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Hand Sign Interpreter For Speech Impaired People

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Abstract: *In modern world communication has becomes very easy because the integration of communication technologies with internet. But the deaf and dump people find difficult to useful this technology because 2.78%of the people in our country are not able to speak. The deaf &dumb people struggle in expressing their thoughts & feeling to the normal people. They are facing the various challenges to expressing their feeling to other people, so the Hand sign interpreter play a major role in the daily activities of human life which are helpful for deaf & dumb people to express their thoughts.*

Keywords: *hand sign interpreter, Impaired people, Gesture.*

I. Introduction

Communication play very important role in human life. Around the world 300 millions of people suffering from disability & maintainability. In the recent year, many number of hearing disabled and speech impaired ratio has risen rapidly due to disease, road accident or birth defects.

A person who is not able to speak or he is lost their ability in accident or faces a very critical issues in communicating his thoughts, knowledge, ideas, feelings to the society so, we understand their issues & design a system called as a Hand sign interpreter for speech impaired people. In proposed system we have made glove, to wearing these glove the speech impaired people are easily communicating with the normal people. This system knows as a sign to voice which is capable of recognizing hand movement by transferring digitized image of hand sign to voice.

Fig 1 Hand sign Interpreter

II. Earlier work

Hanine El Hayek and Jessica Nacouzi (April-2014)The proposed system is Used techniques of the recognition and translation of the alphabets especially in the Arabic sign language were developed using five phases; Pre-processing phase, Best frame Detection phase, Category Detection phase, Feature Extraction phase, and finally Classification phase. This technique used the images of bare hands that can translate the movement to Arabic Letters using minimum distance classifier (MDC) and multilayer perception (MLP) neural networks. This system requires a huge software program. [1]

Anagha J. Jadhav1, Mandar P. Joshi2 (July-2016) Proposed design a system which will translate sign language and at the output we are having playback voice module, such that we can get output in form of sound. Flex sensors and accelerometer will be used to sense the hand gesture. The device designed will portable and user friendly. It will be flexible to any common person. [2]

V.Padmanabhan, M. Sornalatha (May-2014) This project aims to lower the communication gap between the mute community and additionally the standard world. The pro-jected methodology interprets language into speech. The system overcomes the necessary time difficulties of dumb people and im-proves their 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 common-place of living. It's in addition useful for speech impaired and para-lysed patient means those do not speak properly and in addition used for Intelligent Home Applications and industrial applications. [3]

III. Proposed Methodology

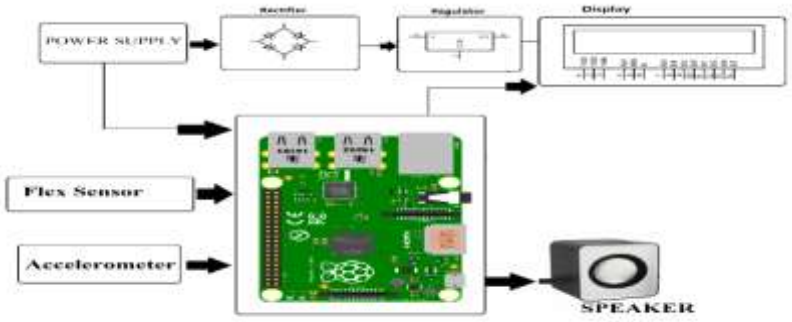
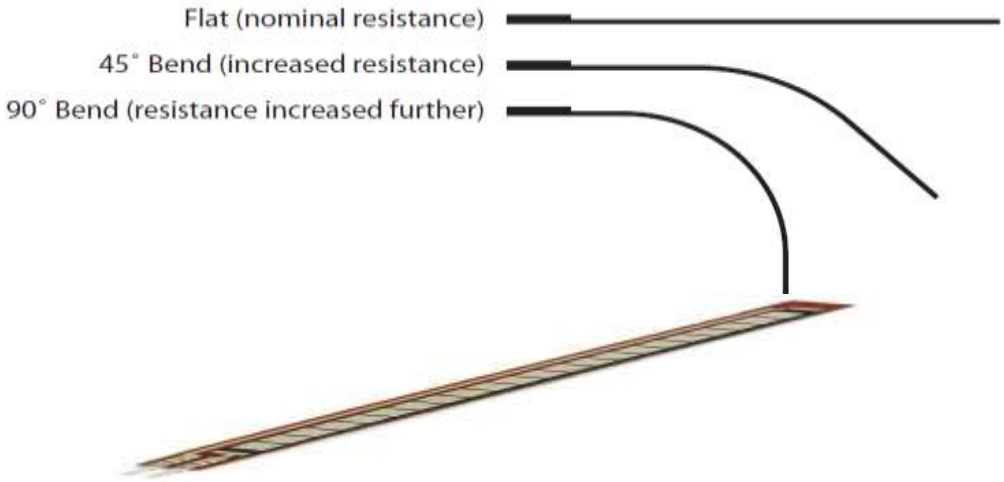


