

MA

Modular Context-Aware Motion Prediction by leveraging End-to-End Driving Stacks

The current state of autonomous driving is split between modular and end-to-end software stacks. Modular systems offer explainability and clearly defined components such as detection, tracking, motion prediction, and planning. In contrast, end-to-end systems treat driving as a single learnable task, enabling strong data-driven context understanding. However, context is hard to capture in purely modular approaches, even though it is crucial for robust motion prediction in real-world driving.

Therefore, this work focuses on using **knowledge distillation from end-to-end autonomous driving systems** to enhance a modular motion prediction model. The approach should build on Uni-AD or a similar end-to-end stack and transfer its learned contextual knowledge to a modular prediction model counterpart through fine-tuning (See Figure 1).

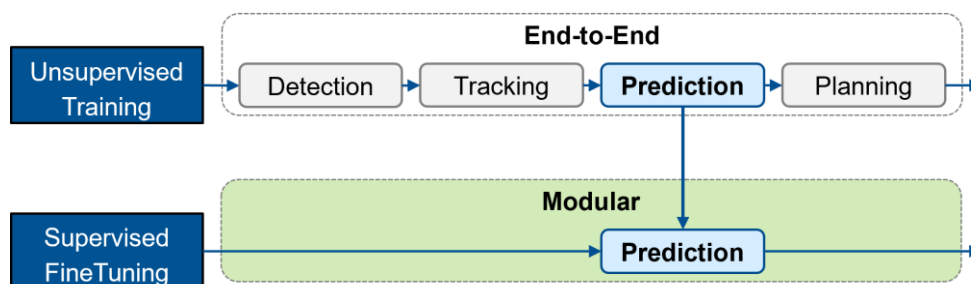


Figure 1: Project sketch

Work packages:

- Literature review: End-to-End/ Modular software stacks.
- Unsupervised End-to-End training on a large dataset.
- Supervised fine-tuning of the motion prediction algorithm for modular use.
- In-depth evaluation and 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.

Possibility for publication in case of excellent work.

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

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Ausgabe: _____

Abgabe: _____