What is predictive maintenance?

Predictive maintenance leverages data, analytics, and AI to forecast equipment needs, reducing downtime and costs while extending equipment life. It ensures smooth operations, efficiency, and minimises waste, energy use, and environmental impact in industrial settings.

Predictive maintenance in action

#1. Public transport

AI-driven predictive maintenance in the public transport sector reduces bus breakdowns, which improves reliability and passenger satisfaction.

#2. Building management

In building management, IoT sensors and AI analytics are used for remote monitoring to reduce equipment breakdowns and initiate maintenance call-outs.

Benefits of predictive maintenance

Reduced downtime

Unplanned downtime costs industrial manufacturers $50 billion yearly.[1] Predictive maintenance helps identify issues early, ensuring continuous operations.

Cost savings

Global manufacturers could save $240-$630 billion from predictive maintenance by 2025.[2]

Increased efficiency

Implementing predictive maintenance can increase equipment uptime by 10 - 20%.[3]

Enhanced safety

Research reveals equipment failure causes 80% of mining sector deaths.[4] Address potential hazards proactively to create a safer work environment.

Reduced energy costs

Predictive maintenance can reduce energy use and costs by optimising equipment performance and maintenance schedules.[5]

How AI makes predictive maintenance possible

Data collection

Ultrasonic sensors in the oil and gas industry detect corrosion, cracks, or leaks in pipelines.[6] Advanced AI algorithms analyse this data for early issue detection, enabling timely and proactive repairs.

Pattern recognition

AI algorithms detect patterns and anomalies in datasets. Companies like Rolls-Royce use AI to monitor real-time engine performance, identifying signs of wear or potential failure.[7]

Predictive learning

KONUX, a Munich IoT startup, creates smart railway switches that monitor key components' health autonomously.[8] Using AI and sensor data, they help operators predict failures and improve prediction accuracy.

The tech behind it all

5G and multi-access edge computing (MEC)

Transforms AI-driven predictive maintenance by processing data at the edge and transmitting it in real time to end devices for critical responses.

Internet of Things (IoT)

Collects real-time equipment data from sensors and devices to help AI predict and prevent failures.

Artificial Intelligence (AI)

Predicts equipment failures and detects anomalies, allowing for proactive maintenance.

Machine Learning (ML)

Enhances prediction accuracy, optimises maintenance schedules, and boosts system reliability by learning from new data.

Learn how Singtel's advanced technologies can support your sustainability strategy.

Get in touch

References:

1. Deloitte, 2023, Predictive Maintenance Position Paper
2. McKinsey & Company, 2023, Unlocking the Potential of the Internet of Things: Executive Summary
3. Deloitte, 2023, Predictive Maintenance Position Paper
4. Shell, 2023, The Benefits of Predictive Maintenance
5. Siemens Blog, 2023, Predictive Maintenance in the Food and Beverage Industry: A World of Opportunities
6. Datategy, 2023, AI Predictive Maintenance in the Oil & Gas Industry
7. Qoco Systems, 2023, AI in Aviation Maintenance: How It's Changing the Industry
8. Deutsche Bahn, 2023, DB Startups: Weichen