



Autonomous Racing – Analyzing and Understanding of Neural Networks for Object Detection

In the context of the project Roborace, software for an autonomous racing vehicle is developed at the Chair of Automotive Technology. This software manages the whole process of autonomous driving: Starting at data acquisition by the sensors, perception, planning and finally controlling the vehicle safely under racing conditions.



Modern vehicles sensors offer a wide range for environment perception such as Cameras, LIDAR and Radar sensors.

In this IDP, the working principles of an object detection network for a camera input shall be recovered in order to understand its workings in detecting vehicles and pedestrians.

The first step of this project consists of a literature search for current developments in the field of machine learning for object detection and the understanding behind it. In the second step, you implement a strategy to analyze the workings of the network, e.g. class activation maps, layer visualization. In a third step, this knowledge is used to fine-tune the network. Finally, you evaluate the network against existing state of the art methods for object detection.

Work packages

- Literature search about understanding object detection on image data
- Applying the most promising techniques of the literature search to an existing object detection network
- Fine tuning of the network
- Evaluation of the implemented approach against other methods

Requirements

- Practical knowledge in the field of neural networks
- Programming experience in Python
- Involved working attitude

Should you be interested in this project or in another project in the context of the Roborace project, send a short motivation letter, transcript and CV to:

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