Fig 2 Working of hand sign Interpreter

Raspberry Pi module is fundamentally used to actualize this project work and this goes about as heart of this work, which is utilized to deliver the output of the proposed work. Accelerometer sensors are the movement sensors Gesture based structure is a large scale microcontroller based structure being intended to streamline interaction among the dumb, deaf and blind peoples and their interaction with the normal persons. The proposed system can be enthusiastically reconfigured to work as a "smart device". The gathered signals are passed to the Raspberry Pi board utilizing the image processing, here the image processing is interfaced with the Raspberry Pi to pass the motions to the beneficiary end.

3.1 Flex Sensor

The output the Flex sensor is in the form of the variable resistance. As the fingers are bend the resistance of the Flex sensor changes. This property is shown below



3.2 Raspberry Pi

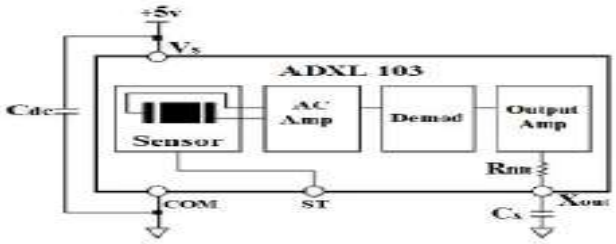
3.1.1 Features of Raspberry Pi

- **Operating Systems**: Raspbian, RaspBMC, Arch Linux, Rise OS, Open ELEC Pidora
- **Video Output**: HDMI Composite RCA

- **Supported Resolutions**: 640x350 to 1920x1200, including 1080p, PAL & NTSC std.
- **Power Source**: Micro USB
-

3.3 Accelerometer

In the system a 3 axis accelerometer is used. Accelerometer works on the principle of the gravitational force. Accelerometer Output changes according to the inclination, in response to the movement of the mass inside. To maintain the simplicity in the prototype we are considering only the 2 dimensional models. Accelerometer provides temperature compensation and g-select option which allow selection among 4 different type of sensitivity. It can be directly interfaced to the ADC.Accelerometer within the Gesture Vocalized system is employed as a tilt sensing element, which checks the tilting of the hand. ADXL103 measuring system as shown in Figure three. The tip product of the measuring system is provided to 3rd module, which incorporates pipeline structure of 2 ADC. There's a technical issue at this stage of the project, that the analog output of the measuring system as shown in Figure 3, that ranges from one.5 volts to three.5 volts to a digital 8-bit output the systems, becomes terribly sensitive.



IV. Performance Analysis

In MATLAB, an effective procedure for performing this operation is the principal component analysis (PCA). This technique has three effects: the first one is to orthogonalizes the components of the input vectors (so that they are uncorrelated with each other); second it orders the resulting orthogonal components (principal components) so that those with the largest variation come first; and finally it eliminates those components that contribute the least to the variation in the data set By using this technique, the learning rate of training the neural network is increased. As a result, the prototype has successfully detected the hand region as shown in fig below

