UDACITY

PROJECT

Traffic Sign Classification

A part of the Self Driving Car Engineer Nanodegree Program

PROJECT REVIEW

CODE REVIEW

NOTES

SHARE YOUR ACCOMPLISHMENT!

Meets Specifications

Excellent work, you nailed it!
👏👏👏

I can see you put a lot of effort in your project and advanced a lot, you should be really proud!

You have shown a firm grasp of the concepts presented here and are good to go.

I must say, this is one of top project I reviewed so far. A lot of exploration, visualization and experimentation. Good job!

Keep going and good luck!
Paul

PS. If you have further questions or need general support you can find us through our support channels.

You can find me on Slack as `@viadanna`

Files Submitted

The project submission includes all required files.

Good job submitting all required files.

Dataset Exploration

The submission includes a basic summary of the data set.

Good job completing the basic data summary.

This step is essential to build a general idea on the dataset.

The submission includes an exploratory visualization on the dataset.

Awesome

Excellent exploration of the dataset, I can see you put a lot of effort to understand what your model will be dealing with.

Design and Test a Model Architecture

The submission describes the preprocessing techniques used and why these techniques were chosen.

Great implementation and description of the preprocessing techniques.

Awesome

Excellent work augmenting and rebalancing the dataset.

Suggestion

A good idea here is to normalize the image data into a range such as [-1, 1] to turn it into a well conditioned problem by having roughly zero mean and equal variance, making it easier for the optimizer to go and find a solution. This also helps preventing the network weights from exploding. You can find more information about this on the course.

Another idea is applying *Contrast Limited Adaptative Histogram Equalization*, or CLAHE.

Did you know you can use TensorFlow to convert the images from RGB to grayscale?

The submission provides details of the characteristics and qualities of the architecture, such as the type of model used, the number of layers, the size of each layer. Visualizations emphasizing particular qualities of the architecture are encouraged.

Nice description of the model architecture.

Suggestion

Have your tried visualizing this architecture using TensorBoard?

The submission describes how the model was trained by discussing what optimizer was used, batch size, number of epochs and values for hyperparameters.

Good job reporting the training parameters.

Suggestion

Instead of a fixed number of **epochs**, one alternative is implementing early termination, as overtraining can lead to overfitting.

Keras already includes this as a callback, making it very easy to implement. Check here for further information.

The submission describes the approach to finding a solution. Accuracy on the validation set is 0.93 or greater.

Nice description of the design process of the model architecture and good work exceeding the required 93% accuracy on validation.

Awesome

Excellent work doing lots of experimentation here, this shows an inquisitive mind that'll be of great benefit on the course and career 

Suggestion

To learn more about convolutional networks I recommend this book.

Test a Model on New Images

The submission includes five new German Traffic signs found on the web, and the images are visualized. Discussion is made as to any particular qualities of the images or traffic signs in the images that may be of interest, such as whether they would be difficult for the model to classify.

Nice evaluation of the new images.

Suggestion

Google Streetview is the perfect place to find more german traffic signs.

The submission documents the performance of the model when tested on the captured images. The performance on the new images is compared to the accuracy results of the test set.

Good job reporting the accuracies for the test set and new images.

Notice that this new images dataset is really small, just to get an idea on how your model performs on images from a different source. And those speed limits are quite hard for the models to get right.

I'd say **great results** 

Awesome

Excellent visualization of the results.

The top five softmax probabilities of the predictions on the captured images are outputted. The submission discusses how certain or uncertain the model is of its predictions.

Awesome

Excellent visualizations of the softmax probabilities and feature maps.

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