Implementing Safety Layer for Trajectory Planning - HiWi (10-20h/Week)

What it is about

We have a project in collaboration with Ford, Michigan, USA. The goal of this project is to extend the trajectory planning of their automated car by a safety layer. This safety layer verifies online that there is no collision [1].

The blue trajectory in the figure is planned based on the most likely path of the obstacle. However, if the obstacle turns suddenly to the left, the trajectory is not safe anymore. Therefore, we plan our emergency trajectory based on the reachable set of the obstacle. This reachable set contains all possible future positions of the obstacle. In case of an unexpected behavior of the obstacle, we have the option to perform the emergency maneuver.

What is your task

You will implement the planning of the emergency trajectories in python. After testing this in a simulation environment (planned for this year), we will integrate it in ROS to run it in a real vehicle (next year).

Requirements

- Interest in trajectory planning
- Good programming skills in Python
- Programming skills in Matlab are beneficial
- You should plan to work at least for two semesters

Note

It is possible to find a related topic for a bachelor or master thesis.