IEEE Transactions on Vehicular Technology Special Issue on
Cybertwin-driven 6G for V2X Applications

A digital twin of an entity is a digital simulation model generated from comprehensive state data of the entity it represents. Digital twin is envisioned to enhance functionalities of future electric and autonomous vehicles. Serving as the digital representation of a vehicle on the application layer, digital twin models the entire lifecycle of processes and services of the vehicle. To provide fundamental support for digital twin from network and transport layers, an agent service —— Cybertwin —— acts as the communication, mobility, and security agent for each user entity (either human or thing) at the edge of the network.

Specifically, Cybertwin, serving as a communication anchor, is the only entrance point of the user for the Internet and records all the user states and behaviors. It can authenticate and authorize the identity of a user entity on the Internet. It is also in charge of the network address mapping, network management and traffic orchestration across a variety of access networks. In addition, Cybertwin can play the role of the security agent through customizing the visibility of recorded data, and helping users to monitor data usage, manage activity data, and make decision on data usage by evaluating the risks of privacy leakage and the benefits, on the condition that data property right belongs to the user. Moreover, Cybertwin can become the personal AI assistant, and interact with not only its serving user but also other Cybertwins.

By enhancing edge intelligence and providing composite edge services, Cybertwin can support advanced vehicle-to-everything (V2X) applications in the future intelligent and secure vehicular 6G network. With the help of Cybertwin, vehicles can seamlessly upgrade the on-board functionalities, e.g., advanced driver assistance, autonomous driving, and energy optimization. The massive amount of data generated by the vehicle can also be fed to Cybertwin. Further, personalized services, such as AI-assisted multi-screen multi-stream rich media interaction, can be realized for the future smart and immersive cockpits.

This special issue seeks for novel and prominent research works on Cybertwin-driven 6G for V2X applications. Contents of the special issue will mainly focus on architecture, methods, and solutions towards Cybertwin-driven 6G for V2X applications. Topics of interest include, but are not limited to:
- Edge intelligence in Cybertwin-driven 6G for V2X applications
- Resource management in Cybertwin-driven 6G for V2X applications
- Heterogeneous access network management and traffic orchestration in Cybertwin-driven 6G for V2X applications
- Personalized service provision in Cybertwin-driven 6G for V2X applications
- Context-aware data transmission in Cybertwin-driven 6G for V2X applications
- Artificial intelligence (AI) in Cybertwin-driven 6G for V2X applications
- Novel RAN design in Cybertwin-driven 6G for V2X applications
- Novel physical layer design in Cybertwin-driven 6G for V2X applications
- Security and privacy in Cybertwin-driven 6G for V2X applications
- Cybertwin-driven 6G communications for autonomous driving
- Cybertwin-driven 6G communications for electric vehicle (EV) applications
- Prototypes for Cybertwin-driven 6G for V2X applications

Submission Guidelines:

Please submit your paper to Manuscript Central at: http://mc.manuscriptcentral.com/tvt-ieee. Author guides are available at: http://www.it.is.tohoku.ac.jp/~tvt/authors/information.html. The submissions must be original and not under consideration in any other venues.

Important Dates:

- Manuscript Submission Due: **Extended to July 31, 2021**
- First Notification Due: September 1, 2021
- Revised Submission Due: October 1, 2021
- Notification of Acceptance: November 1, 2021
- Final Papers Due: November 15, 2021
- Publication Date: January 2022

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