Traffic and transportation science consists of a broad range of topics. Traditional mathematical models and analysis techniques are not capable of translating many real-life problems in traffic and transportation engineering. In recent decades, optimization techniques and computational simulation and optimization models have provided solutions to address real world problems. Papers in this special issue represent recent applications of optimization in traffic and transportation science and engineering. Different optimization techniques including using optimization algorithms, heuristic algorithms, iterative methods, and global convergence with their application in traffic and transportation are presented. We hope that this special issue would attract major attention of the peers. 45 papers were submitted to this special issue, 15 of which were accepted for publication. As the guest editors of this special issue, we would like to summarize the 15 accepted papers below.

Two papers of this special issue focus on introducing strategies to minimize energy consumption. One paper focuses on optimizing the domestic flights in Japan to optimize the flight time and the distance between the origins and destinations and minimize fuel consumption and flight time. The other paper presents a framework to optimize driving strategies and minimize energy consumption while driving. The method was developed for the needs of an electric powered racing vehicle which is among the most famous and largest race of energy efficient vehicles.

In this special issue, two papers focus on road network pricing. In one of the published papers, a nonlinear constrained road pricing model is presented that determines tolls on congested highways based on traffic density, traffic flow, and time of day. The road pricing model could be applied to either planned highway concessions with recovery of capital costs or the extension of existing concessions. In the second paper, an empirical analysis is presented to maximize the price of anarchy for congested transportation networks of different sizes and demand levels.

Two papers of this special issue present optimization algorithms to solve vehicle routing problem. One paper presents a two-stage stochastic program to solve vehicle routing problem. The first stage minimizes a routing plan cost whereas in the second stage the average cost in the peak period is minimized. The second paper introduces a bilevel optimization model to optimize the road freight routing problem in Santander, Spain, while minimizing the total transport system costs.

Three papers of this special issue present optimization models to accurately predict the traffic demand and traffic flows. One paper introduces an optimization model that accurately predicts the daily entrance and exit passenger flow of rail transit stations. The other paper presents an innovative approach for large-scale subway networks to predict the station inflow during weekdays and identify capacity bottlenecks by considering the transport capacity of each section. In another paper, a mixed integer programming model has been developed to optimize vehicle scheduling for working service networks.

In this special issue, two papers present optimized solutions for the performance of transport services. One paper solves a highway passenger transport based express parcel service which is an emerging business that uses unutilised room of coach trunk to ship parcels between major cities network. This paper integrates the service decision, frequency, and network flow distribution to solve the problem. Another
paper presents an algorithm to optimize the location of refueling stations for alternative-fuel vehicles. The algorithm maximizes the total covered traffic flow to determine the optimal locations for the refueling station.

One paper of this special issue presents a unique simulation-based methodology to optimize traffic signal timing on corridors that experience high train traffic. Using this methodology, the traffic safety and capacity of traffic corridors are also maximized. One of the papers addresses a big problem in traffic monitoring which is missing traffic data due to detector/communication failure. In that paper, a hybrid method is presented to predict the missing traffic data. Another paper presents a unique optimization technique to optimize and prioritize the maintenance activities of unpaved roads within limited budget.

Acknowledgments

We would like to express our appreciation to all the authors, reviewers, and editorial team for great support to make this special issue possible.

Sara Moridpour
Edward Chin-shin Chung
Taha Rashidi
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