Semester-/Master-Thesis

Neural Point Cloud Compression with Temporal & Semantic Priors

The aim of this study is to integrate and compare several semantic priors into a state of the art neural point cloud compression method.

Background

Autonomous vehicles generate huge amounts of sensor data, which is semantically processed by neural networks and classical algorithms to perform the dynamic driving task.

In particular, point clouds are difficult to compress due to the direct modelling of structure. Classical compression methods struggle to integrate the structural information necessary to compress the information strongly.

Recent research is using neural networks to learn the structural information and thus increase the compression rate. In the case of AVs, we can go one step further and use the semantic output from the vehicle's perception pipeline and other modalities such as images to further increase the compression rate.

Goal of this work:

Improve upon the state of the art neural compression method by leveraging structural and semantic information and beat an existing algorithmic base line

Your Role

- Literature research on current neural data compression methods and their evaluation
- Literature research on semantically relevant perception models, e.g. segmentation & detection methods
- Integration of semantic and multimodal methods for point cloud compression
- Training and evaluation of the developed methods

Depending on the type of thesis, this work can be split up in different topics

Was should you bring along?

- Strong interest & motivation for autonomous driving
- Initiative & independent way of working
- Foundational understanding of statsistics and machine learning
- Programming skills, e.g. Python

Language

English/German

If you are interested, please send me a grade sheet with your CV!

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