

Image Classification of Traffic Signs

Atrin Sarmadi

Metis Deep Learning Project - 2021

Self-Driving Cars

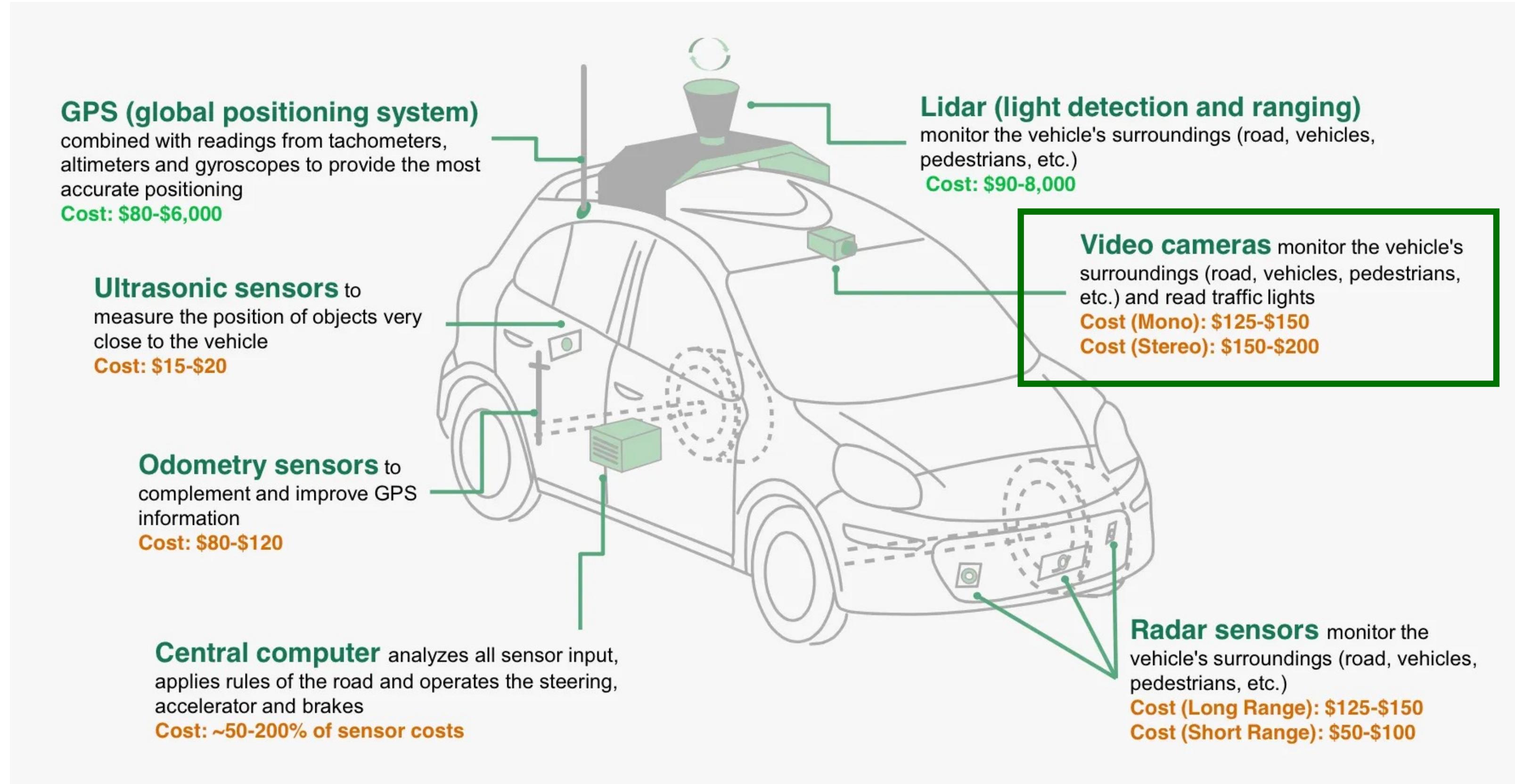
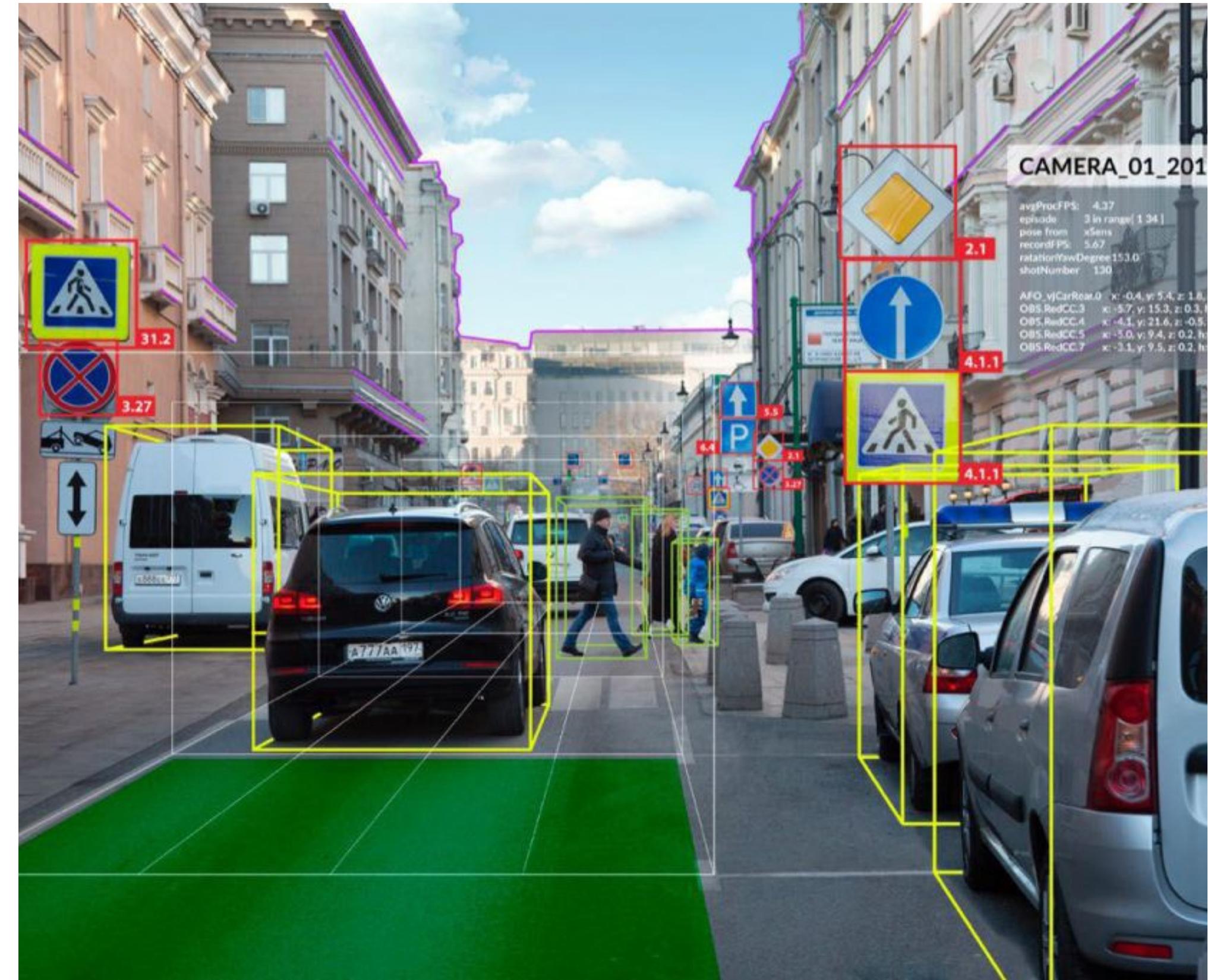
