



Implementation of Gesture to Voice Conversion for Hearing and Speech Disability

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ABSTRACT: A person can communicate with another person if and only if they are talking in same Language. Language barrier limits person to communicate with another person speaking different Language. This Gap of Language is even wider for people that cannot speak or hear. In order to reduce this gap between people with Hearing and Speech Disability we are presenting our paper on project, which will lessen this gap. Our project serves to aids the communication of people with Hearing and Speech disability with normal person. Our project focuses on addressing regional audience. This project converts the hand gesture into voice and text for regional audience. Flex sensor is primarily used, which is mounted on Gloves. The resistance of flex sensor changes on bending and voltage varies accordingly. This voltage variation is given to microcontroller which converts analog signals into digital signal. This Digital Signals are then converted to voice and text. Our implemented kits recognize Indian sign language.

KEYWORDS: ATmega16 microcontroller IC, Data Glove, Flex Sensor, GLCD, Voltage Regulator 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. A gesture is associated degree enormously language is also a certain movement of hand with a particular type created out of them.

Gesture recognition is classed in a pair of main categories vision based mostly and detector based sign language usually provide the sign by the gesture for whole word. A gesture is documented and consequent transcript information identified. An electronic device that can translate sign language into speech in order to make the communication with normal people is made. In this project flex sensor plays important roles that change their resistance according to the degree of bending of sensor.

Along the size or length of finger the data glove is fitted with a sensor. The output from the sensor it is in analog form and fed to the AT mega16 microcontroller .This IC converted analog to digital converter the resulting digital signal enclosed by the RF system. When the sensor data matches the set of recognize that sign and output it as text .The output is given on the LCD screen and speaker. Which can be read and listen by a normal person. The proposed system bridges the gap between people with different ability to normal people.

II. LITERATURE SURVEY

[1] Sachin Bhat, Amruthesh M, Ashik, Chidanand Das and Sujith in their paper, "**Translating Indian Sign Language to text and voice messages using flex sensors**", in International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 5, May 2015 have designed a Gesture to voice conversion and have concluded that The more reliable, user independent and portable system to convert the sign language to text message form which consumes less power because of the low ultra power AT89S52 microcontroller is designed.

[2]Priyanka R.Potdar, DR.D.M.Yadav "**Innovative Approach for Gesture to Voice Conversion:Review**".International journal of innovative research and development .vol 3,Issue 6, june2014.have designed Gesture to Voice Conversion and have concluded that completion of the project suggests that these wired

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gloves can be used for partial sign language recognition. In future work of this proposed system supporting more number of signs and different language mode.

[3] Mr Prashant chaudhari,prof.G.R Phulay and Mr Ravindra Patil in their paper,"**A Review on Hand Gesture Recognition System**", in International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 3, January 2013 have designed a Hand Gesture Recognition System and have concluded that data glove can give promising results if used in the field of medicine and also be used for monitoring hand function for rehabilitation purposes.

[4] Mr.M.V.N.R.P.Kumar, Mr Ashutosh Kumar,Mr.S.B.Arawandekar,Mr.A.ABhosale,Mr.R.L.Bhosale "**AVR Based Gesture Vocalizer Using Speech Synthesizer IC**". International journal of Research in Advent Technology, vol 3,issue 5,May 2015 have designed Gesture to voice recognisation project and have concluded that The project aims to lower the communication gap between the deaf or mute community and the normal world. This project was meant to be a prototype to check the feasibility of recognizing sign language using sensor gloves.With this project the deaf or mute people can use he gloves to perform sign language and it will be converted in to speech so that normal people can easily understand.

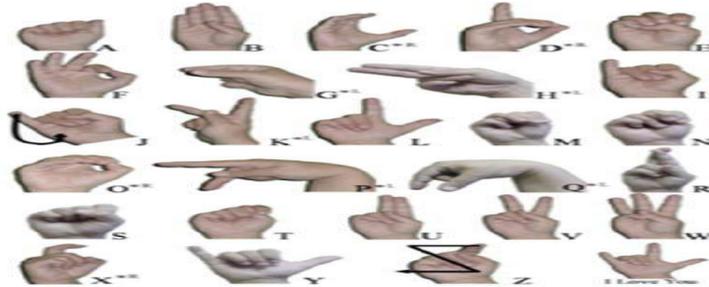


Fig. 2.1.Equivalent English Cue Symbol for Database (ISL)

