UDACITY

Back to Self-Driving Car Engineer

Traffic Sign Classification

REVIEW

CODE REVIEW

HISTORY

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.

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.

- Ipython notebook with code
- HTML output of the code
- A writeup report (either pdf or markdown)

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.

Suggestion

Can you come up with a more robust technique for that? Tip: check out numpy.unique

The submission includes an exploratory visualization on the dataset.

Good job plotting a few examples.

This step is essential to get insights on what kind of data your model will be dealing with.

Suggestion

To further explore the dataset visually, you could plot one or two examples from each class.

Another idea would be plotting the distribution of the classes on the training dataset to get an idea of the balance of classes. This can be done easily using matplotlib.pyplot.hist

Design and Test a Model Architecture

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

Excellent exploration of the preprocessing techniques.

Suggestion

A good idea here is to normalize the image data into a range such as [-0.5, 0.5] to prevent floating point errors from skewing your results and 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.

You can find more information about this on the course.

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

Excellent description of the architecture of your model.

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 describing how the model was trained.

Suggestion

Instead of a fixed number of epochs, an alternative is implementing an early termination.

You can do this easily by defining a max number of epochs, and on each epoch decide to continue or terminate based on the previous values for validation accuracy and/or loss. For instance, if there's no improvement for the last *n* epochs, stop training.

Also, if you want to know more about optimizers, check this article for a nice description and comparison of different algorithms.

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Nice description of the design process of the model architecture and hyperparameters.

Starting with a well-known architecture is a good way to get started fast and progressively improve your model by fine tuning hyperparameters and adding layers.

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

It seems to me your model might be overfitting due to the gap between validation and test scores. You might want to consider adding more dropout layer out decreasing the keep probability.

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 particular qualities of the images or traffic signs in the images that are of interest, such as whether they would be difficult for the model to classify.

Good job on your 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 both new images and dataset.

Suggestion

For a more robust model check my previous suggestion on overfitting.

You can also use the dataset augmentation to balance the number of examples on each class.

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.

Excellent visualization of the softmax probabilities!

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