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Talking Hand for Deaf & Dumb People Using Flex Sensor

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ABSTRACT

Communications between deaf-mute and a standard person have invariably been a difficult task. The project aims to facilitate individuals by means of a glove based mostly deaf-mute communication interpreter system. The glove is internally equipped with five flex sensors. For every specific gesture, the flex detector produces a proportional amendment in resistance and measures the orientation of hand. The process of those hand gestures is finished in controller [1] [3]. The propose method extracts feature from the sign through Flex Sensor and then transmit that sign signals through Bluetooth to the Android Mobile. This integrated feature improves the performance of the system; the system serves as an aid to disabled people. Its application includes hospitals, government sectors and some multinational companies.

KEYWORDS: Flex detector, ADXL335, HC05 Bluetooth Module, and Mobile with Developed Android Application.

I. INTRODUCTION

Dumb/mute people use sign language for communication purpose. Sign language uses gestures instead of sound to convey information. As we tend to all grasp that communication plays a really outstanding role in our human lives. At ~~this gift innovative world, there squ~~are measure most of individuals World Health Organization (WHO) square measure deaf and dumb ought to have a tiny low dream on communicate as traditional people with others is not a straight forward task. An electronic glove is developed for deaf-mute communication interpreter system that helps out the deaf and dumb individuals to speak with dependability. Here only 1 hand is employed .There is five flex detectors are employed and every square measure fitted with length of every finger of glove. The hand gesture plays a key role. The gestures are decoded by microcontroller [3]. By every specific gesture (i.e. creating completely different positions of fingers) of the flex sensors. In this paper, PIC16F877 is used to take input from flex sensors all the data from PIC16F877 is sent to android phone and accordingly the android phone will speak the corresponding Sentence which has been allotted to particular gesture value. The work that related to the project such as of gesture recognition that plays a key role. In this one of the methods is glove based systems. The extra sensors make it easy to collect hand configuration and movement. However, the devices are quite expensive and bring much cumbersome experience to the users some of the earlier gesture recognition systems attempted to identify gestures using glove-based devices that would measure the position and joint angles of the hand is studied from references. This Gestures which are come from PIC16F877 board the Bluetooth module send that sign to Android phone only when android phone's Bluetooth is enable. By using the mobile App incoming message will convert to voice. When the normal people want to communicate with deaf people there is also one App which converts speech to text data [3] [4].

II. SYSTEM BLOCK DIGARAM AND FLOW METHOD

As the FLEX detector output is analog form, thus on convert to digital kind there's Analog to Digital converter (ADC). Then ADC's output goes in microcontroller module wherever programming is finished. And therefore the output is shown on LCD display [4]. Then after that saved database signal is then transmitted to Android device by using HC05 Bluetooth Module, after receiving that signal it will show on application which we have developed which shows particular database signal on Display as well as there will an sound output produced .While we have produce required database sentence according that we bend some fingers and open require fingers. For matching given fixed value flex sensor varies the value after matching the fixed value it will stop variations and produce database assigned sound.

