Sign Language Communication using Smart Glove

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Abstract-In this modern world the physical challenged people face many problems. The deaf people are trained with sign language but normal people cannot understand this sign language so the communication becomes very difficult. In some situations, the deaf people have some emergency, when a deaf person traveling alone, if they need to communicate with nearby people or convey a message, it becomes very difficult to communicate. Thus, this smart glove system is implemented here this smart glove consists ofthe flex sensors and the Arduino uno. When the deaf people are alone and not able to communicate using normal language, they use this sign language for communication. This Sign language is not understandable by all normal person. when this smart glove is used by the deaf person the information is absorbed by the flex sensors and processed by the aurdino uno which is fixed in the glove. And the information is used conveyed through text and audio using Bluetooth module, which is understandable by the normal person.

Keyword-flex sensor, arduino uno, node mcu

I. Introduction

Sign language are languages which are used by deaf and dumb people, to communicate with normal person using this language this smart glove is used. Here the glove is fixed with the microcontroller and flex sensors which is further powered by lipo battery, when a person uses this smart glove to communicate with the normal person the flex sensors detects the gestures and sends it to the aurdino uno where the process takes place and the output is show in the form of text and audio to the normal person, thus the communication for the deaf/dumb people becomes easy using this method.

II. COMPONENTS USED

This smart glove representsletters, number andphrases in sign language in the form of hand gestures, we should know the movement in finger for each number, phrase and letter. This electronic device has five flex sensors each sensor is fixed infingers (flex sensor has the voltage divider and the sensor is implemented with resistors

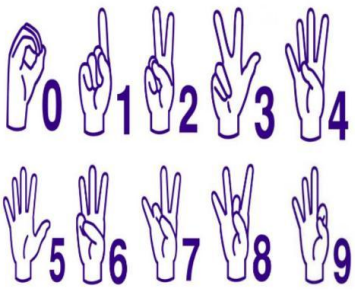


Fig1: ASL sign language

it is used in fabric material;this microcontroller is waterproof thus this microcontroller is used in this system. This ardunio has six analog-digtal pins. The analogy and digital pins used converts the information from the flex sensors to the microcontroller. The trigger sensor is used for the on and off of the system. Here these electronic materials are connected with the LiPo battery.

2.1 ARDUINO

This microcontrollerMain Board is based on the ATmega328p. The operating voltage for this is 2.7- 5.5v, it has 14 digital input and output pins. Thisardunio is washable. The work of this ardunio is to process the hand gestures or the movement done by the user which is given through the flex sensor. Thisardunio is powered by lipo battery. Arduino is connected with flex sensors with 5 analog pins present in Atmega 328p. The positive and negative of the arduino is connected with the flex sensors.

Fig2: microcontroller (Arduino uno)

2.2. FLEX SENSORS

This sensor measures the amount of bending and flexing done by the user to communicate with the use of sign language. The length of the flex sensor is4.5 inches, it consists of 2 pins p1 and p2 where p1 is ground p2 is connected to vcc, the power is supplied usinglipobattery. There are different types of sensors and the sensor used in this is the fibre flex sensor. This sensor works on the

bending strip principle. This flex sensor is connected with an 10k resistor. Here the angle displacement is measured using the voltage form the resistor. Every flex sensor is connected with 10k resistors. The range of resistance bend will vary from 45k-125kohms. By bending the flex, we will get resistance value and for each resistance value we should train by using training set and fed the information by using the ATmega 328p.

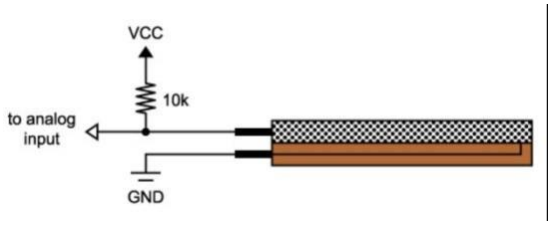


Fig3: circuit diagram for flex sensor

2.3. NODE MCU

NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module

The node mcu acts as the wifi module and it helps in uploading the values or datas to the cloud..

2.4. LiPo BATTERY

This lithium ion polymer battery is rechargeable and this uses a polymer electrolyte. This battery is used in this because is gives a specific energy when compared with other batteries.

2.5. IOT

When the signs are used to convey the message the bending of the flex sensor is measured using the voltage with the help of the connected resistors . Here for displaying the output through the smart phone (iot) internet of things is used. Using this iot an app is designed for displaying the output through the smartphone. This app displayes the output in the form of text and audio.

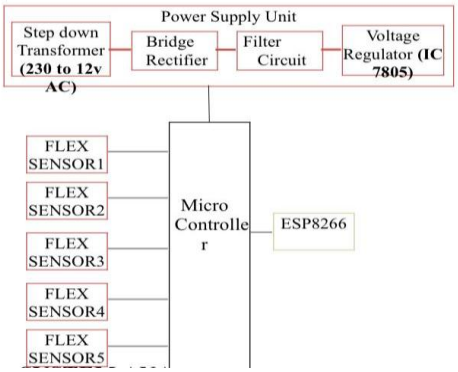
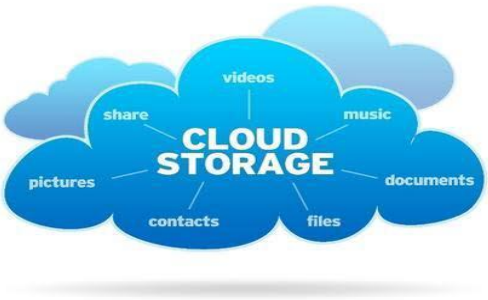


Fig4: flow cart of smart glove

III. CLOUD STORAGE

Cloud storage is a model of computer data storage in which the digital data is stored in logical pools said to be on "the cloud". The physical storage spans multiple servers (sometimes in multiple locations), and the physical environment is typically owned and managed by a hosting company. These cloud storage providers are responsible for keeping the data available and accessible, and the physical environment protected and running. People and organizations buy or lease storage capacity from the providers to store user, organization, or application data.

