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Talking Hands – An Approach Towards Better Society

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Abstract- Sign language is very elaborate as it entails many actions and gestures taking location both consecutively and concurrently. Since some translators are bulky, sluggish and no longer that environment friendly due to heavy processing that is taking region parallel. The value of translators is usually very excessive due to the hardware and software program that are required to meet the demands. Therefore there is a requirement for a plenty simpler, simpler and low in cost gadget which can help to bridge the gap between regular human beings who do no longer recognize signal language and the deaf character who communicates through sign language. Since India being a very populous country, the profound listening to disability is about one million approximately. In this research, the aim was to observe single-hand gesture with the assist of five flex sensors each representing a figure; these sensors are installed on the glove on which the Arduino UNO is fastened on the lower back of the glove the final output would be conveyed by means of the application on the phone. The readings can also vary from character to character because each and every man or woman hand size unique from the other. One of the fundamental goals is to improve this system in such a way that it is able to realize a realistic variety of gestures and words and the practicable to add new phrases and gestures in future.

Keywords :*Gestures, Arduino, Flex Sensors*

I. Introduction

Language is one of the fundamental sources of communication in our day to day lives. Communication is an vital existence ability which helps us to apprehend and gives a link to speak with the outside world.[7] Language consists of facial expressions, hand gestures and tone of speech which helps in decoding the movements and words spoken with the aid of a person. But unfortunately, some have hearing and speech impairments which come to be a major downside for them to communicate. Since gestures play a fundamental function in each day undertakings of human life, in precise throughout communication offering simpler understanding. Sign language (Fig 1) is a language which is used with the aid of the deaf and mute to communicate except the skill of acoustic sounds. Alternatively, sign language primarily depends on gestures and expressions, i.e., body language, position, actions and

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gesticulation of the arm to simplify the perception between people. Sign language is exclusive for one of a kind countries and special languages. Sign language is the solely skill of verbal exchange for the deaf and mute therefore in this system a glove has been designed which can be worn on either hand and makes use of one-of-a-kind algorithm that interprets sign language into spoken sentences and words. Each character person's hand is of a special measurement and shape, so we have targeted to create a device that ought to furnish reliable translations in spite of those differences.[5] In this gadget 5 Flex-Sensors are used each representing a finger that is used to specific how a great deal each finger is bent. These sensors are read, averaged, and organized according to the position of the fingers which symbolize a word or an alphabet, using a Arduino UNO USB microcontroller. The values which are received from the flex sensors are in contrast with the values stored in the database and signs corresponding to these values are identified. If the values in shape the corresponding alphabet or wide variety, they are then dispatched to a voice module that generates the speech. Fig.1 shows the American Sign Language that includes 26 alphabets and numbers from Zero to Nine.

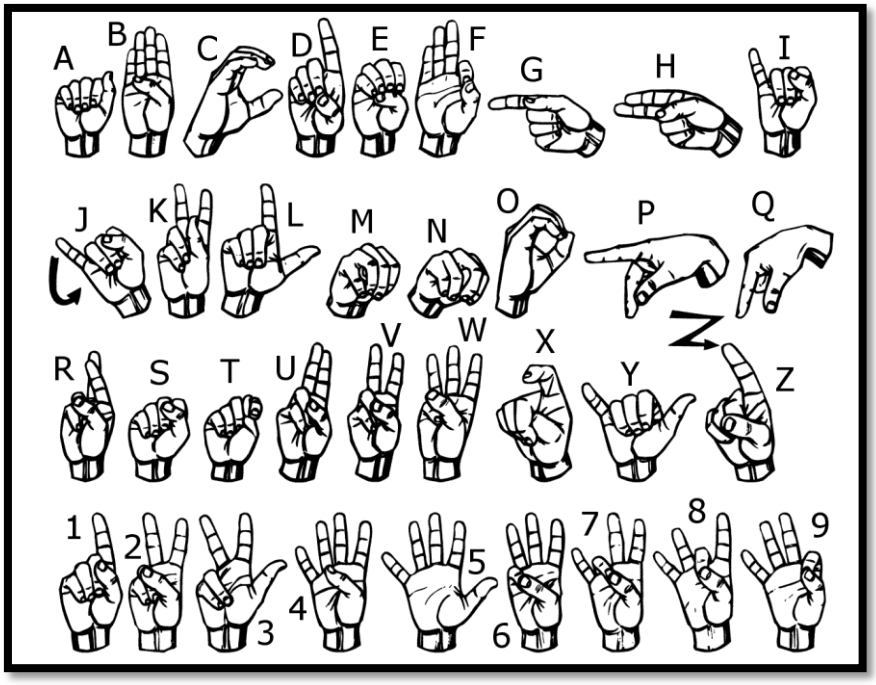


Figure 1: Single Hand translator

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There are two types of modules related to the research work as depicted in the Fig 2.

