

# **The Role of Artificial Intelligence in 6G Wireless Networks**

## **A Pathway to Intelligent Connectivity**

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### **9.1 INTRODUCTION**

The evolution of wireless communication has been pivotal in transforming modern society. Wireless technologies have evolved through multiple generations, each introducing advancements that redefine connectivity, efficiency, and communication paradigms. From the early 1G networks, which supported only voice communication, to 5G networks that offer high-speed internet, ultra-reliable low-latency communication, and massive machine-type communications, the demand for higher performance, efficiency, and intelligence continues to grow [1].

While 5G networks have significantly enhanced connectivity, data rates, and latency, the exponential growth of connected devices and emerging applications necessitate a paradigm shift toward the sixth generation (6G) [2]. The ever-increasing data demands, proliferation of the Internet of Things (IoT), expansion of smart cities, and rise of immersive applications such as augmented reality (AR) and virtual reality (VR) highlight the need