A critical aspect of connected vehicle safety analysis is understanding the impact of human behavior on the overall performance of the safety system. Given the variation in human driver behavior and the expectancy for high levels of performance, it is crucial for these systems to be flexible to various driving characteristics. However, design, testing, and evaluation of these active safety systems remain a challenging task, exacerbated by the lack of behavioral data and practical test platforms. Additionally, the need for the operation of these systems in critical and dangerous situations makes the burden of their evaluation very costly and time-consuming. As an alternative option, researchers attempt to use simulation platforms to study and evaluate their algorithms. In this work, we introduce a high fidelity simulation platform, designed for a hybrid transportation system involving both human-driven and automated vehicles. We decompose the human driving task and offer a modular approach in simulating a large-scale traffic scenario, making it feasible for extensive studying of automated and active safety systems. In our analyses and verifications, we look at a large driving dataset to extract expressive parameters that would best describe different driving characteristics. Finally, we recreate a similarly dense traffic scenario within our simulator and conduct a thorough analysis of different human-specific and system-specific factors and study their effect on the performance and safety of the traffic network.

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The public is welcome to attend.