HARNESSING SMART FACTORY DATA FOR MAXIMUM VALUE AND REDUCED RISK

Increase shop floor efficiency by identifying hidden anomalies and delivering insights for next-level monitoring and maintenance of manufacturing assets. Explore how Altair enables enterprises to leverage operational data throughout the complete data lifecycle - from shop floor to top floor - for increased value and reduced risk with a comprehensive self-service data analytics and machine learning platform.

Improve Manufacturing Systems with Predictive Maintenance Analytics and Machine Learning
The cost of downtime, scheduled or unscheduled, in manufacturing environments can be extremely costly to the business, often to the tune of millions of dollars annually. Unexpected downtime can significantly impact tangible and intangible operating costs. To mitigate risk associated with downtime, manufacturing operations often develop equipment maintenance calendars, servicing equipment regardless of whether it is needed, leading to higher than necessary overhead expenses.

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> Unplanned downtime costs industrial manufacturers an estimated $50 billion annually. Equipment failure is the cause of 42% of this unplanned downtime. Unplanned outages result in excessive maintenance, repair and equipment replacement.
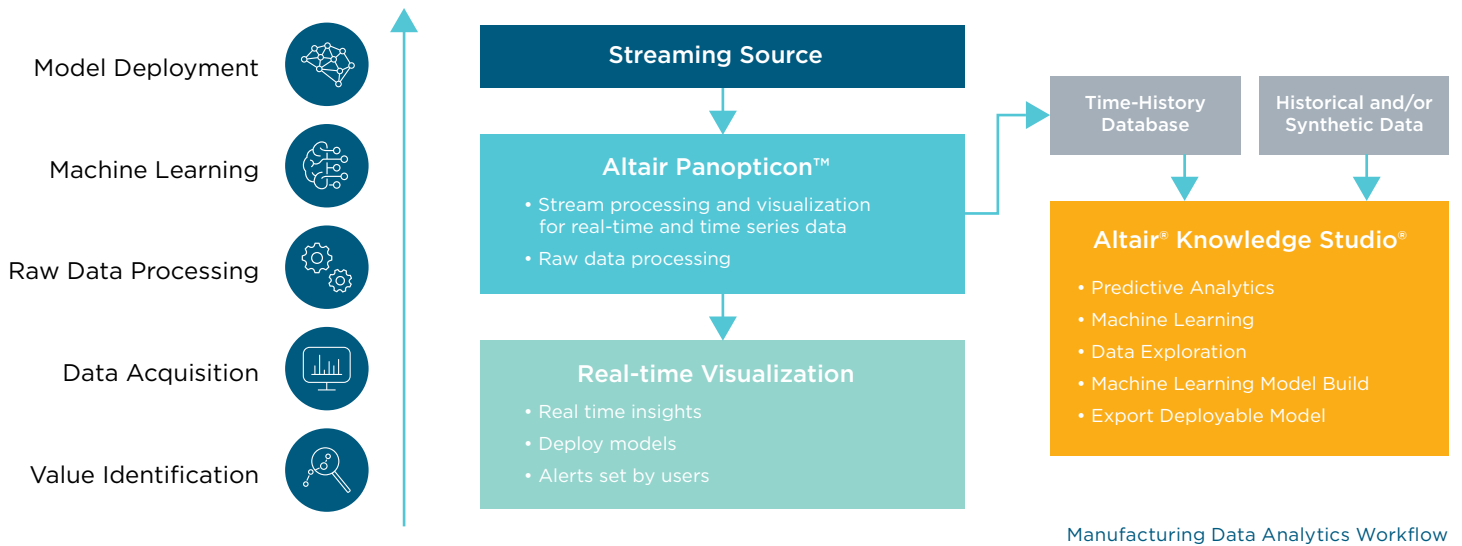>
> The Wall Street Journal

Real-Time Insights - The implementation of smart manufacturing combined with the power of Industrial IoT have enabled organizations to collect real-time data about how their equipment is operating and avoid unnecessary maintenance. This data contains hidden indicators of future equipment failure. Using predictive analytics manufacturers can extract these hidden insights so they can choose to do maintenance when the risk becomes high. The result is avoidance of costly or dangerous unplanned downtime and more efficient scheduling of repair and maintenance personnel and resources.

