AI for Wireless Network Optimization: Challenges and Opportunities

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Abstract

Nowadays, Artificial Intelligence (AI) and Machine Learning (ML) are gaining increased attention. The huge amount of information coupled with a plethora of multimedia applications have posed a great challenge to scientists and engineers to handle the big data and manage various resources. All of this prompted researchers to think of innovative ways to make best use of AI and its tools to address existing and emerging problems in the field of data science and data networks. This had an impact on developing the concept of self-organized networks and systems.

This chapter discusses a state-of-art of AI concepts and tools applied to wireless networking. We firstly introduce the AI concepts. We review self-organizing and cognitive networks. Then, we introduce the ML approach. We discuss how AI and ML would contribute to the management of wireless networks as well as the optimization of their operation. To help researchers gain a focused knowledge on the role of AI concepts in facilitating solutions to various problems in wireless networks, we discuss different areas and challenges where AI and ML have been used effectively to overcome those challenges.

Keywords: Artificial Intelligence, Machine Learning, Wireless Networks, Cognitive Networks.