

Opponent Review

for the master thesis

*"Evaluation of Self-Supervised Learning For Vehicle-Type Detection
in Autonomous Driving"*

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Summary

Mr. Ahmed's thesis evaluates the performance of the two self-supervised learning (SSL) techniques SimCLR and SimSia on the specific sub-problem of identifying different vehicle types in vehicle image data. Identifying specific vehicles is an important task in autonomous driving and the performance of SimCLR and SimSia within this sub-discipline of vehicle detection hasn't been investigated. Both SSL techniques are evaluated on the public available image datasets of the ILSVRC2012 challenge (ILSVRC2012) and CIFAR-10 dataset and show a superior performance compared with classical supervised approaches.

Review

The thesis is structured in a coherent and logical fashion, adheres to common scientific standards, is written very well and research objectives are stated precisely. Results are stated clearly, but could have been improved by some points (see below). The thesis clearly reflects limitations and lists potential future directions and critically discusses results.

The following points would improve the manuscript:

- A motivation is missing why the selected two self-supervised learning were used and not (any) of the self-supervised methods listed in the introduction of the thesis.

- IoU values are only reported as histograms. Reporting IoU values as distributions and using classical statistical values like differences of means and standard deviations would improve the analysis.
- AUC analysis is kind of flawed. Only one value is used and not a range of thresholds is shown.
- Visual representation could be improved. For instance, the line-spacing is different in some parts of the thesis. Ideally, figures are imported as vector-graphics, use identical font-sizes and styles and aren't skewed.

In conclusion, I recommend rating the thesis in the range between *very good* and *good*.

Deggendorf, 30.08.2023

Prof. Dr. Phillipp Torkler