Ph.D. in Information Technology
Thesis Defense

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Room PT1 and online by Webex

Bibo ZHANG – XXXIV Cycle

RESOURCE MANAGEMENT FOR MILLIMETER-WAVE ACCESS NETWORKS BASED ON ARTIFICIAL INTELLIGENCE

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Abstract:

Millimeter wave (mmWave) communications have been envisioned in the fifth-generation (5G) standardization process as a promising direction, due to their attractive potential to provide a huge capacity extension to traditional sub-6 GHz technologies, thus meeting the demand of huge wireless access data rates. However, such high-frequency communications are susceptible to harsh propagation conditions such as high path losses and blockages that can be only partially alleviated by directional phased-array antennas. This makes mmWave networks coverage-limited, thus requiring the dense deployment of a number of base stations. Integrated Access and Backhaul (IAB) network is a cost-effective solution to the end of network densification.

Resource allocation in mmWave IAB networks is complicated and faces big challenges originated by directional transmissions, device heterogeneity and harsh propagation conditions. In addition, the dynamics, such as the short-lived access links due to user mobility and the random link blockages generated by moving obstacles, require the available resources in IAB networks to be carefully tuned on-the-fly. Thanks to its adaptability, Artificial Intelligence (AI) techniques especially Reinforcement Learning (RL) can be adopted to implicitly capture the network variations and learn to manage the real-time operations in such dynamic networks. In this work, we aim to take advantage of AI tools to address the problem of flow allocation and link scheduling to maximize the user throughput in dynamic mmWave IAB networks.

PhD Committee
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