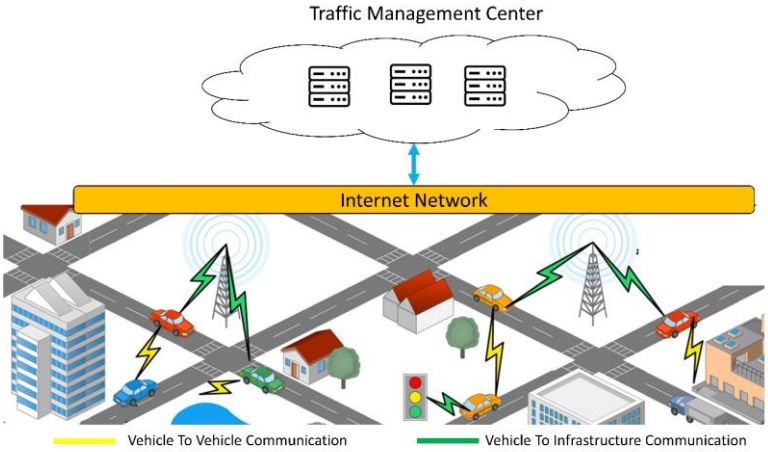

Development of simulation-based traffic management strategies for CAVs

Problem description

Applying traffic management systems is one of the essential factors in improving road network performance. The emergence of Connected and Autonomous Vehicles (CAVs) provides numerous capabilities for traffic management systems' improvement. One of the most important of these capabilities is CAVs' communication capability. CAVs offer two types of communication. The first one is vehicle-to-vehicle (V2V) communications, used when CAVs communicate among themselves. The second one is vehicle-to-infrastructure (V2I) communications, used when a CAV sends or requests some information to a traffic management center or it needs to access some content on the Internet. The figure on top [1] shows the overall communication architecture between road entities . As can be seen in this figure, CAVs can collect traffic-related data and send such data to other CAVs using V2V communication. They can also use V2I communications to send such data to road network infrastructure or traffic management centers. By exploiting such data, traffic management centers can provide services that may potentially improve road network performance. One such service is traffic management through (re)route strategies in case of disruptions. The goal of this master thesis is to study different routing and re-routing strategies for CAVs in case of disruptions.

Assignment

This study will implement traffic simulation tools (SUMO) to develop the best (re)routing strategies in various link and lane closure scenarios. New methods such as machine learning (reinforced learning) can be used to find the optimum strategy.

Research group

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References

[1] De Souza, A.M., Brennand, C.A., Yokoyama, R.S., Donato, E.A., Madeira, E.R. and Villas, L.A., 2017. Traffic management systems: A classification, review, challenges, and future perspectives. International Journal of Distributed Sensor Networks, 13(4), p.1550147716683612.