Gesture Recognization System for Deaf and Dumb People

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Abstract--- Generally dumb people use sign language for communication but they find difficulty in communicating with others who don't understand sign language. It is based on the need of developing an electronic device that can translate sign language into speech in order to make the communication take place between the mute communities with the general public possible. In this project Flex Sensor Plays the major role, Flex sensors are sensors that change in resistance depending on the amount of bend on the sensor. We are in process of developing a prototype using this process to reduce the communication gap between differentially able and normal people.

Keywords: 8051 microcontroller, accelerometer sensor , flex sensors ,16x2 LCD ,speech IC . .

I. INTRODUCTION

Sign language is the language used by deaf and mute people and it is a communication skill that uses gestures instead of sound to convey meaning simultaneously combining hand shapes, orientations and movement of the hands, arms or body and facial expressions to express fluidly a speaker's thoughts. Signs are used to communicate words and sentences to audience. A gesture in a sign language is a particular movement of the hands with a specific shape made out of them. A sign language usually provides sign for whole words. It can also provide sign for letters to perform words that don't have corresponding sign in that sign language. In this project Flex Sensor Plays the major role, Flex sensors are sensors that change in resistance depending on the amount of bend on the sensor.

A. Various problem related to parameters and solutions

Data gloves can only capture the shape of the hand and not the shape or motion of other parts of the body e.g. arm, elbows, face etc. So only postures are taken and moving gestures are ignored. The problem of recognizing moving gestures can be resolved using 3 axis accelerometer sensor at wrist for full capture of the wrist movement changes, while 2 axis accelerometer can be used at elbow and shoulder.

B. Study of Flex sensor

Flex sensors are normally attached to the glove using needle and thread. They require a 5-volt input and output between 0 and 5 V, the resistivity varying with the sensor's degree of bend and the voltage output changing accordingly. The sensors connect to the device via three pin connectors (ground, live, and output). The device can activate the sensors from sleep mode, enabling them to power down when not in use and greatly decreasing power consumption. The
flex sensor pictured below changes resistance when bent. It will only change resistance in one direction. An un flexed sensor has a resistance of about 10,000 ohms. As the flex sensor is bent ,the resistance increases to 30- 40 kilo ohms at 90 degrees. The sensor measures ¼ inch wide, 4-1/2 inches long and 0.19 inches thick.

Fig. 1: Flex Sensor

In this two or three sensors are connected serially and the output from the sensors is inputted to the analog to digital converter in the controller. The outputs from the flex sensors are inputted into LM258/LM358 op-amps and used a non-inverted style setup to amplify their voltage .The greater the degree of bending the lower the output voltage. The output voltage is determined based on the equation V in * R1 / (R1 + R2), where R1 is the other input resistor to the non-inverting terminal. Using the voltage divider concept the output voltage is determined and it ranges from 1.35 v to 2.5v.

Fig. 2:

II. MAIN BLOCK DIAGRAM OF PROJECT

Below figure shows the main block diagram of our project. Sensor data are recognized and then recorded while a user performs various sign, correlating these with specific signs and mapping them to a database. The system stores sensor data in an array for recognition. When the sensor data matches the set of values associated with a sign system recognizes that sign and output it as text. Here the microcontroller used is AT89V51RD2.

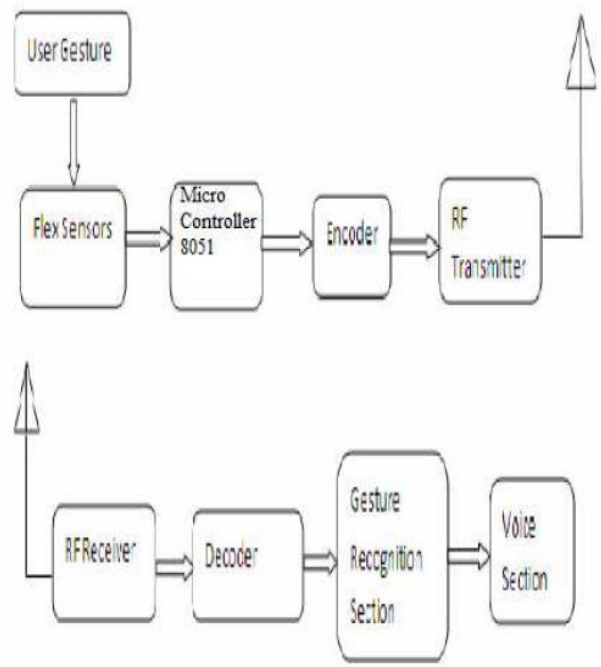
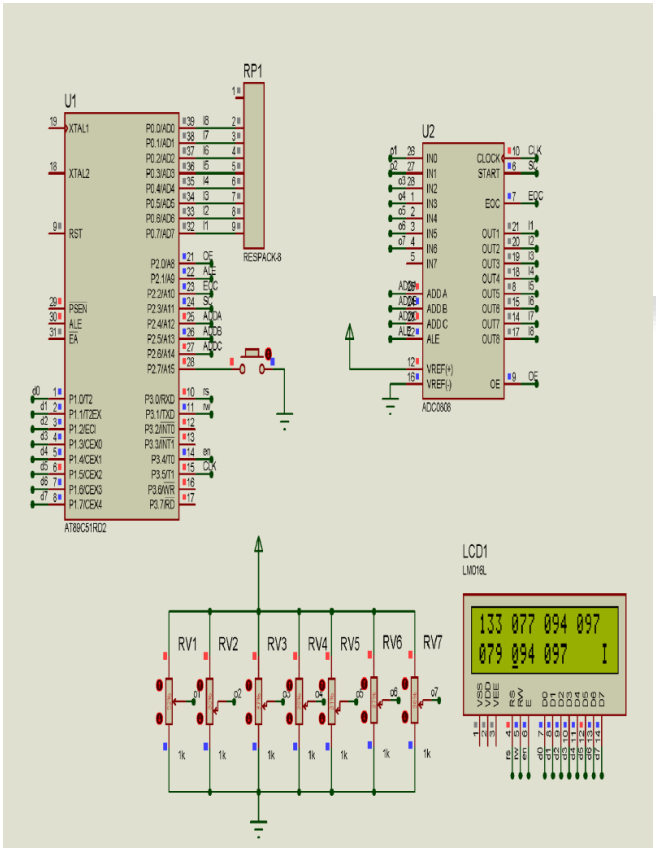


Fig. 3:

A. simulation of project



B. Explanation about simulation

As shown in the above simulation 5 flex sensor and 2 value of accelerometer register are measured and display on the LCD here for particular range of register According to sign language character is display on the LCD. In our project we use ADC 0808 which is connected to port 0 of microcontroller. The value of flex sensor and accelerometer is given as a input of ADC 0808. Output of ADC is applied to port 0 of microcontroller which is in digital form. As shown in fig that LCD is connected to port 1 hence data latched at port 1 can be displayed on LCD. Here port 2 is used to initialize ADC.

We have just programmed in KEIL C software and simulate program for our project in proteous. Also we performed display program on 16x2 LCD and AT89V51RD2 as shown in fig.

III. Conclusion

Sign language is a useful tool to ease 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 world. With this project the deaf or mute people can use the gloves to perform sign language and it will be converted in to speech so that normal people can easily understand.

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