Mobility impacts of automated driving and shared mobility – Explorative model and case study

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Authors:

Snelder, M. (TU Delft Transport and Planning; TNO, Den Haag)
Wilmink, Isabel (TNO, Den Haag)
Van der Gun, J.P.T. (TU Delft Transport and Planning)
Bergveld, HJ (Arcadis)
Hoseini, Parvin (Provincie Noord-Holland)
Van Arem, B. (TU Delft Transport and Planning)

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Abstract

This paper presents a model specifically developed to explore the mobility impacts of connected and automated driving and shared mobility. It is an explorative iterative model that uses an elasticity model for destination choice, a multinomial logit model for mode choice and a network fundamental diagram to assess traffic impacts. To the best of the author's knowledge, it is the first model that combines a network fundamental diagram with choice models. A second contribution is the inclusion of automated vehicles, automated (shared) taxis, automated shared vans and new parking concepts in the model as well as the way in which they affect mobility choices and traffic conditions. The insights into the impact mechanisms and the direct and indirect mobility impacts are the third contribution. The short computation time of the model enables exploration of large numbers of scenarios, sensitivity analyses and assessments of the impacts of interventions. The model was applied in a case study of the Dutch Province of North-Holland, in which the potential impacts of automated and shared vehicles and mitigating interventions were explored. In this case study, four extreme scenarios were explored, in which 100% of the vehicles have SAE-level 3-4 or 5 and people have a low or high willingness to share. The extremes were chosen to get insights into maximum effects. The results show that if automated vehicles and sharing are accepted, it is likely that there will be considerable changes in mobility patterns and traffic performance, with both positive and problematic effects.

Tags: mobility, rijden, mobiliteitspatroon, automatisch, impacts, modellen