

VACANCY: Infra scanner self driving car

ABOUT GOUDAPPEL

At Goudappel and Dat.mobility we are experts in the field of mobility. We connect our expertise on integrated solutions for the journey of today and the world of tomorrow. We contribute to accessibility, quality of life, safety, sustainability and economic vitality in the Netherlands and abroad.

Within our organization, we think highly of students and attach great value to interns and graduates. New ideas arise and innovative research is carried out by the new generation of mobility experts. This keeps our organization fresh and ensures that knowledge can be shared. In addition, your internship or graduation theses can be an interesting start to your career. You might be our future colleague!

INTRODUCTION

The development of connected automated vehicles (CAV) also called self driving cars has gained momentum in the past years. Although there is still discussion whether it is possible to reach SAE level 5 (full automation) there will be an increase in which drivers will be assisted with automation while driving a car via Automated Driving Systems (ADS) or Advanced Driver Assistance Systems (ADAS). As a result it is expected that automation is possible in certain conditions, which is referred to the operational design domain (ODD). An ODD definition describes specific operating conditions in which the automated driving system is designed to properly operate. It specifies what operating parameters the CAV must be able to manage; for example, weather conditions, infrastructure, location, time of day and everything else that can have an impact on the driving situation. The ODD is thus an important part of the safety concept of a vehicle (for more information on the ODD, see for example <https://youtu.be/u4F5OZIRlaQ>).

PROBLEM DESCRIPTION

A large part of the ODD definition is related to the characteristics of the infrastructure (e.g. lane width, roadmarking, on- and off ramp design and mixed traffic). To optimize benefits of automation, it is preferred to ensure that the ODD is large enough in terms of time and space and not constantly changing during a trip. Furthermore the ODD is a vehicle-based concept, which means that the ODD can vary between vehicles (e.g. depending on brand or more general on SAE level) or even between ADS/ADAS functionalities within a single car. For road authorities it is of interest to know whether their infrastructure is ready to accommodate CAV vehicles and its ADS/ADAS functionalities, but also where this is not the case and because of what reason. Therefore, the ODD concept should be adapted to reflect which road sections present the appropriate characteristics that enable the operation of a certain driving automation system. The interaction between an automated vehicle and the road infrastructure plays a major role, in addition to other environmental factors. Being able to scan the infrastructure to determine if it is suitable for self driving cars can for instance be used to determine if it is beneficial to adapt the infrastructure to enlarge the ODD, or to determine where the usage of such systems should be forbidden. An interesting starting point is formulated in this article: <https://www.frontiersin.org/articles/10.3389/fbuil.2022.901840/full>.

ASSIGNMENT

The assignment is to design and develop an ODD infrastructure “scanner”. Using GIS as a tool and suitable criteria you will develop a tool which allows for assessing the infrastructure for its suitability for CAV or possible ADS/ADAS systems.

For this assignment you will use various data sources depending on the elements needed to be scanned. Examples of available data sources which could be relevant are NWB (national wegenbestand), Open Street Map (OSM), HERE network data, OmniTRANS Spectrum and Cyclomedia Street Smart data.

INFORMATION

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More information on Goudappel can be found via www.goudappel.nl.