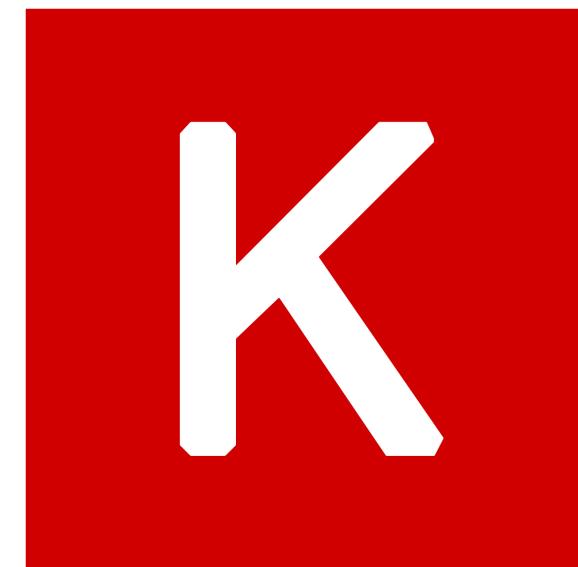
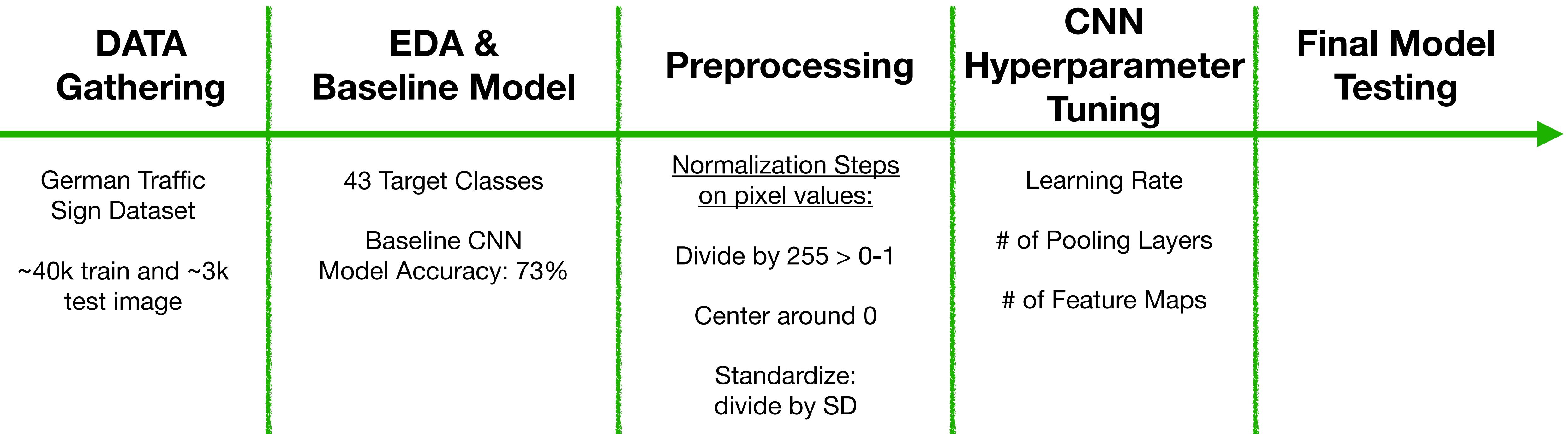


