International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.07, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

GESTURE TO TEXT AND SPEECH CONVERSION USING MICROCONTROLLER

Ranjitha.ML[1], Sushma.BM[2], Swathi.S[3],

Yashashwini.BR[4] , Nitya.S[5]

[1, 2, 3, 4, 5]*School of Electronics and Communication, REVA University (India)*

ABSTRACT

Glove-based gesture recognition system is the better way of representing hand movement data to the normal people.It is the manual communication used by mute people for an effective communication. There are only few who can understand the sign language communicated by the mute community. The model is developed with the help of electronic device in a way that translates the sign language into text and speech in order to communicate in public place. A wired glove is used with flex sensors stitched according to the length of each finger. This paper guides to the developing technology such as digital glove. It investigatesthe qualities of the gadget and examines future wok. The goal of this paper is to provide innovative framework for the glove system technology to thereaders.

Keywords:*Accelerometer, ASL (American Sign Language), Audio module, Flex sensors, MicrocontrollerATmega 32.*

I. INTRODUCTION

A hard of hearing and unable to speak individual uses gesture based communication for correspondence. Here a glove based gadget acts as a correspondence for trading of data between normal and mute community. Communication via gestures is the dialect utilized by hard of hearing and quiet individuals. The gadget utilises the gestures and converts it into text and voice which is read and understood by the normal people. A motion in a gesture based communication is a specific development of the hands with a particular shape made out of them. A gesture based communication as a rule gives sign to entire words. It can likewise give sign to letters to perform words that don't have relating sign in that communication through signing.

In this gadget Flex Sensor assumes the real part, it will sense the change in resistance made on twisting of the sensor. This advanced glove means to bring down this obstruction faced by the mute people. It is electronic gadget that can make an interpretation of Sign dialect into discourse so as to influence the correspondence to occur between the quiet groups with the overall population conceivable. It can likewise give sign to letters to perform words that don't have comparing Sign in that communication via gestures. Sensor gloves innovation has

been used by the mute people, which requests precise following and understanding of gesture based communication. The paper clarifies the outlining necessities, elements of digitalised gloves. The paper clarifies the outlining necessities, elements of digitalised gloves. This paper guides to build up a couple of signal vocalize gloves. It gives the related work, clarifies the framework design, qualities, favourable circumstances and weaknesses of this gadget. In future the framework would be upgraded to wireless gloves which would be more reliable.

II. RELATEDWORK

2.1 Microcontroller based Hand Gesture Recognition System using Flex Sensor for Disabled People

The signal acknowledgment is finished with the assistance of a sensor glove which comprises of five flex sensors, accelerometer sensor that is best situated in fingers. The plan of glove and the idea of interpreting motion are made conceivable by considering the pivot introduction of the Accelerometer sensor concerning gravity and create some voltage esteems. In view of the voltage esteems the comparing words will be created from the stored templates. [1].

2.2 Hand Gesture Recognition Application for Physically Disabled People

D. Vishnu Vardhan Vision based hand motion Recognition framework perceives hand signal in midair, particularly for physically hindered individuals, and gives perceived character or number as content and comparing sound. Here the hand motions will be caught in type of pictures by the camera. From the caught picture, by advanced picture preparing strategy for each motion developments relating importance of activities will be perceived and shownas the type of content or by voice utilizing amplifier [2].

III. PROPOSEDWORK

In this project the sign language translator starts with the Glove, which is the heart of the project. Fig 1 shows the block diagram of the model. The glove contains five flex sensors and a three dimensional xyz axis accelerometer. The sensors used are flex sensors which are variable resistors. Their resistance varies with the change in the direction of fingers. The digital output is fed to the on-chip ADC of the microcontroller, thus converting the analog voltages into digital values. The American Sign Language in the Fig. 2 is a hand gesture used for manual communication. This type of communication is only understood by few and to make it convenient to the normal people the proposed model works fine. The Look up table in the Fig. 3 is created for the Alphabetical letters which is a simple mapping technique. Here the variable is created that stores ADC values which is compared with the Look up table code. On performing the gesture the resultant equivalent gesture is shown in the LCD which would help the normal people to understand the sign language.

