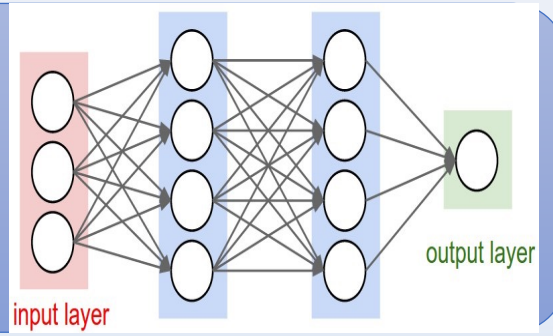
Transfer Learning with VGG16 Convolutional Neural Network

Ronan McCormack
IT Sligo



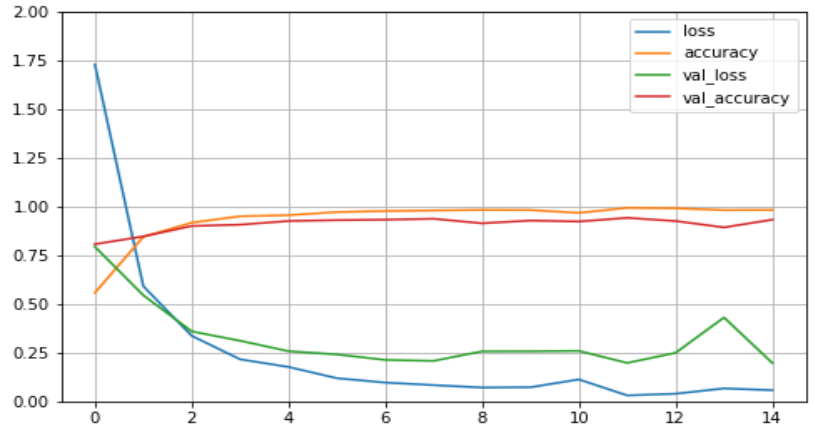
Introduction

- Apply Transfer Learning to the VGG16 Convolutional Neural Network.
- Identify road traffic signs as accurately as possible.

Methodology

- Used VGG16's CNN for feature extraction.
- Addition of self determined output layers to classify the images into 43 different classes.

Results



- The data was evenly distributed amongst the 43 classes.
- The prediction rate on the test data was 74%.
- The training and validation data converged quickly around the 2-4 epoch range.

Conclusion

- The CNN was able to predict the validation class at a much higher rate compared to the test images.
- Over-fitting may have been the largest contributing factor.

Literature Cited

•Albawi, S., Mohammed, T. A. & Al-Zawi, S., 2018. Understanding of a convolutional neural network. *Proceedings of 2017 International Conference on Engineering and Technology, ICET 2017,* pp. 1-6.

•Avci, M., Ozyildirim, B. & Sarıgül, M., 2019. Differential convolutional neural network. *Neural Networks 116,* pp. 279-287.

•Istiyadi Swasono, D., Tjandrasa, H. & Fathicah, C., 2019. Classification of Tobacco Leaf Pests Using VGG16 Transfer Learning. *12th International Conference on Information & Communication Technology and System (ICTS) ,* pp. 176-181.

•Krizhevsky, A., Sutskever, I. & Hinton, G. E., n.d. ImageNet Classification with Deep Convolutional Neural Networks.

•Qassim, H., Verma, A. & Feinzimer, D., 2018. Compressed residual-VGG16 CNN model for big data places image recognition. *2018 IEEE 8th Annual Computing and Communication Workshop and Conference, CCWC 2018,* pp. 169-175.

•Qin, X., Wu, Y., Pan, Y. & Yuan, C., 2018. Convolution Neural Network based Transfer Learning for Classification of Flowers. *IEEE 3rd International Conference on Signal and Image Processing,* pp. 562-566.