Lehrstuhl für Fahrzeugtechnik
Fakultät für Maschinenwesen
Technische Universität München

MA/ SA/ IDP

Hands-On Deep Learning: Optimization of Multi-Class Motion Prediction for Autonomous Driving

Motion prediction of surrounding objects is a key requirement for autonomous driving. However, state-of-the-art approaches face a fundamental challenge: the motion patterns of different classes diverge strongly. Pedestrians may stop abruptly, cyclists combine pedestrian-like agility with vehicle-like dynamics, and vehicles typically follow traffic rules but can still vary widely in speed and maneuvers. Capturing all these behaviors within a single model is highly demanding, as class-specific nuances are often averaged out.

In this thesis, an existing joint tracking and prediction approach is to be further optimized to enable robust and accurate multi-class motion prediction. To achieve this, literature research will be conducted, and the existing model will be refined, with a particular focus on exploring class-specific prediction heads as a promising strategy for improving prediction performance.

+ Possibility of a publication in case of excellent work.

Work packages:

- Literature review: Motion Prediction
- Design and implementation of the context-aware motion prediction model.
- In-depth evaluation and comparison.
- Iterative improvement.

Requirements:

- Very good programming skills in Python.
- High personal motivation and independent working style.
- Very good language proficiency in German, English or French.

The thesis should clearly document the individual work steps. The candidate undertakes to complete the term paper independently and to indicate all scientific aids used.

The submitted work remains the property of the chair as an examination document.

Prof. Dr.-Ing. M. Lienkamp

Betreuer: Loïc Stratil, M. Sc.

Ausgabe:_____

Abgabe: _____