



JAYPEE INSTITUTE of INFORMATION  
AND TECHNOLOGY  
Bachelor In Technology  
in  
Computer Science

MINOR–PROJECT (3<sup>rd</sup> year)

by

Eshan Dhawan (9918103066)  
Rhythm Agarwal (9918103080)  
Kavya Vishnoi (9918103188)

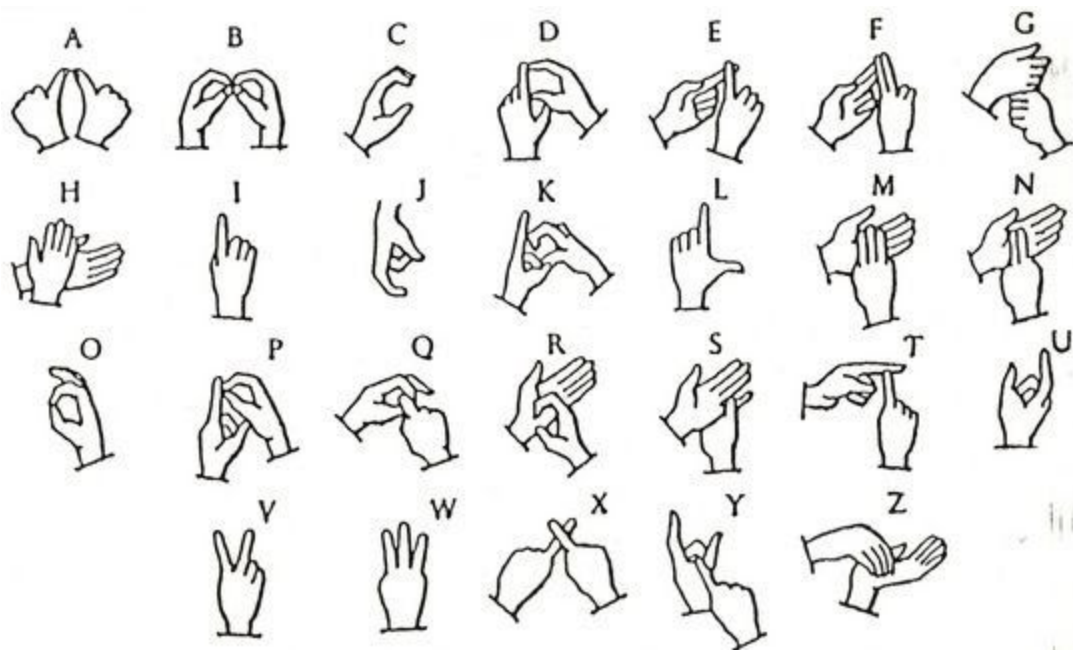
Dr Raju Pal  
FACULTY OF ENGINEERING AND  
TECHNOLOGY  
JIIT, NOIDA, INDIA  
(SEM –V 2020)

# Synopsis

## 1. Introduction

Verbal Communication is one of the main pillars of our society but people with speaking and hearing disabilities have problems navigating various aspects of a normal life. This creates a barrier between the normal and the specially abled people.

In order to help the specially abled people navigate through the communication aspect of life. Sign language was devised where they represent various alphabets through signs and symbols as seen in the image.



These symbols to some extent help them to navigate through the aspects but still many people don't understand sign language.

So In our minor project we wanted to create a program using various Artificial Intelligence techniques like Machine Learning and Deep Learning to translate Sign language to text and speech. We also aim to convert text and speech to sign language. This might help to ease the miseries of the specially abled.

## 2. Motivation

We are motivated by several things in our work, doing work on a meaningful project, which will help to overcome the problems of many people and will have a great and a positive impact on society.

### 3. Methodology

#### **Image Acquisition**

For this process we decided to use the vision-based approach for the process of gesture recognition as it is much more convenient to use but the accuracy is much low as compared to glove based approach as in the glove based approach we employ special hardware to detect the gesture, Whereas in vision-based recognition we use Computer Vision algorithms to detect the gestures using the real-time web camera.

#### **Image Preprocessing**

Digital image processing is the use of computer algorithms to perform image processing on digital images. It allows a much wider range of algorithms to be applied to the input data — the aim of digital image processing is to improve the image data (features) by suppressing unwanted distortions and/or enhancement of some important image features so that our AI-Computer Vision models can benefit from this improved data to work on.

#### **Feature Extraction**

The features of the processed Image are extracted for further processing and classification. The selected image is converted to greyscale to as the image is still in RGB format.

Then various features are extracted from the grayscale image.

#### **Classification**

In Machine Learning, classification is a process of supervised learning in which the computer learns from the input data we provide to it and then uses this learning to classify new observations.

Some examples where classification is already used are handwriting classification, biometric identification etc.

There are various classification algorithms that can be used for our project.

