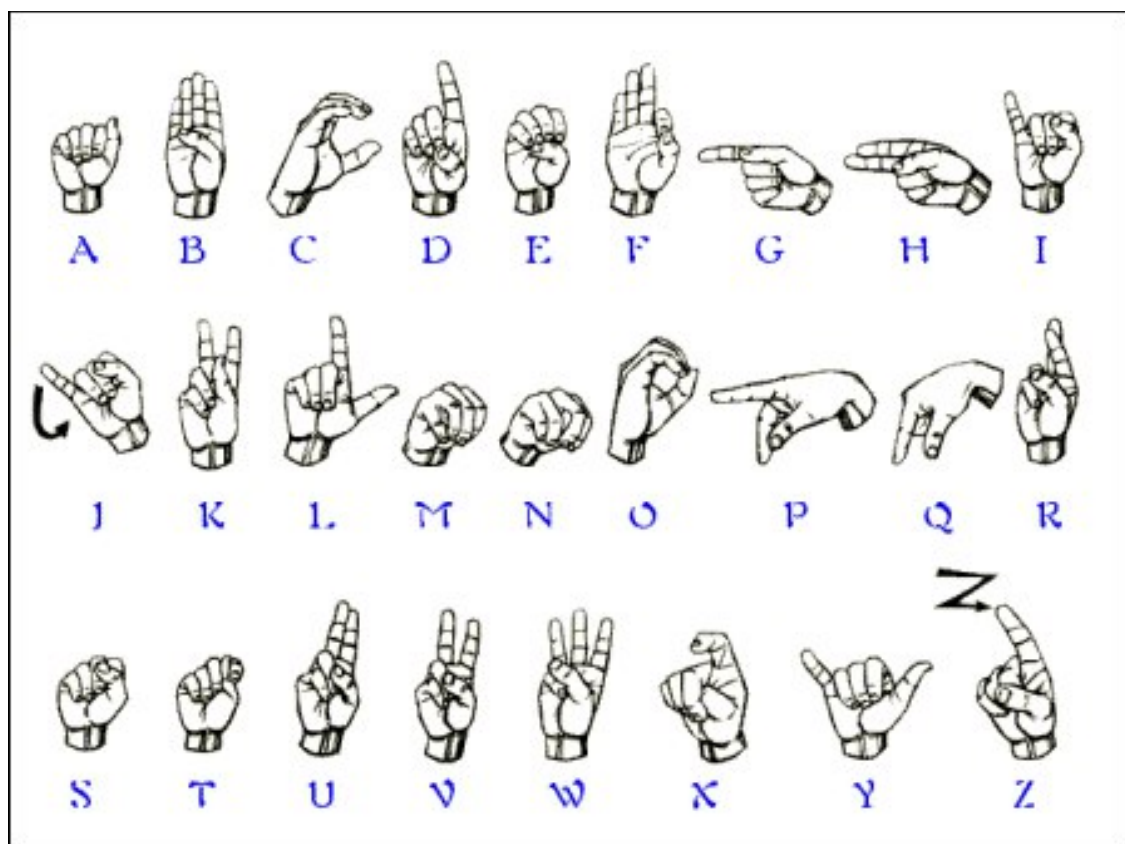


# Neuro Fuzzy Techniques Sign Language Recognition



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# Architecture

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## **Pre-trained :**

Used Resnet50 model in keras which had 50 deep convolutional layers. Relu and Softmax were used as the activation functions.

## **Basic :**

Used differential error back propagation algorithm for the model. It had 100 input nodes , 2 hidden layers of 64 nodes each and an output layer of 26 nodes (one for each alphabet). Sigmoidal function was used for activation.

# Pre-Processing

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## **Pre-trained :**

Used 520 images(20 for each alphabet) for training set and 130 images (5 for each alphabet) for testing.

## **Basic :**

Used 130 images(5 for each alphabet) for the training set and 26 images (1 for each alphabet) for testing.

# Dataset

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**All the images for the alphabets were taken from -**

[https://github.com/rrupeshh/Simple-Sign-Language-Detector/tree/master/mydata/training\\_set](https://github.com/rrupeshh/Simple-Sign-Language-Detector/tree/master/mydata/training_set)

# Working

## Pre-trained :

The output layer was changed from 1000 nodes to 26 and the weights were initialized to imagenet. Next, the model was compiled using categorical\_crossentropy as loss function and adam optimizer. The model is fit with 20 epochs and batch size as 32.

## Basic :

In the basic model, training was done for fixed amounts of epochs (1000 here) . The learning rate(alpha) used was 0.01 . The images used for testing were photos with a mixture of complete black and complete white pixels, so the normal colour photos were classified either as some other alphabet with similar sign or nothing.

# Accuracy

## Pre-trained :

The model had an accuracy of approximately 86% at the end of 20 epochs.

## Basic :

The model had an accuracy of approximately 69%. The following alphabets were recognized from a test-set which had 1 photo of each alphabet that was not trained.

A \_ C D \_ F G H \_ J K L M \_ O P Q \_ \_ \_ U V W X Y \_

# What can be done to improve the accuracy of the model?

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Instead of taking a fixed number of epochs for training , a stopping condition can be used so that the model keeps training till the mean squared error is of a permissible value(for example 0.0001) but at the cost of training time.

Pictures of colour could be used for training to improve the accuracy in classifying colour images.