

# Proposal for master thesis “Real time traffic sign detection for smart data logging”

To more efficiently record real world data for testing ADAS systems, automated labelling and live evaluation is required and one way of achieving this is to use real time object detection on camera streams to analyze the current scenario. In my thesis I will focus on the detection of traffic signs for this purpose, and I will explore different ways to improve the performance of SOTA machine learning models in terms of the standard metrics of the YOLO model family, precision, recall and mean average precision. This includes:

- Creating a test dataset from own drive recordings to be able to evaluate general detection performance.
- Adapting the publicly available GTSDDB & GTSRB datasets for model training.
- Extending the training dataset with synthetic data and augmentations in search for better detection performance in arbitrary target domains.
- Fine tuning models with a split of my own dataset to optimize for this specific target domain.
- Exploring the impact of hyperparameters.
- Exploring the performance potential of different models. (YOLOv8n, YOLOv8s, etc.)
- Exploring a multistage approach with an initial model that is trained to detect more general sign types and a following classification step to distinguish specific signs.
- Comparing the results against an already existing baseline model.
- Analysis of real time capability with benchmarking on the target hardware.