Call for Paper: 3rd Special Session on Cooperative Driving in Mixed Traffic (ITSC 2023)

Organizers

- Ziran Wang, Purdue University, USA (ziran@purdue.edu)
- Jia Hu, Tongji University, China (hujia@tongji.edu.cn)
- Meng Wang, Technische Universität Dresden, Germany (meng.wang@tu-dresden.de)
- Jiaming Wu, Chalmers University of Technology, Sweden (jiaming.wu@chalmers.se)
- Qiuchen Wang, Scania, Sweden (qiuchen.wang@scania.com)
- Marilo Martin-Gasulla, PTV Group, Germany (marilo.martingasulla@ptvgroup.com)

Scope and Topics

With the advancement of vehicle-to-everything (V2X) communications, the concept of cooperative driving has been attracting increasing attention from both academia and industry. Connected vehicles, either driven by human drivers or automated controllers, are able to coordinate with each other or infrastructures through V2X communications in certain traffic scenarios to improve the overall performance. Cooperative Adaptive Cruise Control (CACC), cooperative ramp merging, connected eco-driving at signalized intersections, automated coordination at non-signalized intersections, among other cooperative driving applications of connected vehicles, have the potential to benefit the transportation system in terms of safety, mobility, resilience, and/or environmental sustainability.

However, the market penetration rate of connected vehicles is expected to evolve gradually. There will certainly be a transition period where only a portion of the vehicles traveling in the traffic environment are connected (and potentially automated), while others have no V2X capabilities – either automated vehicles equipped with on-board sensors or legacy vehicles driven by human drivers. How to perform cooperative driving maneuvers in mixed traffic environments to allow the coordinations among all these vehicle types remains an open research question.

This will be the third special session of the series, focusing on cooperative driving in mixed traffic. It focuses on sharing the state-of-the-art design, modeling, algorithms, simulation, and field implementation of cooperative driving in mixed traffic, and identifies challenges as well as research needs, aiming to encourage cross-disciplinary cooperation. The specific topics of interest are listed below:

- Cooperative perception or situation awareness enabled by sensors on multi-vehicles or sensor fusion between vehicles and infrastructure
- Driving behaviour modelling and driver intention inference
- V2X-based cooperative motion planning and motion control
- Cooperative driving methodologies for modelling the interaction between human-driven vehicles and automated vehicles
- Application of advanced machine learning techniques to cooperative driving
- Cyber security of cooperative driving systems
- Communication standard (including messaging) to enable cooperative driving
- Interaction between vehicles and vulnerable road users
- Advanced simulation of cooperative driving applications in mixed traffic
- Field implementation of cooperative driving in mixed traffic

Important Dates

Paper submission deadline: May 15, 2023
Notification of paper acceptance: June 30, 2023
Final paper submission: July 31, 2022