

Student thesis



Master thesis

Simulation-empowered deep learning for vehicle environment perception

Topic and Goal of the Thesis

Deep learning-based methods such as neural networks outperform other methods e.g. in semantic segmentation of camera images. A major challenge of supervised machine learning methods is the creation of training data sets, e.g. by manually labeling sensor data.

Modern simulation software allows automatic generation of synthetic labeled sensor data with increasing proximity to reality. This thesis shall evaluate possibilities to make perception models trained with synthetic data usable in real-world applications.

Working Points

- Literature research on using synthetic training data for deep learning and generalization of such models to real-world application
- Extension of an existing implementation for generating synthetic training data for training a model to predict occupancy grid maps from lidar point clouds (cf. <https://arxiv.org/abs/2102.12718>)
- Evaluation of the trained model with real-world data and identification of possible improvements to further close the reality gap

Requirements

- Good English or German language skills
- Reliability, commitment and enjoyment of working independently
- Programming skills, at best with Python and C++
- Experience with Machine Learning, TensorFlow or ROS is an advantage

Department

Vehicle Intelligence &
Automated Driving

Contact



Raphael van Kempen

+49 241 80 25599

✉ raphael.vankempen@
ika.rwth-aachen.de

Language

German or English

Entry Date

Earliest possible date

Prior knowledge

Programming Skills
Machine Learning