Detection of Road Markings by Lane-Keeping Systems

Problem description

Visible road markings on the road is a key factor to ensure road safety. The visibility of road markings depends on many factors, some of which are related to the physical properties of the materials of which the road markings are made of, while others are related to external factors, such as pavement conditions, lighting conditions, weather conditions, dry or wet surface, and maintenance level. One of the main infrastructure challenges of automated vehicles is reliable and accurate detection of lane markings which is the basis for Lane Keeping Assistance and Lane Departure Warning systems. Most of these systems rely on cameras that use visible light and require clear lane markings in order to function effectively. Therefore, in certain circumstances different road markings could lead to different detection levels and vehicle positioning performance. The main aim of this research is to reproduce (as realistically as possible) the physical properties of different road markings in terms of visibility, and assess the detection level by a Lane-Keeping System with different properties.

Assignment

- Review of the state-of-the-art on lane-markings' types and quality, factors affecting their visibility, and detection performance measures as well as different simulation platforms for automated vehicles;
- Designing a driving simulator experiment in which different scenarios are developed, in terms of road curvature, weather and lighting conditions, and the features of lane-keeping system, etc.;
- Executing the experiment by running automated vehicles with Lane Keeping Assistance and Lane Departure Warning functions (e.g. by using AV Simulation, Deepdrive, CARLA or other);
- Analyze the detection level and vehicle positioning performance in these different scenarios and draw conclusions regarding the visibility and safety;
- Writing a thesis report (and optionally a scientific paper for international journal).

Research group

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Information

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