TEXAS TRANSPORTATION

PLATOON CENTERED CONTROL FOR CAV DRIVING BUILT UPON HYBRID MPC SYSTEM, ONLINE LEARNING AND DISTRIBUTED OPTIMIZATION

The recent advancement of connected and autonomous vehicle (CAV) technologies provides tremendous opportunities to mitigate urban traffic congestion through innovative traffic flow control and operations. Particularly supported by advanced sensors, communication, and portable computing devices, CAVs can sense, share, and process real-time mobility data and conduct cooperative or coordinated driving. This has led to a surging interest in self-driving technology. However, the self-driving technology focusing on assisting individual driving maneuvers mainly ensures neighborhood traffic efficiency and an individual vehicle's safety; it does not always ensure traffic flow efficiency when a group of self-driven vehicles is packed in a complex freeway system with multiple lanes, on-ramps, and off-ramps, etc. Motivated by this view, our research team seeks to develop new resolutions: system optimal platoon-centered driving control (PCC), leveraging online learning, and distributed optimization. This talk will present our recent research on coordinated vehicle platooning control, including system optimal car-following control, cooperative PCC and PCC based eco-driving at a signalized intersection. The methodology development combines traffic flows, MPC, optimization, machine learning, and distributed computation. Our numerical experiments confirmed that platoon-oriented driving would significantly improve traffic efficiency, smoothness, and safety.

WHEN:

March 25th, 2022
1:00pm - 2:00pm

MEETING ID:

965-6665-1295

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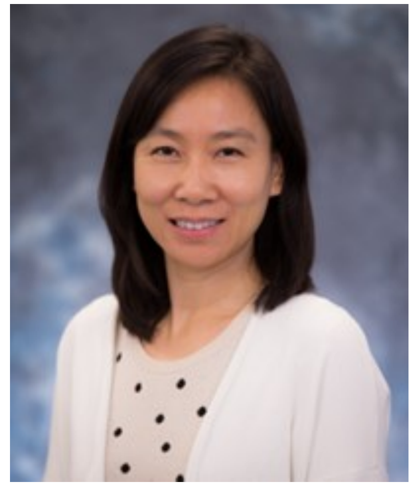

LILI DU

ASSOCIATE PROFESSOR AT UNIVERSITY OF FLORIDA

Dr. Du is an associate professor in the Department of Civil and Coastal Engineering, University of Florida. Before joining UF, she worked as an assistant and then an associate professor at the Illinois Institute of Technology. Dr. Du received her Ph.D. degree in Decision Sciences and Engineering Systems with a minor in Operations Research and Statistics from Rensselaer Polytechnic Institute in 2008. Dr. Du's research is characterized by applying operations research, network modeling, big data analytics, and machine learning approach into transportation system analysis, network modeling, and control. She currently focuses on several interdisciplinary research areas, including CV/AV/CAV/EV network modeling and platooning control, resilient civil infrastructure networks, sustainable multimodal transportation systems, mobility as services, and traffic flow analysis. Dr. Du's studies have been well funded by NSF, state DOT, university transportation research centers such as NEXTRANS, STRIDE, FMRI, and Toyota InfoTechnology Center. Dr. Du is a recipient of the NSF CAREER award in 2016. Her project Driverless City won the First Nayar Prize at IIT in 2015. Dr. Du currently serves as an editor for Transportation Research Part B, Associate Editor for IEEE ITS, editorial board member on Transportation Research Part C. She chairs TRB subcommittee on Emerging Technologies in Network Modeling (AEP40-5) and ASCE AI in Transportation Committee.

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