Project: Build a Traffic Sign Recognition Classifier

-Vidit Shah

In this write up I will explain my code and Architecture which was used to develop this model.

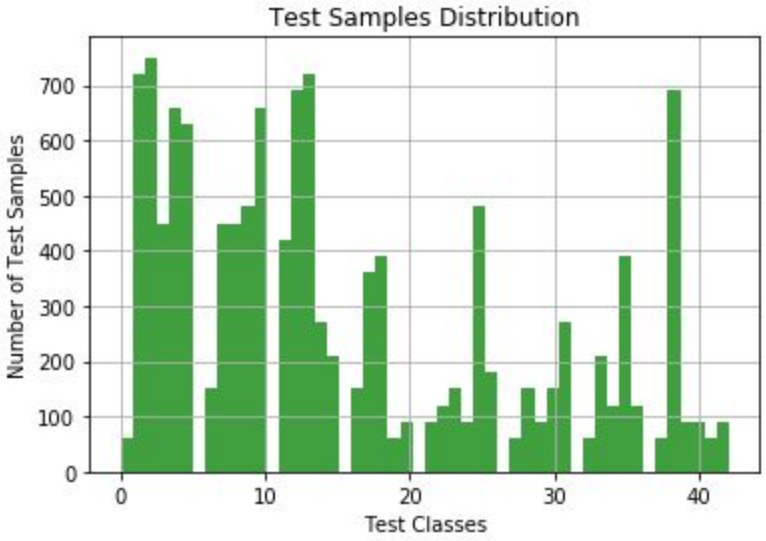
Data Set Summary & Exploration

Utilized Numpy Library to get the insights of the Data:

1. Size of training set-34799
2. Size of testing set -12630
3. Shape of image is - 32 by 32 by 3
4. The number of unique classes is : 43

Visualisation.

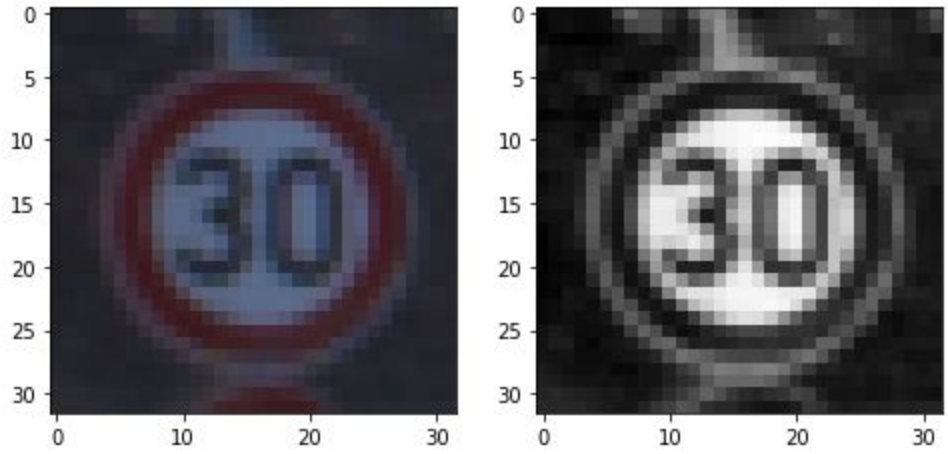
The image below Shows the distribution of training and testing samples



Preprocessing Technique:

The preprocessing technique used here is grayscale and normalization.
Converting into grayscale help us to deal with only 2 pixel values(0-255)
This reduces the Image depth from 3 to 1 which reduces the computation burden and also does not compromise the accuracy of the model.

Grey Scale Image shown below is:



Architecture.
I have used Convolutional Neural Network for the approach of this project.
My CNN is based on LENET Architecture.
The Values described Them is as follows:

Layer	Description
Input image	32 by 32 by 1 (1 because Gray scale
Convolution Layer	1 by 1 stride with valid padding
relu	Activation
Max_pool	2 by 2 filter size

The following procedure is carried out twice till .ie 2 Convolutional layers and is passed on to the Fully connected layer.
This Fully connected layer gives us the softmax distribution of the layer.

TRAINING

I have used the following hyper parameters for training my model

EPOCHS = 40
BATCH_SIZE = 128
Learning rate =0.001

Optimizer used for minimizing the cost is AdamOptimizer

Accuracy
My Validation Accuracy is 0.929

My Initial approach was single convolutional layer which resulted in less accuracy thus I utilized Lenet Architecture for my project.

I used images from the Data set for prediction process

Prediction:

The Prediction which was achieved was satisfying.

```
[Traffic signals       ] is predicted as [Traffic signals]
[Speed limit (70km/h)  ] is predicted as [Speed limit (30km/h)]
[Speed limit (70km/h)  ] is predicted as [Speed limit (70km/h)]
[Vehicles over 3.5 metric tons prohibited] is predicted as [Vehicles over 3.5 metric tons prohibited
[Speed limit (20km/h)  ] is predicted as [Speed limit (20km/h)]
[Stop                  ] is predicted as [Stop]
[Speed limit (70km/h)  ] is predicted as [Speed limit (70km/h)]
[Speed limit (80km/h)  ] is predicted as [Speed limit (80km/h)]
[Right-of-way at the next intersection] is predicted as [Right-of-way at the next intersection]
[Speed limit (50km/h)  ] is predicted as [Speed limit (50km/h)]
```