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Turning 6G Air Interface into an AI Computer



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Kaibin Huang received the B.Eng. and M.Eng. degrees from the National University of Singapore and the Ph.D. degree from The University of Texas at Austin. He is a Professor and an Associate Head at the Dept. of EEE, The University of Hong Kong. He received the IEEE Communication Society's 2021 Best Survey Paper, 2019 Best Tutorial Paper, 2019 Asia-Pacific Outstanding Paper, 2015 Asia-Pacific Best Paper Award, and the best paper awards at IEEE GLOBECOM 2006 and IEEE/CIC ICC 2018. He has been named as a Highly Cited Researcher by the Clarivate Analytics in 2019-2022. He is Hong Kong Research Grants Council's Research Fellow and Engineering Panel member. He has served as a symposium/TPC co-chair for international conferences such as IEEE Globecom 2014 and 2017, PIMRC 2017, IEEE CTW 2013 and 2023. Currently, he is an Executive Editor of IEEE Transactions on Wireless Communications, an Area Editor for IEEE Transactions on Green Communications and Networking and also IEEE Transactions on Machine Learning in Communications and Networking. He was a Distinguished Lecturer of the IEEE Communications Society and the IEEE Vehicular Technology Society, and is a Fellow of IEEE.

报告摘要

6G will feature edge intelligence referring to ubiquitous deployment of AI algorithms at the network edge. One key operations is the use of distributed learning algorithms to distill AI from an enormous amount of mobile data distributed at the edge. The other operation is to use the distilled intelligence to automate IoT applications ranging from autonomous driving to virtual reality. Such data-intensive operations create a wireless communication bottleneck. This problem is rooted in the traditional rate-centric philosophy of treating the Air as "bit pipes". Aligned with the 6G paradigm shift towards task-oriented designs, I will introduce a new class of techniques called Over-the-Air Computing (AirComp). Their ambitious goal transcends overcoming the communication bottleneck to aim at turning the 6G Air Interface into an AI computer. In this talk, I will introduce the history and principle of AirComp that exploits channel waveform superposition to realize a desired computing function such as averaging and maximization. Then latest advancements in the field will be introduced including over-the-air federated learning, distributed optimization, and distributed sensing. I will conclude by describing a vision of 6G intelligence network becoming a gigantic computer integrating computing on devices, at servers, and in the air.

邀请人：张文逸 (中国科学技术大学)

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