

A Game-Theoretic Framework for Traffic Flow

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In traffic modeling, vehicles can be viewed as agents within a multi-agent framework, where driving decisions are guided by interconnected goals or strategies. With the rise of autonomous vehicles (AVs), the characteristics of traffic flow could be transformed if AVs are designed to drive differently from humans. In this talk, we will focus on developing a game-theoretic approach to traffic flow models using mean field approximation, which allows us to devise the payoff or cost functions for cars on a microscopic scale and transform such a behavior to macroscopic traffic characteristics. We aim to propose a broader class of traffic flow models by manipulating the objective function in the obtained forward-backward PDE system. In the numerical simulations, different traffic patterns are presented under different cost functions. This is a joint work with S. Di (Columbia University), M. Herty (RWTH Aachen), M. Lauriere (New York University, China), C. Segala (USI Lugano), Z. Mo, X. Chen (Columbia University).

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