

# IEEE Transactions on Intelligent Transportation Systems

## Call For Papers

### *Special Issue on Intent-based Networking for 5G-Envisioned Internet of Connected Vehicles*

#### **MOTIVATION AND SCOPE**

With the recent advances in wireless communications, the automotive industry is leading to evolution. To succeed in this emerging era of technology, the Internet of Connected Vehicles (IoCV) has emerged as one of the potential applications of the Internet of Things (IoT). It refers to the dynamic mobile communication systems that communicate between vehicles and public networks to enhance the connectivity between cars via technology. By offering a wide variety of infotainment services, fleet operations, and in-vehicle applications, IoCV has gained the tremendous capacity to provide a safer and sustainable transportation system to the society. According to Gartner Inc., “the connected car is already a reality, and in-vehicle wireless connectivity is expanding rapidly”. As a result, the evolution of cars into the IoT will keep on accelerating the global market which is expected to grow by 270 percent by 2022. Further, the increasing deployment of sensors and ever-evolving cognitive technology open up new opportunities for IoCV. Due to these significant developments, connected vehicles are receiving widespread attention from the major automotive giants such as Tesla, BMW, Waymo (Google), Uber, Volvo, etc. Despite all the opportunities offered by the IoCV, their highly dynamic topology and the increasing number of vehicles pose challenges regarding delivering low-latency vehicle-to-everything (V2X) communications.

The fifth generation (5G) wireless networks emerge as a critical provider to handle the stringent connectivity requirements of IoCV. Moreover, with the development of massive multiple-input-multiple-output (MIMO), non-orthogonal multiple access (NOMA), terahertz (THz) frequencies, millimetre-wave (mmWave), and heterogeneous networks (HetNets), 5G intends to guarantee new capabilities related to connectivity, data rates, transmission delay, throughput and moreover quality of experience (QoE). Thus, integrating 5G cellular systems into IoCV is a promising technology to achieve the goals mentioned above. However, as we are moving towards the 5G communication era, the data generated by connected vehicles is expected to grow exponentially; which in turn brings significant challenges to 5G. Therefore, to promote productivity, improve efficiency, and ensure the efficient handling of continuous growing data, it requires the support of high computing paradigm that can process the data with minimum delays. To accomplish these objectives, a programmable and scalable network paradigm is the need of the hour that can provide a variety of services to 5G-envisioned IoCV in diversified scenarios.

In this direction, software-defined networking (SDN) and network function virtualization (NFV) have gained much attention from the research fraternity. They rely more on network programmability to realize efficient network services. However, this traditional device-to-device management paradigm falls short while dealing with 5G mobile networks as it is characterized by a humongous cycle of connected devices. To overcome these problems, intent-based networking (IBN) has evolved as one of the paradigm shifts which combines automation with intelligence. Typically, IBN is composed of four essential elements namely, translation and validation,

automated implementation, awareness of network state, and assurance and dynamic optimization/remediation; which takes the networking strategy to a higher level. Due to these fundamental elements, IBN holds excellent potential for reliable network support with quick turnaround and scalable services. Additionally, it also facilitates simplified network operations with seamless integration of artificial intelligence and machine learning. This, in turn, provides more opportunities to build more robust and efficient network designs for 5G-envisioned IoCV.

Thus, this special issue intends to offer an opportunity for researchers (both from industry and academia) to present the dedicated efforts on the key theories, innovative schemes, and significant applications for realizing QoS in 5G-envisioned IoCV communication. This special issue mainly focuses on collecting the original contributions related to IBN-IoCV amalgamation in 5G wireless networks, which aims to provide high-performance scalable computing to connected vehicles while advancing the V2X communication infrastructure.

### **LIST OF TOPICS:**

Topics of interest to this special issue include, but are not limited to:

- New opportunities/challenges/ use cases for IBN in 5G enabled IoCV
- Machine learning and optimisation-based algorithms, tools and solutions
- Distributed mobility management and network intelligence
- New architecture and communication protocols
- Innovative applications and services
- MIMO/massive MIMO/millimeter wave technologies
- Big data analytics and Industrial IoT Applications
- Role of cloud, edge and fog computing
- Secure, dependable and trustable cyber-physical systems
- Privacy protection and trust management
- Energy-efficient and green communication solutions
- Reliability, dependability, and fault tolerance support for IBN

### **PAPER SUBMISSION GUIDELINES:**

Paper submission should conform to the information for authors available at <https://mc.manuscriptcentral.com/t-its>.

### **IMPORTANT DATES:**

First submission deadline: March 30, 2020

Notification of first decision: June 30, 2020

First revision submission deadline: August 30, 2020

Notification of final decision: December 30, 2020

Final manuscript (camera ready) submission deadline: January 30, 2021

Issue of Publication: March 30, 2021

**GUEST EDITORS:**

**Dr. Sahil Garg**, École de technologie supérieure, Université du Québec, Montreal, Canada.  
([sahil.garg@ieee.org](mailto:sahil.garg@ieee.org))

**Prof. Mohsen Guizani**, Qatar University, Qatar.  
([mguizani@ieee.org](mailto:mguizani@ieee.org))

**Prof. Ying-Chang Liang**, University of Electronic Science and Technology of China, China.  
([liangyc@ieee.org](mailto:liangyc@ieee.org))

**Prof. Fabrizio Granelli**, University of Trento, Italy.  
([fabrizio.granelli@unitn.it](mailto:fabrizio.granelli@unitn.it))

**Prof. Neeli Prasad**, International Technological University, San Jose, CA, USA.  
([neeli.prasad@ieee.org](mailto:neeli.prasad@ieee.org))

**Dr. Ranga Rao Venkatesha Prasad**, Delft University of Technology, The Netherlands.  
([r.r.venkateshaprasad@tudelft.nl](mailto:r.r.venkateshaprasad@tudelft.nl))