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# Smart Speaking System for Mute People Using Hand Motion and Gestures

**Shamal Kalmegh, Shweta Anasane, Surbhi Dhole, Pratik Giramkar, Shailesh ankhade , Prof. G. Dalvi**

U.G. Student, Department of Electronic and Telecommunication Engineering, P. R. Potepatil College of Engineering and Management, Amravati, Maharashtra, India

Department of Electronic and Telecommunication Engineering, P. R. Potepatil College of Engineering and Management, Amravati, Maharashtra, India

**ABSTRACT:** Its very difficult for mute people to convey their message to regular people. Since regular people are not trained on hand sign language, the communication becomes very difficult. In emergency or other times when a mute person travelling or among new people communication with nearby people or conveying a message becomes very difficult. Here we propose a smart speaking system that help mute people in conveying their message to regular people using hand motions and gestures. The system makes use of a hand motion reading system equipped with motion and flex sensors along with a speaker unit. This system is powered by a battery powered circuitry to run it. A raspberry pi is used for processing the data and operating the system. The system consists of around 10 stored messages like "need help", "where is the toilet/washroom" and so on that help mute people convey basic messages. The system reads persons hand motions for different variations of hand movement. It also consists of a trigger sensor in order to indate that the person wishes to activate the system and speak something. This ensures the system does not speak when the person is just involuntarily making hand motions. The raspberry pi processor constantly receives input sensor values and then processes it. Now it searches for matching messages for the set of sensor values. Once it is found in memory this messages is retrieved and is spoken out using text to speech processing through the interfaced speaker. Thus we have a fully functional smart speaking system to help mute people communicate with regular people using a simple wearable system.

## I. INTRODUCTION

Sign language is language used by the speech impaired. There are more than one million deaf adults and around half million deaf children who are functionally deaf, and another 10 million who are hard of hearing. The main problem that works aims to solve is the communication problem between speech-impaired people and the others.

Smart speaking system for mute people using hand motion and gestures As those people cannot express themselves with the words, they have many difficulties during their daily life. Some of the existing methods used by them are that they can either have an interpreter that can convey their messages in word they even use alphabetic charts or short hand written notes that will convey their message. They prefer writing to be their mode of communication then signs as written notes are more Smart speaking system for mute people using hand motion and gestures EXTC/PRPCEM/2020-21 2 efficient to understand. People have even developed a speech to text convertor for the students who are speech and hearing impaired thus helping them understand the speech of the other individual. The work aims to bridge the barrier by building an application that can convert sign language to voice and provide them a medium to Communicate .This is a smart speaking system that helps to mute people in conveying their message to regular people using hand motions and gestures. The system makes use of a hand motion reading system equipped with motion  and flex sensors along with a speaker unit. This system is powered by a battery to run it. Arduino mega is used for processing the data and operating the system. It also consists of a trigger sensor in order to ideate that the person wishes to activate the system and speak something. This ensures the system does not speak when the person is just involuntarily making hand motion. A person with speaking disability faces difficulty in communicating with the rest of the population. This device is developed to improve the lifestyle of a person who has speaking disability. This device converts the gesture to speech that gives voice to a mute person. Speech is one of the important factors required for the humans to convey their messages. In this project, Flex sensors play the major role. They are stitched to the gloves. The output from the flex sensors is fed into the Arduino development board. Arduino converts the analog signal to digital and then the data is send to LCD display and Android phone via Bluetooth where the speech output is obtained using a Speaker. A functioning sign language recognition system could provide an opportunity for the speech impaired to communicate with non-signing people without the need for an interpreter. It could be used to generate speech or text making the speech impaired more independent .Unfortunately there has is a little know in this field. In this work our aim is to develop a Sign Language Recognition system which is restricted to finger spelling. A gesture in a sign language is a particular movement of the hands with a specific shape made out of them. A sign language usually provides sign for whole words. It can also provide sign for letters to perform words that don't have corresponding sign Smart speaking system for mute people using hand motion and gestures EXTC/PRPCEM/2020-21 3 in that sign language. In this device Flex Sensor plays the major role, Flex sensors are sensors that change in resistance depending on the amount of bend on the sensor.

## II. METHDOLOGY

**COMPONENT DISCRIPTION**

*POWER SUPPLY*
To operate the overall system we are going to use 9V. Battery supply for portability and also we are going to use adapter to save the battery usage, while user is at stationary position to provide power to the system. Instead of using this we can refer rechargeable battery supply.
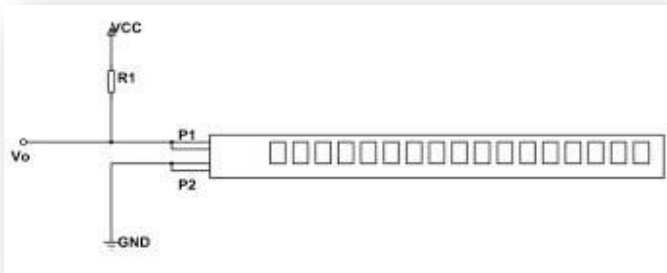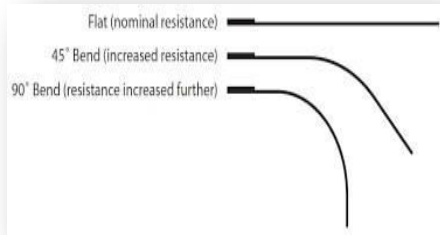
*FLEX SENSORS*

Flex sensors are usually available in two sizes. One is 2.2 inch and another is 4.5 inch. Although the sizes are different the basic function remains the same. They are also divided based on resistance. There are LOW resistance, MEDIUM resistance and HIGH resistance types. Choose the appropriate type depending on requirement. Here we are going to discuss 2.2inch Flex sensor that is FS-L-0055.

*Features and Specifications of Flex Sensors*

| Sr .No | Parameters | Description |
|---|---|---|
| 1 | Operating voltage of Flex Sensor | 0-5V |
| 2 | Operates on | Low Voltage |
| 3 | Power Rating | 0.5 Watt(Continuous),1 Watt(Peak) |
| 4 | Operating Temperature | -45c to +80c |
| 5 | Flat Resistance | 25kohm |
| 6 | Resistance Tolerance | +-30% |

## IV. CONLUSIONS

This system is a simple cost effective wearable system for Speech impaired people, which overcome the communication barriers between deaf people and regular people.

A Smart Speaking Glove for Speech impaired People is designed and implemented with various gestures. This System is more reliable, efficient easy to use and a light weight solution to the user as compared to other proposed systems. This bridges the communication gap between speech impaired people and others. During this project we have faced various challenges and we have tried to minimize the problem. Since, we observed that they cannot handle bulky and delicate in structure. We have minimized the communication problem as:

✓      The output is in the form of speech which is easily understood by others.
✓      This system will provide assistance to the speechless people to express their needs using gestures.
✓      The voice output can be manipulated in mobile app or speakers according to the user.

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