COMMUNICATION AMONG BLIND DEAF AND DUMB

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Abstract

Communication is an important aspect of day to day life. Yet not everyone has the privilege of communicating without any difficulties. Visually impaired and speech impaired people have to go through a lot of trouble in order to communicate efficiently. In this paper, a device is proposed which aims at reducing the difficulty in communication among blind, deaf and dumb. A glove is designed using "flex sensors" which converts the gesture made into required output as per the requirement of the people who are communicating. The possible outputs are voice, text and in some cases braille output.

This device is not limited to people with disabilities. It also helps people without disabilities to communicate among blind, deaf and dumb persons without having to learn any complex sign languages.

I. INTRODUCTION

In this paper, we come up with measures to make communication easier among visually and speech impaired people and also among normal people [1]. According to a survey more than 300 million people suffer from this disability.

There can be a lot of confusion and inconvenience when communicating with a person who has the fore mentioned disabilities, especially if the language or mode of communication is not common. Generally, there is no education or awareness about sign language in schools or colleges. Because of this people with these disabilities feel left out by the society.

A mute person generally communicates with sign language [2]. Imagine he wants to communicate with a person who doesn't know sign language. A problem arises. Similarly, to communicate with a deaf person, sign language is required. The thing about sign language is that it's very complicated for a normal person to learn and also, it's not widely taught in schools. This creates a gap between people while communicating. To bridge this gap, a sensor glove is developed using flex sensor [3][4].

Some drawbacks of existing methods are that they rely on standard sign languages. These sign languages may not be universal. Also, these complicated sign languages are not taught to everyone. Therefore, the standard sign language is of no use for a normal person. Another drawback is that if a person has more than one disability, only sign language wont work. We also need voice output and text output. But the most important thing is that if a person is deaf dumb and also blind then braille is needed. Existing methods lacks these facilities.

Some fundamental goals of this paper are overcoming any barrier between correspondences among handicapped individuals utilizing a glove. Also overcoming the need to learn all the standard sign language. Further, develop a wide database which enables the user to assign desired meaning to a gesture.

II. METHODOLOGY

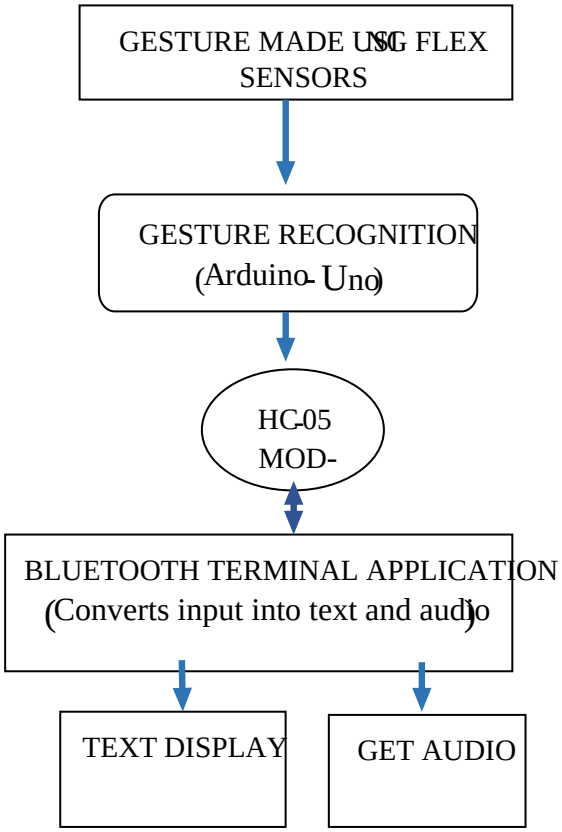

Fig 1. Block Diagram of the System

1.1 Set up and Gesture recognition

In this paper, the device is in the form of glove. Five flex sensors are used. One flex sensor per finger. We note down the resistance value of each flex sensor both when it is bent and when it is kept idle. This bent resistance is the key feature. Based on the range of bent resistance we determine if the gesture is valid. All the five flex sensors are tested for its resistance value. The minimum possible gestures that can be made using five flex sensors are 2^5 that is 32. Each gestures are assigned a certain meaning [6]. Which can be changed.

The resistance values are read by the Arduino Uno and the assigned gestures for that resistance range is detected by Arduino Uno microcontroller. HC-05 Bluetooth module is used to communicate between arduino and the Bluetooth terminal application.

1.2 Conversion of gestures into text and audio

After the process of gesture recognition by the arduino Uno the input is given to the Bluetooth terminal app via HC-05 module. The input is the resistance values of the flex sensors. This input is converted into respective text message and audio output. The text is displayed on the mobile screen and audio output is obtained from its speaker.