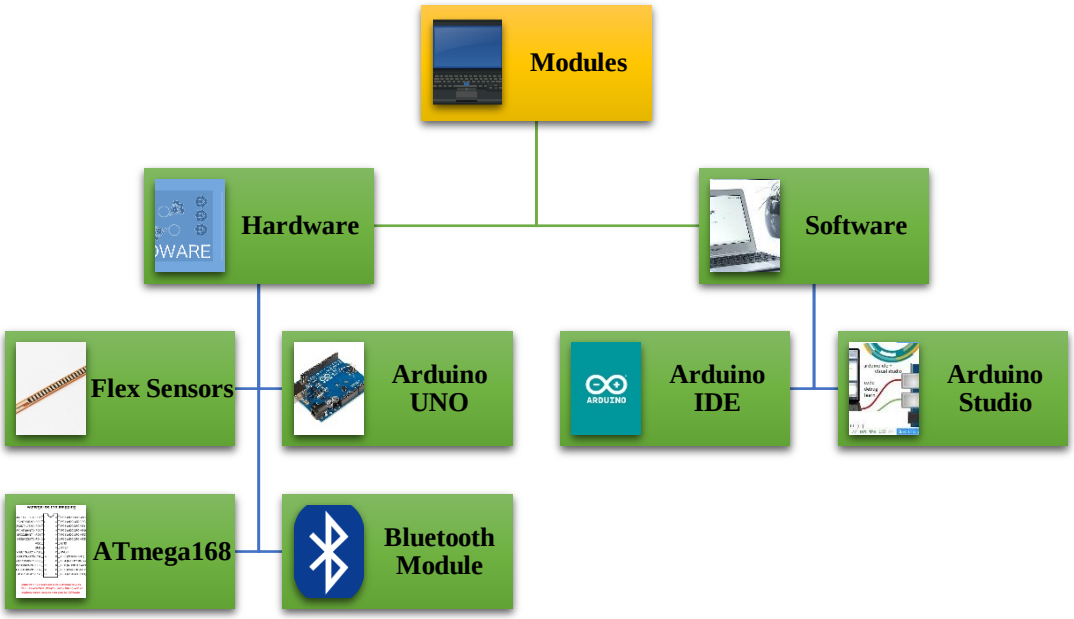


Figure 2: Classification of modules

II. Literature Review

Hanine El Hayek et al. [1] proposed that any deaf and/or mute person can use the glove tocommunicate with people who don't understand sign language. This paper suggests a sign to the letter translator device using a hand glove. The performed signs are displayed on the LCD as alphabetic letters with the hand wearing the glove.This glove can be very effective, secure and beneficial in addressing the interaction problems that arise between people with hearing disabilities and people who do not. It is made up of flex resistors that sense the shift in movements, a microcontroller which gathers, processes, and sends data to the LCD which displays the corresponding letter.The Sign to Letter Translator was designed to facilitate contact between the transmitter and the receiver to better achieve and completely understand the meaning of the message.

Raviprakash et al [3] proposed Hand Talk glove is a marginal tissue driving glove fitted with flex sensors. The output of the sensors is a data stream that changes with the degree of finger bend. Flex sensors are sensors that adjust the value of the resistance depending on the sensor's bend number. We translate bend change to electrical resistance the higher the bend, the higher the resistance cost.Using a microcontroller, the output value from the sensor is

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converted to digital and interpreted, and then it responds with a speaker in the tone. Flex sensors, microcontroller, speech IC and speaker were used in this project to produce the output.

JanFizzaet al.[4] focused on Throughout keeping with the American Sign Language Standard, the glove converts sign language movements into text. The glove included flex and contact sensors to detect finger movements and palm bending. In addition, an accelerometer in the glove was designed to calculate the acceleration generated by the hand's changing positions.Principal Component Analysis (PCA) was used to train the glove to interpret various movements and then translate the gestures into real-time alphabets. A Bluetooth connection was then developed by the glove with an Android phone, which was used to show the letters and words obtained and translate the text into voice.

