

# SPEAKING SYSTEM FOR MUTE PEOPLE USING HAND GESTURES

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**Abstract :** Communication problem between deaf-mute and a normal person have always been a difficult task. Hand gesture is one of the typical methods used in sign language for non-verbal communication. It is most commonly used by deaf and dumb people to communicate among themselves or with normal people. Various sign language systems have been formulated by manufacturers around the world but they are neither adaptable nor cost effective for the actual user. Speaking System for Mute People using Hand Gestures helps disabled people to live with normal people. As mute person cannot speak, this system helps him to convert his hand gesture into text and pre-recorded voice. This also help normal person to understand what he is trying to say and reply accordingly. The main objective of the implemented project is to develop a reliable, easy to use, light weight smart hand gloves system which can minimize the obstacles for disabled people where they can stand with the race.

**IndexTerms** –IOT,Arduino Uno,Arduino Mega Board,Accelometer,Zigbee.

## I. INTRODUCTION

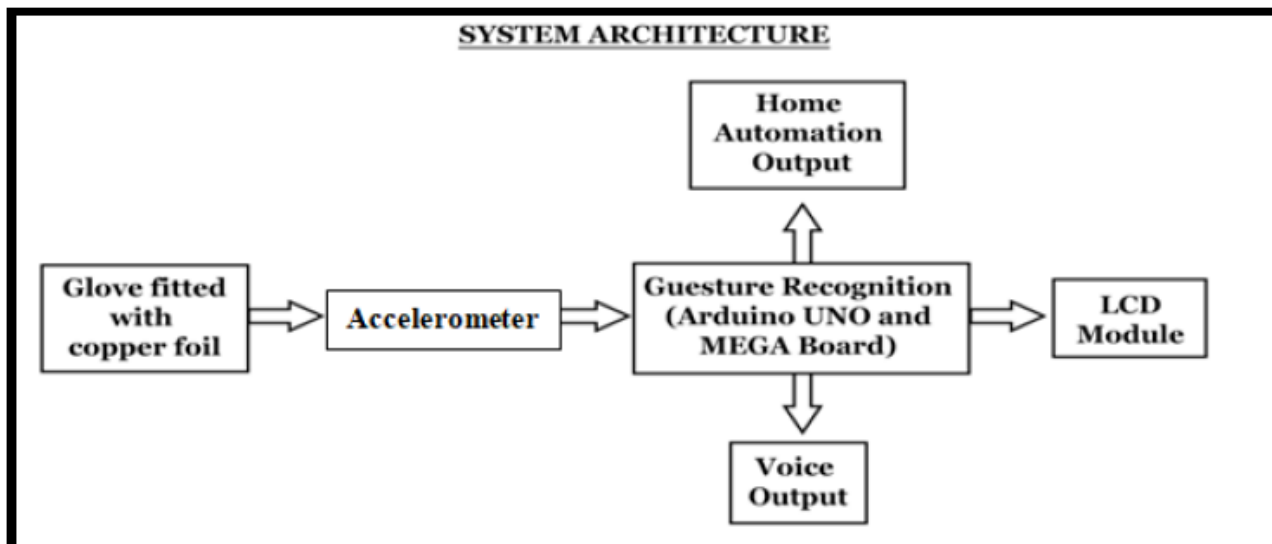
Inability to speak is considered to be a true disability. Sign language is a non-verbal form of intercommunication which is found amongst deaf people in world. The languages do not have a common origin and hence difficult to translate and Interpret. Here, We have designed a Speaking System For Mute People which overcomes the difficulties faced by the dumb day to day and using this system they can get their basic needs satisfied like (Drinking Water, Feeling Hungry, Emergency etc) and they can also control things around them like switching lights (ON/OFF), fans etc without the help of others.

The primary aim of this project is to introduce a device that will efficiently translate hand gestures to voice and Understandable Text. The System makes use of a glove comprising of Wires along the finger Length, Accelerometer and Arduino Boards ,Voice Kit and LCD. For each hand gesture made, the software code loaded onto the boards recognizes the gesture based on the Acceleration and the wires in contact and generates Messages. Gesture recognition implies a method by which the knowledge is collected from Hand and processed to work over attributes like hand form, Orientation of the hand. Further the processed data is sent in a wireless manner to the receiver section. In this section the gesture is recognized and the corresponding output is displayed on LCD and simultaneously a speech output is play backed through speaker and the Home Automation module connects the controlled devices and we can visualize the controlling of Lights and Fan .The portability of this project is a major advantage and is useful for both deaf and dumb. Thus with the help of this project, the barrier faced by Mute people in communicating with the society can be reduced to a greater extent.

