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Sign Language Convert to Voice Based on AVR Microcontroller and Android Application

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ABSTRACT: The advancement of technology has impacted all aspects of the human life. Sign language is the primary means of communication in the deaf and dumb community. Dumb people are specially trained to use this sign language. But normal people are not able to understand what the deaf and dumb people are trying to say. This paper presents a language converter for the deaf and dumb people. In the present world it is very difficult for the deaf and dumb people to talk with the ordinary people. So it becomes impossible for them to communicate with the ordinary people unless and until ordinary people like us learn the sign language for the purpose of communication. The application provides deaf people a way of getting more closed to advanced technology by using speech to image translation. The implementation of project is choose language: it displays the language which the user needs to select such as Tamil, English and Telugu. After choosing the language have to click the translate button. It translates the particular actions into voice and the audio will be displayed as text message. The work presented in the paper mainly reduce the communication gap between the deaf and dumb people and ordinary people and aims to facilitate the deaf and dumb people's lifestyle.

KEYWORDS: Microcontroller, Flex sensor, Bluetooth, Battery, android application and LCD display

I. INTRODUCTION

In our project android application is placed in front of the physically impaired person. The physically impaired person wearing colored rings in his fingers. When he makes the gestures of the alphabets, the glove with the help of flex sensor to capture the hand gesture movements and the analog signal passed through the microcontroller. Then the signal was converted into digital signal and the digital signal converted as voice signal. By combining hand shapes, hand movements, facial expression the output will be displayed. In this system flex sensor plays the major role. Flex sensors

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are attached to the glove using needle and thread. Flex sensors are the sensors whose resistivity varies with the person to person based on their hand movement.

In this paper, AVR microcontroller is used to take input from flex sensors and then this analog data is converted into digital form by using microcontroller. All the data from microcontroller is sent to android phone and we are getting the audio signal of sign language in the mobile phone. By this way physically impaired person will be able to go through the entire sentence that he wants to communicate. By using this system the physically impaired people would be beneficial as they can communicate with everyone freely which indeed would be great achievement for the mankind.

II. EXISTING SYSTEM

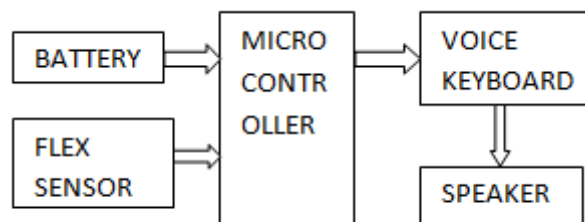


Figure 1: Block diagram

Now a days we communicate through two processes communication through cellular and face to face communication. only the person who knows the sign language can speak with them and normal hearing people cannot chat with them. Hence we need to know the sign language. People with hard of hearing could not make a clear conversation with people .In todays technology we can communicate face to face through an application called MIMIX. The MIMIX technology which can convert speech to sign conversion with a recorder.

The existing system are like as image processing and pattern recognition techniques and glove with flex sensor techniques. The physically impaired person would be wearing colored rings in his fingers. When he makes the gestures of the alphabets, the webcam will capture the exact positions of the rings and perform image processing using color recognition to determine the co-ordinates of the colors. In this projects they are used webcam, color rings and image processing techniques. Flex sensors are attached to the gloves of the dumb and mute people.

III. DRAWBACKS

As the image processing and pattern recognition techniques projects they are used webcam, color rings and image processing techniques and the image recognition process take a lot of time. cost of the project is very high. Lightning problems are affected the results of the project. Microcontroller produces the some specific sentences only. So it is the major drawback. Then the flex sensor resistance varies for different kind of people. so all the time we are changed the embedded C programming based on the users. It is also one of the drawbacks.

