



Stony Brook University

Department of Civil Engineering
College of Engineering and Applied Sciences

SPRING 2021 ONLINE SEMINAR SERIES

Dr. Henry Liu, Ph.D.

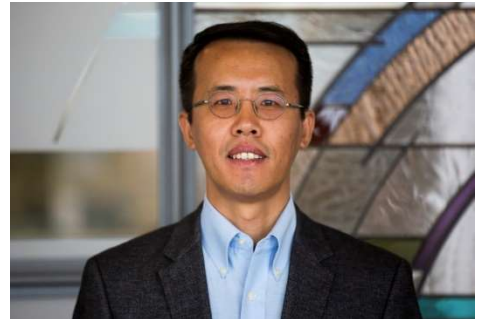
Professor, Department of Civil and Environmental Engineering
University of Michigan, Ann Arbor

Monday, February 22nd, 2:40 – 3:35 PM

Intelligent Driving Intelligence Test for Autonomous Vehicles with Naturalistic and Adversarial Environment

Abstract

Driving intelligence test is critical to the development and deployment of autonomous vehicles. The prevailing approach tests autonomous vehicles in life-like simulations of the naturalistic driving environment. However, due to the high dimensionality of the environment and the rareness of safety-critical events, hundreds of millions of miles would be required to demonstrate the safety performance of autonomous vehicles, which is severely inefficient. We discover that sparse but adversarial adjustments to the naturalistic driving environment, resulting in the naturalistic and adversarial driving environment, can significantly reduce the required test miles without loss of evaluation unbiasedness. By training the background vehicles to learn when to execute what adversarial maneuver, the proposed environment becomes an intelligent environment for driving intelligence testing. We demonstrate the effectiveness of the proposed environment in a highway-driving simulation. Comparing with the naturalistic driving environment, the proposed environment can accelerate the evaluation process by multiple orders of magnitude.



ZOOM LINK: Meeting ID: 950 6760 3617; Passcode: 426506

<https://stonybrook.zoom.us/j/95067603617?pwd=dXQybEprSkNITFY3WHIiWYjViUG95UT09>

Bio

Professor Henry Liu is a professor in the Department of Civil and Environmental Engineering at the University of Michigan, Ann Arbor. He is also a Research Professor at the University of Michigan Transportation Research Institute and the Director for the Center for Connected and Automated Transportation (USDOT Region 5 University Transportation Center). Prof. Liu conducts interdisciplinary research at the interface between civil and mechanical engineering. Specifically, his scholarly interests concern traffic flow monitoring, modeling, and control, as well as testing and evaluation of connected and automated vehicles. He has published more than 100 refereed journal papers and is listed as one of the top 50 leading authors in the past 50 years (1969-2019) in the prestigious Transportation Research journal. Professor Liu and his work have been widely recognized in public media for promoting smart transportation innovations. He has appeared on media outlets including CNBC, Forbes, Technode, etc. In 2019, Professor Liu was invited to testify on national transportation research agenda in front of the US House Subcommittee on Research and Technology. Professor Liu has nurtured a new generation of scholars, and some of his PhD students and postdocs have joined first class universities such as Columbia University, Purdue University, RPI, etc. Prof. Liu is the managing editor of Journal of Intelligent Transportation Systems.