Radio Resource Allocation in the Beyond 5G Era: Promises of Deep Learning and Deep Reinforcement Learning

Abstract:
Optimal resource allocation is a fundamental challenge for dense and heterogeneous wireless networks with massive wireless connections. Because of the non-convex nature of the optimization problems, often it is computationally demanding to obtain the optimal resource allocation. Machine learning, especially Deep learning (DL), is a powerful tool where a multi-layer neural network can be trained to model a resource management algorithm using network data. Therefore, resource allocation decisions can be obtained without intensive online computations which would be required otherwise for the solution of resource allocation problems. Recently, deep reinforcement learning (DRL) has emerged as a promising technique in solving non-convex optimization problems. Unlike deep learning (DL), DRL does not require any optimal/near-optimal training dataset which is either unavailable or computationally expensive in generating synthetic data. In this talk, I shall present a novel centralized DRL-based downlink power allocation scheme for a multi-cell system intending to maximize the total network throughput. Specifically, I shall discuss a deep Q-learning (DQL) approach to achieve near-optimal power allocation policy. I shall present some simulation results to compare the proposed DRL-based power allocation scheme with the conventional schemes in a multi-cell scenario.

Venue:
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Time and Date:
2:00 PM – 4:00 PM, Thu – 15th July 2019

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Light refreshments provided, No admittance fee,
Public welcome