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Energy Efficient joint user association and power allocation using Parameterized Deep DQN
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Abstract
Using small cells to create an ultra-dense network for 5G and beyond is a promising strategy to improve network coverage, data demands and reduce latency. Despite using small cells, these dense wireless networks result in performance degradation and increased energy consumption. Energy consumption is a crucial parameter for sustainable future wireless networks. In order to improve quality of service (QoS) and Energy Efficiency (EE), efficient resource allocation strategies are required. This paper investigates a Parameterized Double Deep Q-Network (PDDQN) based framework for joint user association and power allocation to improve EE and throughput. Apart from other conventional machine learning approaches, considering single state space of the joint optimization problem, our proposed framework considers both discrete and continuous state spaces. Our proposed PDDQN technique also solves the generalization problem that occurs due to similar states. The simulation results indicate that the proposed work significantly improves energy EE and throughput in large-scale learning problems. © 2023 IEEE.

Author Keywords
5G; deep Q-network; energy efficiency; HetNets; machine learning; power allocation; ultra-dense network; user association

Index Keywords
5G mobile communication systems, Deep learning, Energy utilization, Learning systems, Quality of service, Wireless networks; 5g, Deep Q-network, Dense network, Hetnets, Machine-learning, Parameterized, Power allocations, Small cells, Ultra-dense network, User associations; Energy efficiency

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