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# Sign Language Recognition system

A I - M L P R O J E C T



# INTRODUCTION



- Communication is very crucial to human beings, as it enables us to express ourselves. We communicate through speech, gestures, reading, writing, etc.
- However, unfortunately, for the speaking and hearing-impaired minority, there is a communication gap. Visual aids, or an interpreter, are used for communicating with them.
- However, these methods are rather cumbersome and expensive, and can't be used in an emergency.



**A system for sign language recognition that classifies finger spelling can solve this problem.**





## Problem Statement

Understanding the exact context of symbolic expressions of deaf and dumb people is the challenging job in real life until unless it is properly specified. Hence there is a need of a system which recognise different sign and gestures and conveys it to normal people.



## Objective:-

Communication is always having a great impact in every domain and how it is considered the meaning of the thoughts and expression that attract the researchers to bridge this gap for every living being.

The objective of this project is to identify the symbolic expression through images so the communication gap between a normal and hearing impaired person can be easily bridged.



# RELATED LITERATURE

Sanil Jain and KV Sameer Raja [4] worked on Indian Sign Language Recognition, using coloured images. They used feature extraction methods like bag of visual words, Gaussian random and the Histogram of Gradients (HoG). Three subjects were used to train SVM, and they achieved an accuracy of 54.63% when tested on a totally different user.





# Datasets

01

## American Sign Language (ASL) dataset

- ASL dataset created by B. Kang et al is used.
- It is a collection of 31,000 images, 1000 images for each of the 31 classes.
- These gestures are recorded for a total of five subjects. The gestures include numerals 1- 9 and alphabets A-Z except 'J' and 'Z', because these require movements of hand and thus cannot be captured in the form of an image.
- Some of the gestures are very similar, (0/o), (V/2) and (W/6). These are classified by context or meaning.

02

## Indian Sign Language (ISL) dataset:

- No standard dataset for ISL was available. So, a dataset created by Mukesh Kumar Makwana, an M.E. student at IISc, is used.
- It consisted of 43,750 depth images and 1,250 images for each of the 35 hand gestures. These were recorded from five different subjects.
- The gestures include alphabets (A-Z) and numerals (0-9) except "2" which is exactly like 'v'. The images are gray-scale with a resolution of 320x240.



# Existing Methods

01

## Glove-based method

- The vision-based method is further classified into static and dynamic recognition. Statics deals with the detection of static gestures(2d-images) while dynamic is a real-time live capture of the gestures. This involves the use of the camera for capturing movements.

02

## Vision-based method

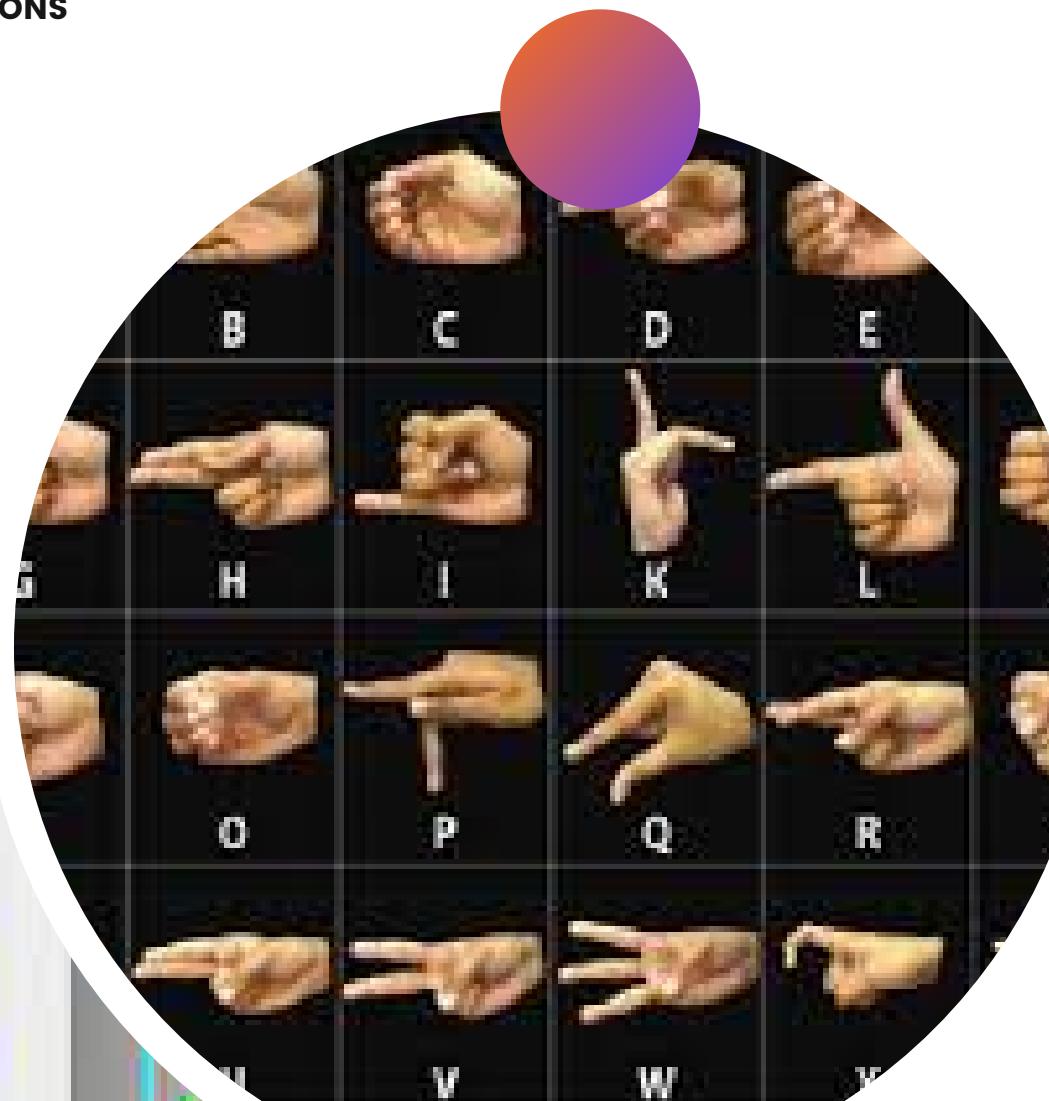
- The glove-based method is in which the signer has to wear a hardware glove, while the hand movements are getting captured.



# STATIC HAND GESTURE DETECTION

Objective :

Producing a model which can recognize Fingerspelling-based hand gestures in order to form a complete word by combining each gesture.





# DYNAMIC GESTURE DETECTION

## OBJECTIVE:

Applying video classification on the video dataset of ASL signs. Take the captured videos, and break them down into frames of images that can then be passed onto the system for further analysis and interpretation.





# Conclusion and future work

Sign Language Recognition System has been developed from classifying only static signs and alphabets, to a system that can successfully recognize dynamic movements that comes in continuous sequences of images. Researchers nowadays are paying more attention to making a large vocabulary for sign language recognition systems. Many researchers are developing their Sign Language Recognition System by using small vocabulary and a self-made database. A large database built for Sign Language Recognition Systems is still not available for some of the countries that are involved in developing the Sign Language Recognition System. Especially the Kinect-based data, which provides the color stream and depth stream video. Fair and direct comparison between approaches is limited because of the variation of sign language in different countries and the difference in limitations set by each researcher. Variation of sign language in most of the country is based on grammar and the way to present each word, such as presenting the language by word or by sentence.



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# Thank You

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