

CPS: Synergy: Real-Time Cyber-Human-Vehicle Systems for Driving Safety Enhancement

Submitted by junmin.wang on Tue, 05/07/2019 - 2:50pm

Project Details

Lead PI:	Junmin Wang
Performance Period:	09/08/18 - 09/30/20
Institution(s):	University of Texas at Austin
Sponsor(s):	National Science Foundation
Award Number:	1901632

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Abstract: Modern ground vehicles are complex cyber-physical systems (CPS) in which many functions are achieved by collaborative interactions between mechanical systems and electronic control units. In addition, human drivers also play important roles on the vehicle driving. For such cyber-human-vehicle systems (CHVS), the synergistic collaborations and integrations among human drivers, vehicle active motion control, and onboard real-time computation and communication are critical for enhancing vehicle driving safety. With the recent advances on vehicle onboard computation and communication technologies, this project aims to develop onboard-adaptable and personalizable human driver models, create driver-specific vehicle active motion control systems, design dynamic onboard real-time computation task scheduling methods that can effectively synthesize with the personalized vehicle motion control methods, and integrate the vehicle-to-vehicle communications for driver-specific, inter-vehicle motion control. The research, upon successful completion, can create methodologies for optimally synthesizing onboard computation and communications, individual human driving characteristics, and vehicle dynamics and active motion control to form a novel CHVS that can enhance the driving safety and increase the likelihood of collision-avoidance. The research objectives will be pursued through analytical, computational, and experimental studies. Driving simulator and real vehicle experiments together with high-fidelity simulations will assist the investigations. The research results from this project will be disseminated through usual academic publications, CPS meetings, and visits to relevant companies for industrial collaborations. Some of the research findings will be used to enrich several undergraduate and graduate courses in different disciplines. High-school summer camp and undergraduate student research opportunities will be generated through this project to attract students to engage in the research and to pursue higher education in science

and engineering.

Related Artifacts

Presentations

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