Two-hop Packet Scheduling, Resource Allocation and UAV Trajectory Design for Internet of Remote Things in Air-Ground Integrated Network

Speaker: Shichao Li, Singapore University of Technology and Design
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Abstract:
Compared with terrestrial network, the air-ground integrated network consisting of unmanned aerial vehicles (UAVs) and high altitude platforms (HAPs) offers the advantages of large coverage, high capacity, and seamless connection, which can provide effective communication services for the Internet of remote things (IoRT). In this paper, we investigate a joint packet scheduling, resource allocation and UAV trajectory design problem, with the objective of minimizing the average packet queue delay from HAP to IoRT devices in the air-ground integrated network. Because the problem is non-convex, we first reformulate it into a Markov decision process (MDP). And then, considering there are continuous and discrete hybrid action spaces in the MDP, we utilize the deep reinforcement learning (DRL) approach to design a hybrid multi-agent deep deterministic policy gradient-adaptive prioritized experience replay (MADDPG-APER) algorithm. Simulation results show that the proposed algorithm can reduce the average packet queue delay compared with other benchmark algorithms.

Biography:
Shichao Li received the Ph.D. degree in communication and information systems from Beijing Jiaotong University, Beijing, China, in 2019. He is currently an Associate Professor with the School of Information and Communication, Guilin University of Electronic Technology, Guilin, China. From October 2022 to October 2024, he is also a Postdoctoral Research Fellow with the Singapore University of Technology and Design, Singapore. His research interests include mobile edge computing, vehicular networks, air-ground integrated network, high-mobility broadband wireless communications, wireless resource allocation, and cloud radio access networks.