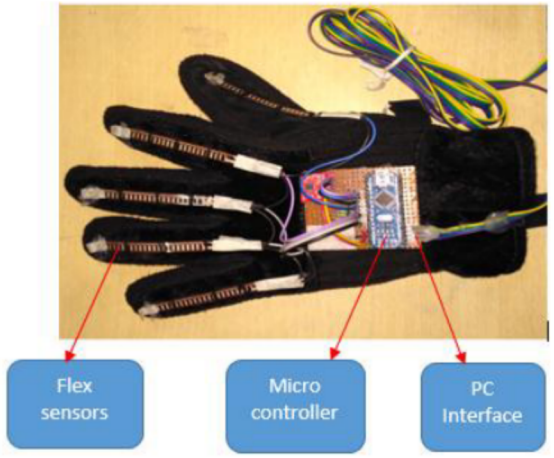

Fig.3: Experimental Setup

2.1. Flex Sensor:

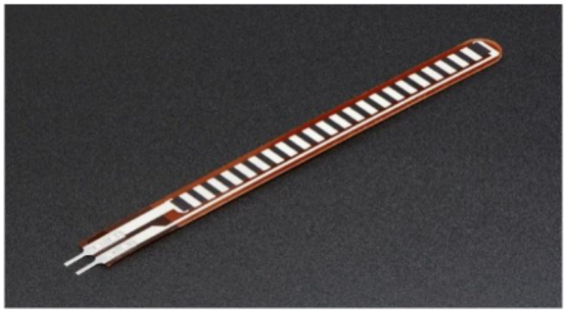

Fig.4: Flex sensor

Flex Sensor is an important component used in this system. The resistance of flex sensors changes depending on the amount of bending. Depending on the resistance values

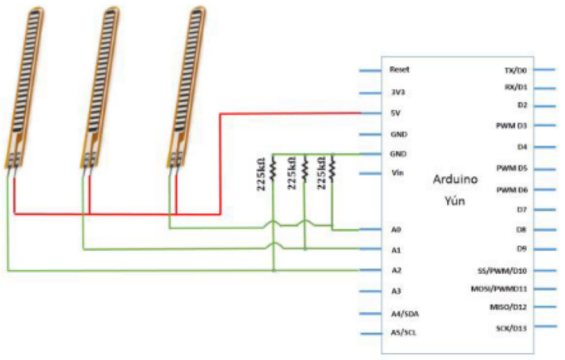

Fig.5: Processing of flex sensors

2.2. Microcontroller:

In this system Arduino is a simple microcontroller board and provides an environment for open source development, that will allow you to make computers that drive both functional and creative projects alike. This microcontroller merge the values from all the flex sensors and provide this input data to server.

Fig.6: Aurdino Microcontroller

2.3. Server side:

At server side the system takes the input from the micro controller and based on the combination of those inputs it will match the pattern with already fed pattern in the database and if the pattern is not available in database, the system will respond with “not available” value. The system also has an option for adding more patterns in the database.

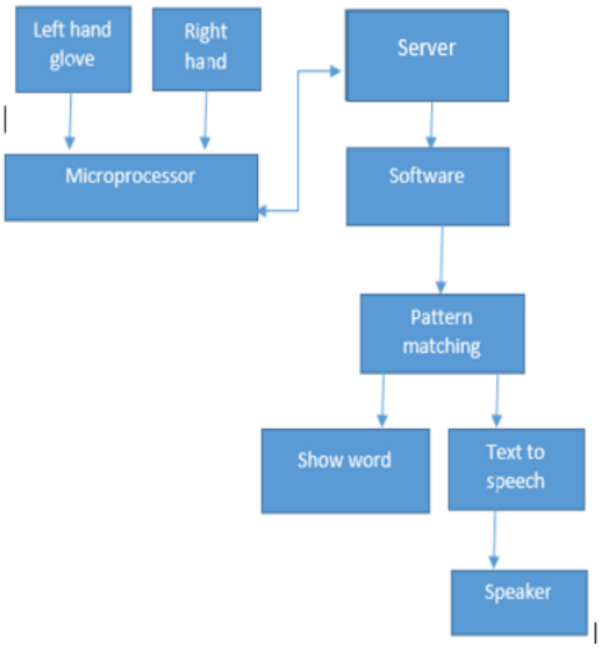

Fig.7: Block Diagram

3. ADVANTAGES

- Requires fewer components so its cost is low.
- It is economical.
- It is small in size, due to the small size we can place its hardware on our hand easily.
- The whole apparatus carries less weight. Hence they are portable and flexible to users.

4. FUTURE WORK

- In this system, more sensors can be embedded to recognize full sign language with more perfection and accuracy.
- The system can also be designed such that it can translate words from one language to another.

5. CONCLUSION

As a sign language is a method to convey the thoughts of Deaf and Dumb people, this system will make that medium more reliable and helpful. Here, the system will convert the sign language into text as well as speech, using these Gloves. In order to improve and facilitate the more gesture recognition, we have added the option to add more Gestures into the database.

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