Project Title
User-Friendly Hand Gesture Vocalizer for Aged or Physically Challenged People.

Name of College and Department
Karnatak Law Society's Gogte Institute of Technology
Department of Computer Science and Technology

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Introduction
Humans possess the voice capability for interaction and communication among each other. Unfortunately, not everybody has the capability of speaking and hearing. Sign language used among the community of people who cannot speak or hear as the means of communication. Sign language is a gesture representation that involves simultaneously combining hand shapes, orientation and movement of the hands, arms or body, and facial expressions to express fluently with a speaker's thoughts. The people who cannot speak makes use of the sign languages to communicate with other fellow vocally impaired person and even with other normal people who knows the meanings of sign languages or an interpreter is needed to translate the meanings of sign languages to other people who can speak and do not know the meanings of sign languages. However, it is not always possible for an individual to be around all the time to interpret the sign languages and not everybody can learn the sign languages. Thus, another alternative is that we can use a computer or a smart phone as a mediator. The computer or a smart phone could take an input from the vocally impaired person and give its textual as well as and audio form of output.

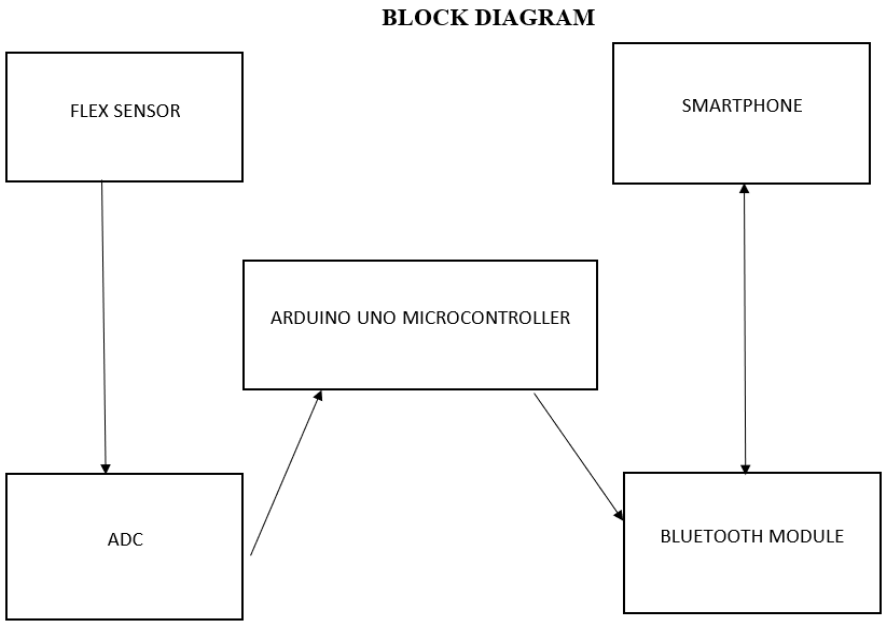
Sign language is composed of visual gestures and signs, which are used by those who are specially challenged in hearing and speaking. It is a well-structured code gesture where every sign has a specific meaning allotted to it. There are 143 different existing sign languages all over the world, mainly American Sign Language, British Sign Language, French Sign Language, Japanese Sign Language, and Indian Sign Language. Every country has its own language since sign language is not a universal language and also has its own grammatical and syntactical meaning as per the language that is referred, which is differs from country to country.

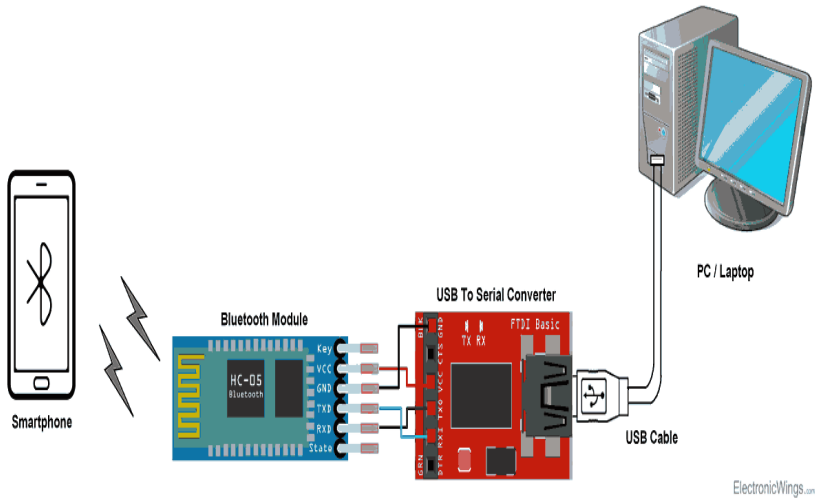
Objectives

- To provide a unique and intuitive way to interact with technology.
- To detect and recognize hand gesture for fluid device control.
- It facilities convenient and intelligent two-way communication, by translating visual language into speech that can be understood by all.
- The system can also help the bed-ridden patients or physically challenged to be semi-independent.
- Serial communication mode to transmit and receive data.
- The voice output is made available in different languages using the Google API maintaining diversity.

