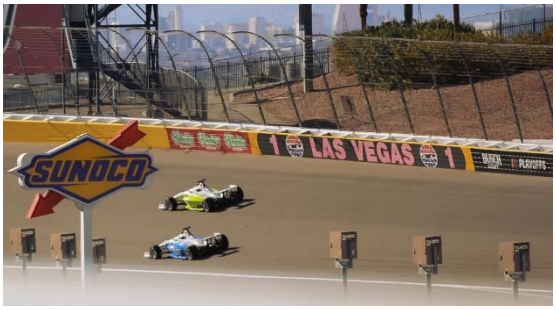
Lehrstuhl für Fahrzeugtechnik
Fakultät für Maschinenwesen
Technische Universität München

Term Paper / IDP

Evaluation of Highspeed Tracking Performance for Autonomous Racing



Autonomous driving is a fast-moving research discipline. At the moment, most of the research community's attention is centered on public streets. However autonomous racing provides a few benefits for research: High-speed driving uncovers a different set of problems than the usual public road scenes. At the same time, the closed track allows for testing new algorithms without safety concerns for the public. The Chair of Automotive Technology competes in the Indy Autonomous Challenge where autonomous Dallara vehicles race against each other at speeds exceeding 250 km/h.

A vital part for success in autonomous racing (and public road driving) is the system's capability to detect objects and track their movements reliably. While a working tracking algorithm is already in place, the tools and the knowledge of how to concisely evaluate its performance is still missing. The goal of this project is therefore to implement a tool to evaluate the tracking with different metrics and apply it to the current algorithm.

The first step is familiarization with the theory of object tracking and metrics to measure tracking performance. This is followed by a familiarization with the current tracking module of the racecar's software stack. Finally, a tool for automated evaluation of the tracking module will be implemented and the current algorithm will be benchmarked using different metrics.

During the project, you will work with following tools:

- ROS2 (Robot Operating System)
- C++/Python

Good knowledge of a programming language, a strong interest in perception and tracking, a drive to learn and an involved working attitude will make you the ideal candidate.

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