CPS: Synergy: Collaborative Research: Design and Control of High-Performance Provably-Safe Autonomy-Enabled Dynamic Transportation Networks

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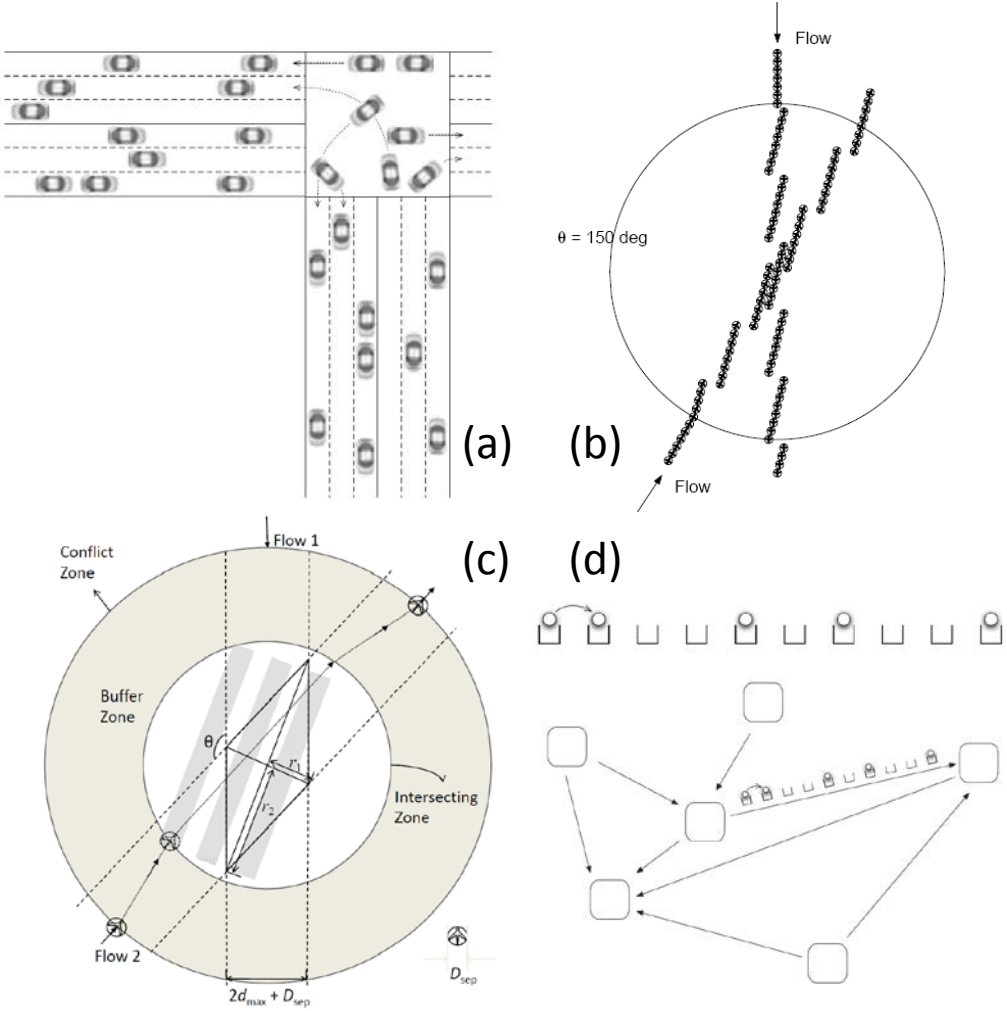
Description

Research objectives:

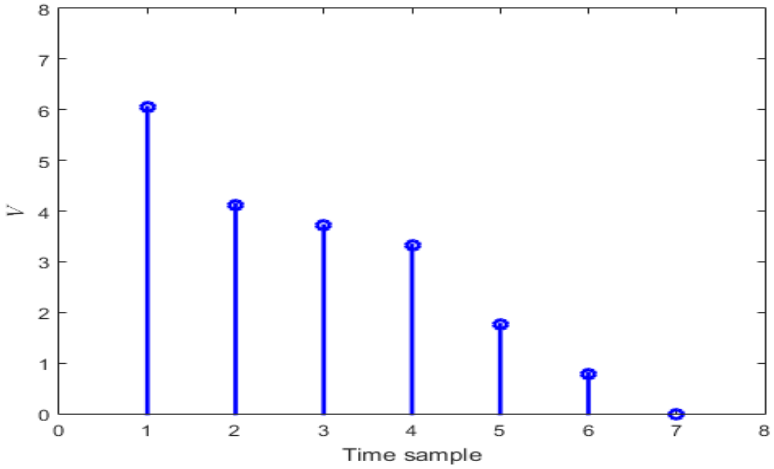
1. To develop a foundational understanding of how automated vehicles can interact in hubs to maximize their performance;
2. To develop rigorous bounds on performance with respect to the network variables including the number and the kinds of hubs and links, their connection structure, their dynamics, etc.

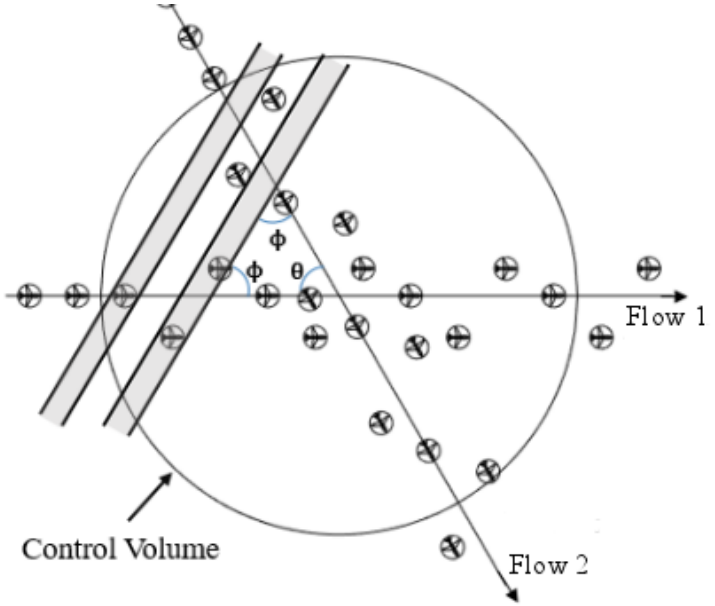


Proposed methods: (a) to study various intersection topologies; (b) to design self-organizing traffic control architectures; (c) to design traffic networks with hubs as building blocks; and (d) to navigate vehicles in "links" through lens of nonequilibrium statistical mechanics

Findings

Developed decentralized hub control laws with provable guarantees on performance and safety





Developed link control laws and analyzed trade-off between efficiency and sustainability