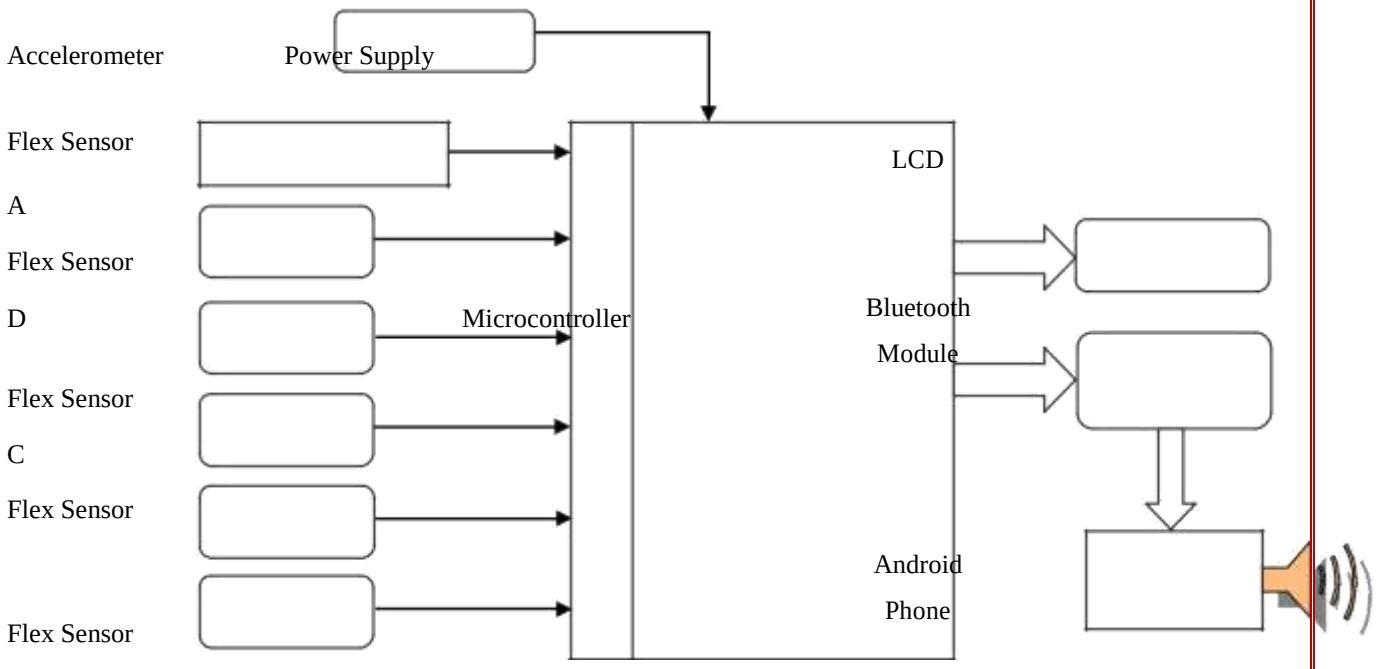

Fig 1: System Block Diagram

The flow process of system is shown in below Fig 2.When power on the system, then first of all the non-verbal communication is given to the system through the flex sensors. There the flex detector of Fig 3, which will be operated with +5v as by giving the actual hand gesture, the resistance variance happens in flex detector by that the output analog signal is made. There also we have used and ADXL335 Accelerometer sensor for tilt motion sensing. The analog signal is given to the ADC of PIC16F877 on convert the signal in digital kind. Next the digital signal is given Bluetooth Module HC05. Then Bluetooth module sends that actual message that is allowed within the code. That code is the sent to Android Phone where we have developed an Android Application for Displaying the Database code assigned to particular bent value [5].

