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AI-Based Interference Mitigation for Dense Wireless Networks

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Abstract: *The large-scale deployment of 5G, Wi-Fi 6/7, and dense wireless networks has increased interference, which restricts throughput, reliability, and the quality of service. Conventional mitigation techniques, such as fixed power control, frequency*
reuse, and deterministic scheduling, are not dynamic and heterogeneous enough to apply to modern networks. The proposed Hybrid AI Model includes the combination of deep neural networks (DNNs) to predict interference and proximal policy optimization (PPO)-based deep reinforcement learning (DRL) to optimize in real-time. Training and validation of the system is performed with extensive simulation datasets representing mobility, traffic variability and multi-channel interference. The findings show that the Hybrid AI algorithm achieves high SINR, throughput, packet delivery ratio, and latency than the traditional, ML-based, and DL- based algorithms. The results demonstrate how AI can be used to support autonomous, high- efficiency interference control in next-generation wireless technology, such as 6G and dense IoT networks.

Keywords: Interference Mitigation Deep Learning Reinforcement Learning Wireless Networks 6G PPO Dense IoT

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