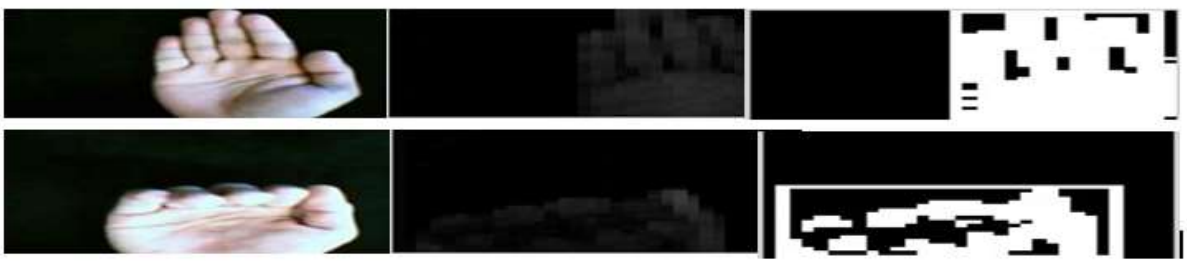


Fig 3 Hand image detection

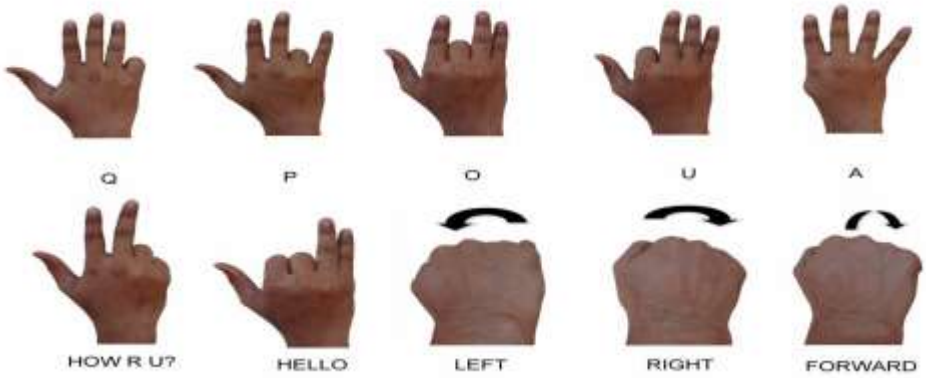


Fig 4 Hand signs used in the system

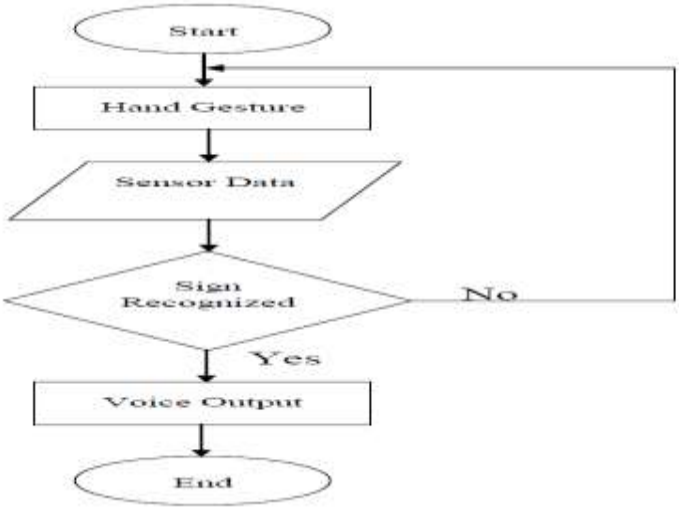
The output signal is an audio signal which is dependent on ADC count, all the hand signs that are to be fetched depends on the counts. The hand signs taken in the prototype do not belong to a specific language, rather these are taken in a way such that user can modify it as per their requirement. Every bending of the sensor (finger) produces a unique ADC count so that when different hand sign is made different ADC count is produced. Processor uses these ADC counts to decide which audio signal should be fetched and played accordingly. With different hand signs different signals can be produced. Using this concept of ADC count, more and more no. of hand signs can be used as per user and accuracy can be increased with a little change in the ADC count. System accuracy, user configurability, portability, its immunity to noise and environmental disturbances make it to be a better choice over the other products available in the market.

V. Algorithm & Flowchart

5.1 Algorithm

step1. Start.
step2. Guess the hand position
step3. Sense the data
step4. Recognize hand position
step5. Generate the Voice output
step6.Stop.

5.2 Flowchart



VI. Conclusion

Hand is the richest source for communication between the people. Speech impaired people uses sign languages to interact with people. To reduce the communication gap between speech impaired people and normal people the above survey was carried out. The above survey also shows some drawbacks such as in many systems image processing is used which is very tedious process. In some papers bulky and complicated hardware is used which is difficult to carry and also less portable. In some cases, optical fiber is used as a sensor but optical losses can be observed. To avoid this, we are going to design a portable system using flex sensors. Also the system will become less complicated and user friendly.

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