

AI in the antenna design life cycle: An AI-assisted systematic review

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The increasing integration of Artificial Intelligence (AI) in antenna design presents opportunities for optimizing the design process. This paper presents a comprehensive AI-assisted systematic review of the use of AI in the antenna design life cycle. A Systematic Mapping Study (SMS) is first employed to map the landscape of AI applications in antenna design, identifying key research areas, trends, and gaps. The SMS categorizes studies into three primary domains: AI for Optimization, AI for Synthesis, and AI for Performance Prediction. In the second phase, a Systematic Literature Review (SLR) is conducted to critically evaluate and synthesize empirical findings from the selected studies. The SLR examines the various AI techniques used in each step of the lifecycle. The results from both methods provide a comprehensive overview of AI's current applications in the field, highlighting key challenges and opportunities for future research. This hybrid approach, combining AI-assisted SMS and SLR, offers both a broad mapping of AI applications and a deep, critical analysis of their real-world effectiveness, making it a valuable contribution to the field of AI-enhanced antenna design and AI-assisted systematic reviews.