

## MICROCONTROLLER BASED HAND GESTURE RECOGNITION SYSTEM

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### ABSTRACT:

This paper is depends on the need of build up an electronic device that can make an translate of finger gesture in order to keeping in mind the end goal to communication between impaired of speech or blind and normal people. An information gloves is fitted with flex sensors along the length of each finger. Speech of impaired people can utilize the gloves to perform hand gesture and it will be converted into speech with the goal that normal people can understand their expression. This device contains flex sensors which are required to give information as input to the microcontroller, this data will show through a LCD as well as speaker or earphones output through voice recording and playback device, over message or if the individual is visually impaired can listen the changed over message from the speaker or headphones through voice recording and playback. This task can enable in general way as well as in addition to can be utilized as biomedical instrument in hospital wards like emergency unit activity theaters.

**KEYWORD :** PIC controller, Wireless Glove, Flex Sensor, Accelerometer etc

### I. INTRODUCTION

In the present years, there has been a quick increment in the quantity of hearing weakened and discourse impaired person because of birth defects or accidents. The general population who can't talk or have lost their capacity to talk in accident, it ends up troublesome for them to pass on their message inside the general public. When the mute person speak to normal person in gesture language then the normal person get confused to understand the sign of deaf-dumb person. To beat this, we have less demanding venture thought called 'Gesture Recognition System In this venture, Flex Sensor assumes the significant part. The flex sensor sense the signal and these signal output give to the ADC channels. In this segment the gesture is perceived by the microcontroller and the result is shown on LCD as well as speech output. The compactness of this venture is major advantage. Thus with the help of this project, the barrier faced by these people in communicate with the society can be reduced to a great extent. This device is easy to use by impaired

of speech person or blind person and less complex circuitry.

### II. LITERATURE SURVEY

By Author's paper description the sign language detection and recognition systems have mainly one of the two following methodologies viz. vision based or picture handling method and sensors and microcontroller based glove. In the picture preparing strategy, the camera is utilized to catch the gesture. These gestures are captured in terms of images and these images are analysed using different algorithms to recognize the meaning of a particular gesture. The disadvantage of image processing based technique is that it requires developing of complex computational algorithms in order to detect the gestures. Further this technique also requires proper lighting conditions, proper backgrounds and field of view limitations. The next approach is to use Accelerometers and Flex sensors to detect the movement of hands. The authors did

not use advanced microcontrollers and thus a separate ADC design was required to measure sensor readings. Further exclusion of wireless transmitters makes the system complex because of wires and the logic levels of LCD did not match for interfacing purposes. Therefore, the authors used ATMEGA 16 for interfacing LCD. One more approach is discussed in other which uses SHAROJAN BRIDGE and several Arduino boards which makes the system little bulky and massive.

### SCOPE OF THE PROJECT

Daily we used to see many deaf and dumb people suffering a lot to communicate their views with the people near them, the sign language made by the affected people cannot be understood by us and they cannot recognize our language. Thus in our task we associate flex sensors to the gloves were by the general people when these flex sensors are twisted alongside the length the protection changes and consequently it hits the memory where the voice message recorded by us is put away and the message is passed on through speaker. In view of microcontroller we did this extend. By utilizing this undertaking we can reduces the troubles looked by the hard of hearing, impaired of vision and physically paralyzed people.

### PROPOSED SYSTEM

Many works were done before for solving this problem, but it became difficulty in sensing the gestures exactly. In past Electronic talking framework was intended for deaf and dumb people by utilizing potentiometer and utilizing microcontrollers. In our project we used flex sensors which were more sensitive and hence respond quickly to minute variation in the length of the sensor. We designed it using AT-mega 16 in which we can easily dump and restore our code.

### WORKING OF PROPOSED SYSTEM

➤ **Block Diagram of System:**

In this system at the transmitter side we use a glove which has to be worn by the user. This glove is mounted with 4 flex sensors each on the 4 fingers of the glove. The flex sensors give their output in the form of change in resistance according to the bend angle. The flex sensors output is send to the ADC channels of the microcontroller. The processed ADC values from the microcontroller are compared with the threshold values for the recognition of a particular gesture.

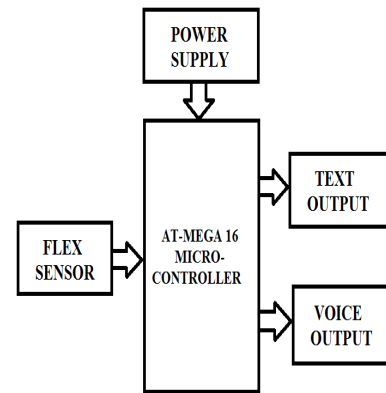


Figure 1: Block diagram

The particular gesture is recognised & is given to the microcontroller which transmits them. For each value received at receiver, the microcontroller gives corresponding commands to the LCD and the Voice Module. Thus we get the voice output for each gesture and display of each gesture in form of text on the LCD display.

**Gesture Recognition System:**

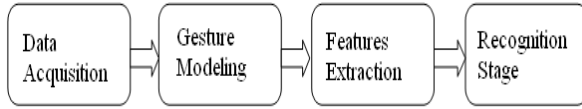


Figure 1: Block diagram of Gesture Recognition System

Gesture acknowledgment framework made out of a few phases; these stages are changed by application utilized, at the same time, however, the bound together diagram can be settled, Figure above satisfies this requirement.

