



# Interaction-aware Control for Autonomous Driving

## Project Summary

From a human perspective, anticipating other drivers' intentions and cooperation are important aspects of safe driving. Therefore, research in recent years in the field of path planning and control for autonomous driving has led to the conclusion that regarding other traffic participants as static obstacles is not sufficient. The focus of this project is to further develop interaction-aware approaches.

## Project Type

- BA Thesis (3-6 months)
- MA Thesis (6 months)
- Internship (3 months)

## Required Qualifications

- Prior experience with Model Predictive Control
- Programming skills in Python

## Contact

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## Detailed Description

- Advancing a current approach using Scenario-based Model Predictive Control (SCMPC) for interaction-aware path planning and control
- Implementation of a traffic prediction method based on Partially Observable Markov Decision Processes (POMDP)
- Integration into CARLA

## References

- M. Bahram, A. Lawitzky, J. Friedrichs, M. Aeberhard, and D. Wollherr, 'A game-theoretic approach to replanning-aware interactive scene prediction and planning', *IEEE Trans. Veh. Technol.*, vol. 65, no. 6, pp. 3981–3992, Jun. 2016.
- C. H. Ulfjoo and D. Axehill, 'On integrating POMDP and scenario MPC for planning under uncertainty – with applications to highway driving', *IEEE Intelligent Vehicles Symposium (IV)*, Aachen, Germany, Jun. 2022, pp. 1152–1160.