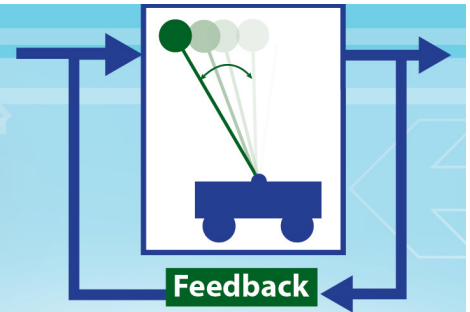


COLLEGE OF ENGINEERING

Control Seminar



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Optimal Coordination of Connected Autonomous Cars in Smart Cities



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Friday, March 31, 2017

3:30 – 4:30 pm • 1500 EECS

ABSTRACT: Connectivity and autonomy of cars and roadside infrastructure is expected to transform urban transportation. For instance, cooperation between intelligent cars and intersection control units can harmonize traffic flow, increase energy efficiency, and enhance safety and passenger comfort. This talk takes a closer look at some of these potentials. In one experimental case study we demonstrate that coordination of movement of human-driven connected cars with traffic signals reduces idling and fuel consumption. In this case study we successfully “crowd-source” traffic signal timings from statistical patterns in motion of connected vehicles in the city of San Francisco. We also discuss the communication protocols and backend computing architecture that we have in place for collecting and processing vehicular data in near real-time and relaying the processed information to subscribing vehicles. Benefits are expected to be higher with autonomous cars where absence of a human driver promises more predictability and precise control. In the second part of this talk, we formulate a novel intersection control concept for autonomous cars in smart cities that does not rely on conventional traffic signals. Arrivals of autonomous cars at the intersection are optimally scheduled to reduce delay. The benefits are shown in simulated scenarios and also in a vehicle- in-the-loop experiment.

BIO: Ardalan Vahidi is an associate professor with the department of mechanical engineering, Clemson University, South Carolina. He received the Ph.D. degree in mechanical engineering from the University of Michigan, Ann Arbor, in 2005, the M.Sc. degree in transportation safety from George Washington University, Washington, DC, in 2002, and B.S. and M.Sc. degrees in civil engineering from Sharif University, Tehran in 1996 and 1998, respectively. In 2012–2013 he was a Visiting Scholar with University of California, Berkeley and a Visiting Researcher with BMW Group Technology Office USA in Mountain View, CA. His recent research spans topics in automotive control, intelligent transportation systems, connected and autonomous vehicle technologies.