Image Classification

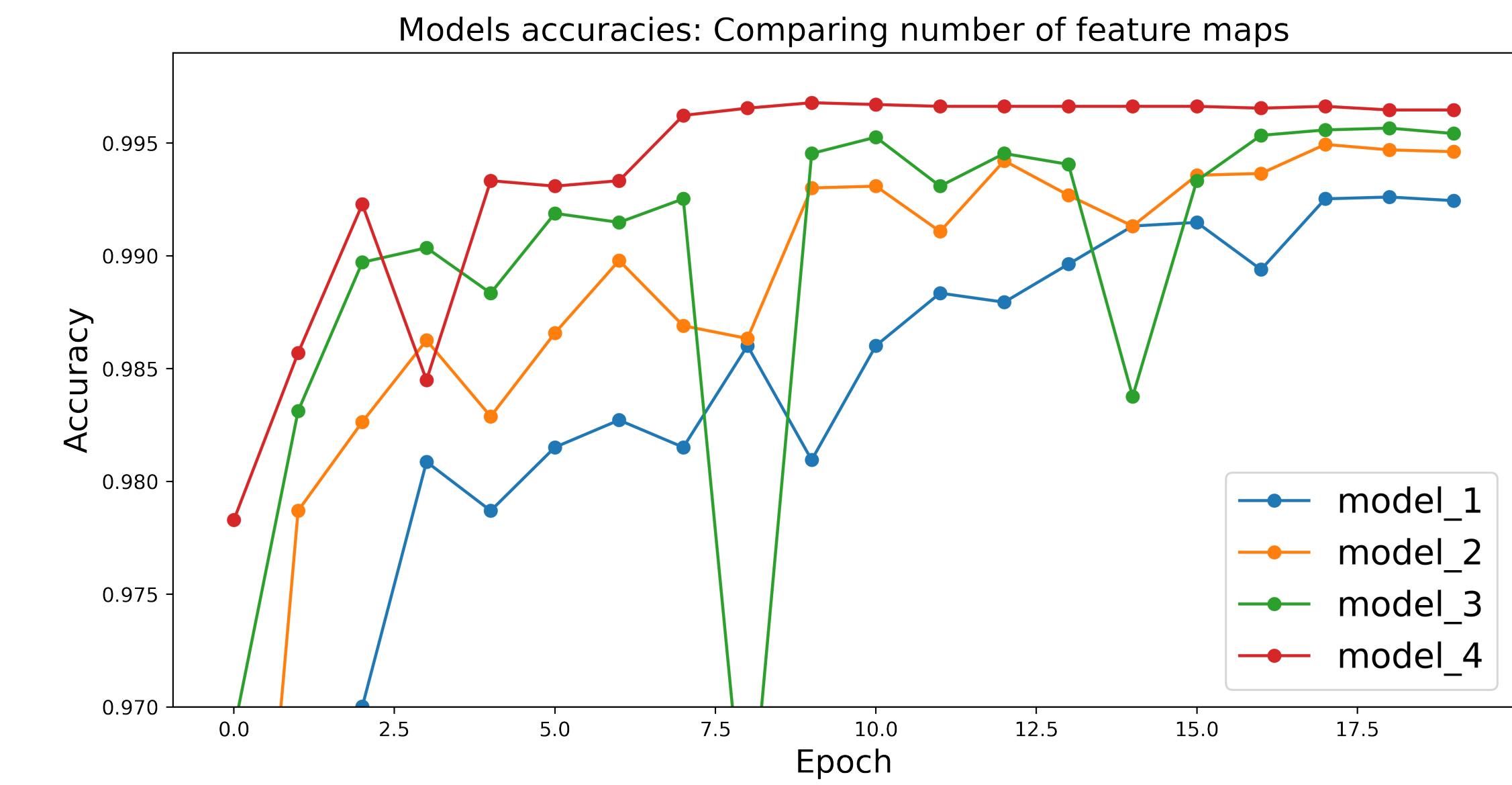
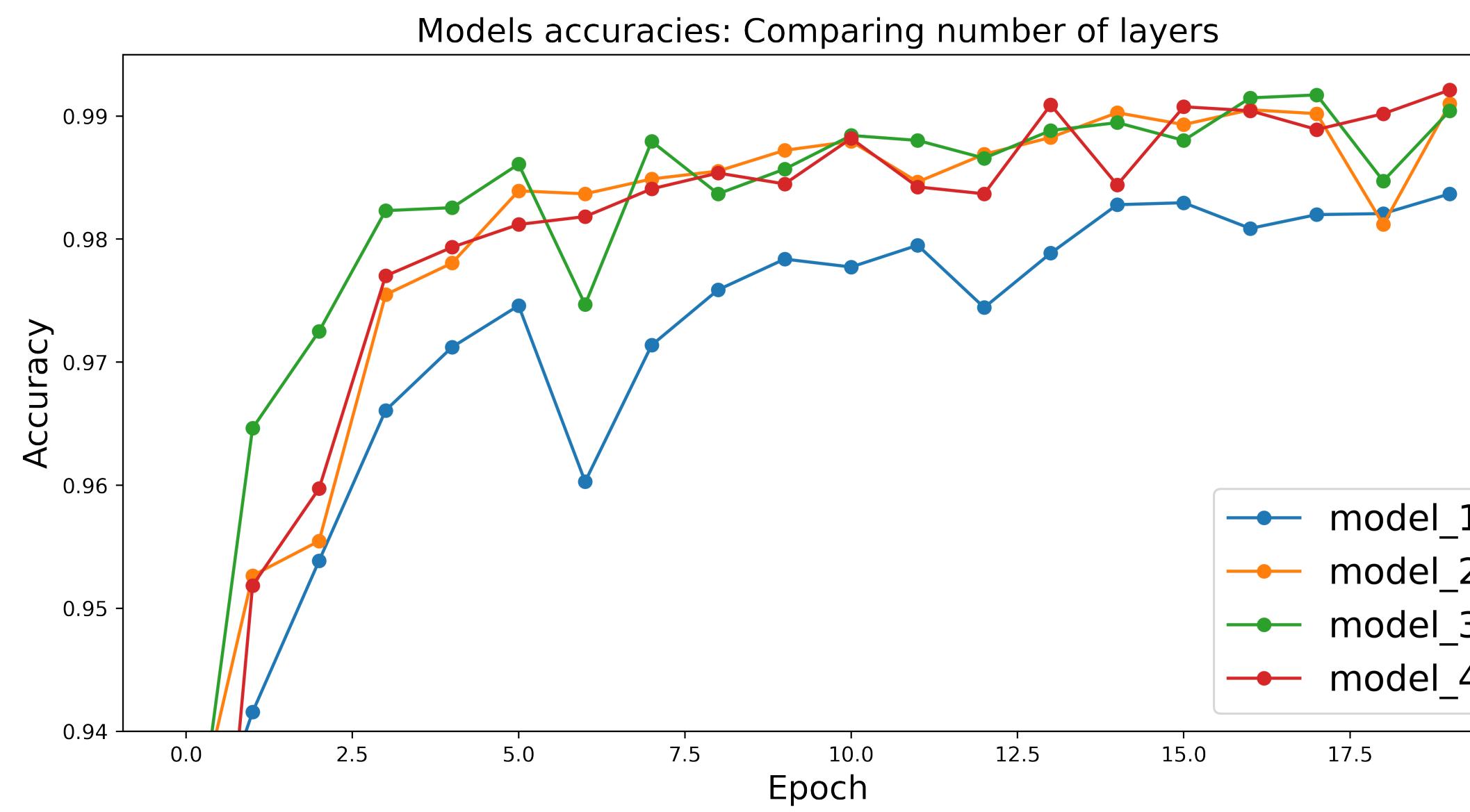
- Camera can detect the traffic sign as an object, classify the image in one of the target classes, and the car computer uses this classification to prompt a specific command to the control system, maneuvering the car in a certain way
 - Focus: Image Classification for traffic signs
 - Impact: Used in self-driving car as an input to control system
 - Target: Successfully identify traffic sign images to target classes