Abhishek et al. [2] introduced a gesture recognition glove for the transmission of the American Sign Language focused on load-transfer touch sensors. The software was compact, so low-cost equipment was introduced. For the numbers 0 to 9 and the 26 English alphabets, A to Z, the model understands expressions. The glove obtained an average identification performance of over 92% on the basis of 1080 trials.

III. Methodology

The Talking Hand is a perfect gadget for those who recognize sign language and want to speak with the outdoor world. With the use of flex sensors and a microcontroller phrases and alphabets can be described using the utility provided. The application can be downloaded in Android phones and is also the best instructing tool for those fascinated in learning the fundamental Sign Language. This device is best for those in public services, students, training etc. It’s lightweight, portable and handy to use at any place.

SOFTWARE USED	***PURPOSE***
Android studio	Making the application
Arduino software (IDE)	To program the microcontroller
Embedded C	Programming

Table 1: Software Incorporated

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Table 2: Hardware Incorporated

HARDWARE USED	*PURPOSE*
Glove	Wearable, having flex sensors and Arduino mounted on.
Flex sensors	To measure amount of deflection or bending.
Arduino Uno	To sense and control objects in the physical world.
Resistors	For flex sensors. (470 Kilo Ohms)
Wires	To connect devices with each other
Bluetooth Module	For connection of Bluetooth

As this gadget design consists of both hardware and software program modules, therefore the hardware module consists of 5 flex sensors, one Arduino UNO microcontroller, a Bluetooth module, a speaker through which the output would be conveyed, SD card and a glove on which the flex sensors and microcontroller are mounted on. The purpose of the flex sensor is to measure the amount of deflection or bending. It requires +5v to function, when the strength is on every of these sensors get a +5v supply. These are used to recognize the figure movements at the input. Each of these sensors is linked to the pins of the microcontroller. Once the consumer makes a letter or a word the values coming from every sensor are recorded and thereafter go in the microcontroller which then converts analog signal to digital values. Once the letter/word has been made the letter then is matched with the database that consists of the signal language alphanumeric values, the SD card consists of a voice note representing the alphabets and variety and then the ultimate output is via a speaker module. The Bluetooth module is used to connect the machine with the phone. If the given role of the flex sensor does not suit the corresponding alphabet, recalibration takes place. Now coming on to the software program system design, this consists of in the main two things i.e. the software used to application the microcontroller and the software required to make the android software thru which calibration will take place. Since we are the use of the Arduino NANO (microcontroller) so the software used to application it is “Arduino Software (IDE)” which will take the enter readings of the flex sensors and software program being used to make the software is “Android

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Studio" on which the calibration of the machine will take place. The software teaches the primary knowledge about sign language i.e., alphabets and numbers.

