



Transportation Science

Publication details, including instructions for authors and subscription information:
<http://pubsonline.informs.org>

Introduction to the Special Section: TRISTAN IX

Niels Agatz, Adam Pel

To cite this article:

Niels Agatz, Adam Pel (2018) Introduction to the Special Section: TRISTAN IX. *Transportation Science* 52(6):1297-1298. <https://doi.org/10.1287/trsc.2018.0877>

Full terms and conditions of use: <https://pubsonline.informs.org/Publications/Librarians-Portal/PubsOnLine-Terms-and-Conditions>

This article may be used only for the purposes of research, teaching, and/or private study. Commercial use or systematic downloading (by robots or other automatic processes) is prohibited without explicit Publisher approval, unless otherwise noted. For more information, contact permissions@informs.org.

The Publisher does not warrant or guarantee the article's accuracy, completeness, merchantability, fitness for a particular purpose, or non-infringement. Descriptions of, or references to, products or publications, or inclusion of an advertisement in this article, neither constitutes nor implies a guarantee, endorsement, or support of claims made of that product, publication, or service.

Copyright © 2018, INFORMS

Please scroll down for article—it is on subsequent pages



With 12,500 members from nearly 90 countries, INFORMS is the largest international association of operations research (O.R.) and analytics professionals and students. INFORMS provides unique networking and learning opportunities for individual professionals, and organizations of all types and sizes, to better understand and use O.R. and analytics tools and methods to transform strategic visions and achieve better outcomes. For more information on INFORMS, its publications, membership, or meetings visit <http://www.informs.org>

Introduction to the Special Section: TRISTAN IX

Niels Agatz,^a Adam Pel^b

^a Rotterdam School of Management, Erasmus University, Rotterdam, Netherlands; ^b Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, Netherlands

Contact: nagatz@rsm.nl,  <http://orcid.org/0000-0003-3514-201X> (NA); a.j.pel@tudelft.nl,  <http://orcid.org/0000-0003-3754-5779> (AP)

<https://doi.org/10.1287/trsc.2018.0877>

Copyright: © 2018 INFORMS

TRISTAN, the Triennial Symposium on Transportation Analysis, brings together top researchers from academia and industry in all areas of transportation science. The ninth edition of TRISTAN was held at the Aruba Marriott Resort in Oranjestad, Aruba, from June 13 to 17, 2016 and continued the tradition of scientific excellence and friendly networking. The organizing committee consisted of Andreas Hegyi (TUD), Bart van Arem (TUD), Adam Pel (TUD), Niels Agatz (EUR), Luuk Veelenturf (TUE) and Alfredo Nuñez (TUD). The scientific committee accepted 193 papers from the 273 submissions.

Our special section is devoted to publications based on work that was presented at TRISTAN IX. In the call for papers, we sought submissions from participants that presented a paper associated within one of the following two emerging areas of research: (1) Developments in data-driven transportation analysis including data analysis, big data and analytics to analyze traffic flows and transportation demand, new data sources including smart card data, WIFI data, GPS data, WIM data, smart phone data, and social media data; (2) Optimization and analysis of shared transportation systems including ride-sharing, car-sharing, bike-sharing, crowdsourcing transportation, and integrated passenger and freight transportation.

Submissions for the special section were open only to participants of TRISTAN IX. The response was good, with a total of 15 submissions. All contributions were peer reviewed according to the usual, high standards of this journal. With the help of a number of expert reviewers, we accepted five papers for publication. We believe that the selected papers represent excellent and innovative work. Four papers address methodological issues related to using real-world data in predicting and designing traffic and transportation systems, and one paper focuses on the optimization of shared freight and passenger transportation.

In “Anticipatory Dynamic Traffic Sensor Location Problems with Connected Vehicle Technologies,” Hyoshin (John) Park, Ali Haghani, Song Gao, Michael

Knodler, and Siby Samuel focus on proactively reducing network delay by controlling traffic signals based on vehicle data transmitted to roadside sensors. In particular, the paper considers the problem of dynamically relocating portable sensors over time as to minimize the total delay. To tackle this multi-period stochastic problem, the authors present a solution approach based on Lagrangian relaxation and variable neighborhood search. Experiments on various demand profiles and penetration rates of an urban transportation network show the benefits of flexible relocation compared to a stationary setting without sensor relocation.

Next, the paper “Uncertainty Propagation from the Cell Transmission Traffic Flow Model to Emission Predictions: A Data-Driven Approach” by Arwa Sayegh, Richard Connors, and James Tate develops a method to calculate the uncertainty in emission predictions of uncertain traffic data inputs. An ensemble-based optimization approach is used to estimate both calibration and validation errors arising from uncertainty in the structure and parameterization of the discretized macroscopic traffic flow model. The authors propose a Monte Carlo sampling approach to propagate the uncertainty in traffic flow inputs to emission predictions. The effectiveness of the model is demonstrated on various real-world data sets for three motorway road networks.

In the paper, “Network Learning via Multiagent Inverse Transportation Problems,” Susan Jia Xu, Mehdi Nourinejad, Xuebo Lai, and Joseph Chow study the use of inverse optimization methods to capture route-choice behavior in a network. They propose new methods to estimate the parameters of heterogeneous travelers’ route behavior to infer shared network state parameters such as link capacity dual prices. The inferred values are consistent with observations of each agent’s optimization behavior. The paper presents four experiments with gradually increasing complexity that demonstrate the validity of the proposed method on artificial and real-world data.

The paper “A High-Order Hidden Markov Model and Its Applications for Dynamic Car Ownership

Analysis” by Chenfeng Xiong, Di Yang, and Lei Zhang focuses on modeling the factors associated with car ownership behavior over time. Their work extends a first-order dynamic Markov model to a high-order hidden Markov model (HO-HMM) formulation which relaxes the Markovian assumption that the future states (preferences or attitudes) depend only on the current state. Instead, the HO-HMM allows future states to depend on a number of previous states. This paper develops the theoretical formulation of a HO-HMM framework and derives a practical recursive algorithm to estimate the parameters of the model. The proposed methodology is tested on longitudinal vehicle ownership panel data. Long-term life-cycle stage changes in households are used as proxies for the high-order Markov transitions in car ownership hidden states. Results indicate that the HO-HMM has superior explanatory power in fitting longitudinal data.

We close the special section with a paper that focuses on optimization approaches for the integration of freight and passenger transportation. The paper “Integrated Passenger and Freight Train Planning on Shared-Use Corridors” by Evrim Ursavas and Stuart Zhu studies the decision-making problems that railway infrastructure managers face in a rail network with dedicated tracks and shared-use corridors. They analyze the consolidation strategy for shared-use corridors, where the track serves passenger and freight trains. An analytical model is developed to compute the expected long-term profit using a consolidation system for the stochastic demand case. The authors analytically derive the optimal track allocation and consolidation time, together with the optimal prices for different cases. They illustrate their approach on a case study using realistic parameter values of the Dutch railway system.