Workflow

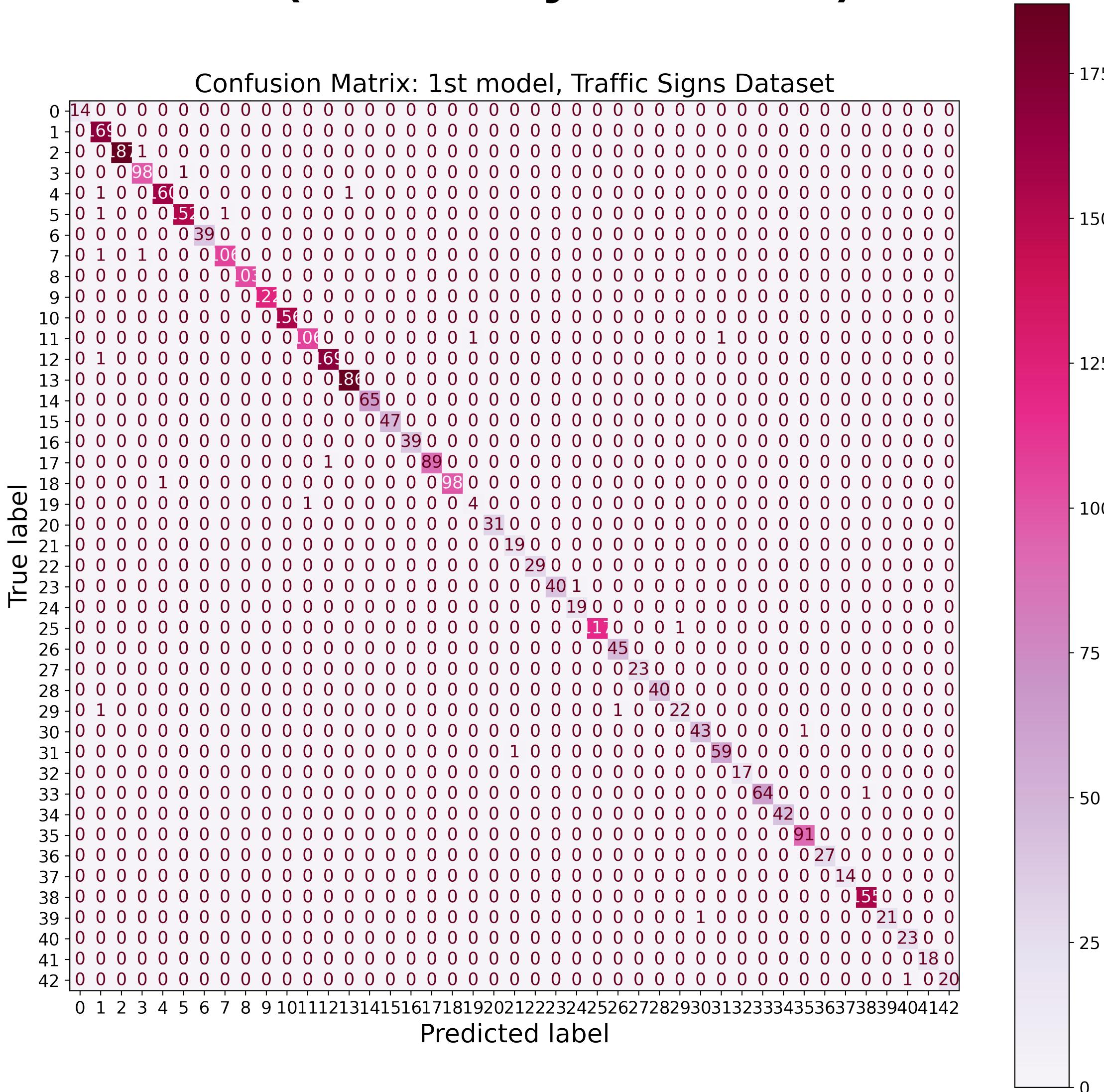


Comparing Validation Accuracies between CNN models



Final Test Results

(Accuracy = 99.2%)



Future Work

- Further optimization of CNN model's hyperparameters, such as drop out, number of neurons in outputs, number of epochs (Computationally expensive, might require cloud computing)
- Further data augmentation to account for different circumstances
- Introduce object detection to find traffic sign objects in videos in real-time





Thank you!

