IEEE Transactions on Intelligent Transportation Systems

Call for Papers

Special Issue on “Deployment of Connected and Automated Vehicles in Mixed Traffic Environment and the Implications on Traffic Safety and Efficiency”

The gradual deployment of connected and automated vehicles in traffic will result in a transition period in which vehicles with various levels of automation and connectivity will have to co-exist with non-connected and non-automated road users for quite some time. As a consequence, new types of interactions will emerge (and old types of interactions are likely to become more complicated) between vehicles at different levels of automation and other road users which could have significant implications on traffic safety and efficiency. Understanding the nature of these interactions, how humans might adapt their behaviour, how connectivity can be utilized to proactively enhance drivers’ driving performance, and how automated vehicles can be programmed to behave in different driving situations to guarantee safety and efficiency remain among the key knowledge gaps that require scientific research. This knowledge is crucial for the development of adequate integration policies of connected and automated vehicles in mixed traffic environment, for updating and improving automated vehicles’ algorithms and software, for designing the road physical and digital infrastructure, and for operating and managing traffic on the road network. This knowledge also forms the first step towards the development of theories and models that describe these interactions which can be translated into mathematical and data driven models that can be implemented in simulation platforms.

Interactions among vehicles at different levels of automation and connectivity, between automated vehicles and human driven vehicles, between automated vehicles and active modes such as pedestrians and cyclists, and between automated vehicles and the infrastructure, are of interest to this special issue.

On the one hand, studying these interactions is challenging as the number of commercial connected and automated vehicles operating on our public road network is still limited. Furthermore, for ethical reasons testing in real life using these vehicles turn out to be challenging. On the other hand, the advancement in sensor, sensing, communication technologies, as well as the advancement of technologies for innovative data collection, such as virtual reality and augmented reality and the increase in computing capabilities provide a unique opportunity to address these knowledge gaps.

This special issue welcomes papers that focus on understanding the interactions between connected and automated vehicles and other road users in urban and sub-urban areas as well as on motorways/highways and the implications on traffic safety and efficiency. To address the above-mentioned knowledge gaps, this special issue is dedicated to the following topics:

- Empirical analysis of the interactions between vehicles at different levels of automation and/or connectivity, human driven vehicles, and active modes as pedestrians and bicyclists;
- Humans’ behavioural adaptation when interacting with automated vehicles;
- Theoretical and mathematical modelling of the interactions in mixed traffic;
• Control transitions and their impact on traffic safety and efficiency;
• Automated vehicles’ driving strategies for optimizing safety and efficiency of mixed traffic;
• Development of new safety indicators and surrogate safety measures for connected and automated vehicles in mixed traffic;
• Microscopic and macroscopic simulation studies considering mixed traffic;
• External human-machine interface of automated vehicles;

We welcome empirical as well as theoretical papers and studies using different research and data collection methodologies, including but not limited to field tests, virtual reality, on-road observations, driving simulators and traffic simulations.

PAPER SUBMISSION GUIDELINES
Paper submission should conform to the information for authors available at https://mc.manuscriptcentral.com/t-its.

IMPORTANT DATES
First submission deadline: October 31, 2021
Notification of first decision: January 2022
First revision submission deadline: March 2022
Notification of final decision: July 2022
Final manuscript (camera ready) submission deadline: August 2022
Issue of Publication: October 2022

SUBMISSION AND REVIEW OF PAPERS
Submitted papers should be original and not be under consideration elsewhere for publication. The authors should follow the journal guidelines, regarding the manuscript content and its format when preparing their manuscripts. All papers will be reviewed by at least three independent reviewers for their suitability in terms of technical novelty, scientific rigor, scope, and relevance to this special issue.

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**Dr. Haneen Farah** is currently an Associate Professor in the Department of Transport and Planning and co-director of the Traffic and Transportation Safety Lab. Her research interests include studying the implications of road infrastructure design on road user behaviour and traffic safety. The main aim of her research is to develop theories and models for road user behaviour and traffic safety taking into consideration the impacts of the road infrastructure and the technological developments and advancements in transportation. In her current research she investigates the implications of the advances in vehicle technology and automation on the road infrastructure design, road user behaviour and traffic safety in the framework of several national and international projects. In her research she combines her expertise in transportation engineering, with her curiosity in the fields of human factors and econometrics to study these connections. Before joining TU Delft she was a postdoctoral researcher at KTH - Royal Institute of Technology, Stockholm, Sweden. She received her M.Sc. and Ph.D. in Transportation Engineering from the Technion- Israel Institute of Technology.

**Dr. Zuduo Zheng** is currently an Associate Professor with the School of Civil Engineering, the University of Queensland, Australia. His research interests include traffic flow modeling, travel behavior and decision making, advanced data analysis techniques, including mathematical modeling, econometrics, numerical optimization in transport engineering, and metaresearch. He was a DECRA Research Fellow supported by the Australian Research Council. He is/was on the Editorial Advisory Board of several transport journals, including Transportation Research Part B, Transportation Research Part C, Journal of Advanced Transportation, etc. He is currently an Associate Editor of IEEE Transactions on Intelligent Transportation Systems.

**Dr. Johan Olstam** is Senior Research Leader in the Traffic analysis and logistics group at the Swedish National Road and Transport Research Insititute (VTI) and Docent and Senior Lecturer at Linköping University. He obtained his PhD in Infra-informatics (2009) at Linköping University with a dissertation on simulation of surrounding vehicles in driving simulators. His research interests include quantitative methods for analysis of traffic and transport systems, traffic modelling and simulation and analysis of Intelligent Transportation Systems. Current research focus on traffic simulation modelling of automated vehicles and how the impact on traffic efficiency is affected by mixes of various types of automated vehicles and human driven vehicles.