Karlsruher Institut für Technologie

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Masterarbeit

Evaluation of Formular-based Decision Making Model for Closed Road Networks

Motivation

With the advent of automated vehicles making their debut on public roads, a multitude of challenges will arise that need to be effectively addressed to ensure the safety and seamless management of traffic. One prominent issue is the likely increase in instances where these autonomous vehicles will have to interact with human drivers, an unpredictable and complex task. Traditionally, the modeling of traffic flow on major roads has been achieved using widely-accepted models like the IDM. However, the complexities and unique challenges presented by autonomous driving demand more comprehensive solutions. In particular, more complex scenarios such as navigating intersections, which include a multitude of variables, need to be considered and addressed. Recent advancements in the field have led to the development and presentation of extensions to traditional following models, offering novel solutions to these pressing issues.

Task description

In the course of this thesis, the main objective is to implement and thoroughly analyze a formular-based decision making model, also referred to as the GIDM model. This model represents a key aspect of this academic work, and its proper setup, in-depth analysis and documentation form the cornerstone of this thesis.

In order to perform a detailed analysis, an expansion of the existing simulation environment based on the SUMO simulation software is required. Key to this expansion is the capability to allow vehicles to run in loops with additional spawning and despawning features. This is a crucial functionality, since it enables the replication of a continuous traffic flow, rather than a static, one-time scenario.

The primary objective of this testing phase is to analyze and identify the optimal parameter settings of the GIDM model from a macroscopic perspective. This involves ensuring that the driving conditions under the management of the GIDM model remain comfortable and safe for individual drivers.

In conclusion, this thesis aims to provide a comprehensive analysis of the GIDM model, examining its impact on traffic flow within a simulated environment, and optimizing its parameters for both efficiency and comfort.

Preknowlegde

- Basic knowledge of signal processing
- Experience in Python
- Enjoyment of scientific work

Subject

- Automated driving
- Signal processing

Course of study

- [x] Elektro- und Informationstechnik
- [x] Informatik
- [x] Mechatronik

Research area

- [x] Implementation
- [x] Signal analysis
- [x] Simulation

Starting

From August

Links

Forschungsprojekt
Mitarbeiter

Contact person

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