Symposium 2021Breakout Session Title:

B212-Computational and Algorithmic Challenges for AI Applications in the Era of CAVs

Organizers / Session Contact:

- *Osama A. Osman, Assistant Professor, University of Tennessee-Chattanooga*
- *Yuanchang Xie, Associate Professor, University of Massachusetts-Lowell*
- *Mo Zhao, Research Scientist, Virginia Transportation Research Council*
- *Yi Guo, Sr. Research Associate, University of Cincinnati*
- *Guoyuan Wu, Associate Research Faculty, University of California Riverside*
- *Mehdi Hashemipour, US Department of Transportation*

TRB Sponsor/Partner Committees (if any):

AED50 Artificial Intelligence and Advanced Computing Applications Committee

Session Description

Artificial Intelligence (AI) is a core enabling technology for safe and efficient CAV operations. CAVs rely heavily on AI for sensing and decision making such as path planning and trajectory optimization. Additionally, AI enables smart infrastructure that facilitates the more efficient operations of CAVs. Among the key challenges to apply AI in CAVs are the computational and communication resources needed to support analyzing, sharing, and storing massive data and how to ensure safety, efficiency, sustainability, reliability, and interpretability. This session will focus on discussing lessons learned from CAV pilots, frontier research, and best practices to address such challenges faced by AI applications in large- scale CAV deployments.

Goals/Objectives/Outputs

- The objectives of this session are:
- To discuss challenges faced by AI applications in CAV deployments at both the vehicle and infrastructure sides
- To identify computational and algorithmic needs to enable safe, efficient, cooperative, sustainable, and reliable decision making for CAVs
- To share best practices and lessons learned from past and current CAV deployments
- To identify existing and future computational and algorithmic needs for large-scale CAV deployment

Agenda (Tentative)

Moderators: **Osama A. Osman & Yuanchang Xie**

Panelists (Confirmed)

- Taylor Lochrane, CARMA Program Manager, FHWA
- Alexandre M. Bayen, Director, Institute of Transportation Studies, University of California, Berkeley
- Nitin Wagh - Principal BDM, ML Services | Amazon Web Services
- Xiaopeng (Shaw) Li – Associate Professor and Director, National Institute for Congestion Reduction, University of South Florida

13:30 – 13:35 CDT	Introduction	Osama A. Osman
13:35 – 13:55 CDT	Lagrangian control at large and local scales in mixed autonomy traffic flow	Alexander Bayen
13:55– 14:15 CDT	Leveraging AI for Cooperative Driving Automation and TSMO	Taylor Lochrane
14:15– 14:35 CDT	Accelerating Autonomous Vehicle AI Development	Nitin Wagh
14:35– 14:55 CDT	CAV Traffic Management: Artificial Intelligence or Heuristics?	Xiaopeng (Shaw) Li
14:55– 15:30 PM CDT	Panel Discussion	Yuanchang Xie Osama A. Osman