VIT-AP UNIVERSITY

SMART GLOVE FOR DEAF AND DUMB PEOPLE

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ABSTRACT

This paper presents the development of smart gloves for mute people using Arduino and an LCD display. The objective of this project is to create a device that enables mute people to communicate with others without the need for a third party interpreter or a speech synthesizer, and also to have a visual feedback of the communication. The smart gloves work by detecting hand gestures and translating them into spoken words or text messages, which are displayed on the LCD display. The system consists of a pair of gloves embedded with sensors, an Arduino board, and an LCD display. The gloves use flex sensors to capture hand movements and gestures, which are then processed by the Arduino board. The processed data is displayed on the LCD display attached to the gloves. The smart gloves have been tested with a group of mute individuals, and the results show that the system is accurate, reliable, and easy to use, and it also provides a visual feedback of the communication, which can be helpful for some users. The smart gloves offer a cost-effective solution to facilitate communication for mute individuals, promoting their independence and social inclusion, and also providing an additional aid for those who have hearing loss.

Smart gloves are useful for mute people because they offer a practical and cost-effective solution for communication. Mute individuals often face significant barriers in communicating with others, as they are unable to use spoken language. In many cases, they rely on the assistance of a third party interpreter or a speech synthesizer, which can be expensive and impractical. smart gloves provide an alternative solution, allowing mute individuals to communicate using hand gestures, which are translated into spoken words or text messages.

Moreover, the addition of an LCD display to the gloves provides visual feedback of the communication, which can be especially helpful for those who have hearing loss. The smart gloves offer a convenient and portable way for mute individuals to communicate, promoting their independence and social inclusion. With the help of the smart gloves, mute individuals can communicate effectively with others in various settings, including at home, school, work, or in public spaces, without the need for a third party interpreter or a speech synthesizer.

INDEX

INTRODUCTION

Mute individuals, also known as non-verbal individuals, face significant challenges in communicating with others due to their inability to use spoken language. This can be due to a variety of factors, including congenital disabilities, injuries, or medical conditions that affect the vocal cords or other parts of the speech apparatus. The inability to communicate effectively can lead to social isolation, depression, and reduced opportunities for education, employment, and social interaction.

To overcome these challenges, researchers and developers have been working on various assistive technologies to enable mute individuals to communicate with others. These technologies include speech synthesizers, which translate written text into spoken language, and sign language recognition systems, which interpret sign language gestures and translate them into spoken or written language.

One promising area of development is the use of smart gloves for mute individuals. Smart gloves are wearable devices embedded with sensors that can detect hand movements and gestures, which can be translated into spoken words or text messages. The gloves can be connected to a mobile application or a computer, which receives the data from the gloves and translates it into spoken or written language.

Smart gloves have several advantages over other assistive technologies. They are portable, cost-effective, and can be customized to meet the specific needs of the user. Moreover, smart gloves offer a practical solution for those who are unable to use sign language or who may find it difficult to use speech synthesizers.

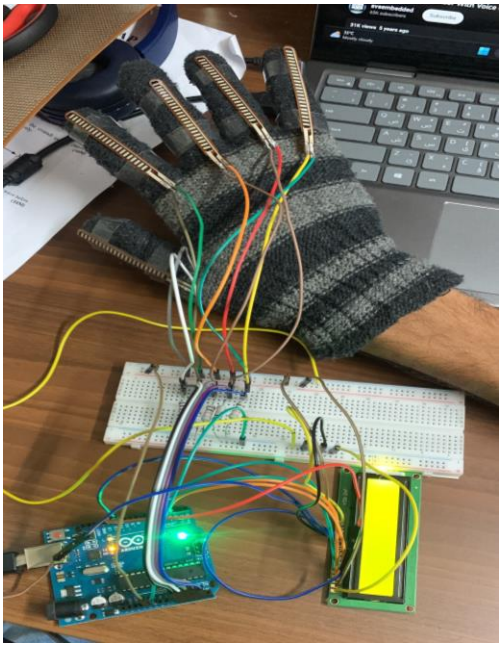
Arduino is a popular microcontroller platform that can be used to develop smart gloves for mute individuals. It is open-source, easy to use, and can be programmed to work with various sensors and wireless communication modules. With the help of Arduino, developers can create smart gloves that are affordable, reliable, and easy to use, providing a valuable solution for mute individuals to communicate with others.

PROBLEM DEFINITON

The problem that smart gloves using Arduino and an LCD display aim to solve is the communication barrier faced by mute individuals. Mute individuals are unable to use spoken language to communicate with others, which can lead to social isolation, reduced opportunities for education and employment, and reduced quality of life. Currently, available assistive technologies, such as speech synthesizers and sign language recognition systems, have limitations in terms of cost, complexity, and accessibility.

