SOLUTIONS FLYER

UNLOCKING SMART FACTORY POTENTIAL WITH PREDICTIVE INSIGHTS AND AI-DRIVEN EFFICIENCY

Increase shop floor efficiency by identifying hidden anomalies and delivering insights for proactive, insight-driven monitoring and maintenance. Explore how Altair enables enterprises to leverage operational data throughout the complete data lifecycle – from shop floor to top floor – to increase value and reduce risk with a comprehensive self-service data analytics and machine learning platform.

Improve Manufacturing Systems with Predictive Maintenance Analytics and Machine Learning

In manufacturing environments, the cost of scheduled or unscheduled downtime can be extremely costly to the business, often to the tune of millions of dollars annually. Unplanned downtime leads to direct costs like lost production time, replacement parts, and on-call engineers, as well as indirect costs including production delays, lost business, and reputational damage. One approach to combat this is traditional time-based maintenance schedules; however, these can result in unnecessary servicing, contributing to higher overhead. Forward-thinking manufacturers are now transitioning to condition-based maintenance strategies driven by real-time insights.

Real-Time Insights – The implementation of smart manufacturing combined with the power of industrial IoT has enabled organizations to collect real-time data about how their equipment is operating and avoid unnecessary maintenance. Real-time equipment data often holds early indicators of failure. Predictive analytics unlock these insights, enabling preemptive maintenance only when the risk is high. The result is avoidance of costly or dangerous unplanned downtime and more efficient scheduling of repair and maintenance personnel and resources. In some cases, AI agents can assist by automatically relaying key signals or flagging conditions that warrant immediate review or intervention.

Incorporating edge computing enables real-time analytics close to the source, reducing latency and improving response times. Combined with federated learning, manufacturers can train machine learning models locally on edge devices without transferring sensitive data to the cloud, thereby ensuring data privacy and achieving faster insights.

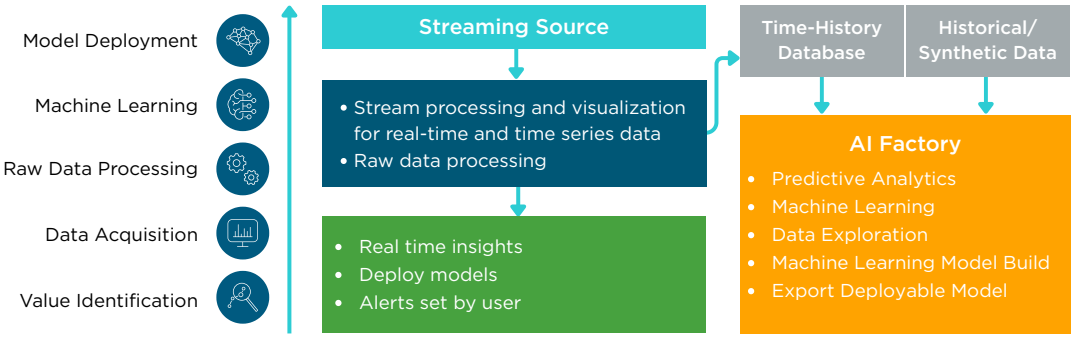
Predictive Analytics and Machine Learning – Altair® RapidMiner® helps manufacturers perform preventative or corrective actions using insights found by analyzing data generated directly from their equipment. Machine learning can immediately show benefits, whether with existing assets equipped with sensors or new wireless sensors without historical data. The system can trigger insights based on anomaly detection and classify different types of faults. AI agents can be configured to act on these insights by pushing alerts to relevant teams or initiating standard procedures in maintenance systems.

Integrate AI-powered digital twins to enhance predictive maintenance by simulating equipment behavior in real-time. These virtual replicas continuously monitor performance, test scenarios, and proactively intervene before physical systems experience issues.

Deploy autonomous maintenance systems that diagnose faults and initiate repair sequences automatically, minimizing human intervention and reducing downtime while upholding safety and performance.

Data science teams can deliver optimized maintenance routines that minimize unexpected downtime and add efficiencies to regular operations; all without the need for custom coding or advanced data science expertise. Being precise in identifying risks and failures on equipment assets enhances the ability to be responsive to the unique characteristics of each piece of equipment.

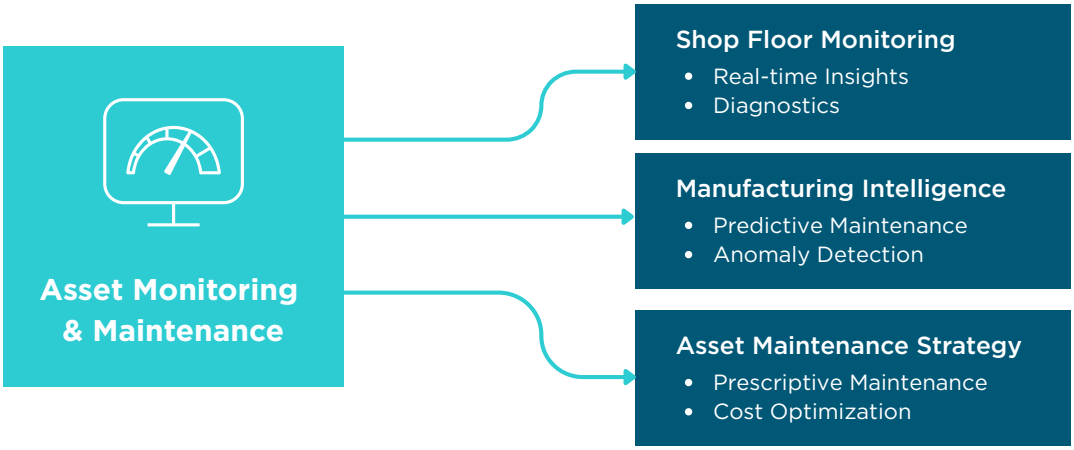
As a result, each machine receives the right maintenance when needed, enabling it to operate in the best condition for the longest period possible. Over time, analytics provide the remaining useful life (RUL) of a machine, enabling optimal use and planning for future capital needs.



Asset Monitoring and Maintenance

According to McKinsey, predictive maintenance powered by IoT and advanced analytics can reduce machine downtime by up to 50% and extend machine life by 20–40%. By using an open, flexible platform that supports their preferred analytics tools, 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 period of time, whether failure will occur over several time periods, or whether a failure will be of a certain type
- Use smart data analytics to optimize energy consumption, reduce carbon footprint, and meet sustainability goals — all while improving equipment lifecycle management



Enabling Data-Driven Operations

The simplicity of 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 decision-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
- Optional AI agents embedded within workflows supports routine monitoring, task routing, or anomaly response across systems

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