## II. LITERATURE SURVEY

In [1],the authors have designed glove which is internally fitted out with five flex sensors, tactile sensors and accelerometer. For each particular movement, the flex sensor produces a proportional change in resistance and accelerometer measures the emplacement of hand. There are a total of 5 Flexion (Bend) sensors (for the 5 fingers) used in each glove which are used to detect the movement of joints in fingers and thumb. As the sensor is flexed, the resistance across the s ensor increases and a single tri-axial accelerometer is fitted on the back of the palm of each glove so as to capture theorientation of the hands along with the bend angle of the fingers. The processing of these movements is done by Microprocessor. The "Sign Language Trainer & Voice Convertor" software receives the values given by the flex sensors and the accelerometers on the two gloves through an Arduino.The system includes a text to speech conversion (TTS) block which interprets the matched gestures i.e. text to speech output. In [2],the authors aim to lower the communication gap between the mute community and manner. Compared with existing system the projected arrangement is compact and is possible to carry to any places. This system converts the language in associate passing voice that's well explicable by blind and ancient people. The language interprets into some text kind displayed on the digital display screen, to facilitate the deaf people likewise. In world applications, this system is helpful for deaf and dumb of us those cannot communicate with ancient person. The foremost characteristic of this project is that the gesture recognizer may be a standalone system, that's applied in commonplace of living. It's in addition useful for speech impaired and paralyzed patient means those do not speak properly and in addition used for Intelligent Home Applications and industrial applications. In [3],the authors have proposed a system in this direction to design modalities that can assist people who are limited by either handicaps or diseases to have better quality of life. In this proposed system a low cost device will be designed that used MEMS accelerometers to recognize different gestures made by people. Once recognized these gestures can be used to do various functions. In [4],the authors have designed a glove-based sign-to-content/voice interpreting framework for hard of hearing and unable to speak individuals. The glove speaks to the gesture based communication letters as yields a sound through the speaker, which helps in restricting the correspondence boundary amongst tragically challenged with vocal individuals. The critical of the exploration is identified with it's intend to help these class of non-vocal individuals to speak with others and enhance their commitments to development and fabricate their countries. The framework has been outlined, customized, executed and tried with decent outcomes. The framework could be reached out to cover more extensive scope of sign by utilizing a mix of two gloves rather than one.

### III. PROPOSED SYSTEM



**Figure 1: System Architecture**

The methodology is explained briefly as follows:

The proposed work is producing speech/ voice to sign language and does Home Automation with simple human gestures and motion sensing technology with the help of Copper foils and Accelerometer. This system started its initiations in the vision to successfully minimize the human machine interaction and to take up the Natural User Interface at the fore front.

The Designed system consists of Accelerometer incorporated at the back of the palm, Arduino UNO Board, Arduino Mega Board, Zigbee, Voice Kit, LCD Module, Push Button and Speaker as its main components.

- The System behaves as a Home Automation Device when the Push Button is Turned OFF and when it is ON, it is used to convey messages to Normal People.
- There are wires running through the finger length from the Arduino UNO Board till the tip of the 5 Fingers(Thumb, Fore Finger, Index Finger, Ring Finger, little Finger) covered with Copper Foil.
- The Thumb is connected to the Ground in Arduino UNO Board. So any finger Pressed against the Thumb makes the pin connected to the respective finger gets activated and based on the orientation of the hand the acceleration is measured through the Accelerometer and Gesture is formed.
- The Arduino UNO Board and Arduino Mega Board are loaded with the software code for Gesture recognition which is written in C Language. It is possible to output 8 messages in three-axes (X-axis ,Y-axis and Z-axis).And Home Automation is designed to work in X-axis Only.
- The Arduino UNO Board identifies the gesture through matching the Orientation and the active Pins and results the respective Letter to the Zigbee. The Zigbee in turn transfers the Letters to the Arduino Mega Board which in turn matches those letters and generates Voice and Message through the LCD and Speaker.
- When the Push Button is OFF, Home Automation is turned ON and through the same Connections, it is possible to control Lights and Fan by pressing fingers against the thumb to activate the pins in the UNO Board.
- The software used is Arduino Sketch IDE which receives the values given by the Accelerometer through the Arduino Uno board.

### IV. RESULTS AND DISCUSSION

As a solution to the problem statement, our results are more realistic and affordable compared to other research papers. Our project Speaking System For Mute People Using Hand Gestures not only displays the gesture into text, but it also able to convert in voices and also Home Automation. The results of our project is shown in fig 2.

When the push button is switched ON and gloves is in x-axis, the following output is obtained as per the code written for different gesture pattern the voice and playback system responded with recorded voices and on LCD display as follows in fig 3.

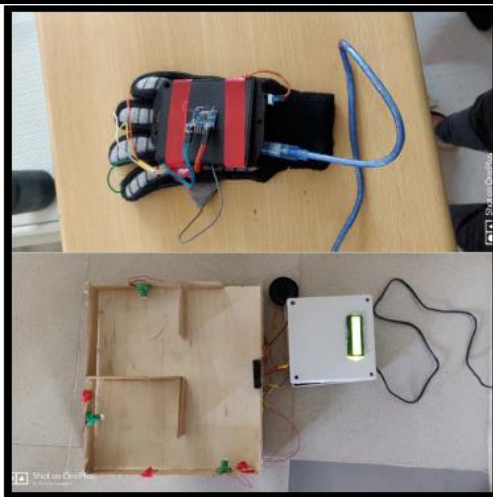


Figure 2: Designed System



Figure 3: Orientation in X-axis

When the push button is switched ON and gloves is in y-axis, the following output is obtained as per the code written for different gesture pattern the voice and playback system responded with recorded voices and on LCD display as follows in fig 4:



Figure 4: Orientation in Y-axis

When the push button is switched ON and gloves is in z-axis, the following output is obtained as per the code written for different gesture pattern the voice and playback system responded with recorded voices and on LCD display as follows in fig 5:



**Figure 5: Orientation in Z-axis**

When the push button is switched OFF and gloves is in x-axis, the following output is obtained as per the code written for different gesture pattern the home automation and on LCD display as follows in fig 6 & fig 7.



**Figure 6: Bulb ON**



**Figure 7: Fan ON**

## V. CONCLUSION

Here we have proposed a system that aims to design a cost effective system that would enable people to communicate easily with the normal people and automate their homes by means of a single wearable interface the customized smart glove. This system would be beneficial for common man as well as the physically disabled, as one can communicate well, could be taken care and can operate the appliances sitting at one place. Based on the research so far, it can be concluded that this system will be a new, innovative approach towards gesture to voice conversion, home automation as it reduces the cost considerably and is user friendly as well.

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