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Investigating Driver Evasive Maneuvers of Takeover Responses in Automated Vehicles

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Abstract

When an automated vehicle (AV) is about to crash, would the speed of the AV (slow vs. fast) affect the steering direction of a human driver who attempts to control the vehicle and avoid the collision? Answering this question provides AV manufacturers insight into how they can produce a safer AV experience for human drivers. Considering that a left turn at a T-intersection allows a greater time budget to make the turn than a right turn which requires sharper steering, we hypothesized that drivers traveling at faster speeds would be more likely to turn left and drivers traveling at moderately slow speeds would turn right to avoid a collision. To test these hypotheses, we conducted a driving simulator experiment where participants monitored the AV's status throughout the driving. We manipulated the speed of the AV when it crashes at a T-intersection (approximately 7 m/s vs. 11 m/s). Our results indicated that the speed of the vehicle had no impact on the steering direction. Interestingly, however, drivers displayed an overall inclination towards right turns to avoid collision at the T-intersection regardless of speed conditions.

Keywords: automated vehicle (AV), speed, right turn, left turn, T-intersection