

# Communication Aid for Deaf and Dumb People

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**ABSTRACT:-** The aim of this project is to help the communication of two people, one hearing impaired and one without any hearing disabilities by converting finger spelling to speech. Finger spelling is a subset of Sign Language, and uses finger signs to spell words of the spoken or written language. We aim to convert finger spelled words to speech and vice versa. Different spoken languages and sign language such as English will be considered.

We propose design and initial implementation of a smart system which can automatically translates sign language to voice. Sign Language Translation Systems could significantly improve deaf lives especially in communications, exchange of information and employment of machine for translation conversations from one language to another has. Therefore, considering these points, it seems necessary to study the speech recognition. Usually, the voice recognition algorithms address three major challenges. The first is extracting feature form speech and the second is when limited sound gallery are available for recognition, and the final challenge is to improve speaker dependent to speaker independent voice recognition. Extracting feature form speech is an important stage in our method. Different procedures are available for extracting feature form speech. One of the commonest of which used in speech recognition systems is Mel-Frequency Cepstral Coefficients (MFCCs). The algorithm starts with preprocessing and signal conditioning. Next extracting feature form speech using Cepstral coefficients will be done. Then the result of this process sends to segmentation part.

**Keywords:** Deaf Human, Sign Language Translation Systems, Humatronics, Automatic Speech Recognition

## INTRODUCTION

About nine thousand million people in the world are deaf and dumb. How frequently we come across these people communicating with the normal world? The communication between a deaf and normal person is to be a serious problem compared to communication between blind and normal visual people. This creates a very small space for them as communication being a fundamental aspect of our life. The blind people can talk freely by means of normal language whereas the deaf-mute people have their own manual-visual language popularly known as sign language. 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. A gesture in a sign language is a particular movement of the hands with a various shape made out of fingers.

A gesture is a static shape of the hand orientation to show a sign. The main aim of this project is to present a system that can efficiently interpret American Sign Language gestures to both text and auditory speech. The converter here makes use of a glove based technique consisting of flex sensors. For each hand gesture made a signal is produced by the sensors corresponding to the hand sign the controller matches the gesture with already stored inputs in the SD card. The device translates alphabets as well as can form words using specific gestures made by person

## LITERATUREREVIEW

AMateen Ahmed; Mujtaba Idrees, [1], This paper describes a neoteric approach to bridge the communication gap between deaf people and normal human beings. In any community there exists such group of disable people who face severe difficulties in communication due to their speech and hearing impediments. Such people use various gestures and symbols to talk and receive their messages and this mode of communication is called sign language. Yet the communication problem doesn't end here, as natural language speakers don't understand sign language resulting in a communication gap. Towards such ends there is a need to develop a system which can act as an interpreter for sign language speakers and a translator for natural language speaker. For this purpose, a software based solution has been developed in this research by exploiting the latest technologies from Microsoft i.e. Kinect for windows V2. The proposed system is dubbed as Deaf Talk, and it acts as a sign language interpreter and translator to provide a dual mode of communication between sign language speakers and natural language speakers. The dual mode of communication has following independent modules (1) Sign/Gesture to speech conversion (2) Speech to sign language conversion. In sign to speech conversion module, the person with speech inhibition has to place himself within Kinect's field of view (FOV) and then performs the sign language gestures.

Aradhana Kar ; Pinaki Sankar Chatterjee [2], This paper propose Sign Language is the language of deaf. There are different types of sign languages spread all over the world. American Sign Language (ASL) is one of the sign languages.

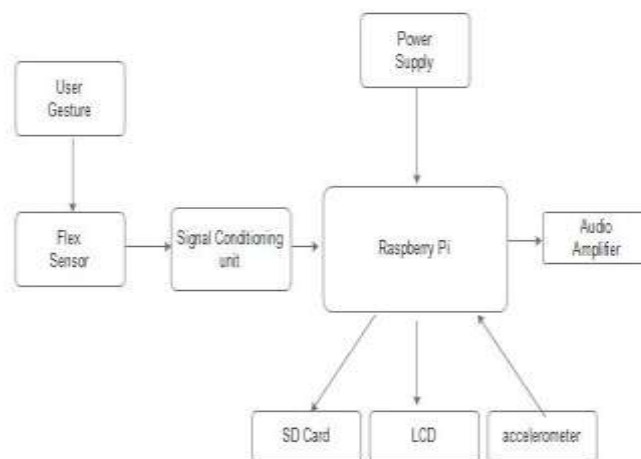
ASL is used by deaf Americans. We had created a system that translates sign language videos to simple sentence in English. This system is taking a lot of time for mapping the sign language videos to its corresponding sign writing images. This paper discusses an approach for minimizing the processing time taken for mapping the sign language videos to its corresponding sign writing images.

