Editorial: Special Issue on Vehicular and Pedestrian Traffic Flow from Data to Models Guest Editorial

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DOI
10.1080/23249935.2018.1441921

Publication date
2018

Document Version
Final published version

Published in
Transportmetrica A: Transport Science

Citation (APA)
Knoop, V. L., Daamen, W., Schadschneider, A., & Seyfried, A. (2018). Editorial: Special Issue on Vehicular and Pedestrian Traffic Flow from Data to Models: Guest Editorial. *Transportmetrica A: Transport Science*, *14*(5), 373-374. https://doi.org/10.1080/23249935.2018.1441921

TRANSPORTMETRICA A: TRANSPORT SCIENCE, 2018
VOL. 14, NOS. 5–6, 373–374
https://doi.org/10.1080/23249935.2018.1441921

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GUEST EDITORIAL

Special Issue on Vehicular and Pedestrian Traffic Flow from Data to Models

We are happy to present this special issue of *Transportmetrica A* on "Vehicular and pedestrian flow: from data to models". It bundles eight papers, which describe the ever progressing state-of-the-art in this field. The methods which become available to model and the data collection techniques do change this field rapidly, which makes it possible to more accurately describe traffic flows. We have six papers on pedestrian dynamics and two papers on car traffic dynamics.

The first paper "Microscopic travel-time analysis of bottleneck experiments" by Bukáček, Hrabák and Krbálek discusses the effect of queuing from the lowest level: they report on experiments they did on pedestrians passing a single bottleneck. This is the first step in the process from data to models.

The second paper, by Handel and Borrmann, discusses the next step. Their paper "Service bottlenecks in pedestrian dynamics" compares the bottlenecks both in real-world and in computational models. They conclude that the feedback in the queuing system, increasing efficiency in high-demand situations, is essential.

Where the first two papers are focused on a bottleneck, the next two add a network component. This covers a complexity which is typical for pedestrian models, being route choice, i.e. the planned path in complex spatial structures like cities, airports or museums. The third paper of the special issue is "A unified pedestrian routing model for graph-based wayfinding built on cognitive principles", by Kielar, Biedermann, Kneidl and Borrmann. The paper presents a methodology to describe routing including spatial as well as social-cognitive aspects.

The fourth paper is "A representation of partial spatial knowledge" written by Andresen, Chraibi and Seyfried. Their paper discusses wayfinding for pedestrians given that they only have partial knowledge of the surroundings when planning their path. This might be very relevant in real-world situations.

The fifth paper, "Pedestrian dynamics at transit stations: an integrated pedestrian flow modeling approach" is by Porter, Hamdar and Daamen. In a model, the pedestrian movements are described using an integrated approach, where principles of a social force model are combined behavioral heuristics. The model has been calibrated using empirics of pedestrian movements.

The sixth paper by Tak, Kim and Yeo presents a macroscopic model for pedestrian dynamics. Their paper "Agent-based pedestrian cell transmission model for evacuation" introduces a model which combines microscopic and macroscopic pedestrian flow models. The macroscopic dynamics are combined with microscopic destination and routing choice.

The final two papers discuss vehicular traffic. The seventh paper, written by Tomoeda, Musashino Miyaji and Ikeda, is entitled "Bifurcation structure of a car-following model with nonlinear dependence on the relative velocity" analyses in depth the car-following

behavior. The stability of traffic streams is studied from the point-of-view of car-following properties.

The eighth and last paper is entitled "Incorporating within link dynamics in an agent-based computationally faster and scalable queue model". In this paper, Agarwal, Lämmel and Nagel argue how traffic streams, especially at busy times, can be described as well by holes travelling backwards since most spots are taken by vehicles. This dual vision can lead to more efficient models.

All in all, the eight selected papers give a good overview of the recent advancements in vehicular and pedestrian flow. The eight papers jointly show various steps in the interaction between models and data. The data are used to formulate, calibrate and validate models, whereas the models are used to generate new insights for future situations, which in turn can lead to more safe operations and efficient use of networks.

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