International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.07, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

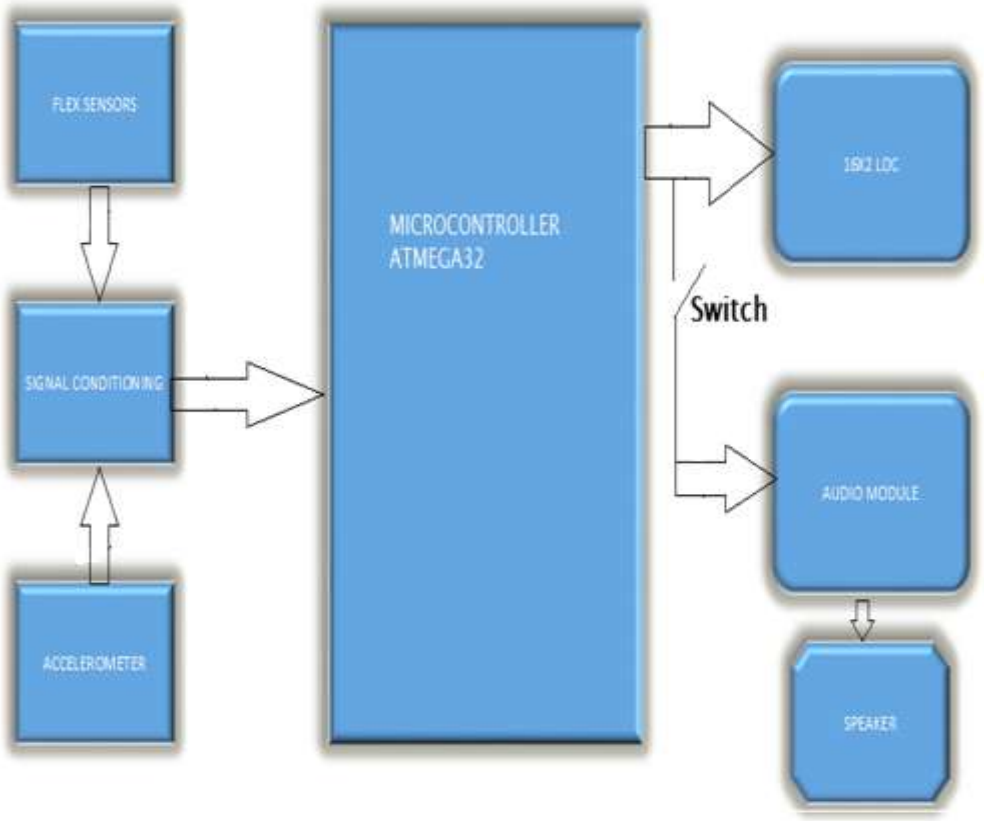

Fig.1: Block Diagram

The above figure consists of accelerometer, audio module, LCD and flex sensors which are interfaced with the microcontroller ATmega 32. The speaker is used to deliver the voice message.

Alphabet	Small finger		Ring finger		Middle finger		Index finger		Thumb finger		Total
	512	256	128	64	32	16	8	4	2	1	
A	0	0	0	0	0	0	0	0	1	1	3
B	1	1	1	1	1	1	1	1	1	1	1023
C	0	1	0	1	0	1	0	1	1	1	343
D	0	1	0	1	0	1	1	1	1	1	351
E	0	1	0	1	0	1	0	1	0	0	340
F	1	1	1	1	1	1	0	1	1	1	1015
G	0	0	0	0	0	0	0	1	1	1	7
H	0	0	0	0	1	1	1	1	1	1	63
I	1	1	0	0	0	0	0	0	0	0	768
J	1	1	0	0	0	0	0	0	1	1	771
K	0	0	0	0	0	1	0	1	1	1	23
L	0	0	0	0	0	0	1	1	1	1	15
M	0	0	0	1	0	1	0	1	0	0	84
N	0	0	0	0	0	1	0	1	0	1	21
O	0	1	0	1	0	1	0	1	0	1	341
P	0	0	0	0	0	1	1	1	1	1	31
Q	0	0	0	0	0	0	0	1	1	1	7
R	0	0	0	0	1	1	0	1	1	1	55
S	0	0	0	0	0	0	0	0	0	0	0
T	0	0	0	0	0	0	0	0	1	1	3
U	0	0	0	0	1	1	1	1	1	1	63
V	0	0	0	0	1	1	1	1	1	1	63
W	0	1	1	1	1	1	1	1	1	1	511
X	0	0	0	0	0	0	0	1	0	0	4
Y	1	1	0	0	0	0	0	0	1	1	771
Z	0	0	0	0	0	0	0	1	0	1	05

IV. RESULT

4.1 Setting up of hardware

Fig. 2: Hand Gesture using American Sign Language

The above figure depicts the sign language used by mute people to communicate with the normal people

The hardware model is setup with different components as shown in Fig.4. The hardware core component is the Atmel ATmega32 which is interfaced with rest of the components. The microcontroller is programmed to recognise the gestures which is an analog input and converts into the digital value. 16x2 LCD is used to display the gesture sign, in digital form, which is alphabetical letters or few commands from the user. The Flex Sensors are used to sense the finger movement. The amount of bending is the change of resistance which is an analog value sent to microcontroller as an input to it. The ADXL335 is a accelerometer which is used in this hardware to provide an output to the inclination, in response to the movement of the mass inside. It works on the principle of the gravitational force. It directly interfaces with the ADC. The output of the gesturesprovides effective communication between the mute community and the normal people. APR33A3 based 8 channel voice record& Audio Playback Board is used to deliver the recorded voice.

