

How to Trust and Accept Automation Technology in Cars

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Introduction

In the automotive domain, a lot of energy could be saved by introducing energy-saving automation technologies. However, accepting such technologies would mean that drivers have to give up control over the vehicle to those technologies. This research explores what factors play a role in persuading people to accept (and thereby giving up control to) automation technology. Previous research has shown that trust is important in the acceptance of automation (Lee & Moray, 1992). Furthermore, research on the media equation has shown that people respond socially to computers (Reeves & Nass, 1996). Research on trust in humans has shown that shared goals are important to trust humans (Siegrist, Cvetkovich & Roth, 2000). In this research we explore whether shared goals also lead to trust in automation technology, using different forms of automation. Furthermore, trust in and acceptance of automation technologies could be based on what they automate. Therefore, we explore the effect of automation technology that either only gives information, only takes over action, or takes over action while giving information.

Method

The automation technology we used is Adaptive Cruise Control (ACC). ACC is like regular cruise control, but ACC also takes distance into account and can brake and accelerate by itself. Thus, ACC takes over control of the vehicle. In two experiments, participants (N = 57, mostly students, all had a driver's license) were presented with descriptions of three types of ACCs, one that would only provide information, one that would automate braking and accelerating and would give information, and one that would only automate braking and accelerating without giving information. Depending on

condition, either all three ACCs shared the driving goal of the user or not. For each ACC, we measured trust in and acceptance of those systems with seven-point Likert scales.

Results

Results confirm our expectations that ACCs that share the driving goal of the participant are trusted and accepted more than those who do not share the driving goal of the participant (trust: M = 4.62 vs. 3.91, acceptance: M = 4.62 vs. 3.84). Furthermore, when an ACC takes over braking and accelerating it is trusted and accepted more when it also provides information than when it only automates action without giving information (trust: M = 4.37 vs. 3.85, acceptance: M = 4.24 vs. 3.98). Trust mediates the effect of sharing driving goals on the acceptance of the ACC.

Discussion

This research shows that a similar process leading to trust in humans also leads to trust in automation technology. Furthermore, whenever automation technology that takes over control of the user is needed to change people's behavior, it is important that the technology also gives information.

References

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