TFTC General Webinar Series

Assessing traffic disturbance, efficiency, and safety of the mixed traffic flow of connected vehicles and traditional vehicles by considering human factors

Friday, **May 27th**, 2022 -- **10 AM** (EDT)   *7 AM for California, 4 PM for Zurich, Paris,..., 7:30 PM for India,11 PM for Beijing*

🔗 https://gatech.zoom.us/j/96551586204   Meeting ID: 965 5158 6204

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Abstract

In the foreseeable future, connected vehicles (CVs) will coexist with traditional vehicles (TVs) resulting in a complex mixed traffic environment and the success of CVs will depend on the characteristics of this mixed traffic. Therefore, before the large scale deployment of CVs, it is important to examine how CVs will influence the characteristics of the resultant mixed traffic. This webinar discusses a recent study on modeling the mixed traffic of TVs and CVs. Intelligent Driver Model (IDM) with estimation errors was utilized to model TVs since it incorporates human factors such as estimation errors. Whereas, connected vehicle driving strategy integrated with IDM was utilized to model CVs because it incorporates driver compliance, a critical human factor for the success of CVs. Moreover, two classes of drivers based on their compliance levels were considered, namely the high-compliance drivers and the low-compliance drivers, to comprehensively investigate the impact of driver compliance on the mixed traffic of CVs and TVs. Two simulation experiments were performed in this study. The first experiment was used to measure traffic flow disturbance and safety while the second was used to measure the traffic flow efficiency. Another important point considered in the simulation was the spatial distribution of CVs in the platoon. As such, three platoon policies are investigated. In the first policy i.e., the best case, the CVs were spatially arranged with a motive to maximize benefits from CVs whereas in the second policy i.e., the worst case, the CVs were spatially arranged with a motive to minimize benefits from CVs. Finally, in the third platoon policy i.e., the random case, the CVs are distributed randomly in the platoon. This study demonstrated the importance of the spatial arrangement of CVs in a platoon at a given penetration rate and its impact on traffic flow disturbance, efficiency, and safety. Moreover, findings from this study underscored that CVs can suppress the traffic flow disturbance, and enhance traffic flow efficiency, and safety; however, traffic engineers and policymakers have to be cautious regarding how CVs are distributed in a traffic stream when deploying these vehicles in the real world traffic environment.

Biography

Dr. Anshuman Sharma is a C.V. Raman Postdoctoral Fellow at Centre for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP), Indian Institute of Science (IISc), Bangalore. His research interests lie primarily in the areas of Intelligent Transportation Systems (including connected and/or automated vehicles), Traffic Flow Modelling, and Human factors in traffic. He is the recipient of the prestigious Cunard award (TRB 2019 Young First Author Best Paper Award in operations section).