Sign language uses the hand gesture to convey messages. Sometime this is a mixture of facial expression along with the hand gesture. Although, only sign are used to convey messages many sign languages differ in context of signs. Therefore, there are various sign languages in around the world. India has Indian sign language. This is also known as Indo-Pakistani sign language (ISL).There is 3000 signs in Indian sign language. Which were created from 12 states and 42 city. Now Indian sign language also has signs in regional language like Tamil. Indian sign language does not have its return form but it is preserved in dictionary in videos form. The video dictionary has a sound synthesizer as well to explain the sign correctly.

III. IMPLEMENTATION

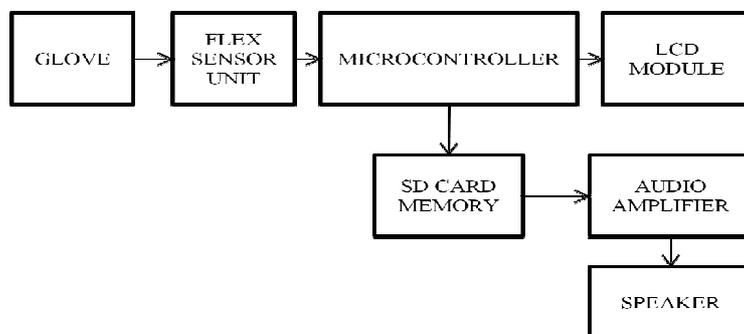


Fig 3.1 Block diagram of sign language detection

In this project data glove is implemented to capture the hand-gestures of a user. At first the kit is started by using a nine volts battery. The data glove is fitted with flex sensors along the length of each finger. The flex sensors output varies with degree of bend and gives change in voltage. The analog outputs from the sensors are then fed to the ATmega16

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micro controller. It processes the signals and perform analog to digital signal conversion. The resulting digital signal is encoded and generate hex. File i.e. digital data dumped and transmitted to the GLCD. It receives the signal and fed to the gesture recognition section. In this section the gesture is recognise and the corresponding text information is displayed on GLCD. This text is converted to audio using .wav file. Which can be heard through the speaker mounted on the kit.fig 3.1 shows the flow chart of the system implementation.

A. Flex Sensor

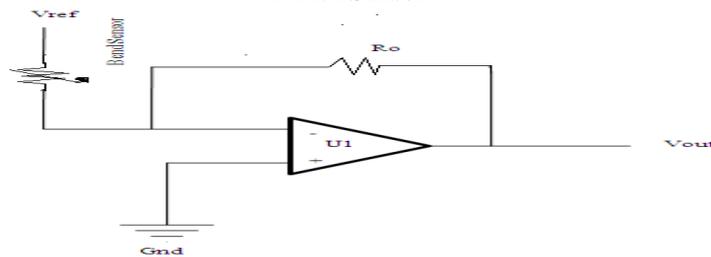


Fig3.2 Basic Flex Sensor Circuit

Flex sensor are the normally fitted with a data glove. Sensor changes their resistance according to the degree of bending and the output voltage changing consequently. Sensor requires a 5 volt input and output 0 and 5V. With a life cycle of over 1 million flexes, its durability is suitable for many consumer applications. The sensors connect to the device via three pin connectors (ground, live, and output).The flex sensor picture above change resistance when send it will only change resistance in one direction. A unflexed sensor has a resistance of about 10,000 ohm. The sensor measure ¼ inch wide 4-1/2 inches long and 0.19 inches thick resistance increase up to 30-40 kilo ohm at 90 degree. The flex sensor is connected to the ATmega16 in micro controller

B. ATmega16 Micro controller

In this project we are using AT mega 16 microcontroller IC with 40 pin. It has advanced RISC architecture. it gives upto 16 MIPS throughput at 16 MHz this IC has inbuilt 8channel, 10 bit ADC. It is 8-bit high performance micro controller IC. It also has 16KB programmable flash memory, static RAM of 1KB and EEPROM of 512 Bytes. The endurance cycle of flash memory and EEPROM is 10,000 and 100,000.there are 32 I/O lines divided into 4 ports. It also has UART peripherals along with other peripherals.