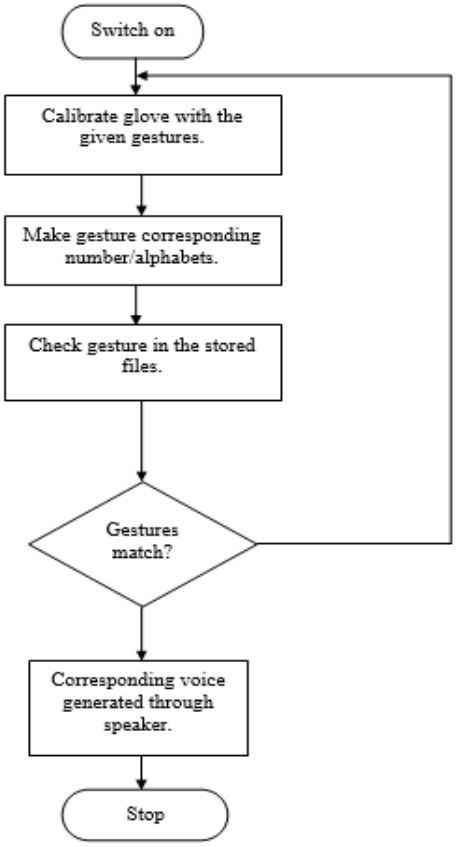


Figure 3: Problem Stepwise Chart

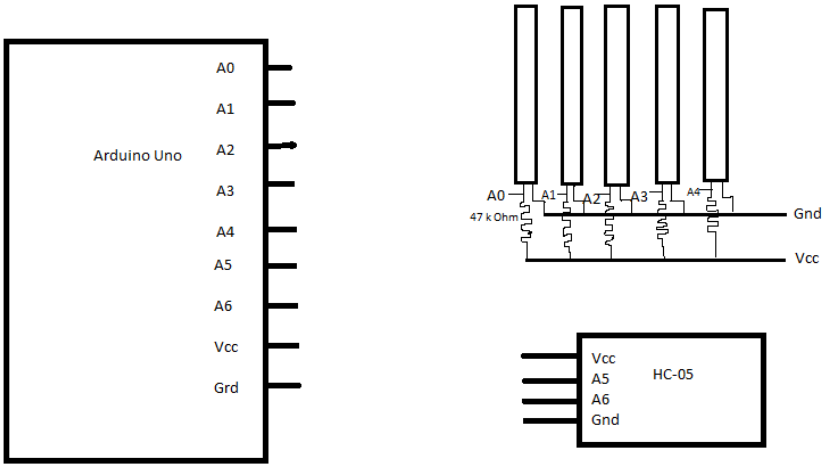


Figure 4: Pin connection

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IV. Result and Analysis

Below are the results of the glove translation in to words.

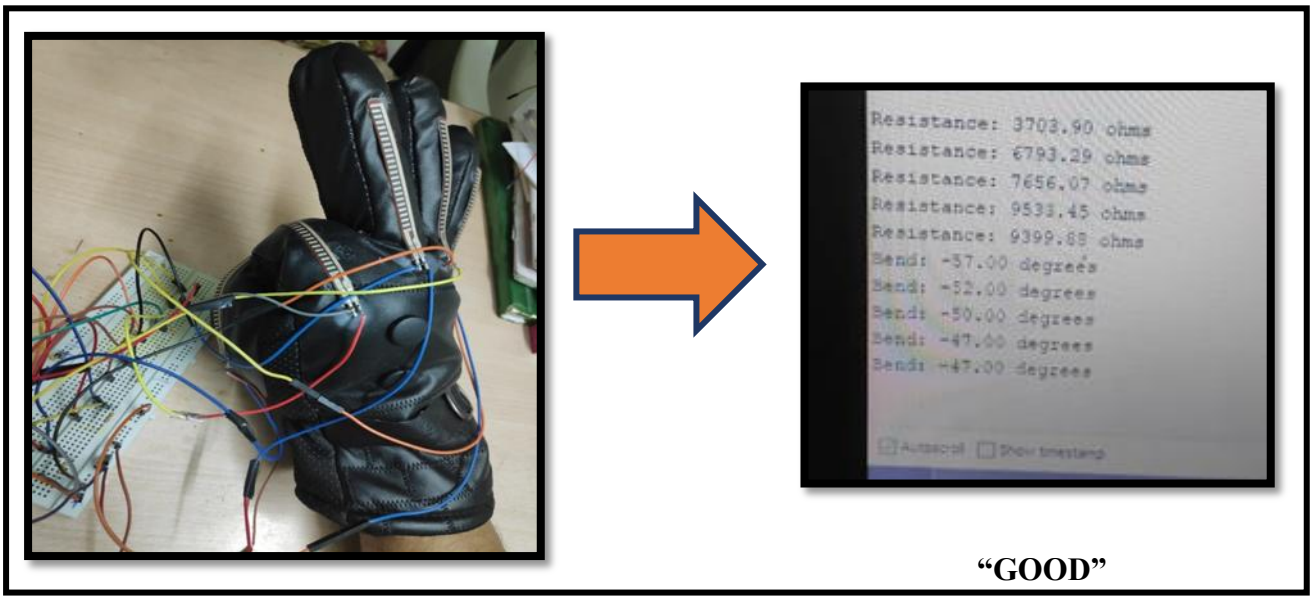


Figure 5: Result depicting the result values with the word predicted

Fig 5 depicted the values of the flex sensors and the word that was predicted by the system proposed. The angular movement with the depicted sign resulted in the value "good".



Figure 6: Result depicting the result values with the word predicted

Fig 6 depicted the values of the flex sensors and the word that was predicted by the system proposed. The angular movement with the depicted sign resulted in the value "good".

