TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
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Computer Science

**Modeling heterogeneous traffic flow: from agent interactions to collective behaviors**

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Livermore Center, Room 101

**Abstract:**

Traffic flow always exhibits certain level of heterogeneity, which may be due to different vehicle types, driver characters, or driving technologies. Effective control of traffic flow requires a thorough understanding of how the heterogeneous agents (i.e. vehicles or drivers) interact with each other, and how such interactions collectively shape the behaviors of traffic flow. With the advent of autonomous vehicles, such an understanding becomes more critical. In this talk, I will present my recent research in this direction, focusing on the analytical and numerical modeling of heterogeneous traffic flow. I will first introduce a numerical model to capture car-truck interactions based on a pragmatic description of agents' perception of each other and show how it reproduces real-life traffic flow patterns. Then I will provide a theoretical characterization of equilibria attainable by heterogeneous agents in multilane highway settings, with probable interactions of human-driven and autonomous vehicles in mind. The research implies the potential of integrating lane control and agent behavior design to regulate heterogeneous traffic flow in the future.

**Bio:**

Dr. Jia Li is Research Assistant Professor at Texas Tech University. He received Ph.D. from University of California, Davis and was Research Associate at Center for Transportation Research, University of Texas at Austin before joining Texas Tech. His research focuses on the intersection of traffic flow theory, transportation systems modeling, and connected and autonomous vehicles. His current research examines the modeling and optimization of mixed autonomous transportation systems. He published twenty peer-reviewed papers, two book chapters, and a dozen of technical reports. His research is sponsored by a Seed Grant from Hurricane Resilience Institute (HuRRI) and a grant from VPR office, Texas Tech University.