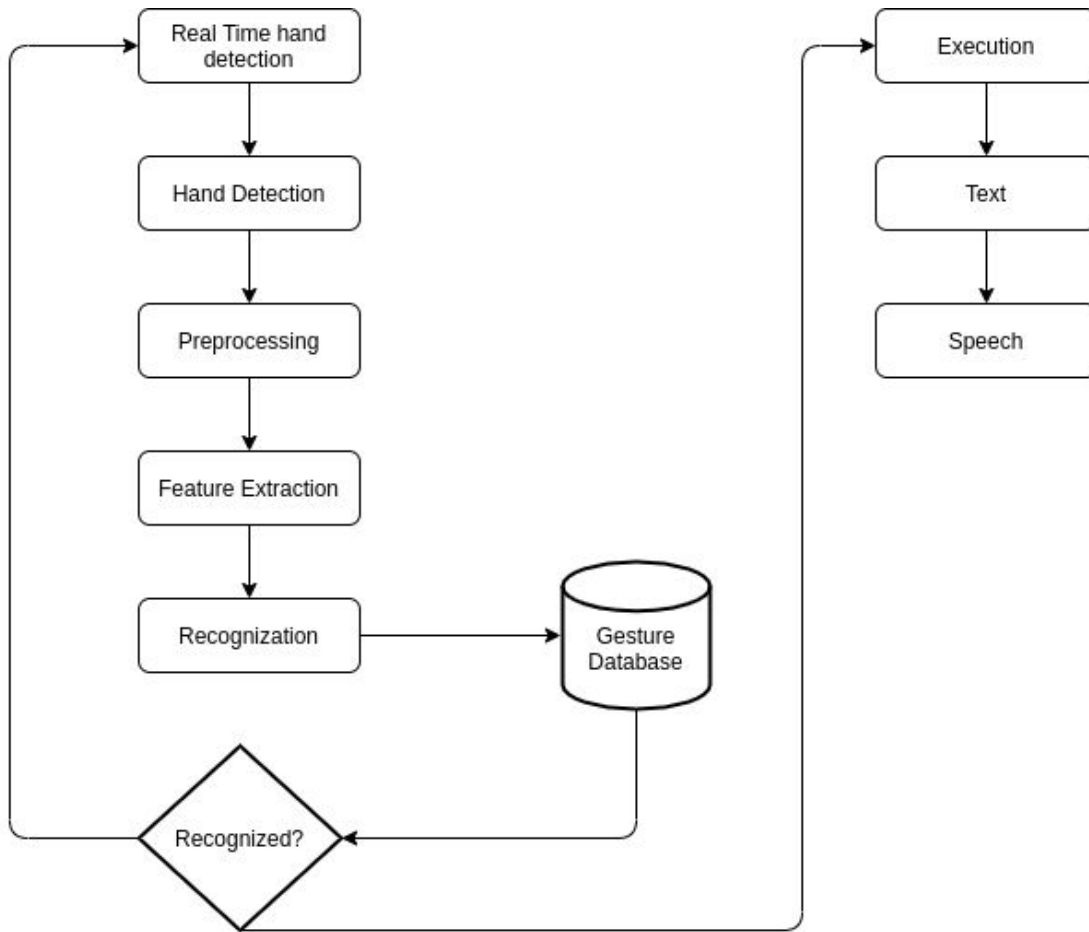
#### **Conversion of text to speech**

For conversion of text to speech, there are few words that are stored in the database and using grammar-translation we frame the letters to words.

The words generated can later be processed using online speech APIs that are available like google's text to speech API, etc.

Also, the text generated will also be displayed as an output.

## Overview of the system



## 4. Plan of work

The dataset to train our software will be gained from an online repository. Since the dataset available online is not properly organized, we will collect data from different hand sizes and shapes to avoid overfitting, during this process. For converting into speech, few words are trained and stored in the database. Using grammar translation, the signs recognized are framed into words and the web-text are used to display speech or text. There are several APIs available lately to convert text to speech. APIs such as Google Text to Speech API will be used here to convert the obtained text to speech.

## References

- [1] <https://ieeexplore.ieee.org/document/7569545>
- [2] [https://www.ripublication.com/ijaer18/ijaerv13n9\\_90.pdf](https://www.ripublication.com/ijaer18/ijaerv13n9_90.pdf)
- [3] [https://www.researchgate.net/publication/335433017\\_CONVERSION\\_OF\\_SIGN\\_LANGUAGE\\_TO\\_TEXT\\_AND\\_SPEECH\\_USING\\_MACHINE\\_LEARNING\\_TECHNIQUE\\_S](https://www.researchgate.net/publication/335433017_CONVERSION_OF_SIGN_LANGUAGE_TO_TEXT_AND_SPEECH_USING_MACHINE_LEARNING_TECHNIQUE_S)
- [4] <https://devmesh.intel.com/projects/a-translator-for-indian-sign-language-to-text-and-speech#about-section>