Indian Sing Language Translator Using Flex Sensor Gloves

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Abstract: *expression to convey one's thoughts without speaking. This dissertation describes the translation of Indian sign language in to voice with help of technology and embedded system. The hand signal with help ThisSign language is a manual communication involving hand, arms, body and face of cloves of flex sensor converted to digital data using comparator circuit and microcontroller. We used signal processing toolbox in MATLAB which indeed play the voice according to sensor value. Change is voice depend proportionately to sensor value. Flex sensor can interpret the 26 English alphabets. As sign language primarily used by deaf but also used by people who can hear having problem in speaking so the approach used in this analysis is vision based. The glove uses are fitted with flex sensor in three dimensions to collect the data from every position of figure and hand motion to differentiate and distinguish each and every word from a particular sign. The translation is than transmitted through microcontroller to base station and which in turn produce voice on interface with computer. Software used is MATLAB.*

Keyword: *Microcontroller, ISL, Flex Sensor, ADC, Embedded system, sign language, 3-axis accelerometer translator.*

I. Introduction

About 5% of world population having hearing loss problem and in numbers it is around 360 million people. Ration of hearing loss is 33% in senior citizen above 65 years old as per WHO figure. Deaf people mostly having total hearing loss, so they often use sign language. Impact of hearing loss or deaf is of .in my project with the help of flex sensor deaf people can communicate easily with hand gloves attached flex sensor which can convert sing language into voice through micro controller and matlab and the text is shown in LCD display. The sensor output is in analog the ADC is convert the analog signal into digital, the ADC out goes into micro controller where programming is done and the output is shown in LCD

System Functionality

- here we use three flex sensor which attached in gloves, when the sing of alphabet is form, change in resistance of flex sensor which is analog type by ADC the signal is change into digital form through ADC know the signal goes in microcontroller in which it code and send to MATLAB. The signals are in analog is converted into digital through ADC. Then voice recorded already save in matlab which is compare with sing made by gloves and the result come out through laptop in voice. output in voice and text message on LCD display, the sing of alphabet is combine to form word which can display on LCD

Block diagram of system functionality
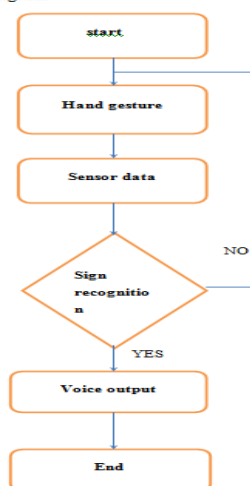

Project prototype-

In this project we use three flex sensor attached to gloves by bending finger the flex sensor also bend due to which flex sensor resistance is change in each flex sensor the analog signal is converted into digital form then signal is coded in microcontroller then the signal is gone in matlab in which the recorded voice is match by sing produce by gloves which is match then it come in output by voice and text in LCD

Flex sensor-

Flex sensor is a thin flexible device comprising thin black layer of graphite (carbon) and another light grey material is a segmented metal electrode. The bending of this thin strip make graphite and metal electrode contact in appropriate proposition to give signals, on respective bending angle of this flex change in resistance occur and signal send to microcontroller which in turn gives output of voice prerecorded. Flex sensors are analog resistor. Work as variable analog voltage divider.
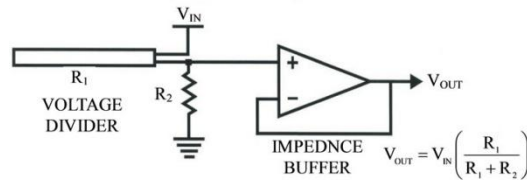
Analog to digital convertor- A device that converts continuous voltage to digital number is known as Analog to Digital convertor. The digital output use usually binary coding which is in proportionate to the input current. The ADC is known by its bandwidth and signal. The actual bandwidth of ACD is measure by its sampling rate (accuracy by which ACR can handle noise and error rate).
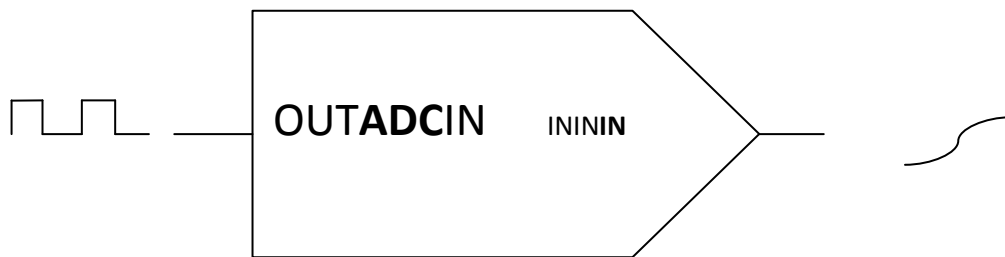

Figure: Analog to digital convertor

1.1.1 Avr microcontroller-AVR Microcontroller

A microcontroller is a single chip computer. It has its own CPU, RAM and secondary storage (permanent memory). Microcontroller used by human in many equipment for day to day work life such as Micro oven, washing machine, stereo equipment, elevators, safety system, in cars and many more and this make all this daily used equipment more intelligent and smart.

Microcontroller can be classified on basis of his architecture, memory, instruction sell and internal bus width. The three most common type of microcontroller is 8 bytes, 16 bytes and 32 bytes and this byte signify the ability of microcontroller to perform arithmetic and logical operation.

AVR microcontroller is an advance virtual RISC. In fast moving world people need compact instrument packed with advanced technology. RISC is the most prefer device for same as it has limited set of instruction and to make it more powerful it transformed in to AVR.
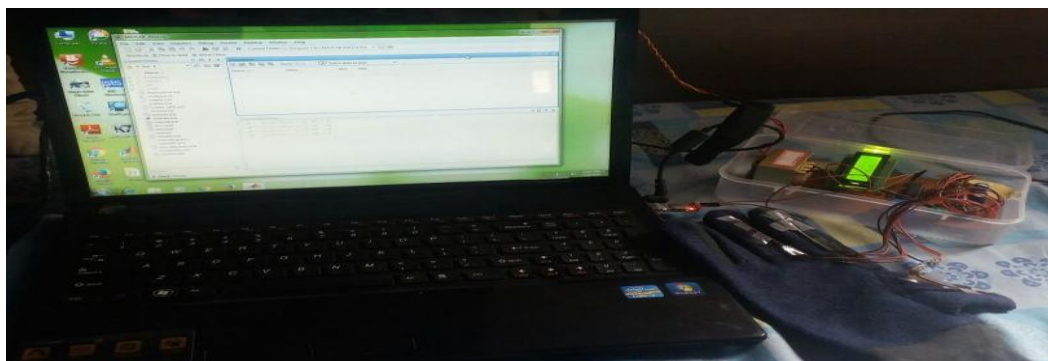
II. Conclusion

The Primary focus of this study was use technology as a tool for the conversion of Indian Sign Language in to audio voice. Further this study helps to be used in the real time application to recognize Indian Sign Language. This can be further used into a system which can be integrated in to the telecommunication devices with cameras to bridge the communication gap between the deaf or speaking people and communities. System can be enhanced with increase in the data processing speed and data storage by using the advance and compression techniques and tools

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