Appendix

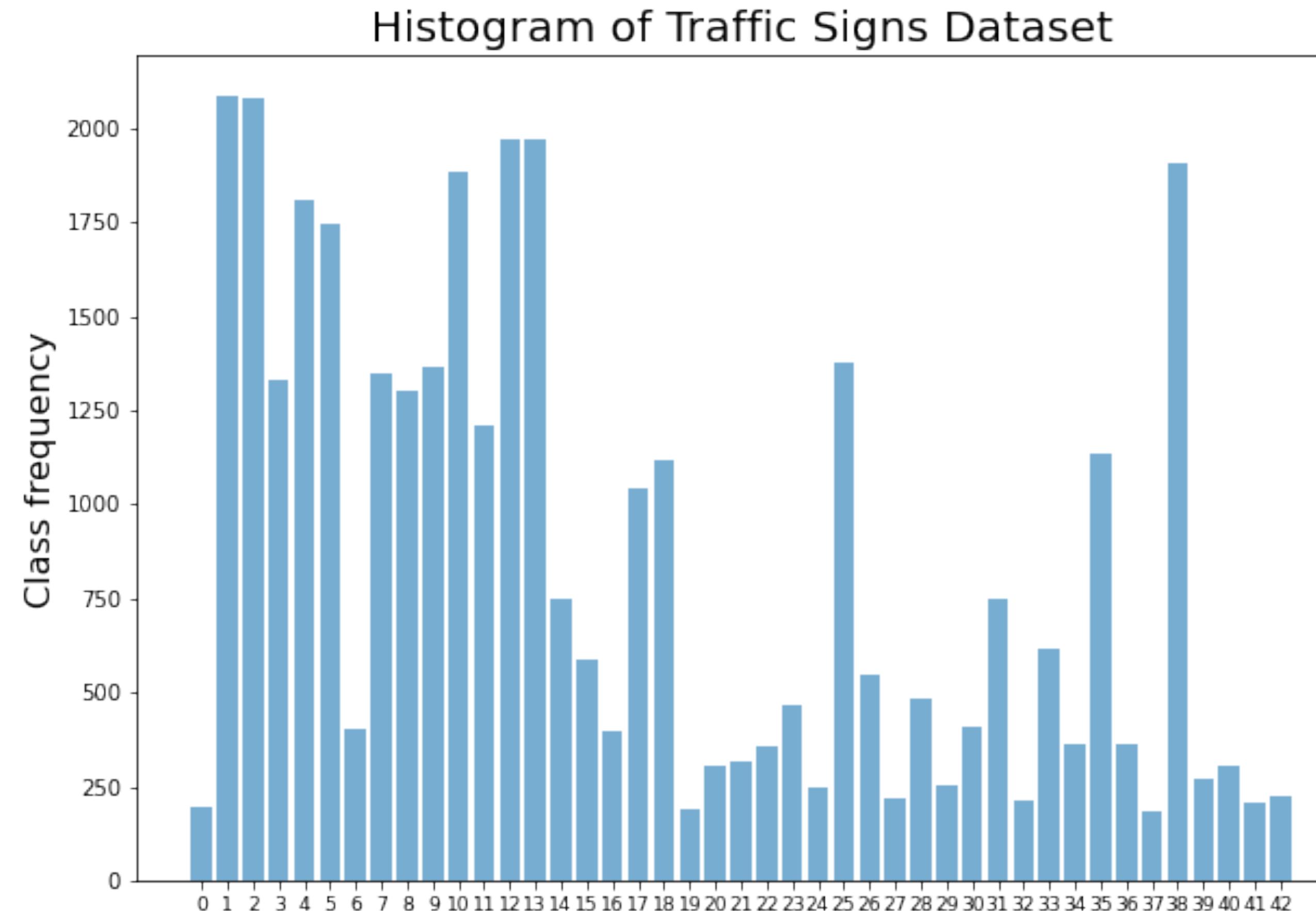
References

Sichkar, Valentyn. (2019). Convolutional Neural Networks for Traffic Signs Classification. 10.13140/RG.2.2.21900.36483.

