Individual Project Personal Reflection

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When I initially approached this project my knowledge of convolutional neural networks (CNN) was very limited, apart from what was covered in my Machine Learning module. Diving into a topic like Transfer Learning was very challenging as it involved both research on existing CNN architecture along with how to apply this to transfer learning.

The main outcomes of this project were:

- Implement transfer learning with the VGG16 CNN.
- Accurately predict a dataset containing German road traffic signs.

My personal outcomes of this project were:

- Understand how and why transfer learning is used.
- How to find a standard approach to solving the problem using many different sources e.g., Kaggle, Google.

My learning was as follows:

- The VGG16 CNN is a simple model to understand and as it has been trained on the ImageNet database, is a good model for feature extraction.
- The data provided in this project was very biased as the images were not evenly distributed amongst the 43-classes.
- There is a larger amount of decision making that is required when training the model. The idea of simply feeding the data into the model doesn't provide best results.
- Parameters must be carefully chosen too as the larger the input images, the more training that is required on the additional layers in the CNN.

The results of this project were enlightening to me as although the data was cleaned to prevent bias, the CNN still struggled to reach an 80% success rate on the test data. Perhaps if I had exposed the CNN to more of the training data, then I could possible bring this to a higher rate.

The resolution of the images was kept at the same specification as the default VGG16 network to allow the VGG16 network to correctly identify the features it was trained to identify.

If I were to do this project again, I would approach it differently from the data input aspect as I feel this is where my CNN lacked success the most.

The overall learning outcome of this project was very positive as it forced me to learn more about transfer learning, along with the VGG16 CNN and how the two can be beneficially used together.