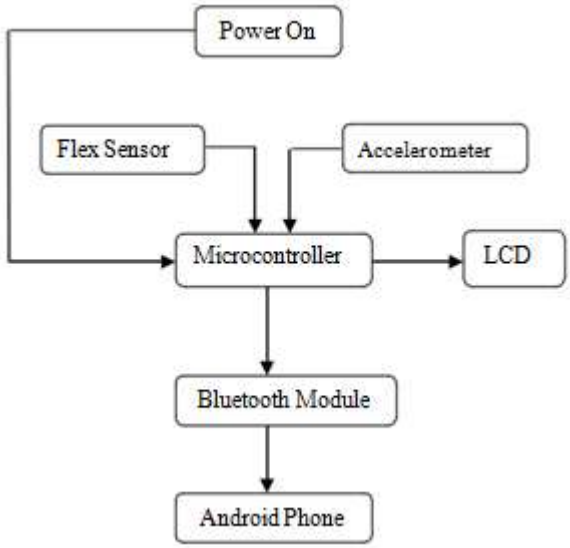

Fig 2: Flow Process of System Practicality

III. SYSTEM HARDWARE AND RESULTS

3.1 FLEX DETECTOR

The Flex detector proprietary technology is predicated on resistive carbon parts. As a variable written of resistance, the Flex Sensor achieves nice form-factor on a skinny versatile substrate. When the substrate is bent, the detector produces A resistance output correlated to the bend radius-the smaller the radius, the higher the resistance price. Flex sensors square measure analog resistors. They work as of variable analog voltage dividers, within the flex detector square measure carbon resistive parts inside a skinny versatile substrate. A lot of carbon means that less resistance. Once the substrate is bent the detector produces a resistance output relative to the bend radius. With a typical flex sensor of Fig 6, a flex of zero degrees can provide 10K resistance can a flex of ninety can provide 30-40 K ohms. The Bend detector lists resistance of 30-250 K ohms. The Flex detector also called as Flex sensor [6].

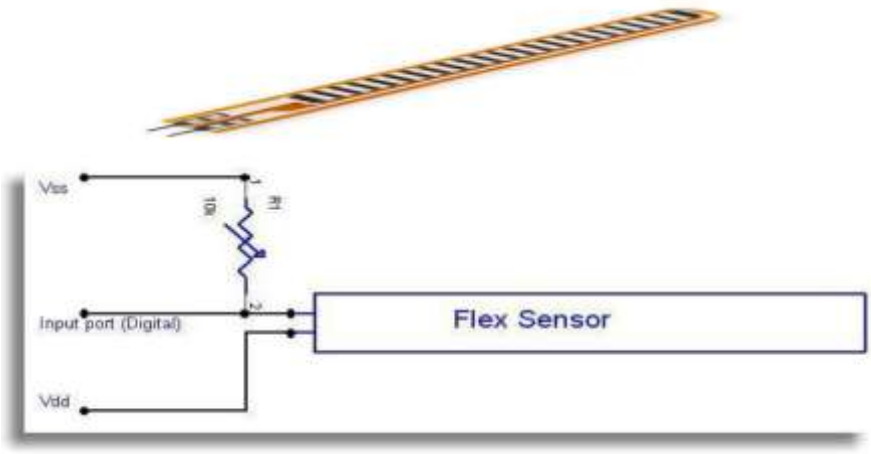

Fig 3: Flex Detector Circuit Diagram

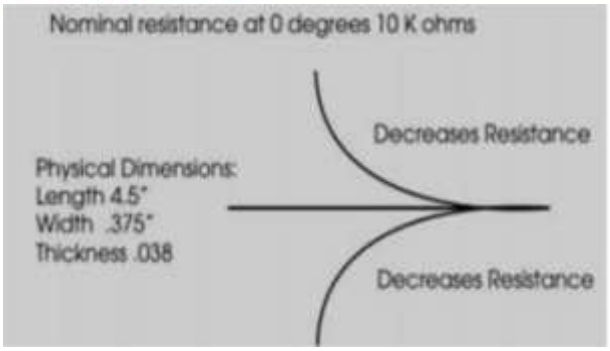

Fig.4. Resistance variations in flex sensors

The following are the electrical specifications of the flex sensors.

- Flat resistance: 10 kΩ
- Bend resistance range: 60 kΩ to 110 kΩ
- Power ratings: 0.50 watts continuous, 1watts peak
- Height: <= 0.43 mm

3.2 **ADXL335 Accelerometer**

The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3 *g*. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. The user selects the bandwidth of the accelerometer using the C_X, C_Y, and C_Z capacitors at the X_{OUT}, Y_{OUT}, and Z_{OUT} pins. Bandwidths can be selected to suit the application, with a range of 0.5 Hz to 1600 Hz for the X and Y axes, and a range of 0.5 Hz to 550 Hz for the Z axis. The ADXL335 is available in a small, low profile, 4 mm × 4 mm × 1.45 mm, 16-lead, plastic lead frame chip scale package**.**

