Lehrstuhl für Fahrzeugtechnik
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Technische Universität München

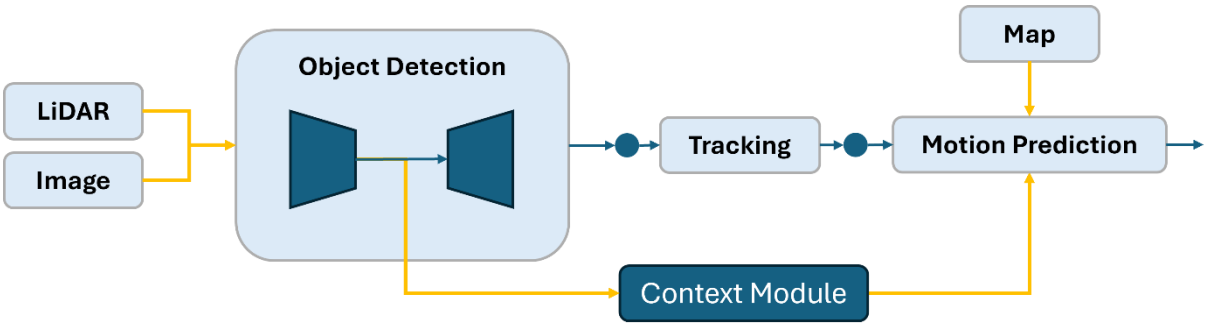
MA

Context-Aware Trajectory Prediction for Autonomous Vehicles

Accurate motion prediction of surrounding agents is a key requirement for autonomous driving in urban environments. Current state-of-the-art algorithms typically rely on past trajectories and map data to forecast future movements of vehicles, cyclists, and pedestrians. While this setup provides strong priors, it often neglects critical contextual cues from the scene — such as traffic lights, turning signals, or dynamic interactions — which human drivers naturally incorporate into their decision-making. As a result, prediction models may fail in complex urban scenarios where context plays a decisive role.

This thesis investigates how embeddings from detection models can be used to provide prediction algorithms with richer contextual information. Detection models can capture high-level cues from the environment, such as blinker states, road users' intent, or other abstract behavioral signals. By propagating these embeddings into a prediction model alongside trajectory and map data, the system gains access to additional context that is often decisive in urban driving. The goal is to evaluate whether such contextual features improve the robustness and accuracy of motion prediction, especially in scenarios with ambiguous or dynamic agent behavior.

+ Possibility of a publication in case of excellent work.



Work packages:

- Literature review: Context-aware motion prediction, Scene understanding
- Design and implementation of the context-aware motion prediction model.
- In-depth evaluation and comparison.
- Iterative improvement.

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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: _____