IEEE Intelligent Transportation Systems Society

IEEE Open Journal of Intelligent Transportation Systems
Editor in Chief (Prof Dr Bart van Arem)
Special Issue on: "5G and beyond technologies for vehicular applications"

Scope

Modern vehicles are equipped with hundreds, even thousands of sensors and can interact with those deployed along the road infrastructure, as provided by other vehicles, pedestrians, road-side nodes. Ensuring high-bandwidth, low-latency and high-reliability vehicle-to-everything (V2X) connectivity will enable vehicles to collect huge amounts of data generated by the myriad of on-board and external sensors. Once collected, such data needs to be properly processed and mined to allow human drivers and self-driving cars to build an accurate view of their surroundings, so to promptly react to unexpected events and cooperatively plan maneuvers for a safer, greener, more efficient and comfortable driving and traveling experience. Nonetheless the well recognized potential of fifth generation (5G) technologies for future vehicular applications, research opportunities still need to be adequately disclosed, especially when considering the soaring demands of automotive applications ultimately leading to cooperative and fully automated driving and the ongoing 5G evolutions towards more disruptive and innovative solutions at different layers of the computing and protocol stacks. This Special Issue encourages the submission of high-quality, innovative and original contributions (both theory and practice) covering advances in the field of 5G and beyond technologies to enable vehicular applications. In addition, it welcomes also survey papers scanning the relevant literature and ongoing research efforts and experimentations.

Contributions for consideration in the Special Issue will include a paper proposed by Prof. Mehrdad Dianati (University of Warwick) and his team titled "Mobility Management for 5G millimetre wave V2X communications: A Survey and Outlook".
Paper abstract. It is envisaged that 5G can enable many vehicular use cases that requires ultra-low latency and high reliability. To support this, 5G is coming with dense, heterogeneous and highly directional mmWave deployment to boost capacity and provide higher data rates and reliability. In such a scenario, however, vehicular communication systems are required to apply strict mobility management proceedings to minimise signalling cost and interruptions during different attachment points. In this study, the authors give an overview of the existed literature and standardization body on handover and beam management process in 5G architecture. Furthermore, they provide a critical appraisal of current research on beam level and cell level mobility management in 5G mmWave networks considering the ultra-reliable and ultra-low latency (URLLC) requirements and dynamics of the vehicular communications. Finally, they also provide an insight into the open challenges and possible evolutions beyond 5G horizons.

The technical areas include but are not limited to:

- Wireless technologies and spectrum for vehicular applications (IEEE 802.11p/bd, Cellular-V2X, 5G NR V2X, THz, Li-Fi, mmWave)
- Novel physical layer and access techniques (e.g., Reconfigurable Intelligent Surfaces, Full-duplex, Non-Orthogonal Multiple Access)
- Network softwarization and programmability (e.g., Software-defined networking, Network Function Virtualization, P4, Network Slicing)
- Vehicular applications (e.g., tele-operated driving, extended horizon, platooning, cooperative sensing and maneuvering, system diagnostics)
- 5G cloud/edge computing to support vehicular applications
- Vehicular cloud/edge computing
- 5G and potential HMI advancements
- Internet of Things technologies and protocols for vehicular applications
- Artificial Intelligence and Machine Learning for vehicular applications
- Localization techniques to support vehicular applications
- Security and Privacy for vehicular applications
- System performance and measurement for vehicular applications

Submission deadline: January 31st, 2021
Accepted papers will be published upon acceptance as early access.
Paper Submission Link: https://mc.manuscriptcentral.com/oj-its (choose manuscript type 5GVEH)

Guest editors:

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Pardis Khayyer *received the MS. in electrical engineering from West Virginia University in 2008, and the Ph.D. in electrical and computer engineering from The Ohio State University in 2013. In 2014 she joined Corporate Research and Technology Center, Cummins Inc., where she did research in the area of automotive controls and diagnostics. Since 2018, Dr. Khayyer has been with Aptiv Corporation where she develops autonomous vehicle control and motion planning algorithms. Dr. Khayyer is an associate editor for IEEE Open Journal of Intelligent Transportation Systems, IEEE Transactions on Intelligent Vehicles and SAE International Journal of Connected and Automated Vehicles.*

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