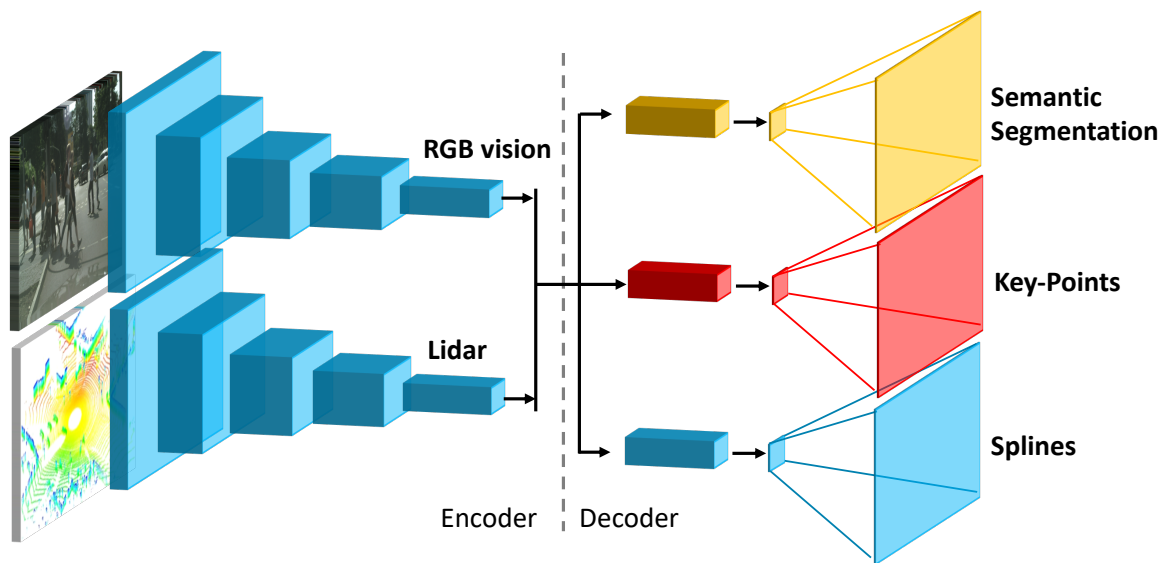


Master Thesis

# Multi-Task Learning for 3D Urban Scene Understanding Using Complementary Road Feature Representations



In the last years, convolutional neural networks (CNNs) have proven to excel on multiple computer vision tasks including image classification, object detection and semantic segmentation. They are a powerful tool to teach autonomous cars the capability to understand their complex and dynamic surroundings. There are many different applications for deep learning in autonomous driving and adjusting the network architectures to the task at hand is an exciting field of research.

In this thesis, it is proposed to design a multi-task network architecture, which is able to jointly predict different types of road features. Thereby the architecture should make use of different output representations (keypoint learning, semantic segmenation, splines) which are specially tailored to extract the relevant information of each class. These representations shall later be combined and used to optain a meaningful and robust 3D urban scene understanding based on RGB vision and/or lidar input measurements.

If you are interested, please write an email to the contact below with your CV, transcripts and a description of your coding experiences.

- Requierements: Theoretical knowledge in machine learning, deep learning & statistics  
 Experienced in python and at least one deep learning framework
- Topics: Deep Learning, Computer Vision, Autonomous Driving
- Supervisor: M.Sc. Frank Bieder  
 Institute of Measurement and Control Systems (MRT)  
 Email: frank.bieder@kit.edu, phone: Tel.: +49-721-608-48423
- Start Date: September, October or November 2019