Smd. Sanzidul Islam ; Sadia Sultana Sharmin Mousumi [3], Collecting hand gesture data for sign language is too much difficult to researchers. Ishara-Lipi, the first complete isolated characters dataset of Bangla Sign Language (BdSL) is conducted in this article. It will help to increase interaction between hearing impaired community and general people. The dataset contains 50 sets of 36 Bangla basic sign characters, collected by the help of different deaf and general volunteers. In Bangla Sign Language sign characters there have 6 vowels and 30 consonants by which they can finger spell all Bangla words. In Ishara-Lipi dataset, after discarding mistakes and preprocessing, 1800 character images of Bangla Sign Language were included in the final state. This dataset could be used to develop computer vision based or any kind of system that approves users to search the meaning of BdSL sign.

Chung-Hsien Wu ; Yu-Hsien Chiu [4], This paper proposes a novel approach to the generation of Chinese sentences from ill-formed Taiwanese Sign Language (TSL) for people with hearing impairments. First, a sign icon-based virtual keyboard is constructed to provide a visualized interface to retrieve sign icons from a sign database. A proposed language model (LM), based on a predictive sentence template (PST) tree, integrates a statistical variable n-gram LM and linguistic constraints to deal with the translation problem from ill-formed sign sequences to grammatical written sentences. The PST tree trained by a corpus collected from the deaf schools was used to model the correspondence between signed and written Chinese. In addition, a set of phrase formation rules, based on trigger pair category, was derived for sentence pattern expansion. These approaches improved the efficiency of text generation and the accuracy of word prediction and, therefore, improved the input rate. For the assessment of practical communication aids, a reading-comprehension training program with ten profoundly deaf students was undertaken in a deaf school in Tainan, Taiwan. Evaluation results show that the literacy aptitude test and subjective satisfactory level are significantly improved.

**BLOCK DIAGRAM**

Indian Sign Language is used by deaf and hard of hearing people for communication by showing signs using different parts of body. All around the world there are different communities of deaf people and thus the language of these communities will be different. The Sign Language used in USA is American Sign Language (ASL); British Sign Language (BSL) is used in Britain; and Indian Sign Language (ISL) is used in India for expressing thoughts and communicating with each other. The “Indian Sign Language (ISL)” uses manual communication and body language (non-manual communication) to convey thoughts, ideas or feelings. ISL signs can be generally classified into three classes: One handed, two handed, and non-manual signs. One handed signs and two handed signs are also called manual signs where the signer uses his/her hands to make the signs for conveying the information. Non Manual signs are generated by changing the body posture and facial expressions. This system is to help hearing impaired people in India interact with others as it translates English text to Sign language.



**Fig: Block Diagram**

## Raspberry Pi

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.

What's more, the Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infrared cameras. We want to see the Raspberry Pi being used by kids all over the world to learn to program and understand how computers work.



Fig: Raspberry pi

## Flex Sensor

This flex sensor is a variable resistor like no other. The resistance of the flex sensor increases as the body of the component bends. Sensors like these were used in the Nintendo Power Glove. They can also be used as door sensors, robot whisker sensors, or a primary component in creating sentient stuffed animals. The Flex Sensor patented technology is based on resistive carbon elements. As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius—the smaller the radius, the higher the resistance value. Spectra Symbol has used this technology in supplying Flex Sensors for the Nintendo Power Glove, the P5 gaming glove



Fig: Flex Sensor

## ADVANTAGES

- Removing the communication barrier between the normal and abnormal people.
- Easy sign gesture converter to audio

- High Performance
- Easy to use

## CONCLUSION

This project eases the communication for the differently abled community. Through the use of Flex sensor mounted glove, they can convey their feelings without the barrier of sign language. The Gestures are recognized and corresponding audio and text output is obtained. This project bridges a wider communication gap and is very useful for the society.

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