

Peer Review

Review of: "Can Human Drivers and Connected Autonomous Vehicles Co-exist in Lane-Free Traffic? A Microscopic Simulation Perspective"

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This is an interesting paper that addresses the lane management problem from a novel viewpoint. The proposed methodology is technically sound, and the experimental results do offer valuable insights. My concerns are mainly rooted in the applicability of LFT under the mixed traffic of HDVs and CAVs. Detailed comments are as follows:

1. My major concern is the safety implication of the lane-free configuration under the mixed traffic. In my humble opinion, strict lane discipline is necessary for regulating human driving behaviors. Without it, traffic safety cannot be guaranteed, though the efficiency might be improved. Thus, other than efficiency, it is necessary to evaluate the collision risks or other kinds of safety benefits to justify the adoption of LFT in practice.
2. Another practical issue is when and where to implement LFT, especially under the mixed traffic environment. For example, this study highlights that a 60% penetration rate of CAVs on the road segment is required before LFT starts showing significant advantages. Then, what is the threshold of the market penetration rate of CAVs after which we can implement LFT? (Note that even if a city achieves an overall market penetration of 60%, certain roads may experience CAV penetration rates as low as 20–30%, which can significantly disrupt LFT efficiency.) The simulation results in this paper cannot provide answers to the above questions.
3. Moreover, the paper assumes an uninterrupted flow setting (a ring road). But in practice, interrupted flow conditions, such as on-ramp and off-ramp interactions on a freeway, should be considered.

Declarations

Potential competing interests: No potential competing interests to declare.