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Code snippet of the Arduino Uno is below.

final.ino

```
  float flexR3 = R_DIV * (VCC / flexV3 - 1.0);
    float flexV4 = flexADC4 * VCC / 1023.0;
  float flexR4 = R_DIV * (VCC / flexV4 - 1.0);
    float flexV5 = flexADC5 * VCC / 1023.0;
  float flexR5 = R_DIV * (VCC / flexV5 - 1.0);
  float angle1 = -1*map(flexR1, STRAIGHT_RESISTANCE, BEND_RESISTANCE,0, 90.0);
    float angle2 = -1*map(flexR2, STRAIGHT_RESISTANCE, BEND_RESISTANCE,0, 90.0);
    float angle3 = -1*map(flexR3, STRAIGHT_RESISTANCE, BEND_RESISTANCE,0, 90.0);
    float angle4 = -1*map(flexR4, STRAIGHT_RESISTANCE, BEND_RESISTANCE,0, 90.0);
    float angle5 = -1*map(flexR5, STRAIGHT_RESISTANCE, BEND_RESISTANCE,0, 90.0);

if(angle1>57 && angle2>45 && angle5>46 && angle3<43   && angle4<43)
Serial.println("Victory");
if(angle4>45 && angle5>45 && angle1<56   && angle2<43   &&  angle3<45)
Serial.println("Good");
if(angle2>47&& angle3>47 && angle4<45   && angle1<57 && angle5 >48)
Serial.println("Hard Rock");
if(angle2>46 && angle3>46 && angle4>46 && angle1<57 && angle5<46)
Serial.println("Call");
if(angle1>57 && angle2>47 && angle3>45 && angle4>47 && angle5>45)
Serial.println("Stop");
if(angle1>57 && angle2>46 && angle3>46 && angle4>50 && angle5<46)
Serial.println("Thumbs up");
if(angle5>46 && angle2>46 && angle3>46 && angle4>45 && angle1<57)
```

Figure 7: Code snippet

V. Conclusion and Future Scope

We have made a system that can be easily accessed anywhere, anytime but there are certain aspects which need to be provided in this system to make it more efficient and reliable source of communication. The Talking Hand is a perfect gadget for those who recognize sign language and want to speak with the outdoor world. With the use of flex sensors and a microcontroller phrases and alphabets can be described using the utility provided. The application can be downloaded in Android phones and is also the best instructing tool for those fascinated in learning the fundamental Sign Language. This device is best for those in public services, students, training etc. It's lightweight, portable and handy to use at any place. The proposed project consists of only one hand functioning and limited to letter formations only this machine is basically a technology demonstrator and has bought a tremendous potential of reducing the barriers of the deaf and mute persons. his gadget can be extended to both hands and with use of accelerometer, the arm actions and gestures can be picked up assisting in making complete sentences thereby easing the conversation troubles of listening to speech impaired individuals.

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References

[1] El Hayek, Hanine, et al. "Sign to letter translator system using a hand glove." The Third International Conference on e-Technologies and Networks for Development (ICeND2014). IEEE, 2014.

[2] Abhishek, Kalpattu S., Lee Chun Kai Qubeley, and Derek Ho. "Glove-based hand gesture recognition sign language translator using capacitive touch sensor." 2016 IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC). IEEE, 2016.

[3] Prof. RaviprakashShriwas , Mr. Nitesh Vihirkar , Ms. Kshama Morey and Ms. NikhitaGulhane. "A Preview Paper on Hand Talk Glove." 2015 IJRASET. 2015

[4] Bukhari, J., et al. "American sign language translation through sensory glove; signspeak." International Journal of u-and e-Service, Science and Technology 8.1 (2015): 131-142.

[5] Abhishek, Kalpattu S., Lee Chun Kai Qubeley, and Derek Ho. "Glove-based hand gesture recognition sign language translator using capacitive touch sensor." 2016 IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC). IEEE, 2016.

[6] Bhat, Sachin, M. Amruthesh, and C. Ashik. "Translating Indian Sign Language to text and voice messages using flex sensors." International Journal of Advanced Research in Computer and Communication Engineering 4.5 (2015).

[7] Philomina, S., and M. Jasmin. "Hand Talk: Intelligent Sign Language Recognition for Deaf and Dumb." Int. J. Innov. Res. Sci. Eng. Technol 4 (2015).

[8] Gopi, T., et al. "Implementation of raspberry pi based intel glove for gesture voice translation with location intimation for deaf & blind people." (2018): 373-376.

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