- A. Data Acquisition: This progression is in charge of gathering the information which are the hand, Face or Body signals and classifier arranges the info tried motion into required one of classes.
- B. Gesture Modeling: This utilized the fitting and melding the info motion into the model utilized; this progression may require some pre-preparing ventures to guarantee the successful unification.
- C. Feature Extraction: After successful displaying of information/motion, the component extraction ought to be smooth since the fitting is viewed as the most troublesome impediments that may confront; these highlights can be hand/palm/fingertips area, joint edges, or any emotional articulation or body development.
- D. Recognition Stage: This stage is thought to be a last stage for motion framework and the order/which means of the motion ought to be proclaimed and done, this stage for the most part has a classifier that can connect each info testing signal coordinating class.

➤ **Flex Sensor :**

In this device the hand gestures are recognized using flex sensor. These sensors are attached to the gloves. Flex sensors are similar to potentiometer, i.e. variable resistor. The resistance of the sensor varies according to the amount of its bending, which intern depends on the movement of finger. In order to precisely measure the bending flex sensor are used. The flex sensors have an average flat resistance about 10k ohms. When the sensor are bent the resistance offered by them increases.

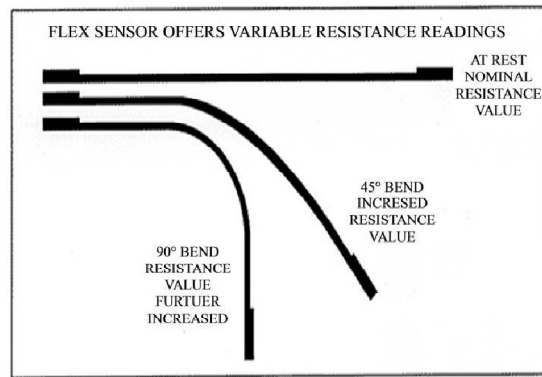


Figure 2: Flex sensor

➤ **Audio Recorder Kit:**

It is a solitary chip, better quality voice recording and playback arrangement. It has 8 channel sound chronicle and playback. We can record the command till 11 minute. It has Dynamic Recording and playback recording buttons. We can record voice with the help of on-board microphone. A solitary or different messages can be recorded. Accounts are put away in on-chip Flash memory, giving non-unpredictable capacity when control is expelled. Old messages can be recorded over with new messages as required.



Figure 3: Audio recorder kit

## RESULT

In our system, the person who wears the glove should hold it for about 2-5 seconds in order to detect the particular gesture. Each signal comprises of development and twisting of fingers of submit a specific request with particular edge correspondingly. The sensor esteems that are being produced by every one of the Flex sensors and an accelerometer are nourished to the ADC channel of the microcontroller. For every bending of Flex sensors and sensors produce different analog values based on positions of these sensors. The different gestures are assigned unique numbers to identify a particular gesture. Once a gesture is identified, it is being displayed on LCD and each value that is received, the microcontroller outputs gesture specific commands to LCD module at the receiver and to the Voice IC simultaneously for giving the speech signal and text accordingly.

## FUTURE SCOPE

- 1) Gesture are bound to assume an increasing essential part in human-PC association later on.
- 2) Facial Gesture Recognition Method could be utilized as a part of vehicles to caution drivers who are going to nod off.
- 3) Area of Hand motion based PC human communication is exceptionally immense. Hand acknowledgment framework can be valuable in numerous fields like mechanical technology, PC

human connection thus influence hand to motion acknowledgment disconnected framework for constant will be future work to do.

- 4) Support Vector Machine can be altered for lessening of many-sided quality. Decreased many-sided quality gives us less calculation time so we can make framework to work ongoing.

## CONCLUSION

This framework is helpful for impaired of speech, hard of hearing and visually impaired individuals to speak with the ordinary person. The impaired of speech person utilize their standard communication via gestures which isn't effectively justifiable by everyday citizens and visually impaired individuals can't see their gesture. This framework changes over the communication via gestures into voice which is effortlessly justifiable by visually impaired and typical individuals. The communication through signing is converted into some content shape, to encourage the hard of hearing individuals too. This content is show on LCD. In order to improve and facilitate the more gesture recognition, motion processing unit can be installed which comprises of Gyroscope as well and with the help sensor fusion technique, we can accommodate a number of other gestures as well for better and efficient communication.

## REFERENCES

1. Rafiqul Zaman Khan and Noor Adnan Ibraheem "Hand gesture recognition: A literature review" Department of Computer Science, A.M.U. Aligarh, India. *International Journal of Artificial Intelligence & Applications (IJAIA)*, Vol.3, No.4, July 2012
2. Miss. Kawade Sonam P, Prof. V. S. Ubale "Gesture Recognition-A Review" *IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)* ISSN: 2278-2834, ISBN: 2278-8735, PP: 19-26.
3. Mrs. Neela Harish and Dr. S. Poonguzhai, "Design and development of hand gesture recognition system

*for speech impaired people”, 2015 International Conference on Industrial Instrumentation and Control (ICIC) College of Engineering Pune, India, 978-1-4799-7165-7/15/\$31.00 ©2015 IEEE, May 28-30, 2015.*

4. *Nikhita Praveen, Naveen Karanthand Megha M S, “Sign Language Interpreter Using A Smart Glove”, 2014 International conference on Advances in Electronics, Computers and communications (ICA ECC), 978-1-4799-5496-1/14/\$31.00 ©2014 IEEE*
5. *Rohit Rastogi, Shashank Mittal and Sajan Agarwal, “A Novel Approach for Communication among Blind, Deaf and Dumb People”, 2015 2<sup>nd</sup> International Conference on Computing for Sustainable Global Development (INDIA Com), 978-9-3805-4416-8/15/\$31.00 ©2015 IEEE.*