

## **ENHANCING PREDICTIVE MAINTENANCE THROUGH IOT BASED DATA PIPELINES**

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### **ABSTRACT**

*In the realm of industrial operations, predictive maintenance has emerged as a critical strategy for minimizing downtime and optimizing equipment performance. This study explores the enhancement of predictive maintenance practices through the integration of Internet of Things (IoT) technologies and data pipelines. IoT devices facilitate real-time monitoring of equipment conditions, collecting vast amounts of data that can be processed and analyzed to forecast failures and schedule maintenance proactively. By implementing robust data pipelines, organizations can ensure that the collected data is effectively managed, enabling timely insights that lead to improved decision-making and resource allocation. The research outlines various architectures and frameworks for IoT-based data pipelines, highlighting the role of advanced analytics and machine learning algorithms in deriving actionable insights from sensor data. This study not only addresses the technical aspects of integrating IoT with predictive maintenance but also examines the associated benefits, such as cost reduction, increased operational efficiency, and enhanced equipment lifespan. Ultimately, the findings underscore the transformative potential of IoT-driven predictive maintenance in fostering a proactive maintenance culture, paving the way for more resilient industrial systems.*

**KEYWORDS:** *Predictive Maintenance, IoT, Data Pipelines, Industrial Operations, Real-time Monitoring, Machine Learning, Operational Efficiency*

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