

Lecture by

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Heterogeneous Data Deterministic Transmission for Factory Automation

Abstract:

With the rapid development of information and communication technology, industrial Internet of Things (IoT) integrated with wireless technology has been implemented in factory automation and promoted the integration of IT and OT. However, compared with the wired communication, wireless communication faces various new challenges. Complex and serious electromagnetic interference, dynamic and variable wireless links, and blocking of large mobile equipment lead to the difficulties on real-time, reliable and deterministic transmission in the fields of factory. By taking the full advantage of time-frequency-space multi-dimensional resources to design a cooperative transmission mechanism, it can effectively resist fading, suppress interference, and significantly improve end-to-end information transmission performance. In this talk, we will discuss the distributed dynamic sensing method and the design of deterministic transmission mechanism for heterogeneous data based on field-level industrial IoT. We propose the correlation feature learning mechanism and resource pre-allocation strategy for matching processes to avoid the complex handshake overhead under the traditional dynamic access mechanism, thus reducing access delay and jitter, and improving resource utilization. Time-sensitive network (TSN) gateway devices and testbed are developed to ensure the performance of heterogeneous data transmission. It enables the configuration flexibility and dynamic networking of on-site devices to enhance the field-level sensing and monitoring capability of industrial IoT.

Biography:



Cailian Chen is currently a Distinguished Professor of Shanghai Jiao Tong University, Shanghai, P. R. China. Her research interests include industrial wireless networks and computational intelligence, and Internet of Things. She has authored 4 research monographs and over 100 referred international journal papers. She is the inventor of more than 30 patents. Dr. Chen received the prestigious "IEEE Transactions on Fuzzy Systems Outstanding Paper Award" in 2008, IEEE Technical Committee of Cyber-Physical Systems (TCCPS) Industrial Excellence Award in 2022, and 5 conference best paper awards. She won the Second Prize of National Natural Science Award from the State Council of China in 2018, First Prize of Natural Science Award from The Ministry of Education of China in 2006 and 2016, respectively, and First Prize of Technological Invention of Shanghai Municipal, China in 2017. She was honored "National Outstanding Young Researcher" by NSF of China in 2020 and "Changjiang Young Scholar" in 2015. Prof. Chen has been actively involved in various professional services. She serves as Area Editor of National Science Open, and Associate Editor of IEEE Transactions on Vehicular Technology, and IET Cyber-Physical Systems: Theory and Applications. She also served as TPC Chair of ISAS'19, Symposium TPC Co-chair of IEEE Globecom 2016, Track Co-chair of VTC2016-fall and VTC2020-fall.