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Graphical abstract



Abstract

Up to a level of full vehicle automation, drivers will have to be available as a fallback level and take back manual control of the vehicle in case of system limits or failures. Before introducing automated vehicles to the consumer market, the controllability of these control transitions has to be demonstrated. This paper presents a novel procedure for an expert-based controllability assessment of control transitions from automated to manual driving. A standardized rating scheme is developed that allows trained raters to integrate different aspects of driving performance during control transitions (e.g., quality of lateral and longitudinal control, adequateness of signalling to other road users, etc.) into one global controllability measure based on video material of the driving situation. The method is adapted from an existing assessment procedure that has been successfully applied to assess the criticality of driving situations in manual driving conditions (e.g., assessment of substance-induced impairments, assessment of fitness-to-drive of novice drivers). This paper presents the rating procedure, including instructions of how to code relevant qualities of the drivers' performance with accompanying video-demonstrations, and material used for rater training.

- A rating procedure for expert-based controllability assessment of control transitions from automated to manual driving based on observation of video material was adapted from an existing method used in studies on manual driving

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