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Mobile Edge Computing for Vehicular Networks

Driven by the new era of the Internet of Things, vehicles are evolving from rudimentary means of travel to innovative network-based modes of transportation that promise efficiency and technological intelligence in modern society. With the aid of advanced communication, computation, and sensory units, smart vehicles offer a variety of new applications and services. However, emerging powerful applications typically require intensive computation while demanding low-delay data processing. Such applications pose critical challenges to the existing vehicular terminals and networks, especially in terms of their computational resources.

Mobile edge computing (MEC), which provides smart vehicles in close proximity with low-latency and low-cost data exchange, is a promising approach to fix the aforementioned problem. However, along with the benefits MEC technology brings to vehicular networks, many new challenges have arisen in edge computing implementation and management. New concepts, architectures, and techniques are urgently required to address these challenges. Through five rigorously reviewed articles, this special issue of *IEEE Vehicular Technology Magazine* (*VTM*) presents the latest results, insights, and perspectives regarding MEC for vehicular networks.

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DRIVEN BY THE NEW ERA OF THE INTERNET OF THINGS, VEHICLES ARE EVOLVING FROM RUDIMENTARY MEANS OF TRAVEL TO INNOVATIVE NETWORK-BASED MODES OF TRANSPORTATION THAT PROMISE EFFICIENCY AND TECHNOLOGICAL INTELLIGENCE IN MODERN SOCIETY.

The first article, "Mobile Edge Computing for the Internet of Vehicles," is by Jingyun Feng, Zhi Liu, Celimuge Wu, and Yusheng Ji. The authors aim to improve edge computation's ability to handle intensive vehicular applications; their article presents new distributed architectures and resource scheduling schemes for MEC networks in which heterogeneous computation resources at different locations are fully exploited. Yanli Qi, Lin Tian, Yiqing Zhou, and Jinhong Yuan propose a comprehensive multilevel computing architecture with a quick response rate and a high vehicle-speed tolerance in their article "Mobile Edge Computing-Assisted Admission Control in Vehicular Networks Frameworks." The article is based on an in-depth investigation of existing architectures of MEC-empowered vehicular network.

In "FiWi-Enhanced Vehicular Edge Computing Networks," Hongzhi Guo, Jie Zhang, and Jiajia Liu seek to fully utilize computation resources in edge and center cloud networks. They introduce a hybrid network architecture and two collaborative task offloading schemes that minimize the overall processing delay of vehicular tasks. In their article, "Mobile Edge Computing-Enabled 5G Vehicular Networks," Zhaolong Ning, Xiaojie Wang, and Jun Huang investigate ways to improve spectrum efficiency and task offloading latency in vehicular MEC networks empowered by nonorthogonal multiple access technology. In the final article, "Deep Learning for Reliable Mobile Edge Analytics in Intelligent Transportation Systems," Aidin Ferdowsi, Ursula Challita, and Walid Saad provide a comprehensive review of deep-learning techniques implemented at the edge of intelligent transportation systems, and they introduce an edge analytics architecture to facilitate the processing of high-volume traffic data.

We would like to thank all of the authors who submitted their research work for this special issue. We are also grateful to all of the reviewers for dedicating their time

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and effort in looking over the articles. Last but not least, we express our deepest thanks to *VTM*'s editor-in-chief, Javier Gozalvez Sempere, for his timely guidance and valuable support. It has been our great pleasure to present the aforementioned articles. We hope that readers will find them enjoyable and inspiring.

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