Driver's Mental Models of Advanced Vehicle Technologies: A Proposed Framework for Identifying and Predicting Operator Errors Dataset

Dataset available at: https://doi.org/10.7910/DVN/LDO7PP

(This dataset supports report **Driver's Mental Models of Advanced Vehicle Technologies: A Proposed Framework for Identifying and Predicting Operator Errors**)

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The related final report **Driver's Mental Models of Advanced Vehicle Technologies: A Proposed Framework for Identifying and Predicting Operator Errors**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/60329

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Description: Advanced vehicle technologies are increasingly more accessible and available in vehicles. These current and future systems, despite promising added safety, convenience, and efficiency to drivers and road users, have an inherently higher level of complexity than the driving systems that most drivers are used to operating. In order to maximize the promised benefits, drivers will need to have a good understanding of these systems—referred to as mental models—in order to use them safely and appropriately. Previous research has identified drivers' gaps in knowledge of advanced vehicle technologies. Beyond users' knowledge of a system, understanding and defining a user's mental model is critical for many aspects of advanced vehicle technologies, including the design of, training for, and use of these systems. However, characterizing a driver's mental model is still a significant challenge. Moreover, these gaps and challenges will only be further accentuated with more complexity in vehicle automation, especially with higher levels of automation. This research was conducted to better elucidate advanced vehicle technologies from a user control

perspective, to examine driver interaction with such complex systems, and to characterize driver mental models in this context. This is achieved through: (i) a review of the current state and complexities of one advanced vehicle technology—Adaptive Cruise Control (ACC)—and its associated documentation, (ii) a review and synthesis of existing literature on mental models and error-making, (iii) the development of a task analysis for driver-automation interactions, and (iv) the building of a framework to help examine user interactions with complex systems to identify sources and probabilities of error commission. This document also reports on an examination of the limitations of various ACC systems in the current market in the context of manufacturer's reporting of such limitations. (2021-02-01)

Subject: Engineering
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Dataset description:
This dataset contains 1 file described below.

Edge Case Scenarios of ACC - for repository.xlsx:
The .xlsx and .xls file types are Microsoft Excel files, which can be opened with Excel, and other free available software, such as OpenRefine.

National Transportation Library (NTL) Curation Note:
As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (https://ntl.bts.gov/public-access) Section 7.4.2 Data, the NTL staff has performed ***NO*** additional curation actions on this dataset. NTL staff last accessed this dataset at https://doi.org/10.7910/DVN/LDO7PP on 2022-04-21. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.