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IV. PROPOSED SYSTEM

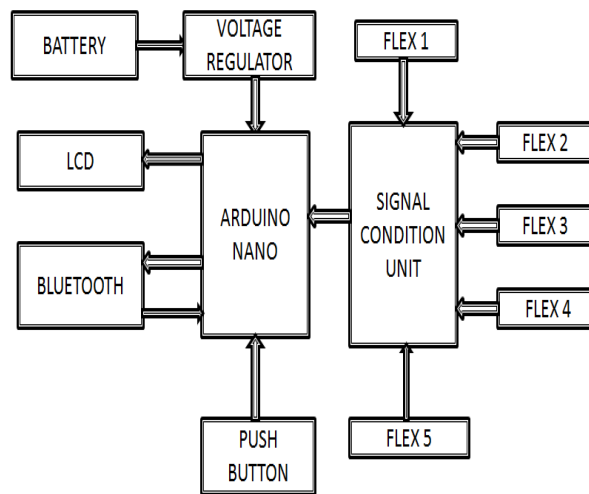


Figure 2:Block Diagram

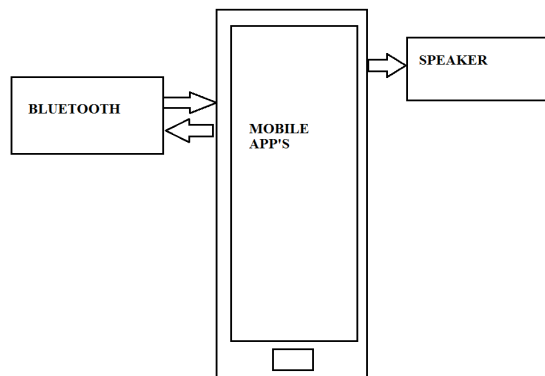


Figure 3:User Section

A block diagram is the total blue print of the proposed project. The total essence and functioning of the project is represented in a single pictorial representation. The block diagram consists of the following components:

- Flex sensor
- Microcontroller
- LCD display
- Bluetooth
- Switch
- Battery
- Voltage Regulator

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A. FLEX SENSOR

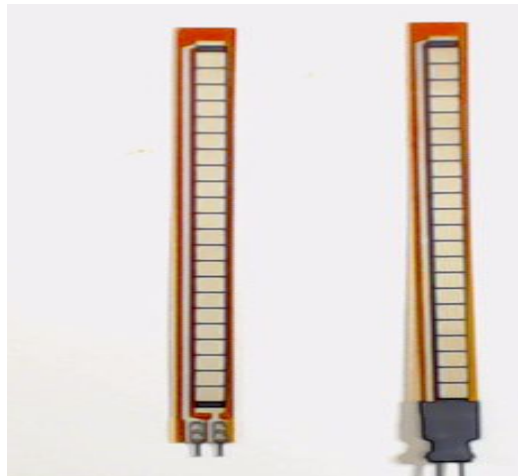


Figure 4: Flex sensor

It reads only the analog signals. Maximum resistance: 30 to 40 k ohms, proportional to the degree of flexing or bending. Nominal resistance: 10 k ohms. Length of the flex sensor is 4.5" inches. It is used for the virtual reality data gloves, bio-metric purpose.

B. MICROCONTROLLER



Figure 5: Arduino Nano

It is arduino nano microcontroller in the family of AVR microcontroller. It gives the high accuracy, small in size. A0 to A7 acts as analog pins and also A0 to A4 is used for Flex sensor. D2 to D7 used for LCD display. D8 to D9 serial connectivity for bluetooth connection.

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C.LCD DISPLAY



Figure 6: LCD Display

A 16x2 LCD has two registers, namely command and data. The register select is used to switch from one register to other. It requires low amount of power supply. The 16x2 translates a display 16 characters per line in 2 such lines.

