IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 1, July 2023

Exploring the Potential of AI and Machine Learning in Predictive Maintenance of Electrical Systems

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Abstract: *This study explores the transformative potential of AI and machine learning in predictive maintenance for electrical systems. By harnessing historical maintenance records and real-time sensor data, AI algorithms exhibit substantial predictive capabilities, anticipating equipment failures before they occur. Comparative analysis reveals a paradigm shift from traditional maintenance approaches. Unlike reactive and preventive methods, AI-driven strategies enable dynamic resource allocation and proactive prediction, mitigating downtime and enhancing equipment lifespan. Challenges emphasize data quality and interpretability. Results interpreted in the context of system optimization highlight AI's potential to enhance reliability and resource allocation. Real-world benefits encompass reduced downtime, operational efficiency, and adaptability. This study underscores AI's role in reshaping maintenance practices across industries, prompting continued research and development in this transformative domain*

Keywords: Electrical Systems, Predictive Maintenance, AI, Machine Learning

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