Belezamo, Baloka; Eken, Süleyman; Avcı, Cafer

Special issue on big data in transportation

Published in:
Expert Systems

DOI:
10.1111/exsy.12931

Published: 01/02/2022

Document Version
Publisher's PDF, also known as Version of record

Please cite the original version:
Belezamo, B., Eken, S., & Avcı, C. (2022). Special issue on big data in transportation. *Expert Systems*, *39*(2), Article e12931. https://doi.org/10.1111/exsy.12931

DOI: 10.1111/exsy.12931

GUEST EDITORIAL

Expert Systems WILEY

Special issue on big data in transportation

Optimization and analysis of transportation systems have become considerably more autonomous and smarter by using connectivity and automation to overcome urbanization problems, such as an ever-growing population, increasing personal travel activities, limited budgets for infrastructure deployments and so on. With this in mind, there is an increasing need for high cooperation both strategically and operationally among different types of transportation modes, each with different objectives and policies. More than ever, Intelligent Transportation Systems (ITS) are playing a significant role in providing efficient integration and cooperation among different technologies and services, and complex and diverse multi-source ITS data have increased massively. Those valuable vast amounts of data can be handled by big data analytics in terms of providing efficient, safe and convenient ITS operations. Through big data–oriented emerging technologies, traffic becomes more intelligent, more manageable and safer.

This special issue focusses on data science, data systems and transportation science and their applications to deliver effective and efficient solutions to the current challenges of handling big data in real-world ITS applications. From 19 submitted articles to this special issue, 4 articles were selected based on their reviews. Each article was reviewed by at least two reviewers and went through at least two rounds of reviews. The contributions of these articles are discussed in brief below.

Claudio Teixeira, Luana Fragoso, Marta Mattoso, Diego Carvalho, Eduardo Bezerra, Jorge Soares, Glauco Amorim and Eduardo Ogasawara, 'A horizontal partitioning-based method for frequent pattern mining in transport timetable'. A public transportation timetable is a document that provides information about public transportation service times to help passengers plan their trip. The timetable will often include the times when a service is scheduled to arrive and depart from specific places. T-mine, a unique frequent pattern mining (FPM) technique for improving knowledge discovery in timetable datasets, is presented in this study to solve the issues of lowering FPM computational cost and redundancy in association rules (AR). Authors show that the T-mine can generate a greater number of distinct, non-redundant and contextualized ARs than the traditional approach without functional dependency.

Zain Ul Abideen, Heli Sun, Zhou Yang and Hamza Fahim, 'Regional based Multi-Module Spatial-Temporal Networks Predicting City-wide Taxi Pickup/Dropoff demand from Origin to Destination'. Accurate forecasting of taxi demand is essential for drivers, riders, ride-hailing businesses and zonal directors. The goal of this work, in the future time interval between all areas estimating taxi demand, is to handle city-wide taxi demand origin–destination (OD) forecasting by Multi-Module Spatial–Temporal Networks (MMSTNs), which is a subject worth studying. Authors do a lot of tests on a real-world dataset called NYCTaxi to show how they can anticipate taxi demand around the city. They also show that their method surpasses prior strategies in terms of accuracy.

Fethullah Gocer and Nazmi Sener, 'Spherical Fuzzy Extension of AHP-ARAS Methods Integrated with Modified k-Means Clustering for Logistics Hub Location Problem'. A hub location problem (HLP) is concerned with where facilities should be located and how demand nodes should be allocated to hubs in order to route goods flow to o-d lowest cost pathways. Using a modified weighted *k*-means clustering algorithm and Multi-Criteria Decision-Making (MCDM) tools under a spherical fuzzy set environment, this work suggests a two-layered methodology to address the logistic HLP. An application of the network structure for postal/cargo operations in Turkey demonstrates the validity of the suggested assessment model.

Iván García-Aguilar, Rafael Marcos Luque-Baena and Ezequiel López-Rubio, 'Improved detection of small objects in road network sequences using CNN and super resolution'. The authors provide a new approach that uses deep convolutional neural networks for super-resolution to identify small-scale visual objects (educed size elements) and enhance the accuracy of class prediction. The results demonstrate that using super-resolution techniques improves the detections made on an image from video surveillance systems.

The guest editors hope that the research contributions and findings in this special issue will benefit the readers in enhancing their knowledge and encouraging them to work on various aspects of Big Data in transportation.

We want to express our sincere thanks to the Editor-in-Chief for and Special Issue Editor of Expert Systems for allowing us to organize this issue. The editorial office staff are excellent, and we thank them for their support. We are also thankful to all the authors who made this special issue possible and to the reviewers for their thoughtful contributions.

Baloka Belezamo[1]
Süleyman Eken[2]
Cafer Avcı[3]

[1]*Transportation Engineering, Arizona State University, Tempe, Arizona, USA*
[2]*Information Systems Engineering, Kocaeli University, Kocaeli, Turkey*
[3]*Transportation Engineering, Aalto University, Espoo, Finland*

Correspondence
Cafer Avcı, Transportation Engineering, Aalto University, Espoo, Finland.
Email: cafer.avci@aalto.fi