IV. SOFTWARE REQUIREMENT

i) **Bluetooth terminal application**

This can help to test on community with any device via Bluetooth. It allows a bidirectional communication with Bluetooth devices. It allows to emulate a Bluetooth terminal, from which we can connect to any Bluetooth-Serial adapter device. It is compatible with most available devices.

V. HARDWARE REQUIREMENTS

i)Arduino UNO

A glove is designed using Arduino Uno. It has a microcontroller. It has 14 pins. 6 analog inputs. We can provide external power supply. We have used analog A0-A2 as input pins with +5V power supply.

ii)Flex Sensors

A Flex Sensor gauges the measure of diversion or twisting. The resistance of the sensor changes when it is bent which is the key factor. The range is 4500 to 12500.Here we use the Flex Sensors according to the circuit of the divider of the voltage. When the flex sensor is bent its value is in the range of 1023-800. When it is kept idle the resistance will be 1023.

iii) Bluetooth Module (HC-05)

The HC-05 module is used to send messages from the mobile to the Arduino and vice versa. This module comes in handy because it can be paired with wide variety of electronic devices.

VI. Result

Fig2.1 Resistance value of the sensor

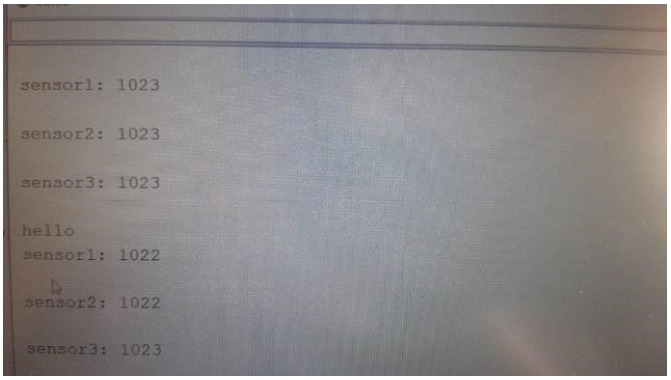

Fig 2.2 Resistance value of the sensor

Fig 2.2 shows the resistance value of the flex sensor when it is idle or straight

Table1. Data table

The table below shows the combinations using 3 sensors and their respective message.

COMBINATIONS			MESSAGES
value 1	Value 2	Value 3	
0	0	0	Come here
0	0	1	Ok
0	1	0	Go there
0	1	1	Good morn-ing
1	0	0	Ready
1	0	1	Go slow
1	1	0	Please
1	1	1	Hello

2.1 Communication process

For deaf person to communicate with blind and/or mute. Gestures are made and resistance input is given to the application via Bluetooth module. The mobile application further converts the input to text and audio. The text is displayed on the screen for the mute and deaf person to read. The audio is obtained from the mobile speaker for the blind person [7].

For mute or blind person to communicate with blind and /or deaf. The same procedure mentioned above is followed. For a person who has all the three disability, braille translator is used [10]. This is addressed in the future works.

For a normal person without any disabilities communicating with people with disabilities becomes easier [8]. Since they do not have to know the gestures made. They can simply read the text or listen to the audio output.

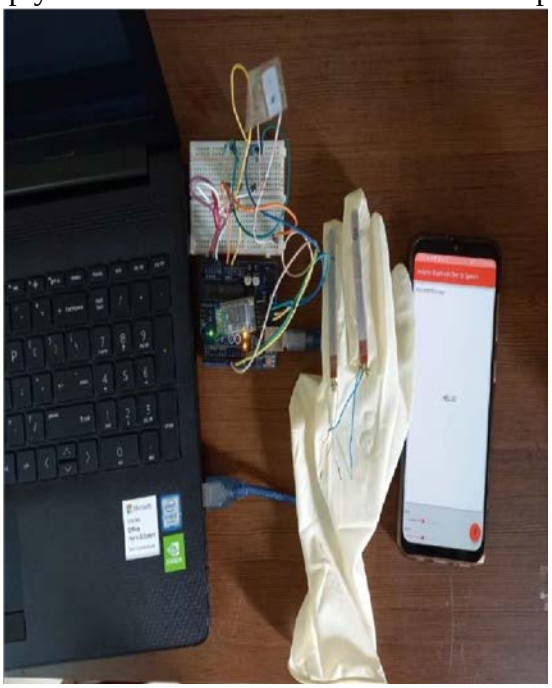

Fig 3 Hardware setup

Fig 3 shows the hardware setup of the system.

VII.CONCLUSION AND FUTURE WORKS

The drawbacks and future works are discussed below:

i. To provide a database of gestures, which is easy and adheres to the current lingo [11].

ii. Develop long distance communication and use internet facility

iii. Smoother detection of gestures.

In this paper we provided a frame work to overcome the problem of communication among disabled people. It also makes communication easier for normal people. This makes everyone feel included in the conversation.

We also use a mobile app which displays the message to make it handy for the user. Communication with disabled people is now same as talking to any other person.

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