Predictive Analytics and Machine Learning - Altair's data analytics platform helps manufacturers perform preventative or corrective actions using insight found by analyzing data generated directly from their equipment. Machine learning can immediately show benefits, whether with existing assets equipped with sensors or new wireless sensors without historical data. The system can trigger insights based on anomaly detection and it can classify different types of faults.

Data science teams can deliver optimized maintenance routines that will minimize unexpected downtime and add efficiencies to regular operations - all completed without manually creating sophisticated algorithms from scratch or a need for experience in advanced analytics programming. Being precise in the identification of risks and failures on equipment assets enhances the ability to be responsive to the unique characteristics of each piece of equipment.
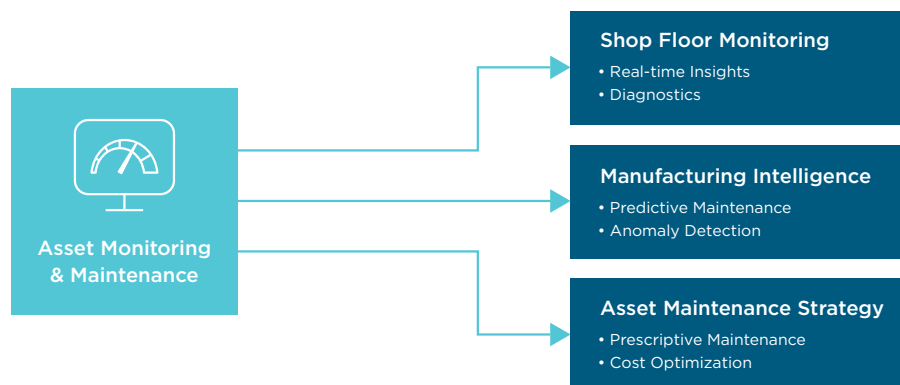
As a result, each machine receives the right maintenance when needed enabling it to operate in the best condition for the longest period possible. Overtime analytics provide the remaining useful life (RUL) of a machine, enabling optimal use and planning for future capital needs.

| Model Deployment | | Streaming Source | | Time-History Database | Historical and/or Synthetic Data |

Model Deployment

Machine Learning

Raw Data Processing

Data Acquisition

Value Identification

Streaming Source

Altair Panopticon™
- Stream processing and visualization for real-time and time series data
- Raw data processing

Real-time Visualization
- Real time insights
- Deploy models
- Alerts set by users

Time-History Database

Historical and/or Synthetic Data

Altair® Knowledge Studio®
- Predictive Analytics
- Machine Learning
- Data Exploration
- Machine Learning Model Build
- Export Deployable Model

Manufacturing Data Analytics Workflow

Asset Monitoring & Maintenance

According to McKinsey, the use of predictive maintenance can reduce machine downtime by 30-50% and increase machine life by 20-40%. Leveraging insights derived from an open, flexible platform that allows analytics teams to use their preferred algorithms, manufacturers can:

- Mitigate expensive costs related to unplanned outages

- Reduce Operating Costs and avoid unnecessary planned downtime

- Benefit from early fault detection and equipment diagnosis

- Detect warning signs of expensive failures before they occur and predict when failures are likely to happen

- Classify whether failure will occur over a given time period, whether failure will occur over several time periods, or whether a failure will be of a certain type

Asset Monitoring & Maintenance

Shop Floor Monitoring
- Real-time Insights
- Diagnostics

Manufacturing Intelligence
- Predictive Maintenance
- Anomaly Detection

Asset Maintenance Strategy
- Prescriptive Maintenance
- Cost Optimization

Enabling Data-Driven Operations

The simplicity of the Altair's predictive analytics solution enables people of different skill sets to easily build analytical applications, or augment analytics into existing applications to use smart data for insightful, informed decisions making. Manufacturers can architect a complete end-to-end analytic process pipeline that supports a data-driven enterprise operation leveraging:

- Best in class real-time stream processing analytics engine and visualization

- High-performance no code visual environment generates insight quicker, reducing months to weeks and weeks to hours

- Vendor-agnostic platform enables seamless data transformation and factory process integration

To learn more, please visit **altair.com/data-analytics**

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