SIGN TO VOICE TRANSLATOR FOR DUMB PEOPLE

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**Abstract:**

The term dumb refers to the people who are unable to speak. In India, around 1.3 million people are hearing impaired, nearly 1% of the Indian population. The people who are hearing impaired, are isolated from the social surroundings due to their disability. Most of the people are without a suitable job because of the difficulty in the communication. These kinds of people are emotionally depressed in comparison to others. Our motive is to break the communication barrier between people with hearing - impaired and normal people. In this paper, we propose an innovative idea to translate sign language to speech. It is based on the hand glove approach, where the hand gesture is done by the user, using the glove, modified into respective text data with the help of Arduino and flex sensors. It is transmitted to the android app via Bluetooth and it makes voice over of it. So the deaf or dumb people can easily interact with other people without any restrictions.

Keywords: Hand gesture recognition - Flex sensor Applications - Accelerometer - Android application

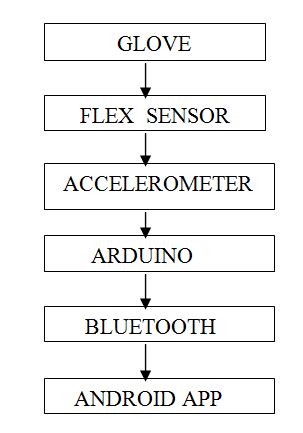
**I.INTRODUCTION**

The problems faced by dumb people are how they interact with normal people and how to ask something from them. It is difficult for them to learn a language in which all others are talking mainly for the deaf and dumb people they are facing with hearing and learning though. In very olden days their learning are done by writing in their hands so that they can feel. After, Sign language was invented by Pedro Ponce de León which played a bigger role in their communication and learning. There are various categories in sign language like ISL (Indian Sign Language), ASL (American Sign Language), BSL (British Sign Language), etc... But none of the sign languages is universal or international[6]. A very familiar example of where we can see sign language communication is TV news readers. But this language is complicated to those who are not well acquainted with sign language.

Several works are done in this title, SVBIcomm-Sign voice Bidirectional communication system, and It helps the blind people to hear the converted voice from the gesture done by the dumb/deaf people. It works in two directions one is processing video to speech, and another is from speech to video[1]. To avoid the camera or overcome the barrier, we introduced a glove that can convert Sign language into Audio output. This glove is fitted with flex sensors, Arduino, Bluetooth module, Accelerometer sensor. The gestures done by them are converted into audio with this glove. The ASL signed hand gestures are converted into text as well as speech using unsupervised feature learning. It is done by image segmentation and object recognition in the framework of FAST and SURF algorithms[3]. The 26 hand gestures in Indian sign language are converted into text and voice using Matlab. In this method, The Linear Discriminant Analysis (LDA) algorithm was used for gesture recognition and the recognized gesture is converted into text and voice format [2]. In our paper, the gestures are pre-installed in the glove. The person who is using this glove his finger motions is detected by the flex sensors. The piezoelectric output of the flex sensor fed into the Accelerometer which converts the output of the flex sensor into voltage with higher amplitude and lower amplitude (DC voltage). Then the input signal is transmitted to Arduino where the inputs are matched with pre-recorded data. If the signal did not match then no output will be given to the Bluetooth module. The matched data then goes to the Bluetooth module. From Bluetooth, data can be transmitted into a voice output which sends to a smartphone that is connected to the Bluetooth module. The rest of the paper is structured as follows, section 2 presents the proposed work, section 3 presents the conclusion. The detailed proposed work and working of this system that is discussed further here

**II. PROPOSED WORK**

The project came into existence for one primary purpose, to assist the deaf and mute people in simply communicating and interacting with the people who aren't physically-impaired . The aim is to convert basic symbols and signs to speech using the smart phone



**FLEX SENSOR**

It is the sensor which is used to calculate the amount of bending, which is made up of carbon and plastic .thus it is also called bend sensor the resistance which is varying can be straightly proportional to the turn, also it will work as a goniometer when the surface of the flex sensor is linear it'll be having its nominal resistance when it's bent 45ºangle the resistance increases to twice as before. And when the bent is 90º, the resistance could go as high as fourfold the nominal resistance. So the resistance across the terminals rises linearly with a bent angle. So during a sense, the Flex sensor converts flex angle to resistance parameter.

**ACCELEROMETER**

Accelerometer sensors are INTEGRATED CIRCUITS that calculate acceleration, which is the change in speed per unit time. Measuring acceleration makes it possible to gain information like vibration and object inclination.

**BLUETOOTH**

The Bluetooth module spp-serial port protocol is designed to set up the Transparent wireless serial connection .it can switch mode between master and slave, which means we can use this Bluetooth module without transferring data and receiving data. The maximum range of this Bluetooth varies up to 1mbps. It takes around 4 to 5 volts to operate this module.

**ARDUINO**

There are different types of Arduino existing in the electronic platform. In this Arduino Uno performs a significant role; it is a single-board microcontroller. The Uno version is the first in the USB based Arduino .the microchip Atmega328p comes with the programmed bootloader which allows a new code into it without any external hardware. It has 20 digital input/output pins (of which six can be used as PWM outputs and six can be used as analog inputs). It contains everything needed to support the microcontroller; connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

**III. WORKING OF THE PROPOSED SYSTEM**

The user should wear hand gloves, fitted with the numerous flex sensors and accelerometer. The glove is used for detecting the hand gesture activities done by the user, with the help of accelerometers and flex sensors. In this system, the flex sensor is used to record the sign language and sense the environment. When the user is ready to make some conversation, using those sign languages involves bending movement of fingers along with the flex sensors fitted in the fingers. The resistance of the flex sensor varies depending on the angle which is measured while bending the fingers. Finally, the movements are converted into electrical signals. The accelerometer present in the palm glove measures the position based on the tilt and motion of the hand gesture activities done by the user. It is represented by the X and Y-axis. It gives the exact direction and position where acceleration is occurring.

The flex sensors and accelerometer fitted on the hand glove is connected to the analog pins of the Arduino. In this system, the Arduino acts as an analog to digital converter. The data from both the accelerometer and flex sensor is sent to the Arduino board. Simultaneously, the program contains the database about the angles and respective texts for the angles dumped on the board. The transmitted data is being matched with the database. The exact matched information (text) will be displayed on the serial monitor. The transmitter and the receiver of the HC – 05 Bluetooth modules are connected in the analog pins of the Arduino board. In this system Bluetooth acts as a transmitter, it transmitted the exact matched data to the receiver end

An android smart phone is involved in this project, where the Bluetooth of the android mobile act as

a receiver end. An android app is created by using the android studio. It is similar to the screen reader application

for the android system. It powers the application to read aloud the text on the screen .as it is identical to the working of google text to speech but not supported by many languages. As the Android app receives the data via Bluetooth

technology and makes the voice of it

**IV CONCLUSION**

Sign language may help communicate between the deaf and mute community and normal people. There is a communication barrier between deaf and dumb people. This project overcomes the gap between deaf and dumb peoples. The hand gestures recognition plays a vital role in it. This project takes hand gestures of dumb people and converts it into voice for them. This hand gestures recognition and voice conversion for dumb and deaf person technique will change their speaking perspective. This device's main advantage is that there is no need for the non-deaf people to carry something to communicate with the hearing impaired people. So the people who are deaf can easily communicate with others, without any restrictions.

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