Cloud storage services may be accessed through a collocated cloud computing service, a web service application programming interface (API) or by applications that utilize the API, such as cloud desktop storage, a cloud storage gateway or web-based content management system



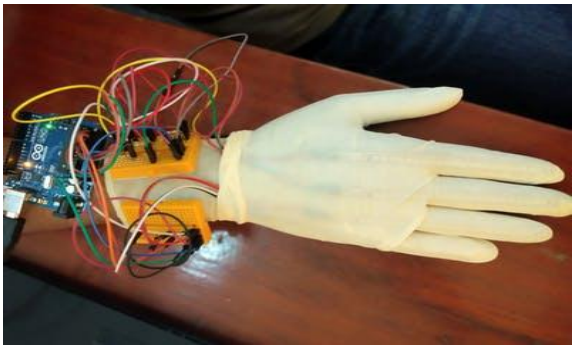


Fig6: CLOUD STORAGE

IV. ANDROID APPLICATION

We made an Android application speaks to the stream chart of the application and shows the

Principle interface of the application to be the interface between the glove and the client and to be a simple and reasonable approach to impart. The application is created utilizing Android Studio IDE. For more data about the code, Addendum - C: Android Application Code Android Studio is a planned progression condition (IDE) from Google that outfits creators with instruments expected to gather applications for the Android working framework stage. Android Studio is open for download on Windows, Mac and Linux. The establishment for Android Studio depends upon Intel Thought. The Android Studio IDE is allowed to download and utilize. It has a rich UI improvement condition with setups to give new originators a take off stage Into Android progress.

V. SIGN INTERPRETATION APPLICATION

The Node MCU sends the data or values to the cloud and the android application access the data through the cloud. The android application has the update section to update the phone numbers of the person to whom should the messages be communicated. And it also contains send button. If the disabled person wants to send the message to the person who is far away then he can click the send button then the message is communicated to the person via SMS. Once the person receives the sms then he can open the app to see the message in text format as well as in audio.

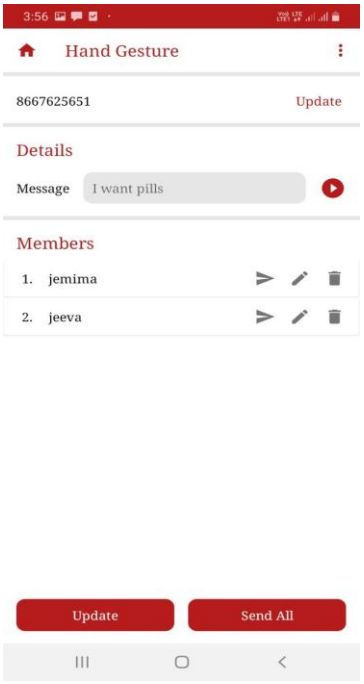


Fig7: output

VI. PROBLEMS FACED

While going the whole process we faced several problems, the sign language gestures are difficult for using. The size of hand is unique for each person thus there may a variation while different person uses the smart glove. Even when the same person uses the glove there may be variation in the sign this leads to the occurrence of the error. There is no accuracy in this glove. Another major problem we faced is the value of the sensor will not stable. The cost of the Sensors were high, the quality of the sensor is also not good.

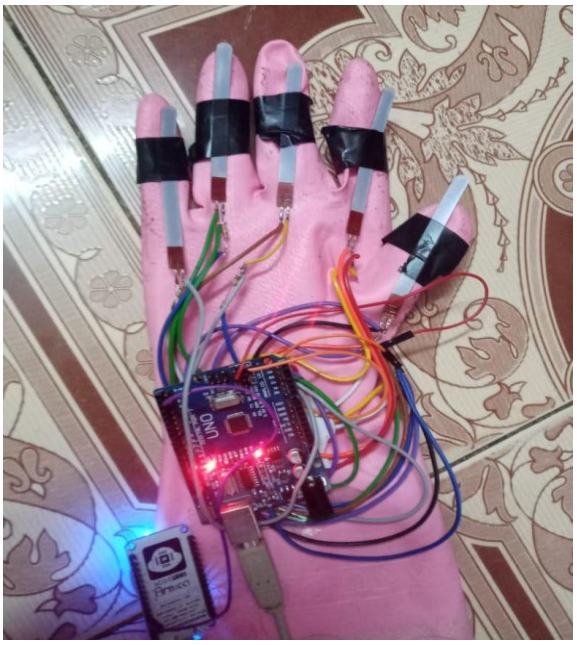


Fig8: smart glove

VII. Conclusion and future work

In this project each sign given by the user gives an output in the form of word. Here we have implemented with 26 basic words for each sign. In the near future this glove is extended by implementing with inbuilt sensors like temperature sensor is used to view the body temperature, pressure sensor is used to view the heartbeat of the body.

VIII. REFERENCES

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