UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

Connected-Vehicle Traffic Signal System Modeling Platform

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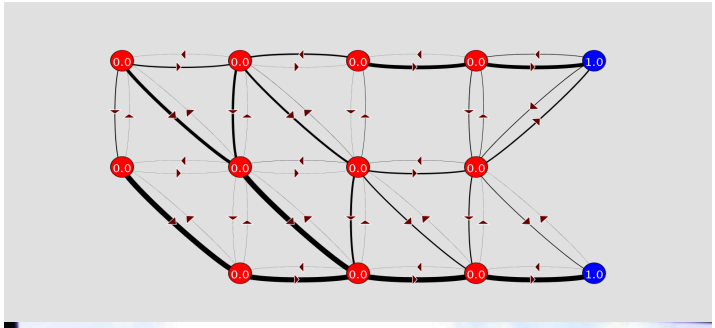
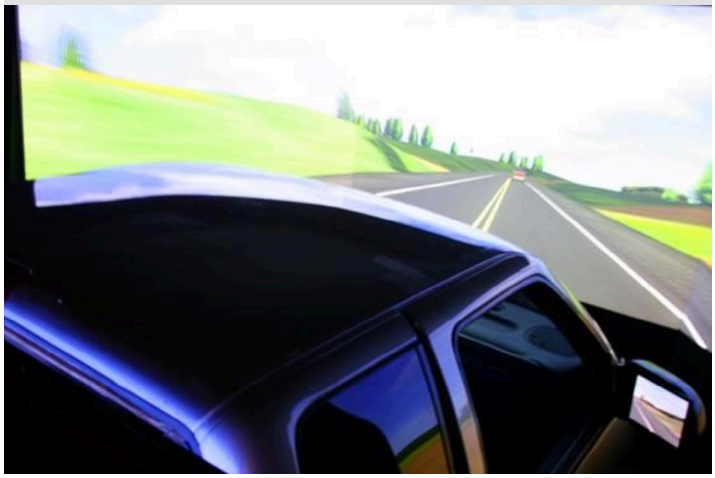
Background

Traffic in the cities of the future will be managed by sophisticated signaling systems working in conjunction with networks connected vehicles that share a wide variety of data. A common configuration for information flow is from vehicles on the road to Road Side Units (RSUs) via Basic Safety Messages (BSM). A BSM contains information about position, heading, state of the vehicle, etc. The roadside infrastructure (RSI) may in return convey information about traffic conditions ahead such as the status of signaling. This way the driver may be able to plan better through a richer knowledge of the traffic conditions and transportation infrastructure in which they are embedded. The roadside infrastructure can similarly plan for improved traffic flow and safety.





Research Project

In this research we will simulate traffic and the decision making of the RSI including signaling. We will also augment the NIATT advanced driving simulator for display of signaling data. The implementation will use not only software from a popular real-time traffic simulator (VISSIM) to simulate traffic flow, but hardware in the form of real traffic controllers in the RSI and a real vehicle outfitted as a driving simulator. Specifically, our aims are:

Aim 1: Experiment with physical displays in the driving simulator for displaying information from the RSI. This will allow experimentation with effective in-cab use of connected vehicle information. We will begin with signaling information delivered by the RSI. The simulator will be incorporated in the overall simulation found in Aim 2.

Aim 2: We will construct an enhanced traffic simulator using the VISSIM traffic simulator creating BSMs to virtual RSUs. Use that information in a signaling optimizer, we will construct and feed the control signals to real hardware controllers which will feed back into the VISSIM. This will allow us to experiment with signaling control at both the macro level of all traffic and at the individual level of a driving simulator.

ABOUT THE AUTHORS

The research team consisted of Robert Heckendorn of the University of Idaho.

ABOUT THE FUNDERS

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EXPECTED DATE OF COMPLETION

August 2021

FOR MORE INFORMATION

http://depts.washington.edu/pactrans/research/projects/connected-vehicle-traffic-signal-system-modeling-platform/