Impact of In-Vehicle Displays Location Preferences on Drivers' Performance and Gaze

Abstract:

Advanced driver assistance systems (ADAS) and driver information systems (DIS) do not always comply with the intended driver safety enhancement. Even if they aim to augment the driver's awareness of the surrounding environment, perceiving this information requires the occasional attention diversion from the road, which could lead to a loss of vehicle control if the total eyes-off-road time exceeds the National Highway Traffic Safety Administration (NHTSA) recommendation for glances away from the roadway. Additionally, technologies that can be found in other mobile environments, smartphones, and tablets are increasingly being integrated into cars, providing a necessary facet of study and continued research in their effects. We addressed this question by analyzing differential preferences for the layout of DIS and ADAS compared with existing ones through a card-sorting experiment. To validate our data, we additionally studied the drivers' performance and gaze with the preferred locations for in-vehicle information through gaze location and speed metrics.
measurements. Our validation process showed that the time the drivers needed to find the conveyed information in the preferred layout was within the recommended time of the NHTSA Guidelines. Drivers’ preferences with regard to the functional layout of current DIS and ADAS compared with existing ones did not essentially differ from the layouts that are currently on the market. However, including mobile applications and social media in a vehicular context was not considered necessary.

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