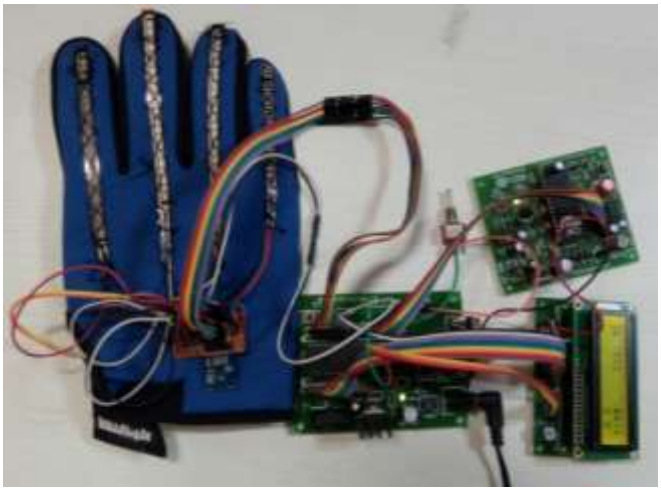

Fig.4: Hardware setup

The above figure represents the setup of the hardware.

4.2 Setting of software

The Win AVR tool is the avr-gcc compiler used to write the program for microcontroller. Programmers Notepad (PN) is an editing tool with syntax highlighting. It is configured in such a way that it does not have to do much command line typing, which makes it easier to work with. With the help of SinaProg the program is dumped in the microcontroller and allows hardware to function.

Fig.5: Software Upload

The above figure shows the software used to program and the tool used to dump the program in the microcontroller.

4.3 Working of hardware

With the help of American Sign Language,the character 'A' is shown in Fig.6. The Look Up Table in Fig.2 is used to study the corresponding value which is generated and displayed on the LCD as shown in Fig. 7.

Fig. 6:Sign Gesture

The above figure shows the gesture of alphabetical letter 'A'

Fig. 7:Output in LCD display

The above figure represents the ADC Output corresponding to 'A' sign Gesture.

V. CONCLUSION

Gesture to text and speech is meant to be a prototype to check the feasibility of recognizing sign language and displaying the characters and words so that it is easily understood by people. The main feature of this project is that the gesture recognizer is a standalone system, which can be applicable in daily life. Here we are using two modes of communication one is character mode and the other is voice mode. The modes are switched to the speech and text, which can be used according to the user convenience. This project build the bridge to cover the communication gap between the mute community and the normal people.The accuracy of the system is achieved nearly 98- 99%, but it depends mostly on the user's performances.

REFERENCES

[1]AaishaParveen S and Rohitha.U.M, "*Microcontroller based Hand Gesture Recognition System using Flex Sensor for Disabled People*", International Journal of Computer Applications (0975 – 8887),National conference on Electronics and Communication (NCEC), 2015.

[2]D.VishnuVardhan and P.Penchala Prasad, "*Hand Gesture Recognition Application for Physically Disabled People*", International Journal of Science and Research (IJSR), *Volume 3 Issue 8*, August 2014.

[3]R.Vinitha, A.Theerthana and B.Yasmin, "*Design and Development of Hand Gesture Recognition System for Speech Impaired People*", International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) *Volume 5, Issue 4*, April 2016.

[4]AartiMeena.M, Uthra.T and Ilakiya.M, "*Depiction and Expansion of Hand Gesture Realization system for speech and hearing impaired people*", SSRG International Journal of Electronics and Communication Engineering - (ICRTECITA-2017), ISSN: 2348 – 8549, March 2017.

[5]Sachin Bhat, Amruthesh M, Ashik, Chidanand Das and Sujith, "*Translating Indian Sign Language to text and voice messages using flex sensors*", ***I***nternational Journal of Advanced Research in Computer and Communication Engineering, *Vol. 4, Issue 5*, May 2015.

[6]Vikram Sharma M, Vinay Kumar N, Shruti C. Masaguppi, Suma MN, D R. Ambika, "*Virtual Talk for Deaf, Mute, Blind and Normal Humans*" , Proceeding TIIEC '13 Proceedings of Texas Instruments India Educators' Conference, *pp 316-320*, 2003.

[7]Laura Dipietro, Angelo M. Sabatin, ―A Survey of Glove-Based Systems and Their Applications‖ , IEEE Transactions on systems, man, and cybernetics-part c: applications and reviews, *Vol-38, No-4, pp-461-482*, July 2008.

[8]ArefinShamsil and Thilaksham, "*Motion Tracking Glove for Human- Machine Interaction:Grasp& Release*", McMaster University, 2010.