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Speaking System and Android Application for Mute and Deaf People Through Hand Gesture Recognition

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ABSTRACT: Conversion of sign language to the language which can be easily understood by normal people who are not trained on sign language is very important now a days.This system helps deaf or mute people to convey their messages and communicate with the normal people with an ease. This paper is a part of proposed system that aims at designing a system that will recognize hand gestures and will convert it into the language that is understandable by normal people. The system conveys the message of the mute or deaf person via LCD display embedded on the system kit and gives the message a vocal via android phone's speaker. An android application provides a user manual along with the sign discription and the help center that will help user to use the system easily.

KEYWORDS: Hand gesture recognition, Flex sensors, AT- mega328P, Accelerometer sensor, HC05 bluetooth module

I. INTRODUCTION

Sign language is the only way for mute or deaf people to communicate. Sign language is the language through which mute or deaf people can express what they feel through the hand gestures. There are total 4 million people in India who are using sign language. Now a days there are hundreds of languages and their converters are available but the converter for sign language is the need of mute or deaf people for communication, As it is difficult for mute or deaf people to convey there thoughts and messages in the normal day to day life in there surroundings. Their is a need of sign language converter to reduced the communication gap between mute or deaf people and the normal people. There are 250 certified sign language interpreters available in India. While communication accuracy should be maintained.

There are some vision based systems also available but there are some drawback with the vision based systems. As this are camera based geasture detection systems in this user should perform the geasture in front of the camera this sometimes gives detection issues due to focus problem on camera. So to overcome this drawback system with flex and accelerometer

Identify applicable funding agency here. If none, delete this. sensors is proposed as this is portable and people just have to perform gestures and the system will convert the same into voice output on mobile as well as readable output on andoid as well as system. The use of android application makes it easy to use, as application provides the user manual for the signs and also people can add gestures if they want to add with help of customer care service provided in application.

II. EXISTING SYSTEM

There are various speaking system available which converts sign language. As shown in block diagram existing system uses flex sensors, analog to digital converters, PIC, Arduino as a microcontroller and it is connected to arduino bluetooth text to speech application via HC05,so that it will speak the message through mobile speaker, also the message will be dispayed on android. Flex sensor is used for hand gesture detection and this sensors works on the bending principle. When the flex sensor bends its resistance gets changed, si- multaneously there is variation in voltage. So the readings are stored according to this varying voltage.There is inbuilt analog to digital converter in Arduino, so when the flex sensor analog input is given to the Arduino it will convert it into digital output. If we are using RaspberryPi we need to use external Analog to digital converter.

Fig. 1. Block diagram of existing system

Advantage of this existing system is the system is portable and cause less environmental effects and the disadvantage is it is less accurate.

III.   PROPOSED WORK

In this system, hand gestures done by mute or deaf people can be detected and then this gestures will be converted into voice output.

Then this message will be displayed on LCD display board and with the help of android application this people can add gestures as well as they can learn standard sign language from the provided user manual.
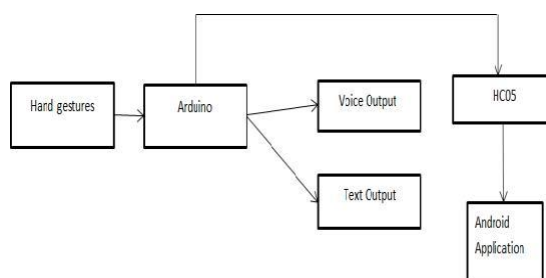
Fig. 2. Block diagram of proposed system

A. FLEX SENSOR

Flex sensor is used for hand gesture detection and this sensors works on the bending principle. When the flex sensor bends its resistance gets changed, simultaneously there is variation in voltage. So the readings are stored according to this varying voltage.The voltage is inversely proportional to the amount of bend and the resistance is directly proportional.
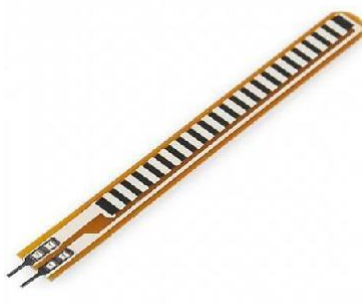

Fig.   3.   Flex Sensor

The resistance of a flex sensor ranges between 30k to 40k. Also their accuracy depends on amount of bend.

B. ARDUINO UNO

It is microcontroller board which is based on Atmega328P and it was developed by Arduino.cc. It consist of analog and digital input output pins.

Fig.   4.   Arduino Uno

C. ACCELEROMETER SENSOR

It is used to measure the acceleration adn also used in various circuits for accuracy purpose.Accelerometer sensor uses inclination sensing so based on the inclination of wrist it will give output in our system.

Fig. 5. Accelerometer sensor
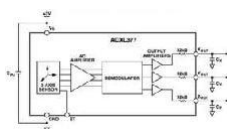
Fig. 6. Block diagram of Accelerometer sensor

D. HC 05(Bluetooth Module)

It is a bluetooth module which is used for wireless communication. In our system we used it to connect the system with android application.

Fig.   7.   HC05

IV. SYSTEM ARCHITECTURE

In first step a mute or deaf person will wear a glove which consist of five flex sensors on five fingers. The proposed system has arduino as a microcontroller which will record the movements. System has flex sensors for storing numbers and alphabets as well as accelerometer sensor to store messages. When a person does the movement of finger the voltage associated with that particular sensor will be recorded by microcontroller. For that particular voltage a message will be stored. Like this we will store different messages.We pro- grammed the microcontroller in embedded C language. Then this whole system will be connected to android application via HC 05 bluetooth module, so the system will speak out the message through the mobile speaker also it will display the message on android.

Fig. 8. System Implementation

A. Android Application

In this project an android application contains user manual to use the system,Sign manual to learn how to do gestures for alphabets,numbers and messages. Also if mute or deaf person wants to add more gestures he or she can simply call to the customer care which is provided in application itself and we can add the wanted gestures in the system so as to make it easy for them.
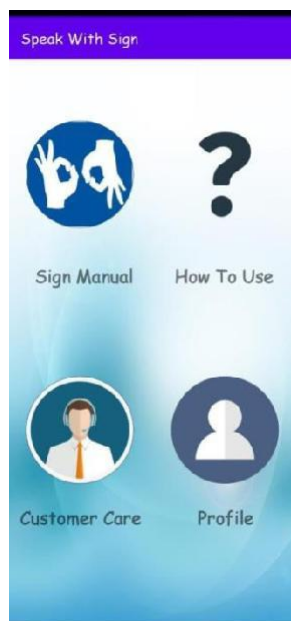

Fig. 9. Android Application

Fig.   10.   Homepage

Fig.   11.   Hand Gestures

V. CONCLUSION

In this project we have designed a system for mute people which is also beneficial to mute, deaf as well as normal people.The main advantage of this project is that it is portable, so that person can carry it anywhere with well maintained accuracy.So the main aim of this system is to make mute and deaf people confident to stand and convey their messages to normal people. In future we will work on the voice output part so that it can speak out the messages in multiple languages and we will work on project so that people can add their gestures dynamically without customer care support.

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