Estimating congestion and traffic patterns when planning road work

Involved persons

Vosse Meijssen	Student master Applied Mathematics (CSE and optimisation)
Leonoor Portengen	CGI, daily supervisor
Alexander Heinlein	TU Delft, professor, supervisor
Henk van Haaster	CGI, supervisor
Wim Wendt	CGI, contractual supervisor (DCS)
Hans van Lint	TU Delft, professor, leader of the MiRRORS group
Panchamy Krishnan (or other)	TU Delft, part of the MiRRORS group, worked at CGI

Project description

CGI is working on SPIN (Systeem Planning en Informatie Nederland), a tool that Rijkswaterstaat uses to plan and notify others of road work. For every measure in SPIN an estimate is made for the effect on traffic and congestion. In the current SPIN, this estimate is hand-made based on personal experiences.

For this master thesis, I want to use mathematical models to create better estimates. Firstly, I will look into numerical traffic models. These model vehicles (microscopic) and traffic flows (macroscopic) and this can be used to create the estimates. The MiRRORS group is a research project in the civil engineering faculty that researches multi-scale traffic models in coorporation with CGI. Their knowledge about traffic models can improve the used traffic models.

Secondly, I will try to use historical open data from NDW and use machine learning algorithms to find patterns between historical road work and their effect on the traffic situation. There exists some research about traffic predictions using neural networks, and there is a lot of historical open data available.

Data

The current plan is to use traffic data, OD-matrices and/or a road map of (a part of) the Netherlands. The road map is of course open data through OpenStreetMap. Furthermore, NDW has a huge database of historic traffic data and real time traffic data. This data is probably too much to handle, but maybe there is some expertise at the MiRRORS research group that can help me navigate this data.

The last data source is the origin-destination-matrix of the Netherlands. The MiRRORS project derived such a matrix ("demand") using historical traffic data ("supply"). Because the MiRRORS project has ties with the TUD and CGI, I am confident that they can help me with this data.