J. Stallkamp, M. Schlipsing, J. Salmen, C. Igel, Man vs. computer: Benchmarking machine learning algorithms for traffic sign recognition, *Neural Networks*, Available online 20 February 2012, ISSN 0893-6080, 10.1016/j.neunet.2012.02.016. (<http://www.sciencedirect.com/science/article/pii/S0893608012000457>) Keywords: Traffic sign recognition; Machine learning; Convolutional neural networks; Benchmarking

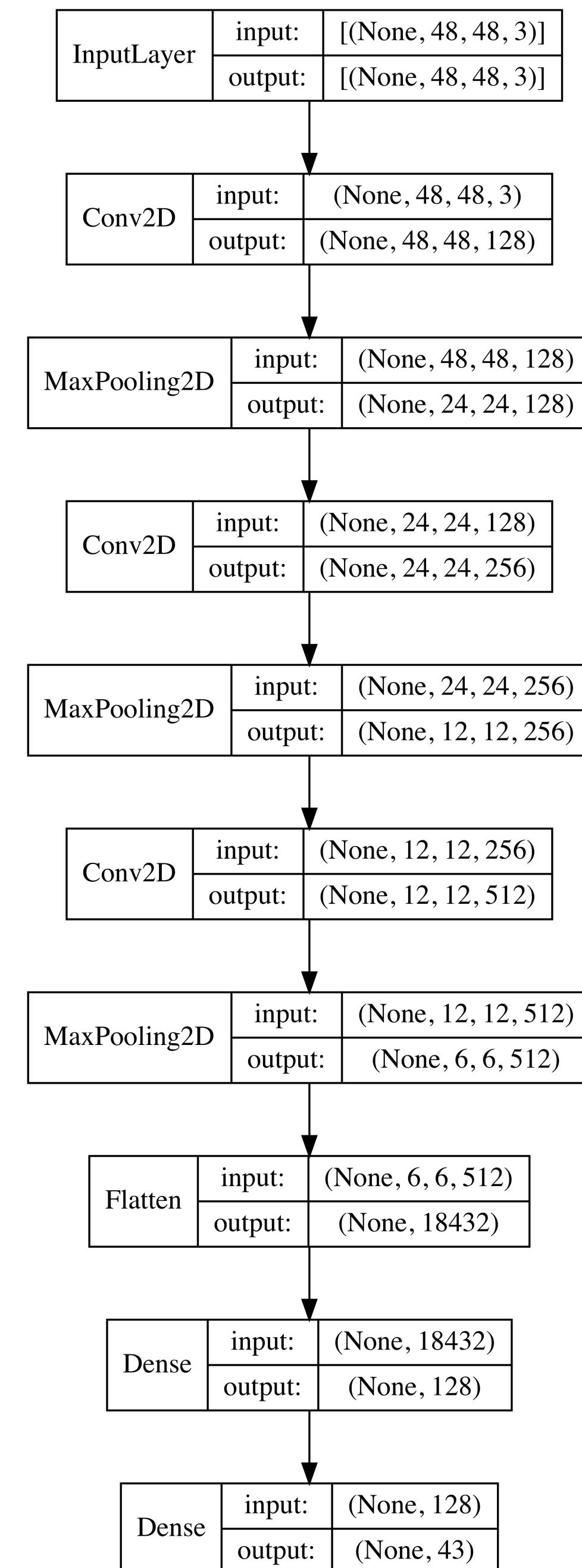
Appendix

DATA Distribution Between Classes



Appendix

Final CNN Model Architecture



Appendix

Example of Traffic Sign Classes

