Guest Editorial
Introduction to the Special Section
on Data-Driven IoT for Smart Cities

D EVELOPING smart cities to better support the growing urban population is a global and complex challenge and involves interdisciplinary fields. Instead of the traditional Internet of Contents in human-to-human and human-to-machine communications, the Internet of Things with communications among massive numbers of sensors will dominate the network traffic. Every day, these smart things generate a massive amount of data in the magnitude of ZettaBytes. Due to inherent characteristics of geo-distribution in big data generated by networked sensors deployed for IoT applications, the "smartness" of infrastructure in future cities requires intelligent data sensing and mining for monitoring and actuation to ensure infrastructure reliability and public safety.

With the in-depth investigation and detailed discussion on the challenges and experiences in data-intensive analysis for smart cities, we aim to deepen our understanding of whether and how IoT-assisted architecture may become an important building block for intelligent and sustainable modern cities. Our objective is to develop a unique perspective of data-driven IoT for smart cities presented in the IEEE TRANSACTIONS ON NETWORK SCIENCE AND ENGINEERING.

We appreciate contributions to this special section and the valuable and extensive efforts of the reviewers. The topics of this special section range from data processing, algorithm, security, to frameworks and architectures of the Internet of Things (IoT) for smart cities. A brief review is summarized as follows.

The paper entitled "PassengerFlows: A Correlation-based Passenger Estimator in Automated Public Transport" by Chai *et al.* studies human mobility related to public transportation for smart city applications. The PassengerFlows system exploits multimodal sensing together with the Wi-Fi sniffing technology and uses lightweight algorithms to process sensing data for stop detection, passenger flow tracking, and passenger estimation in an automated train. Chen *et al.* propose a framework, called ProfitMax in the paper entitled "The Framework of Increasing Driver's Income on the Online Taxi Platforms", which runs in an online taxi system. ProfitMax recommends fares, profitable routes as well as orders to drivers in order to optimize the balance of fare and profit.

Gao *et al.* propose a distributed inference framework for urban environment sensing in "Federated Region-Learning for Environment Sensing in Edge Computing System". The framework incorporates federated learning and utilizes regional characteristics for the distribution of training samples to improve the inference accuracy facilitated by micro clouds. The paper entitled "Edge Computing-Empowered Large-scale Traffic Data Recovery Leveraging Low-rank Theory" by Xiang *et al.* proposes GTR, an edge computing-empowered system for large-scale traffic data recovery with the low-rank theory.

The paper entitled "Data-Driven Intrusion Detection for Intelligent Internet of Vehicles: A Deep Convolutional Neural Network-based Method" by Nie *et al.* proposes a data-driven intrusion detection system, for the Internet of Vehicles (IoV), by analyzing link load behaviors of Road Side Units (RSUs) in the IoV against various attacks, where a deep learning architecture based on the convolutional neural network is designed to extract features of the link loads and detect the intrusion aimed at RSUs. The paper entitled "Unsupervised Anomaly Detection in IoT Systems for Smart Cities" by Guo *et al.* investigates unsupervised anomaly detection on multidimensional time series data in IoT systems, which employs Gated Recurrent Unit (GRU) cells to discover the correlations among time series data to characterize multimodal data.

We believe that this special section represents one of the first publication venues focusing on a timely topic, which brings attention from both academia and industry to the advancements in interdisciplinary research in smart cities. In addition, we hope that this special section will impact and contribute to diverse communities in academia and industry interested in data-driven IoT for smart cities.

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