Smart gloves using Arduino and an LCD display offer an alternative and practical solution for mute individuals to communicate with others. The gloves use sensors to detect hand movements and gestures, which are translated into spoken words or text messages. The addition of an LCD display provides visual feedback of the communication, which can be especially helpful for those who have hearing loss. The smart gloves offer a portable, cost-effective, and customizable solution that can be used in various settings, including at home, school, work, or in public spaces.

The problem of communication barriers faced by mute individuals is significant and has a significant impact on their quality of life. The development of smart gloves using Arduino and an LCD display provides a valuable solution to promote independence, social inclusion, and improved communication for mute individuals. The challenge is to develop a system that is accurate, reliable, and easy to use, and that can be adapted to meet the specific needs of the user.



OBJECTIVES

The objectives of developing smart gloves using Arduino and an LCD display for mute individuals are as follows:

- To create a practical and cost-effective solution for communication for mute individuals, promoting their independence and social inclusion.
- To develop a system that accurately detects hand movements and gestures and translates them into spoken words or text messages.
- To integrate an LCD display into the smart gloves to provide visual feedback of the communication, which can be especially helpful for those who have hearing loss.
- To develop a user-friendly interface that can be easily customized to meet the specific needs of the user.
- To test the system with a group of mute individuals to evaluate its accuracy, reliability, and ease of use.
- To identify areas for future development and improvement based on user feedback and testing results.

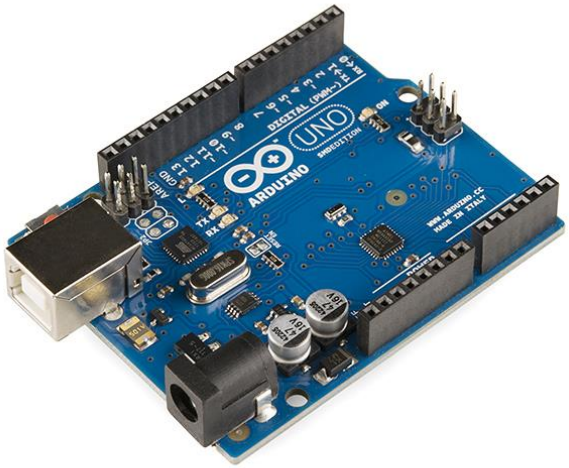
The overall goal of developing smart gloves using Arduino and an LCD display is to provide a practical and effective solution for communication for mute individuals, addressing the current limitations of existing assistive technologies. By achieving these objectives, we aim to improve the quality of life for mute individuals by promoting independence, social inclusion, and improved communication.

METHODOLOGY/PROCEDURE

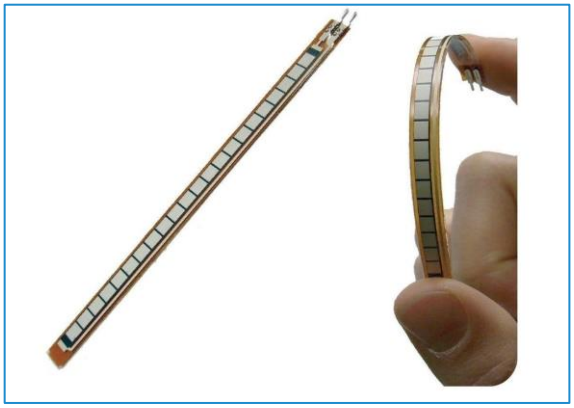
This glove is total works on the sensors. which are having the 5 sensors on 5 fingers. means one sensor on one finger respectively. and these sensors are the flex sensor. when we flex these sensors the value of the reading gets changes. so we will use this reading in our application. the flex sensor varies the values from 0 to 1023, so you have to modify your code according to the sensor value. we put all these sensors over the glove as we bent our finger the flex sensor also will be bent. so, when we bent our finger the reading got changed and the Arduino send the value on the LCD screen. for example, if we bent our first finger then the sentence on the LCD will be "I need food". and if I bent my thumb then it will show "I need water". same condition for the rest three fingers also

Components Required:

