The Role of Transition Control in Enhancing Traffic Flow and Safety

Problem description

Given the rise in technology and innovation, autonomous vehicles (AVs) are progressively finding their place on road networks, with promises of improving traffic safety and enhancing traffic flow. Current automation SAE Level 1 and Level 2 are increasingly being deployed on the public road. These vehicles still demand the human monitoring and intervention in certain situations. In certain situations when the driving conditions are outside the operational design domain of the automated driving system, the driver would need to take back control and drive the vehicle manually. These transitions of control might have negative implications on the traffic performance. In this direction, in this thesis you will investigate the impact of transition control on traffic flow safety and efficiency. To accomplish this objective, the project will employ two main methods. Firstly, the present behavior of autonomous vehicles (AVs) will be analyzed using available data from Level 2 automation provided by TNO. Secondly, traffic simulation models will be utilized to evaluate traffic flow safety and efficiency under varying transition control scenarios. The research project intends to identify potential risks and areas for improvement in AV operation by comprehensively understanding how AVs behave in real-world situations. Moreover, the use of traffic simulation models will aid in predicting the effects of transition control on traffic flow safety and efficiency in hypothetical situations. The findings of this project will offer valuable insights into the benefits and drawbacks of transition control on traffic flow safety and efficiency within the context of AVs.

For this thesis you will get the opportunity to work at TNO in the Hague.

Assignment

- Studying the literature on human driver behaviour, traffic safety, AV transition control etc.
- Analysing available AV level2 data and develop models to bring transition control insights
- Develop simulation models of mixed traffic (including transition of control) and report the performance in terms of traffic flow and safety with different KPIs.
- Reporting the insights gained from the literature review, data analysis, and simulation models.

Research group

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