

Automated vehicles will not improve traffic congestion

Technology for automated vehicles (AVs) is developing rapidly, and some claim that AVs can improve traffic congestion. To evaluate the AV's impact on traffic congestion, six measures for service levels can be considered, including flow rate and daily traffic volume (Toledo, 2011). This paper argues that introducing AVs, without adequate government interventions, will not improve traffic congestion since (1) AVs do not improve traffic flow, and (2) AVs could increase traffic volume.

The benefits AVs have on traffic flow are insubstantial as a small fraction of conventional vehicles can impede the traffic flow with AVs. In 2017, researchers at Delft University of Technology developed a simulation model, which relates the travel time and the breakdown capacity (i.e. traffic flow when traffic speed is lower than 70 km/hr) to the percentage of AVs in a traffic system. The model has shown that the travel time increases, and the breakdown capacity drops when the percentage of AVs in the system is below 80 to 85% (Calvert, 2017). It implies that in the next few decades, the traffic flow will not improve until a significant majority of the vehicles transition to AVs. Furthermore, it is unlikely that conventional vehicles will phase out entirely since people enjoy driving manually. According to a commuter survey in the City of Adelaide, 61% of respondents prefer owning both an AV and a conventional vehicle (Cohen, 2018). Thus, the traffic flow will not improve shortly unless the public attitude towards AVs changes.

AVs could also increase traffic volume for two reasons. Some city planners believe that AVs could increase car-sharing and reduce traffic congestion (Shaver, 2019). However, the public appears to think the opposite of what the theory predicts. 48% of the respondents in the Adelaide commuter survey prefer owning an AV and earn income from it, and less than half of the respondents choose using AVs car-sharing and not owning one (Cohen, 2018). From that, it is evident that the AVs will not lower the demand for private vehicles, and the traffic volume will either remain the same or increase. Besides, AVs would increase the number of cars cruising on the streets, as it is more economical than paying for parking fees when the passengers arrive at their destination. In 2019, researchers at the University of California, Santa Cruz, modelled the parking behaviour of AVs in downtown San Francisco. The model shows that 40% of AVs trips in downtown San Francisco choose cruising as the cheapest option to park among other options such as on-street parking (12.7%), parking offered by the company (39.4%), and return home (7.9%) (Millard, 2019). More vehicles cruising on the street will not only increase the traffic volume but will also slow down the traffic.

Traffic congestion is a complex transportation problem that cannot be mitigated solely by AV. A more effective solution is to complement AVs technology with government interventions, such as taxation on conventional vehicles and congestion pricing (Millard, 2019).

References

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