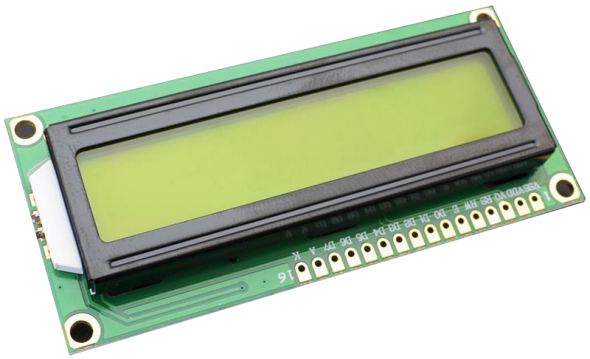
- Arduino Uno
- Flex sensor
- 16X2 display
- 10k Potentiometer
- 10k ohm Resistor
- breadboard
- wires
- glove

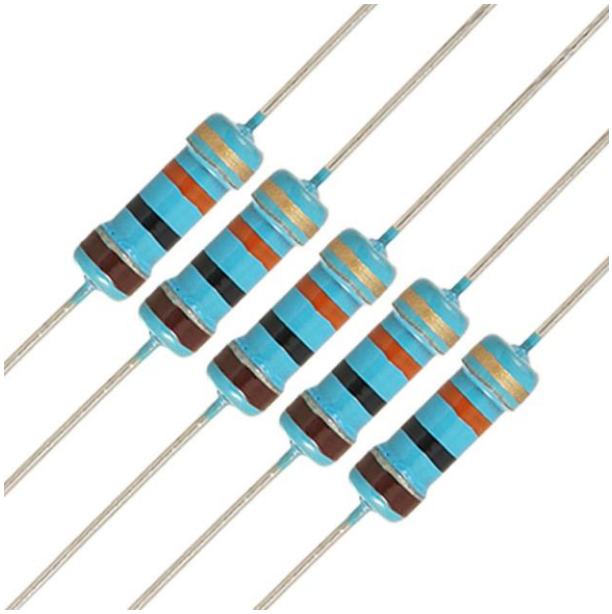


Arduino Uno



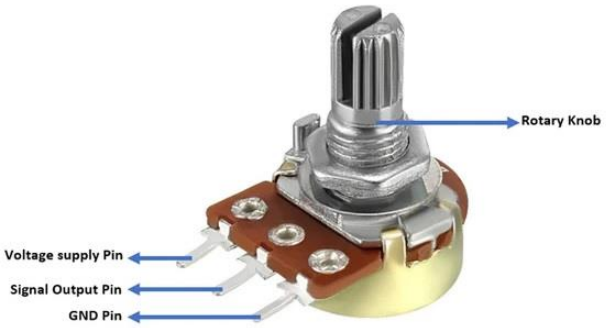
Flex sensor





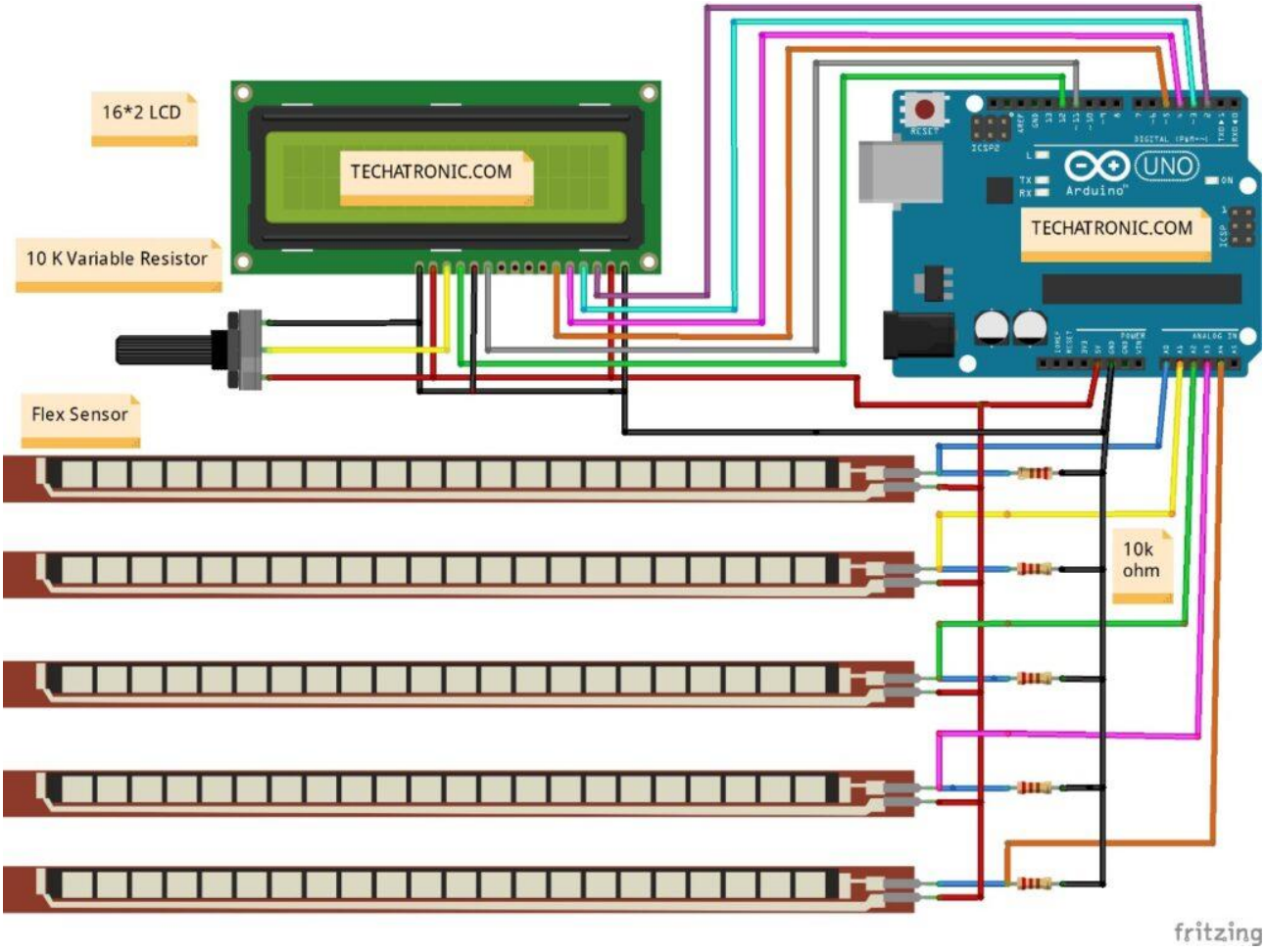
- 16X2 display

10k ohm Resistor

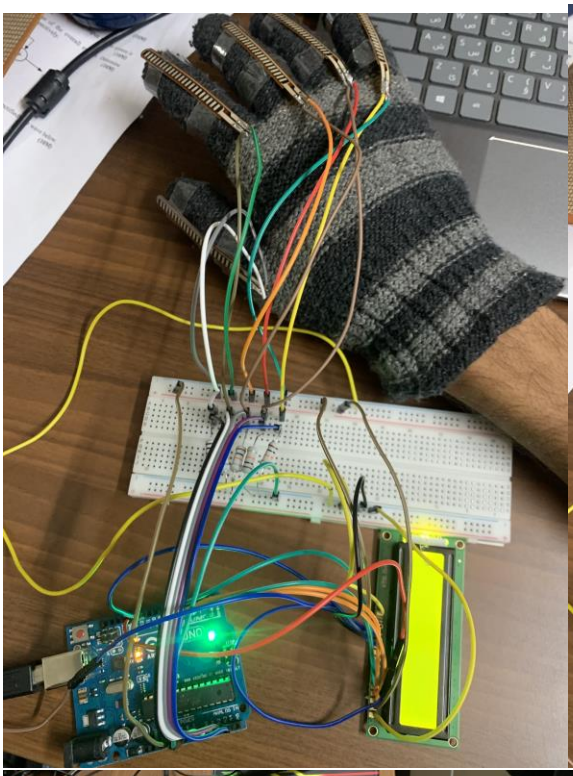


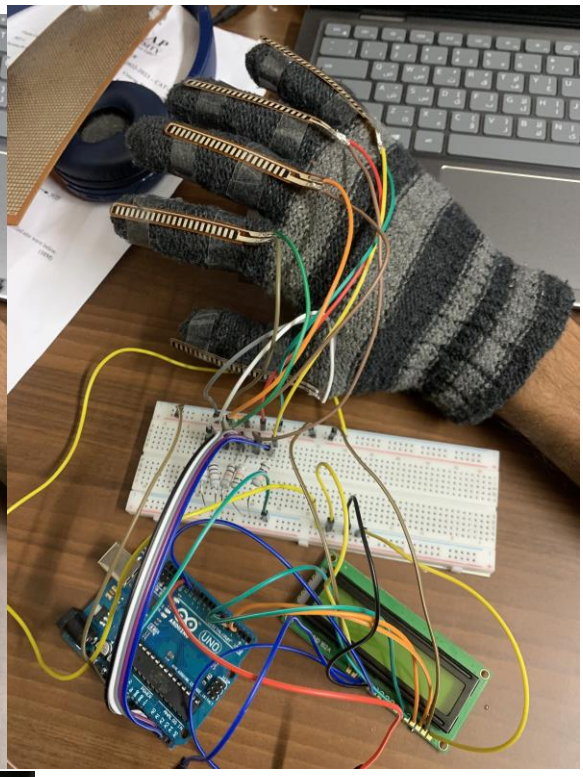
- 10k Potentiometer

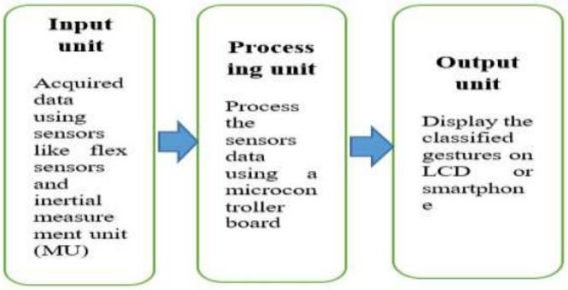
Circuit Diagram



RESULTS AND DISCUSSION







CONCLUSION AND FUTURE SCOPE

In conclusion, the development of smart gloves using Arduino and an LCD display for mute individuals offers a practical and cost-effective solution to address the communication barriers faced by this population. The smart gloves use sensors to detect hand movements and gestures, which are translated into spoken words or text messages, and an LCD display provides visual feedback of the communication. The system offers a portable, customizable, and user-friendly solution that can be used in various settings, promoting independence, social inclusion, and improved communication for mute individuals.

