e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:05/May-2023 Impact Factor- 7.868 www.irjmets.com

SMART HAND GLOVES FOR DEAF AND DUMB

Sakshi wankhade[*1], Vishal wadekar[*2], Ajinath Algude[*3], Nagarjun Jadhav[*4], Dr. Priya Gokhale[*5]

[*1,2,3,4]B.E. Student, Dept. Of Electrical Engineering, JSPM's Jaywantrao Sawant College Of Engineering, Pune, India.

[*5]Professor, Dept. Of Electrical Engineering, JSPM's Jaywantrao Sawant College Of Engineering, Pune, India.

DOI : https://www.doi.org/10.56726/IRJMETS40384

ABSTRACT

We see in our daily lives that patients who are voiceless or mute have a tough time communicating with regular people. Patients who are unable to speak typically use sign language that is obscure to most people. We were motivated to develop a technology system for communicating with people who are unable to speak since we are aware that visual communication is more successful than verbal communication. We have created a project that focuses on improving patients' or people's ability to communicate with others who are speech-impaired. The project consists of a glove that uses Flex sensors to convert finger-bending movements into voice or speech data. The binary data from the flex sensors are processed by the AVR microcontroller, and the voice module then processes the microcontroller output to create speech.

Keywords: Glove, Microcontroller, Flex Sensors.

I. INTRODUCTION

Glove-based systems, the most common devices for hand movement acquisition, have been under development for about 30 years, and a rising number of researchers are still involved in this work. Information must be exchanged in order for communication to be successful, and this can only be done if all parties speak the same language. The language of the deaf and the mute, sign language, is a method of communication that combines facial expressions, movement of the hands, arms, and body, as well as hand shapes and orientations, to fluidly express the thoughts of the speaker. Words and sentences are conveyed to the audience through signs. In sign language, a gesture is a particular hand motion that creates a certain hand form.

Whole words are typically represented with a sign in sign language. Additionally, it can offer a sign for letters to represent words for which there is no equivalent sign in that sign language. Flex sensors, which vary resistance according to the degree of bend on the sensor, are a significant part of this essay. In this study, we present a sign language glove that will help people who have any type of speech impediment communicate by gestures; specifically, the user will produce alphabet movements using sign language using just one hand. The glove will capture every gesture the user makes and translate those gestures into an auditory and visual format.

II. METHODOLOGY

Existing system

Around 2.78% of the population in our nation cannot speak at all and are considered dumb. Hand gesture recognition and voice conversion technology for dumb people They simply express themselves and move their hands to communicate with others.

As a result, we suggested a novel method for dumb individuals dubbed artificial speaking mouth. They will find it quite useful for communicating their ideas to others. Some people can quickly deduce information from their movements. The remainder cannot comprehend their method of communication. For the technologically challenged, an artificial mouth has been developed. The motion sensor is the system's foundation. Dumb people have a meaning for each movement they make. A database stores that message. The database also contains all templates. A microcontroller is supplied with a template database in real time, and a motion sensor is fixed to their hand.

The flex sensors accelerate in response to every action and send a signal to the microcontroller. The speaker is used as the system's output. The artificial mouth will allow the stupid to speak normally by appropriately

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:05/May-2023 Impact Factor- 7.868 www.irjmets.com

updating the database. A text to voice (TTS) conversion block that translates the matched gestures is also part of the system.

In the suggested system, text is displayed on the controller's LCD display, and sign language is converted to voice using a flex sensor. A gesture-based circuit is intended to communicate the needs of physically incapacitated patients. An open-source manufacturer of computer hardware and software is called Arduino. An Atmel328 microcontroller chip, a USB port, and the internal power supply are all found on a microcontroller board. A glove is used to fix the flex sensor, which detects sign language input and sends it to the microcontroller, which processes it and outputs both speech and LCD displays.

Benefits:

- Beneficial for people who are paralysed and unable to speak
- Makes effective real-time communication possible

Disadvantage:

