Research Fact Sheet

Research project: Driver's Interactions with Advanced Vehicles in Various Traffic Mixes and Flows (connected and autonomous vehicles (CAVs) electric vehicles (EVs), V2X, trucks, bicycles and pedestrians) - Phase I: Driver Behavior Study and Parameters Estimation

What's the issue?

Connected vehicle and driver assistive technologies are advancing quickly and are fast-tracked for implementation in new cars, known as connected and autonomous vehicles (CAVs). Most of the new cars come pre-equipped with these applications, but what isn't known is how drivers will react: When drivers receive a warning from their car, what will they do? And how long does it take them to act on the warning?

What did the research discover?

The researchers put 93 drivers from diverse socio-economic backgrounds in a driving simulator and asked them to drive for 186 experiments to investigate driver behavior in terms of braking, steering and throttle control, and change in speed when five different CAV applications are used. Forward collision warning and red light warning worked well, resulting in earlier, more aggressive braking. But curve speed warning – not so much. Drivers didn't slow down. The data revealed that with the exception of the curve warning system, these systems improve safety and driving performance. Researchers also studied how fast drivers resumed control after a warning or action by the car, and found the annual miles driven, age, and familiarity with this technology influenced the Take Over Reaction Time (TORt).

How can I implement this?

Driver reaction times are important for safety, and these results serve as a basis for further research, since understanding driver reaction time is critical to modeling driver behavior in simulator studies. The parameters established in this driving simulator research can be integrated into traffic simulation so that researchers can safely study reactions that cannot be studied in the real world. For example, one 59-year-old participant in the driving simulator said he didn't know what the pedestrian collision warning light was, so he ignored it but then struck a pedestrian. Ultimately, this type of research will contribute to more user-friendly, effective CAV applications.

Learn more:

Information about the project and the full report are available at https://www.morgan.edu/school_of_engineering/research_centers/urban_mobility_and_equity_center/research/completed_research/drivers_interactions.html

The Urban Mobility & Equity Center is a federally funded research consortium led by Morgan State University and includes the University of Maryland and Virginia Tech. www.morgan.edu/umec