AI-Driven Predictive Maintenance for Industrial Systems

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Abstract. This research investigates the application of artificial intelligence in predictive maintenance for industrial machinery. By utilizing advanced analytics and machine learning models, the study aims to predict equipment failures before they occur, thereby reducing downtime and maintenance costs. The integration of AI-driven solutions provides a competitive edge by ensuring continuous production and enhancing operational efficiency. This paper presents case studies from various industries demonstrating the effectiveness of these predictive models. The findings reveal a significant improvement in maintenance practices and resource allocation, leading to enhanced productivity.

Keywords: predictive, maintenance, industrial, ai, efficiency

Introduction: In today's competitive industrial landscape, minimizing downtime and optimizing maintenance schedules are critical for achieving operational efficiency and cost-effectiveness. Traditional maintenance approaches, often reactive, can lead to unexpected equipment failures and increased operational costs. This paper explores the use of artificial intelligence and machine learning techniques in predictive maintenance, aiming to forecast failures and schedule timely interventions. By analyzing historical and real-time data, AI-driven predictive maintenance systems can identify patterns and anomalies that precede equipment failure. The case studies included illustrate substantial improvements in machinery uptime and resource management across different sectors.

References

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