Methodology

In the given system, power supply is given by microcontroller 7805 which maximum can give 5 volts. Flex sensor of 2.2 inch were used for the bending of the fingers .To detect whenever one figure is contact with one another we get the input voltage is 0.Here a A\D converter is used with turn the analog signal to digital signal. Here 10 ohm resistor are in parallel with flex sensor which again have the resistance of 10 ohm which generate a digital pattern given to the micro controller .A firmware is inserted in the microcontroller such that each gesture is assigned a particular symbol. It has a Bluetooth module which is in parallel to voice processor and in series with Bluetooth so that we can get to know the board is taking response or not. Bluetooth is connected to port D of PIC is and voice processor is connected to another port C. It has a reset button which is only used to execute the program from the starting.
In short when the finger is moving or making a gesture it is recorded by the flex sensor then it send the signal analog to digital which convert the signal to the digital it is then send to the pic microcontroller it then check the pre-defined gesture which matches both of them then it send the command to the voice processor system .Thus we hear the command through the voice processor.

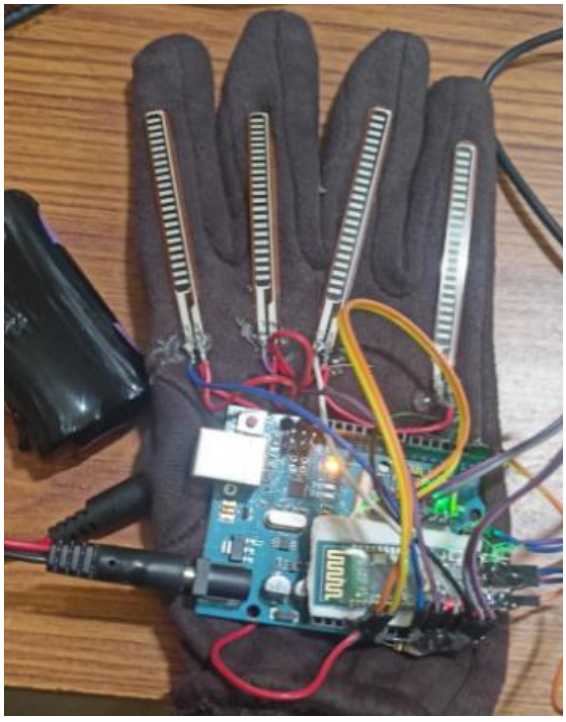




In the given block diagram when the glove make a gesture it is recorded by the flex sensor which then send the signal to the analog to digital converter which convert the signal from analog to digital and send it to the microcontroller which then check the signal in the pre-defined gesture recognition system if it matches with the given signal it then pass the command to the voice processor system and it display the word on the LCD of the given command.

RESULTS

Finally, we have obtained a system that can read the values for a particular gesture done by the user, predict the output for the gesture, display it on the Android screen, and provide an audio output via a android speaker.



CONCLUSION

Sign language is a useful tool to case the communication between the deaf or mute community and the normal people. Yet there is a communication barrier between these communities with normal people. This project aims to lower the communication gap between the deaf or mute community and the normal people .This project was meant to be a prototype to check the feasibility of recognizing sign language using sensor gloves. With this project the deaf or mute people can use the glove to perform the sign language and it will be converted into speech so that normal people can easily understand. The main feature of this project is that the gesture recognizer is a standalone system which is applicable in daily life.

FUTURE SCOPE OF THE PROJECT

The completion of this project suggests that sensor gloves can be used for partial sign language recognition. More sensor can be employed to recognize full sign language .A handy and portable hardware device with building translating system and group of body sensors along with the pair of gloves can be manufactured so that a hearing impaired and mute person can communicate to any normal person anywhere.
To help shape the device into something more slim and comfortable, the team suggests a few improvements to the prototype. Primarily, the team suggests designing a smaller and more compact PCB, which will more efficiently combine the components of the system. The team also recommends using conductive fabric to possibly replace the wiring, the contact sensors, or the flex sensors to allow for less bulky wiring and more conforming, lightweight connections. Slimmer battery supplies which may provide the required voltage and hopefully enough power to last for at least 5 hours would also be a valued improvement to the prototype.