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Next-Gen Wireless: Enhancing WiFi 7 Performance Using AI and MIMO Technology

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Abstract: *WiFi 7, defined by the IEEE 802.11be standard, represents a major leap in wireless networking by offering ultra-high throughput, reduced latency, and enhanced reliability. This study presents a comprehensive evaluation of WiFi 7 performance with the integration of Artificial Intelligence (AI) and Multiple-Input Multiple-Output (MIMO) techniques. AI is employed for intelligent channel prediction, adaptive resource allocation, and dynamic beamforming, while advanced MIMO configurations (8×8 and 16×16) are implemented to maximize spatial efficiency. Comparative simulations reveal that the combination of AI and MIMO boosts average throughput up to 32.7 Gbps, reduces latency to 5.4 ms, and lowers packet loss to below 1%. Additionally, energy efficiency improves significantly, reaching 3.4 × 10^6 bits/Joule. These findings highlight the transformative potential of AI-augmented WiFi 7 systems for next-generation wireless applications in high-demand environments.*

Keywords: WiFi 7, AI, MIMO, IEEE 802.11be, Wireless Communication, Throughput Optimization, Beamforming.

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