Lehrstuhl für Fahrzeugtechnik
Fakultät für Maschinenwesen
Technische Universität München

SA /IDP

Automated point-cloud dataset labelling for autonomous driving

In the context of the EDGAR autonomous driving project, we record perception data from various sensors such as Cameras, Lidar, and Radar in the regions of Garching and München.

The data we acquire serves a crucial purpose in the later stages of autonomous driving development, including tracking, prediction, and planning. However, labelling this data can be quite challenging, especially when dealing with 3D point clouds, where the labelling involves either annotating bounding boxes or each individual point. Nowadays, there is a growing preference for novel strategies that reduce reliance on manual labelers

The primary objective of this project is to leverage state-of-the-art detection models to automate the labelling process, making it more efficient and cost-effective. The first step is to implement a pseudo-labeling pipeline using pretrained object detectors. Second step is to optimize the parameters and models of the approach to the Munich scenario Third step is to generate a dataset of labeled point-clouds in Munich for autonomous driving. Final step is to evaluate the quality of the labels and extract insights on how to improve them.

Work packages:

- Building of an automated labelling pipeline based on 3D detection models and Semi-supervised learning strategies
- Pipeline optimization for Munich scenario und EDGAR sensors
- Labelling of a point cloud dataset
- Label quality assessment and evaluation.
- Design and evaluation of label improvement strategies

Requirements:

- Programming experience in Python
- Experience with Pytorch/Tensorflow and Docker
- Knowledge of computer vision
- Experience with Deep Learning, CNNs, Object detection, Semantic segmentation
- Desired: Experience with OpenPCDet or OpenMMLab

The thesis should document the individual work steps in a clear form. The candidate commits him/herself to carry out the study independently and to indicate the scientific aids used by him/her.
The submitted paper remains the property of the chair as an examination document.

Prof. Dr.-Ing. M. Lienkamp   Betreuer: Esteban Rivera, M. Sc.

Ausgabe:_____   Abgabe: _____