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Out-of-Distribution Detection in 3D Semantic Segmentation

Master Thesis

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1. Introduction

2. Methodology

3. Experiments & Results

4. Conclusion



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Lessons Learned

Learning's during the duration of the thesis are

1. Training and evaluation of 3D DNNs are time consuming and resource intensive.
2. Finding the proper prior for Flipout layers is hard and currently we use brute force to find the best fitting prior.
3. OOD benchmarking require in depth analysis of datasets like studying the structural similarities in the datasets and also color spectrum.
4. LiDAR datasets have large memory requirements especially for the preprocessing and metric computation.
5. Getting 100% OOD detection performance is not possible with the post-hoc methods used as some points in the ID dataset also have low probability scores.

Conclusion





Future Work

This thesis can be extended in the following ways.

1. This thesis is limited to only point based models, this can be extended to graph and projection based models.
2. The datasets involved are only static datasets and this thesis study can be further extended to other type of datasets such as synthetic and sequential datasets.
3. Since this thesis utilizes post-hoc threshold methods for OOD detection. Other methods such as Mahalanobis distance based OOD detection [1] or MetaSeg [2] can be added as an extension to this thesis.

References

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