D.BLUETOOTH

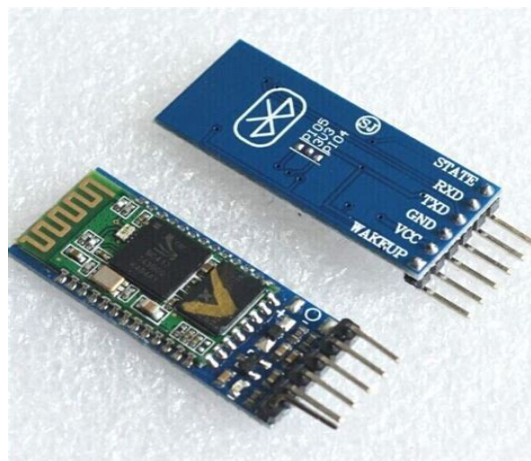


Figure 7: Bluetooth Module

HC-05 module is an easy to use bluetooth serial port protocol. Low voltage energy consumption. Wireless signal transmitter.

It transfer the signal above 30 meters.

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E.BATTERY



Figure 8: Battery with Power supply board

9V battery is used in this system. A power supply board is used for power supply control in this system. This board consists of 4 diodes, capacitor, Voltageregulator, LED and Resistor.

V. SIGN LANGUAGE PICTURE

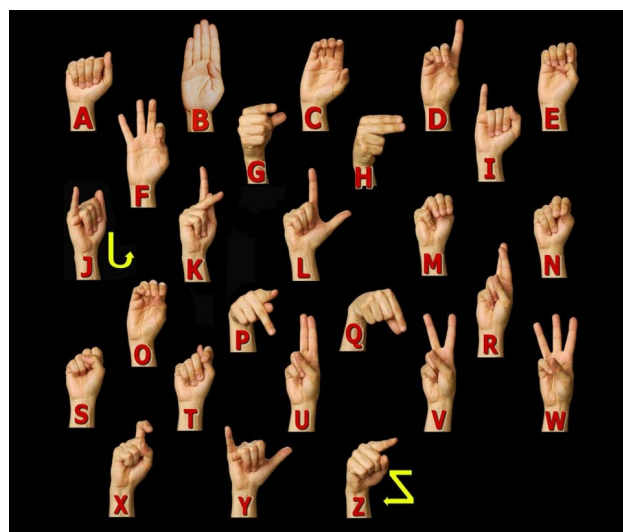


Figure 9: Sign Symbols

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VI. PROJECT OUTCOME



Figure 10: Kit Module

The proposed model will be consisting of combination of hardware and software. Hardware part will include flex sensor on each finger, microcontroller, power supply, android phone and Bluetooth module. Software part will include programming for android phone application. Hardware part will be consisting of flex sensors to take input from different gestures through gloves, microcontroller to convert input analog data to digital data and for further processing, power supply to provide voltage to specific units and finally Bluetooth module to send the data from controller to android mobile.

Here HC-05 bluetooth module will be used. Thus the flex sensor can be manually created and that can be attached to the intermediate of the fingers. So we are easy to fit the glove on all size of hand people and does not affect the bend based resistance values. It gives the accurate value in our projects. And we are used that the two gloves right hand glove and left hand glove. The right hand glove is used to analyse the alphabetic values in the hand gestures movement and the left hand glove is used to identify the sentence, words using the deaf and dumb people. The digital data can be send through the android mobile based on the HC-05 bluetooth module. Thus the digital data value can be changed that the text based on the ASL sign language. So the ordinary people can be easily understand that the end users say. Finally easy to use our projects only ordinary people have in our android application.

VII. CONCLUSION

In this paper, the presented work on gesture recognition through the use of flex sensor. The hand moment of deaf and dumb people will be recognized and it will get converted in form of message and voice that can be shared using android app between Bluetooth connected devices.

The project aims to reduce difficulties in the communication between deaf and dumb people and normal people. This system will improve deaf and dumb persons lifestyle. The gloves of ease to wear and does not need any special training. So its user friendly and it can be easily used by all.

VIII. FUTURE SCOPE

The system can be extended to support more number of signs and different language modes. Different software development strategies and various programming techniques can be exploited to enhance system efficiency.

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