The future scope for the development of smart gloves using Arduino and an LCD display is significant. First, there is a need for further research to improve the accuracy and reliability of the system. This can be achieved through the use of more advanced sensors, machine learning algorithms, and artificial intelligence. Second, there is a need to develop more advanced user interfaces that can be easily customized and personalized to meet the specific needs of the user. This can be achieved through the integration of voice recognition technology, virtual assistants, and augmented reality. Third, there is a need to promote the accessibility and affordability of the smart gloves to ensure that they are available to a wide range of individuals who could benefit from them.

Overall, the development of smart gloves using Arduino and an LCD display for mute individuals is a promising solution that has the potential to improve the quality of life for this population. With continued research and development, this technology can be further advanced to meet the specific needs of mute individuals and promote their independence, social inclusion, and overall well-being.

Codes in Appendix

```
int thumb;
int first_finger;
int second_finger;
int third_finger;
int fourth_finger;
#include <LiquidCrystal.h>


// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
void setup() {
  // put your setup code here, to run once:
  pinMode(A0, INPUT);
  pinMode(A1, INPUT);
  pinMode(A2, INPUT);
  pinMode(A3, INPUT);
  pinMode(A4, INPUT);
  Serial.begin(9600);
  lcd.begin(16, 2);

}


void loop() {
  // put your main code here, to run repeatedly:
int thumb = analogRead(A0);
int first_finger = analogRead(A1);
int second_finger = analogRead(A2);
int third_finger = analogRead(A3);
int fourth_finger = analogRead(A4);
Serial.print(thumb);
Serial.print("\t");




Serial.print(first_finger);
Serial.print("\t");
```

```
Serial.print(second_finger);
Serial.print("\t");



Serial.print(third_finger);
Serial.print("\t");




Serial.println(fourth_finger);
Serial.print("\t");



if(thumb >=40 )
{
  lcd.clear();
lcd.setCursor(1,0);
lcd.print("HEY THERE!");
delay(500);

  }




else if(first_finger >=30 )
{
  lcd.clear();
lcd.setCursor(1,0);
lcd.print("MY NAME IS SAI");
delay(500);

  }
else if(second_finger >=300 )
{
  lcd.clear();
lcd.setCursor(1,0);
lcd.print("I'M HUNGRY");
delay(500);
```

```
}


 else if(third_finger >=230 )
{
  lcd.clear();
lcd.setCursor(1,0);
lcd.print("GOOD AFTERNOON");
delay(500);
}


else if(fourth_finger >=25)
{
  lcd.clear();
lcd.setCursor(1,0);
lcd.print("I'M SLEEPY!");
delay(500);



  }


  else{
     lcd.clear();
lcd.setCursor(1,0);
    lcd.print("NOTHING");

    }









}
```

REFERENCES

- Sign language translator project | Final year ece project | Tecahtronic (techatronic.com)
- https://youtu.be/BxH4vPYfL-A
- SMART_GLOVE_USING_ARDUINO_WITH_SIGN_LANGUAGE_RECOGNITION_SYSTEM_ijariie11898.pdf