UDACITY

PROJECT

Traffic Sign Classification

A part of the Self-Driving Car Program

PROJECT REVIEW

CODE REVIEW

NOTES

SHARE YOUR ACCOMPLISHMENT!

Meets Specifications

Hello Udacian,
Your code is clear, lead to the solution, and you have correctly answered all the questions. I enjoyed reviewing your work. Congratulations! You made it.😊

Good luck in the rest of your Self Driving Car Nanodegree Program!

Files Submitted

The project submission includes all required files.

You submitted:

- The IPython Notebook file
- An HTML version of IPython Notebook and
- Writeup in pdf

Great submission.

Dataset Exploration

The submission includes a basic summary of the data set.

You're on the right track! You provided a succinct summary of the data. Good use of `shape` method to print out the shape of an array.

The submission includes an exploratory visualization on the dataset.

I'm happy to see you working like that. You provided visualisations of all types of traffic signs images and successfully show the ID class for each sign. You also showed a Histogram that represents the number of occurrences of each sign in the dataset. I appreciate the fact that you have made examination of the distribution of the training, and testing sets. Great job! :)

Design and Test a Model Architecture

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

Nice job here providing sufficient details of the preprocessing techniques used.

Suggestions and comments:

- Have you considered all cases to really see if color isn't an important feature to change?
- Do you think other preprocessing techniques, like rgb to yuv, histogram equalization, min max scaling, or label binarizing might help? You may try these, and if any helps, please include the reason why you chose to use it :)

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.

Awesome description of the architecture! You did a great job to talk about:

1. The type of model used, and
2. The number of layers
3. The size of each layer
4. The activation nodes used

Suggestions and Comments:

Not bad to include LeNet architecture used. You could include a visualisation of the architecture in your descriptions by using this tensorflow tool for visualization for a better understanding by your reader.

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

Great job here describing how the model was trained and evaluated.

Suggestions and Comments:

- I suggest you to generate additional data. In this case, it was contrast and brightness bracketing. The reason for this is because the for any given image there are many variations that could be experienced in real life.
- I recommend you to use the train_test_split to split your training dataset into training and validation.
- In the Question, *"Describe how you set up the training, validation and testing data for your model."*, you'll have to be more specific about *how* the dataset was split, like, what was the percentage split between the train, validation, and test set?

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

In Question 5, you gave a great explanation of how you came about to design the model architecture. And the explanation of the approach taken for deriving and designing the model architecture was quite reasonable.

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.

Fantastic work here giving background about the new images selected for testing, including the particular qualities that may make them difficult to classify. Great!

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.

That's good! you have provided the accuracy of your model in the images downloaded from the internet.

Suggestions and Comments:

- You could include a Confusion Matrix of the results, to clearly show where the model makes errors for the new dataset compared to where the model makes errors for the test set.
- You could also to compare the performance of the model when tested on the *images from internet* to that of the results of testing on the test dataset. Does it perform poorly compared to the testing set? Or does it perform well? Or too poorly compared to the test set performance?

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 work visualizing the softmax probabilities of the predictions on the captured images. And your discussion about the certainty and uncertainty of the model is great!

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