Condition-based Maintenance (CBM)

Overview

Condition-based Maintenance (CBM) or predictive maintenance is the science of maintaining physical assets over time, in order to maximize their return on those assets. It is enabled by sensors and data analytics that provide visibility into the current and future status of assets.

Applicable Industries

- Aerospace
- Agriculture, Forestry & Fishing
- Automotive
- Chemicals
- Electronics & Embedded Devices
- Construction
- Consumer Goods
- Food & Beverage

- Furniture & Home Appliances
- Healthcare Services
- Heavy Vehicle
- Equipment & Machinery
- Medical Devices & Equipment
- Mining
- Paper & Pulp
- Pharmaceuticals
- Plastics & Rubber
- Rail & Metro
- Renewable Energy
- Shipping
- Smart Grid
- Telecommunications

Applicable Functions

- Facility Maintenance
- Maintenance
- Production - Manufacturing
- Quality Assurance

Market Size

Estimate A

The global market for maintenance analytics is projected to grow from USD 9.1 billion in 2014 to USD 24.7 billion in 2019.

Source: ABI Research

Estimate B

Another source predicts the global predictive maintenance market from grow from USD 2.7 billion in 2015 to USD 9.2 billion in 2020.

Source: Markets and Markets

User Viewpoint

Business Value

How does this use case impact an organization's performance?

The value in leveraging IoT to improve CBM capabilities includes lower maintenance costs, lower asset lifecycle cost, greater asset availability, reliability, performance, and quality of output.

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Key Performance Indicators

How is the success of the system measured for users and for the business?

Downtime, maintenance cost.

System Capabilities & Requirements

What are the typical capabilities in this use case?

Enables maintenance when the need for it arises. One or more indicators show that there might be potential equipment failures coming up, which allows intervening before that happens.

Performance Requirements: Fully based on collected data from multiple sources, like sensors. Requires a database to retrieve information from.

Deployment Environment

Where is the 'edge' of the solution deployed?

Any machine required to run as uninterrupted as possible.

Technology Viewpoint

Sensors

What sensors are typically used to provide data into the IoT system, and which factors define their deployment?

Sensors as core of the CBM solution delivering the data required. Measuring all kinds of relevant condition data like temperature, humidity, vibrations, pressure, light, voltage, current, field strength or other variables.

Analytics

What types of analysis are typically used to transform data into actionable information?

Analytics are performed to see any deviation from the ideal and predetermined values.

Cybersecurity

What factors define the trustworthiness of the solution?

For some cases there might be many devices spread out across a big area to cover a complete production site etc., which requires high effort to be able to control and secure the devices constantly.

Cloud & Edge Platforms

What factors define the cloud and edge platforms used to integrate the solution?

Real-time edge analytics are essential to system performance. Cloud storage enables accumulation of historical data.

Connectivity

What factors define the connectivity solutions used to provide both device-to-device and device-to-cloud communication?

High latency and security requirements.

User Interface

What factors define the interfaces available to the system users?

Multiple users with different competency levels must receive different alerts.

Data Viewpoint

Data Sources

How is data obtained by the system?

IoT devices, most importantly sensors, gather relevant data about the current condition of the equipment and transfer it for real-time analytics and storage to

edge and cloud solutions.

Data Types

What data points are typically collected by the system?

Condition related data, like temperature, pressure, voltage, light, humidity, vibrations, etc.

IoT ONE Use Case

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