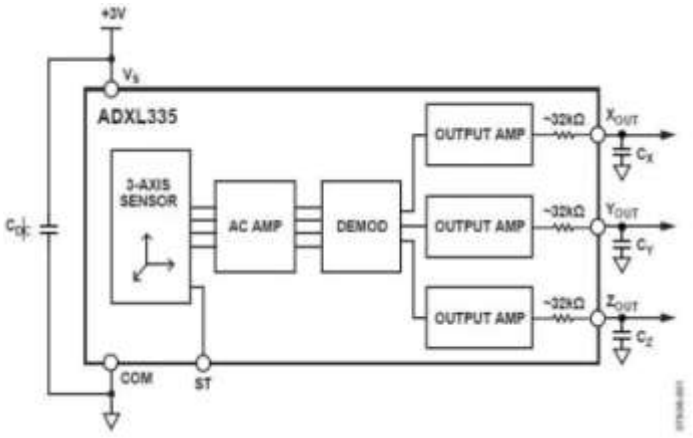

Fig.5. Internal Structure of ADXL335 **Fig.6. ADXL335**

3.3. PIC16F877 Microcontroller

In this project we are using a PIC Microcontroller i.e. PIC16F877 which is a 40 pin Microcontroller.PIC Controller needs a +5 Volt VCC supply voltage. It has an in built ADC (Analog to Digital Converter) which is a 10-bit and 8

Channel. The output from the Flex Detector is given to that internal ADC also the output from Accelerometer is also given to the ADC to convert that analog Voltage value into Digital Ascii code.

Features

- 2 PWM 10-bit
- 256 Bytes EEPROM data memory
- ICD
- 25mA sink/source per I/O
- Self-Programming
- Parallel Slave Port

3.4 HC05 Bluetooth Module

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

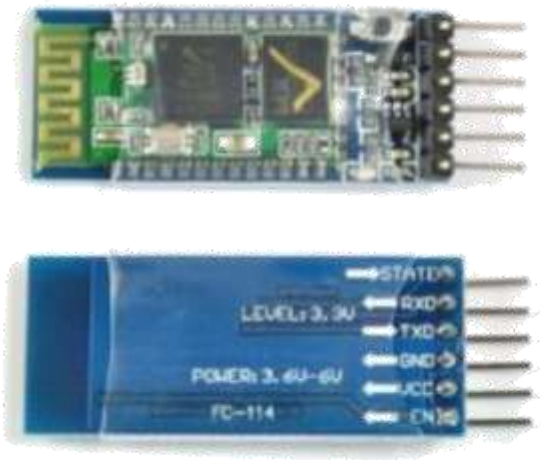

Fig.7. HC05 Bluetooth Module **Fig.8. HC05 BM Interfacing with Android Phone**

3.5 LCD

Innovative {alphanumeric display or LCD} 2x16 A Module provides versatile display functions. Through its straight forward connections, it may be controlled by Innovative BASIC Commander for a good vary of alphanumeric applications. During this module, 2 show lines, each with sixteen characters on every line may be displayed. By exploitation the indicator management command, the position of the character to be displayed on the screen may be arbitrarily modified.

3.6 SYSTEM RESULT AND SETUP

Fig.9. Flex sensor Mounted on Gloves

Fig.10. Message Displayed on LCD

In the result as you can see that there are the flex sensors which are mounted on the gloves. By the particular gesture of the flex sensor the message will display that we have saved in the Android Application database will display on LCD as well as the Android Phone and sound signal will also produce.

IV. CONCLUSION

[1.] This project is helpful for deaf and dumb Individuals people who cannot communicate among themselves or with normal person. It's additionally helpful in creating of communication responsibility cherish language translation & effective communication between the deaf/dumb & traditional individuals.

[2.] This project is helpful for further additional help of developing mobile communication for deaf &dumb individuals.

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