Improving Traveling Times in Paderborn using Vehicular Networking

Description:
In many larger cities such as Paderborn, we observe severe traffic congestions especially during rush hours. This situation might be improved using well-configured and adaptive traffic lights. At the same time, we see major developments and innovation in the new field of inter-vehicle communication (IVC). Bringing both together, we see a huge potential for improvements. Assuming vehicles can exchange information with traffic lights and estimate current traffic flows in a fully distributed manner, they can take this information into account for trip planning. This way the overall driving experience can be enhanced and even harmful emissions can be reduced.

Tasks:
In a first step, the current situation of road traffic flows and traffic light control in Paderborn needs to be assessed. This needs to be coordinated with the city council and will be supported by dSPACE. The result will be a study report outlining the current state and provide a basis for further investigations.
Using the simulation tool Veins, which allows to accurately model not only road traffic mobility and inter-vehicle communication, but also supports the import of geodata for example from OpenStreetMap and modeling traffic lights, the road traffic network will be modeled and validated against road traffic statistics as available from the study.
In a final step, the use of inter-vehicle communication protocols will be integrated in order to obtain some first insights into the potentials of this technology to improve the situation. In particular, both the road traffic efficiency and the resulting emissions need to be compared between the studied situation and the envisioned IVC enabled solution.

We plan to organize this thesis as teamwork for two master students working tightly together on the initial study. The final evaluations will be split into two independent sub projects.

Requirements:
Basic knowledge on computer network and interest in taking part in improving our road traffic situation in Paderborn

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