VE581 HW2 Report

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# Explore the dataset

The dataset placed into directory ‘./data’. Python package ‘pickle’ is used to import training set, validation set and testing set separately. There’re 34799 figures in the training set, 4410 figures in the validation set and 12630 figures in the testing set. Each figure within the dataset is a 32x32x3 RGB picture. In total, there’re 43 classes inside the dataset. The distribution of classes within each set is shown in Fig1. This part is done within section “Summary of dataset”.

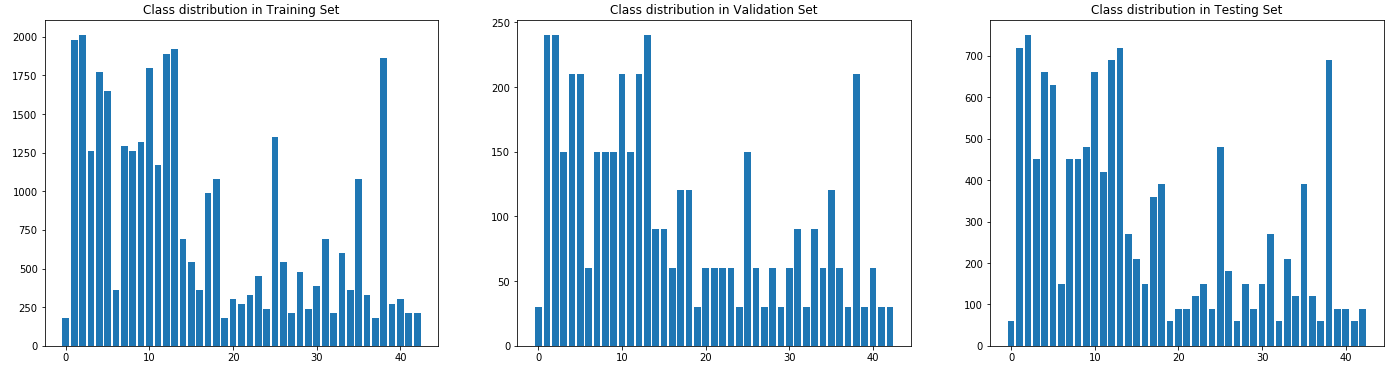


Fig 1. Distribution of classes within each set.

After loading the dataset, representative from each class is chosen randomly from the training set. The resulting gallery is shown in Fig2, and this part is done in section “Exploration and Visualization”.



Fig 2. Gallery of 43 representatives from each class.

# Design and Test on my classifier

## 2.1 Processing

It has been noticed that some of the figures are quite dark compared to others when exploring the dataset. Thus, a pre-processing procedure is necessary. In my code, the color converting strategy is taken.

As we want to add brightness to those dark figures, converting RGB figure into HSV space and tuning the ‘V’ channel is straightforward and useful. However, it should be noticed that not all figures need to be adjusted. A criterion is taken to judge if this figure it too dark or too bright. This is done by checking the maximum and minimum values in V-channel:

If the distance is less than 128, it’s grounded to believe that brightness in this figure is not well distributed. And it will be redistributed by taking a histogram equalization procedure.

## 2.2 Model Architecture and Compiling

The architecture of my model is shown in Fig3.

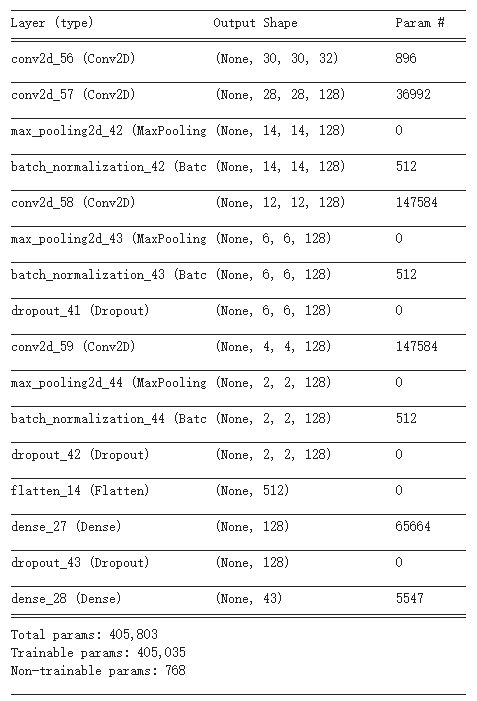


Fig 3. Model architecture.

As has been addressed in class, Adam optimizer is the first choice. The loss function is chosen as ‘sparse\_categorical\_crossentropy’, with ‘accuracy’ being the metrics.

## Training process

Batch size is set to 128,

# Predictions on new images