

Public summary of PhD-thesis of Hanneke Hooft van Huysduynen

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Personalized Persuasion to Increase Acceptance of Automated Driving

It is predicted that in the future, vehicles as we know them nowadays, will disappear. Intelligent systems, also known as Automated Driving Systems (ADS), will allow drivers to delegate driving activities to the vehicle. As ADS are developed with a strong focus on safety, the behavior of self-driving cars is expected to be cautious and defensive and, possibly, against the driver's preferred driving behavior. This may have a negative effect on people's willingness to use such systems. A framework to categorize drivers and guidelines to counteract the negative aspects of automated driving without changing the behavior of ADS are proposed in this thesis.

The number of systems in commercially available vehicles that assist or support driving is growing, as well as the capability of these systems. One particular class of systems consists of autopilot systems, which combines adaptive cruise control and lane keeping. At least for the next decade, using autopilot systems is up to the discretion of the user. There may be several reasons for drivers to not accept the assistance provided by ADS and decide to disengage the system. For example, the speed maintained by ADS, boredom and sleepiness, or the enjoyment of manual driving. Thus, there is a need to systematically analyze driving styles and, based on those, investigate ways to enhance people's willingness to adopt intelligent systems in vehicles.

Drivers can be roughly classified into two categories, namely Risky and Careful drivers. These two driving styles can be analyzed from three perspectives: the behavior, knowing the consequences of the behavior and the motivation of the behavior. From a behavioral perspective, the driving styles Risky and Careful can be considered as opposites. Risky drivers tend to drive at or faster than the maximum speed, while careful drivers often drive below the maximum speed. A second aspect relates to whether drivers are aware of the consequences of their driving behavior or not. For some drivers speeding is unintentional; for others, speeding is an intentional act. Lastly, a specific driving behavior can occur because of internal (personality) or external motivations (goals or distractions). Based on these observations, eight different types of drivers are identified, which may be used for categorization of drivers in future studies.

Afterwards, reasons why drivers may disengage the autopilot were investigated and six reoccurring themes were identified. Based on those, several design opportunities are proposed to counteract the driver's inclination to disengage the automated driving system, including the use of ambient light or additional sounds in the vehicle.

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