- System processing may be sluggish;
- Inability to express facial expressions

BLOCK DIAGRAM DESCRIPTION

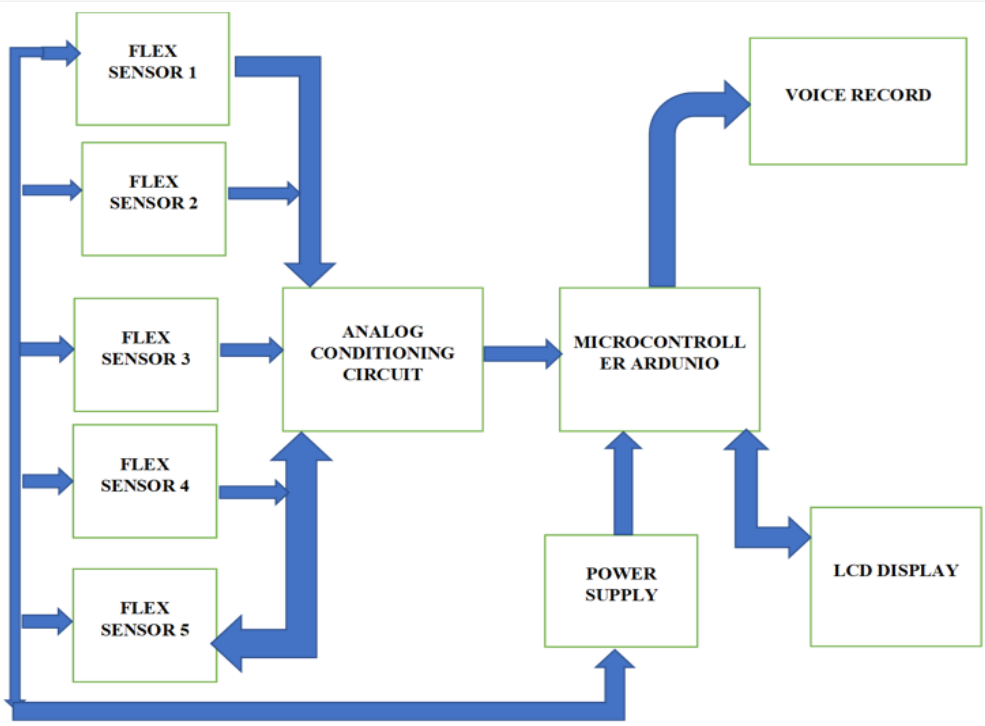

Fig 1: block diagram of system

The system's Block diagram demonstrates how the components were put together. The glove has a flex sensor built right into it. Resistance changes proportionally as a result of the flex sensor. The Arduino is coupled with this flex sensor. The Arduino Uno board handles the processing of these hand gestures. Additionally, an LCD display and voice recorder are linked to the Arduino to record and playback audio

Flex Sensor:

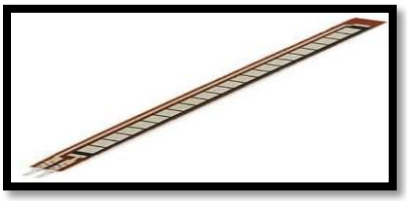

Fig 2: Flex Sensor

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:05/May-2023 Impact Factor- 7.868 www.irjmets.com

Using a flex sensor on each finger, signed leBters are identified. According to the degree of bend in the sensor, as depicted in the figure, the flex sensors adjust their resistance. The flex sensor provides an excellent form factor on a thin, flexible substrate as a changeable printed resistor. When a glove-mounted sensor is bent, it generates a resistance output according to the radius of the bend. The resistance value increases with decreasing radius. They have a 5-volt input requirement and a 0 to 5-volt output range. Three-pin connectors (ground, live, and output) are used to connect the sensors to the apparatus. In the device's sleep state, sensors are turned on. When not in use, it enables them to go into power-saving mode.

Fig 3: Glove with flex sensors

Micro-controller

One of the best-known microcontrollers in the business is the PIC16F877A. It is easy to code or programmed this microcontroller, and it is also very convenient to use. The fact that it employs flash memory technology is one of its key advantages because it allows for unlimited write-erase cycles. This microcontroller has 33 input and output pins out of 40 pins. Numerous applications with Pic microcontrollers use the PIC16F877A.

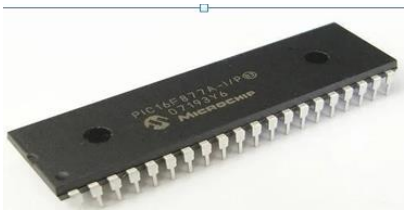

Fig 4: Microcontroller

Lcd Display

An LCD is a flat panel display, electronic visual display, or video display that takes advantage of liquid crystals' ability to modulate light. A variety of devices, such as computer displays, televisions, instrument panels, etc., employ LCDs. Signage and displays in aircraft cockpits Compared to CRT, LCD panels use less energy and can be disposed of more safely. Here, the output is displayed using a 16x2 LCD.

Fig 5: LCD Display

Gesture Recognition Action

The main component of the recognition system is the gesture manager. It has information to compare to the incoming information. The system makes an effort to align incoming data with the current posture. The

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:05/May-2023 Impact Factor- 7.868 www.irjmets.com

distance to the current data is determined using the finger bend values and each posture specification. The position and orientation data are then compared similarly.

Working principle

The sensor works on the principle of bending strip theory; it detects changes in resistance anytime the strip is bent. Any controller can be used to measure this. This sensor functions similarly to a variable resistor since it changes resistance when it bends. Since the resistance will differ when the surface is level, the resistance change may be dependent on the surface's linearity. The resistance would be different if the sensor were rotated by 450 degrees. Similar to how the resistance would be different when this sensor is turned to 900.

III. RESULTS AND DISCUSSION

The designed circuit has been connected and tested with many Hand gesture where the voice was clear for any gesture as shown in the figures bellows, where Figure 6. shows four finger is bend

Fig6: Hand gesture HELLO

Fig 6: Shows that the Index finger is bent and Lcd shows the message Hello

Fig7: Hand Gesture THANK YOU

Fig 7: shows that the thumb is bend and Lcd shows the message Thank You

FIG8:Hand Gesture SORRY

Fig 8: shows that the Ring finger is bent and Lcd shows the message Sorry

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:05/May-2023 Impact Factor- 7.868 www.irjmets.com

IV. CONCLUSION

The system will benefit those who are physically disabled and close the gap between them and average individuals. It is always usable because it is a two-way portable communication system. For patients who are unable to speak, this prototype is useful. It serves as a helping hand for the paralyzed and unique cases of diseases, as well as a tongue for the deaf. By creating a vocabulary for intricate systems, it can be used to convey several messages.

V. REFERENCES

[1] Praveen kumar , S. Havalag, Shruthi, Urf Nivedita, "The Amazing Digital Gloves that give voice to the voiceless", IJAET, Volume 6, Issue 1, March 2013, PP. 471-480.

[2] Sankar kumar, Jenitha J, Narmadha, Suganyaa, "An embedded Module as virtual tongue for voiceless", Volume 4, Issue.3, May 2014, PP. 155-163.

[3] Syed faiz Ahmed, Syed Muhammad Baber Ali, Sh. Saqib Munawwar Qureshi, "Electronics speaking Gloves for Speechless patients", IEEE, Nov 2010, PP. 56-60.

[4] Abjhijit auti, V. G. Puranik, Dr. A.K. Kureshi, "Speaking gloves For Speechless Persons", IJIRSET, Volume 3, Issue 4, April 2014, PP. 282-290