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Bachelor / Master thesis

Potential of Cloud-Based Object List Fusion

Overview

The environment perception of automated vehicles is restricted by the distance-dependent decrease of the performance of detection algorithms, occlusions and the limited field of view of specific sensors. In Cooperative Intelligent Transport Systems (C-ITS), traffic participants may share perception data with others. All traffic participants may benefit from a cloud-based fusion of the data. In the future, critical situations may not only be handled better by vehicles that can make use of this fused data, those situations may also be avoided in the first place. The number and severity of accidents of automated vehicles hence may be reduced. In this thesis, one part of a cloud-based system intended to achieve the aforementioned goals by providing fused object lists is to be conceptualized, implemented and evaluated.

Working Points

Object lists are a popular representation for dynamic objects in the environment of an automated vehicle. Based on existing concepts, an algorithm that fuses object lists of multiple vehicles in a central cloud server will be implemented. Vehicles send their own global pose such that this information may be incorporated in the fusion algorithm. As a bonus, machine learning techniques may be used to predict future states of the objects. The concept will be implemented and evaluated in a simulation.

Steps

1. Literature research on object list fusion.
2. Development of a concept for a cloud-based fusion algorithm.
3. Implementation of the developed concept.
4. Evaluation of the implemented concept using a simulation software.

Department

Automated Driving

Contact



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Language

German or English

Entry Date

Earliest possible date

Requirements

- Good English or German language skills
- Reliability, commitment and enjoyment of working independently
- Experience with ROS, Python and C++ is an advantage (not a must)