The Impact of an Anticipatory Eco-Driver Assistant System in Different Complex Driving Situations on the Driver Behavior

Abstract:

The anticipatory advanced driver assistance system (ADAS) developed at the Institute of Ergonomics at the TU München assists to reduce the individual fuel consumption of each driver by anticipating earlier. The goal is to achieve improvements in as many road situations as possible. The paper gives an overview on the different options to support the driver to reduce its fuel consumption. It also discusses the possibilities of an extension of anticipation to support the driver in eco-driving. Related work shows that anticipatory advanced driver assistance systems help to save fuel, but they focus on the general potentials of the system. The presented study in this paper, however, deals with the question of the impact of different road traffic situations on an anticipatory driver assistance system. Different traffic scenarios were chosen and varied in its complexity to evaluate the impact of the complexity of different driving situations on an anticipatory ADAS. A driving simulator study was conducted with 27 participants. The results showed that the fuel consumption is reduced with the assistant
system due to earlier and better reaction but that there is no influence of the complexity of a situation on that. The influence of the situation on the driver in his use of the ADAS can be shown by his visual behavior. The percentage of the gaze time on the human machine interface (HMI) on the system is significantly reduced in the more complex situations.

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