

Interdisciplinary Project

How Well Perform Today's Autonomous Driving Models

This work can be done in German or English in a team of 2-4 members

At the current stage of autonomous driving, failures in complex situations are inevitable. A learning-based method to predict such failures could prevent dangerous situations or crashes. However, collecting real-life training data of crashes caused by autonomous vehicles is not feasible. A different solution is to use data from realistic simulations of a self-driving car, such as CARLA [1].

In this project, the objective is to setup available autonomous driving models such as [2-7] and use our existing data logging pipeline to evaluate these model's failure cases. The whole process should be further improved by extending our logging pipeline with an orchestration layer to manage all other services.

Tasks

- Implementation and integration of orchestration layer into existing data logging pipeline
- Setup of existing autonomous driving models
- Collection of driving data with the implemented system
- Evaluation of autonomous driving model failures and collection of failure data

References

- [1] A. Dosovitskiy, „CARLA: An Open Urban Driving Simulator“, S. 16, 2017.
- [2] F. Codevilla, E. Santana, A. M. Lopez, und A. Gaidon, „Exploring the Limitations of Behavior Cloning for Autonomous Driving“, S. 10, 2019.
- [3] M. Toromanoff, E. Wirbel, und F. Moutarde, „End-to-End Model-Free Reinforcement Learning for Urban Driving using Implicit Affordances“, arXiv:1911.10868 [cs, stat], Nov. 2019.
- [4] NVIDIA Drive, <https://www.nvidia.com/de-de/self-driving-cars/drive-platform/>
- [5] <https://github.com/tech-rules/DAVE2-Keras>
- [6] <https://github.com/adityaguptai/Self-Driving-Car->
- [7] <https://github.com/commaai/research>

Prerequisites

- Experience with Python (ROS and Linux)
- Knowledge about Docker would be helpful
- General knowledge about Machine Learning

Advisors

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