

Title:

Indoor radio wave propagation modeling meets machine learning

Brief Abstract:

Modeling radio wave propagation in indoor environments poses unique challenges due to intricate geometries, diverse building materials, and complex multipath interactions. Conventional modeling techniques, relying heavily on empirical, deterministic, or stochastic methods, often struggle to achieve the necessary accuracy and efficiency demanded by advanced wireless systems, such as Wi-Fi 7 and 6G networks. This talk introduces a novel, machine learning-based approach specifically tailored to indoor propagation scenarios. By leveraging extensive datasets alongside advanced machine learning methods, including fully connected neural networks, convolutional neural networks and graph neural networks, the presented framework demonstrates remarkable adaptability, accuracy, and efficiency in modeling indoor propagation characteristics. This presentation underscores how machine learning techniques are set to advance indoor wireless network planning, paving the way toward smarter, more robust, and ultra-high-performance communication networks.

Bio:



Sen Liu (Member, IEEE) received the B.E. degree from the University of Electronic Science and Technology of China, Chengdu, China, in 2015, the M.E. degree from Waseda University, Kitakyushu, Japan, in 2017, and the Ph.D. degree from Tohoku University, Sendai, Japan, in 2020. He was a researcher with the Electromagnetic Compatibility (EMC) Laboratory, National Institute of Information and Communications Technology, Tokyo, Japan from 2020 to 2024. He is currently a senior researcher with Ericsson Research, Gothenburg, Sweden. He is an IEEE AP-S YP Ambassador of 2025 class. His current research interests include antenna arrays, evolutionary computation, radio wave propagation modeling, reconfigurable intelligent surfaces, B5G/6G, and machine learning.

Dr. Liu received Young Encouragement Award from IEICE Technical Committee on Antennas and Propagation in 2021. He was a recipient of URSI Young Scientist Award in GASS 2021 and IEEE AP-S Japan Young Engineer Award in 2021. He was presented with the Young Excellence Award from IEICE Technical Committee on Electromagnetic Compatibility in 2024.