

SA/ IDP/ MA

Development of a Motion Prediction ROS2 Node for a Real-World Autonomous Driving Platform EDGAR

Autonomous driving technology can only improve through real-world testing. For this purpose, we have access to EDGAR, our research vehicle, which we use to develop and validate advanced autonomous driving capabilities. One of the biggest challenges in today's autonomous driving systems is motion prediction, the task of forecasting where surrounding vehicles, pedestrians, and other objects will move in the future. These predictions are essential because they directly feed into planning, which determines how the autonomous vehicle navigates through its environment.

Currently, EDGAR uses a physics-based motion prediction algorithm. While reliable, it cannot fully capture the complex behaviors seen in real-world traffic. Modern state-of-the-art approaches use machine learning, enabling systems to learn from data, incorporate environmental context, and make far more accurate long-term predictions.

Therefore, in this work, the goal is to select a state-of-the-art motion prediction algorithm and develop a ROS2 node that integrates it into our autonomous driving software stack. The chosen algorithm will be trained using the UniTraj framework, which enables efficient use of data from multiple public autonomous driving datasets.

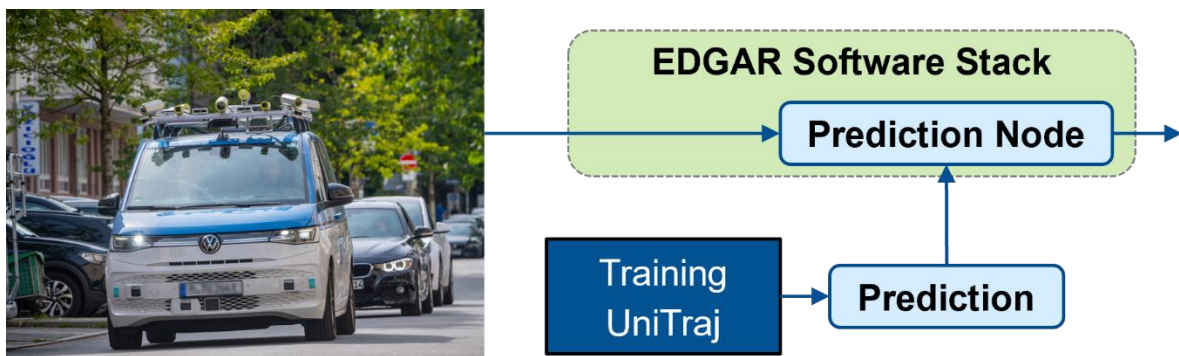


Figure 1: Project sketch

- + Validate your work through test drives with EDGAR in Munich.
- + Possibility for publication in case of excellent work.

Work packages:

- Literature review: Modular motion prediction
- Motion Prediction Training with the UniTraj Framework
- ROS2 Node development and deployment on EDGAR
- In-depth evaluation and iterative improvement.

Requirements:

- **Very good programming skills in Python and C++.**
- 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: _____