

GEHIRNWAGEN

Self Driving Cars

Nov. 16th, 2021

Presented By:

Brandon W

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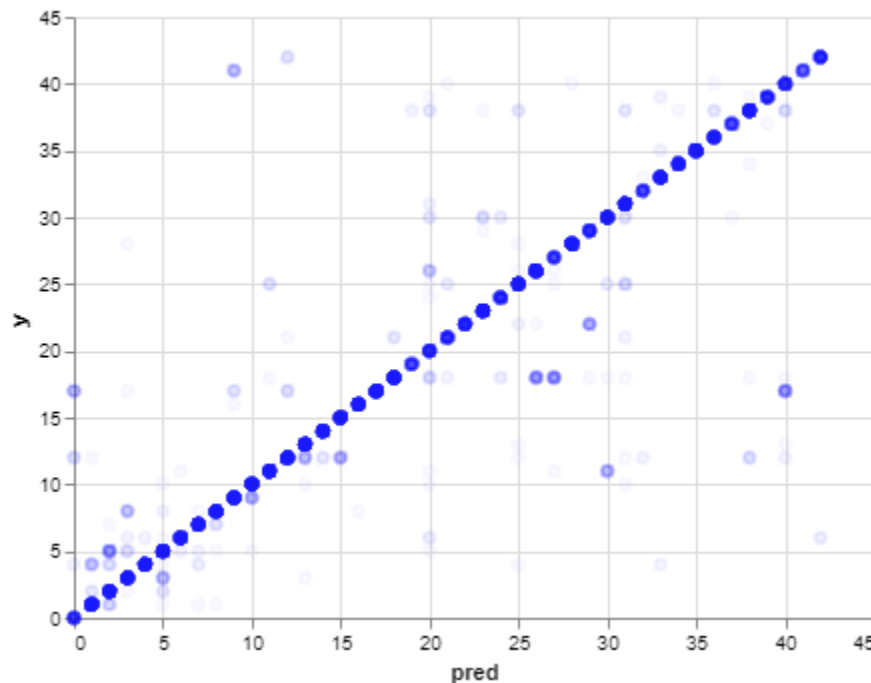
Avery R

Problem and Objectives

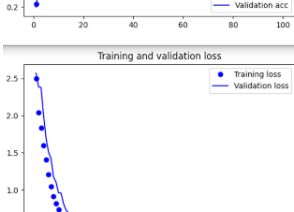
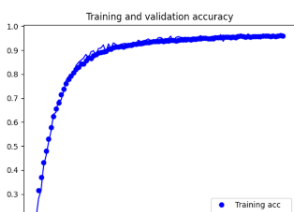
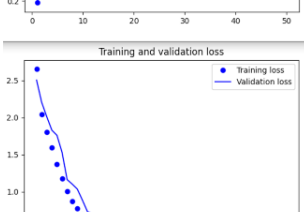
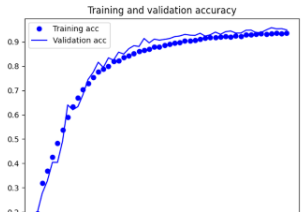
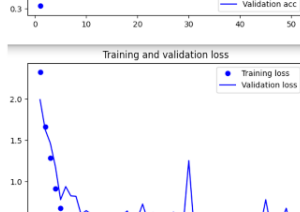
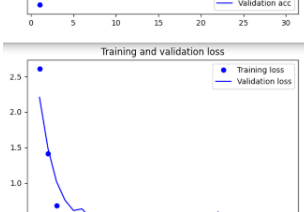
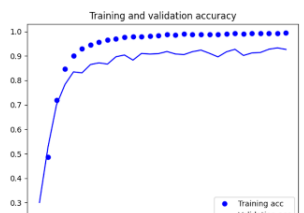
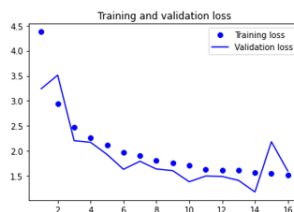
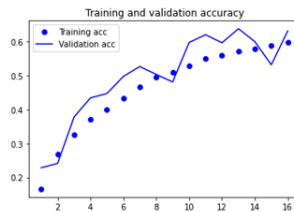
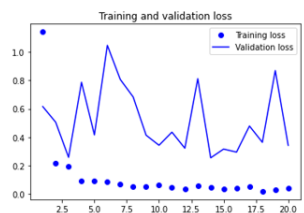
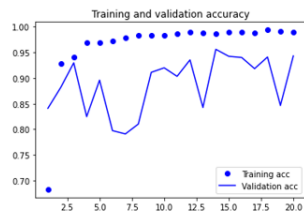
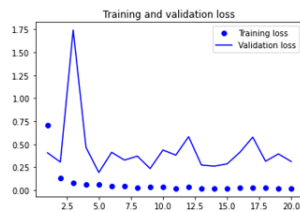
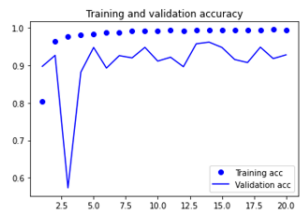
We were hired by Gehirwagen to create a neural network that can recognize street signs in Germany. This network will be used with self-driving smart cars to distinguish different signs on the road.

Solutions Value and Conclusion

Through an iterative process of creating and refining our neural network models as well as wrangling the data, our models grew increasingly more reliable, stable, and accurate as depicted in the charts below. Our final model (the farthest chart down) shows the validation accuracy sticking extremely closely to the training accuracy. This means that the neural network is not overfitting and it's not just memorizing the training data. When the model predicts the signs in the test dataset (pictures never seen), it predicts with an accuracy of 96.175%



The above chart has plotted all of the test dataset and the predictions our model made. The y axis represents the true classification of the sign, and the x axis shows what our model predicted each sign's classification was. The darker the point shows overlapping data. Correct predictions are when a single point is plotted at $x = y$, or a diagonal line from the bottom left to the top right. The points of data not on that line shows where our model got it's sign recognition wrong.



The image data is preprocessed by dividing the rgb values by 255 so that they are normalized between zero and one. A good dataset to train on should have data augmentation so that images can be identified that are not seen perfectly. The dataset we used to train had images with different lighting and distance from the sign. This results in our image recognition being able to recognize signs that are not perfectly seen.

Links

Final: Nathan W

Brandon W:

<https://colab.research.google.com/drive/1dLgmqgZTkM9B80gEP314itMUHCYZRTUY?usp=sharing>

Nathan W:

https://colab.research.google.com/gist/Natosphere/4a055e120442c7d0f458200fc56ef3f7/nathanwheelwright_module5_signs.ipynb

Alex B:

https://colab.research.google.com/gist/desertalex/459b6377d3f3505644c18e56acb70879/copy-of-starter_signs_v2_student.ipynb

Avery R:

https://github.com/jarreed0/school_stuff/blob/main/starter_signs_v2_student.ipynb