C. GLCD (Graphical LCD)

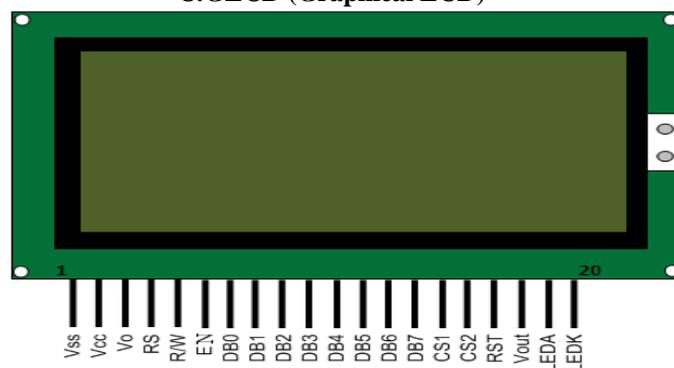


Fig 3.3 GLCD 128*64

We are using JHD12864E GLCD. This GLCD display has a format of 128*64 dots and has yellow green colour backlight. Each GLCD needs two controllers to execute its internal operations. This GLCD uses two KS0108 Controllers. The 128*64 is divided into two equal halves with each being controlled by two separate KS0180 Controllers. It involves paging scheme i.e. whole GLCD is divided into 128*64 with 128 columns and 64 rows. In total there are 1024 pixels.

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D. Voltage Regulator IC (7805)

7805 is a voltage regulator integrated circuit (IC). Voltage regulators IC are the IC that is used to regulate voltage. IC 7805 is a series of 78XX voltage regulators and it is fixed linear voltage regulator IC's. In some circuit, the voltage source may have fluctuations and which would not give the fixed output voltage for such situation to ensure constant voltage, IC 7805 voltage regulator is used to maintain the constant output voltage. It maintains output at 5v and protects circuits from short circuit and thermal overloading.



Fig 3.4 Voltage Regulator IC

Pin no.	Function	Name
1.	Input Voltage (5V-18V)	Input
2.	Ground (0V)	Ground
3.	Regulated Output(5V)	Output

Fig 3.4.1Pin Description

The above table gives a brief discription about the pins of the voltage regulator IC 7805.

IV. RESULT

The signs will be converted to letters and it will be displayed on GLCD screen in the form of text and those letters can heard through speaker mounted on the kit.

V. 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. This project was meant to be a prototype to check the feasibility of recognizing sign language using sensor gloves. With this project the deaf or mute people can use the gloves to perform sign language and it will be converted into speech so that normal people can easily understand.

REFERENCES

- [1] Sachin Bhat, Amrutash M, Chidanand Das, Sujith"Translating Indain Sign Language to Text and Voice messages using Flex Sensor". International journal of advanced research in computer and communication Engineering, vol 4, Issue 5, MAY 2015.
- [2] Priyanka R.Potdar, DR.D.M.Yadav "Innovative Approach for Gesture to Voice Conversion :Review",International journal of innovative research and development ,vol 3,Issue 6, june2014.
- [3] Mr. Prashant Chandhari, Prof. G.RPhulay, Mr. Ravindra Patil "A Review on Hand Gesture Recognition System" ,International journal of Advanced Research in Computer Engineering and Technology, Vol 2,Issue 1,jan 2013.
- [4] Mr.M.V.N.R.P.Kumar, Mr Ashutosh Kumar , Mr.S.B.Arawandekar, Mr.A. A Bhosale,Mr.R.L.Bhosale "AVR Based Gesture Vocalizer Using Speech Synthesizer IC",International journal of Research in Advent Technology, vol 3,issue 5,May 2015.
- [5]G. Potamianos, C. Neti, G. Gravier, A. Garg, and A.W. Senior, "Recent advances in the automatic recognition of audiovisual speech," in Proceedings of the IEEE, vol. 91, Issue 9, pp. 1306-1326, 2003.
- [6]P. Heracleous, N. Aboutabit, and D. Beauteemps, "Lip shape and hand position fusion for automatic vowel recognition in cued speech for French," IEEE Signal Processing Letters, vol. 16, Issue 5, pp. 339- 342, 2009.