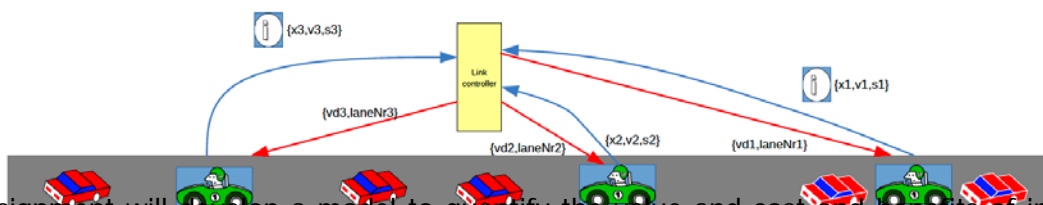


V2I/I2V communication structure and contents for safe and efficient intelligent highway operations

Communication information structure and contents for safe and efficient intelligent highway operations. Information regarding the dynamic states of the connected automated vehicle (CAV) group members and surrounding (possibly) uncontrolled conventional vehicles are crucial in decision-making of CAV groups. Such information may include (static) parameters of the environment, history and/or current state of CAV group members and surrounding vehicles, and the intended behaviour of interacting vehicles. While in general better information lead to better system performance for dynamic systems, the increased availability of information often comes at a cost. It is important to take into account the cost and benefits at the early design phase for V2X communication systems.

This assignment will focus on a framework to design the information structure and content for safe and efficient highway operations under cooperative vehicle infrastructure systems. Assumed are in the coming decades there will be CAV maneuver as a group surrounded by conventional vehicles. The CAV groups can communicate with the roadside infrastructure systems at bottlenecks.



The assignment will develop a model to quantify the value and cost and benefits of information under hierarchical framework and apply the model to design communication language of intelligent highway systems. The following research questions will be pursued:

- How to model the dynamics of CAV groups in multilane highway?
- How to model the dynamics of traffic flow with mixed CAV and conventional vehicles in multilane highway?
- How to measure the value/benefits of information?
- How to quantify the cost of information?
- When and what to communicate between the CAV and intelligent infrastructure systems?
- How to optimally distribute the communication resources and control actions between intelligent infrastructure and intelligent vehicles.

Supervisor

Supervisor: Dr. Meng Wang, Transport & Planning department, CiTG

Supervisor at RWS: Mr. Marco Schreuder, Mr. Ronald Adams

Co-supervisor from TU Delft: 3mE/EWI/TPM

External support

This assignment will be facilitated by ITS Edulab. It is also part of the cooperation between the Dutch and Chinese Ministry of Transport. Data and expertise from Research Institute of Highway, under the Ministry of Transport, China will be available. A paid trip is expected to Beijing.

Further Information

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