

Generate Value from Plant Floor Data with AI and the Digital Twin

Q&A eBook with Sight Machine



Sight Machine
Digital Manufacturing Platform

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Why is there a data variety problem in the manufacturing industry?

The modern factory – to say nothing of the modern supply chain – is a balkanized, chaotic technology environment, often with thousands of assets and data sources. As a result, manufacturing presents unique problems of data variety.

Data has immense practical value to manufacturers, but only if it is useful. At the most basic level, manufacturers need to be able to take raw data from thousands of sources; transform that data into operationally useful units of information about machine cycles, process behavior, and part attributes; and analyze complex relationships between all of these parameters.

However, data is not generated in discrete packages like machine cycles or part birth certificates. Instead, at any given point in a plant's process, there are hundreds of sensors, some generating timeseries data; some providing event or exception data; some analyzing part quality; some providing pictures, text, or error codes; some structured; some unstructured.

This data, in turn, must be understood continuously and in relation to data from thousands of other points in the process. Data generated by a sensor doesn't know whether it belongs to one machine cycle or another, or that it is associated with a serialized part at that moment in the part's digital thread. Something is needed to relate each of these data points to the concepts that drive the business.

What are best practices manufacturers should be aware of when looking to make plant floor data useful?

Manufacturers need to make sense of the massive variety of data created on the factory floor in order to use it. The Sight Machine analytics platform helps to solve this challenge by making plant floor data useful in the following ways:

1. The platform first acquires an expansive variety of production data from every point in the production process and from any level of aggregation: raw data from sensors, data from PLCs, collected data from historians, quality and inspection data, and data from MES, SCADA, ERP, and IoT connectivity platforms — the Sight Machine platform is agnostic as to data source, and the range of data types is unlimited.
2. Next, the platform provides semantic context and exports both processed data and analytical results.
3. Last, data is visualized both through the Sight Machine visualization layer and, should the client prefer, through leading business intelligence (BI) and visualization applications.

The analytical task — semantic context — is Sight Machine's most distinctive element, and at its heart are two patent-pending technologies: the AI Data Pipeline and the Digital Twin Builder.

Sight Machine's technologies have been developed over five years and through iterative use in multiple segments within the manufacturing industry. They have been further developed through scaling at the enterprise and supply chain level. The AI Data Pipeline is a technology for applying semantic context as data is ingested. Digital Twin Builder is a technology that, through configuration, provides rapid enterprise scalability for any type of machine or line.

The platform, purpose-built for both discrete and process manufacturing, uses artificial intelligence, machine learning, and advanced analytics to address critical quality and productivity challenges by providing real-time, actionable insights into every machine, line, and plant, throughout the enterprise.

What role do AI & digital twins play in manufacturing?

The AI Data Pipeline

The AI Data Pipeline solves the variety challenge and provides semantic context for Sight Machine's out-of-the-box manufacturing analytics.

Technology Value

This patent-pending technology that takes highly varied data from disparate sources and systematically and continuously combines it to provide manufacturing-specific context.

Built from the ground up for manufacturing data, it contains algorithms and AI techniques trained from terabytes of data from hundreds of data sources and assets.

Productivity Benefit and Enterprise Scale

The AI Data Pipeline continuously joins and concurrently analyzes data from any factory source and any level of abstraction (e.g., raw sensor data, historian, PLC, SCADA, MES, ERP, etc.), to provide a unified global view of operations.

Sight Machine's patent-pending Digital Twin Builder achieves enterprise scalability through systematic and rapid deployment of Digital Twins for plants, parts, lines, and machines.

Technology Value

1. Uses configurable technology to rapidly deliver, deploy, and validate Digital Twins for widely varied assets.
2. Unifies and integrates data modeling so that each Digital Twin is analytically interoperable with every other Twin.

Productivity Benefit

Unlike incumbent technologies, the Sight Machine platform enables analysis of dissimilar machine types, multiple processes across facilities, and the combination of part and process data.

Enterprise Scale

The Digital Twin Builder quickly scales Digital Twins for any type of line, machine, part, etc., irrespective of type.

What is the misconception about AI & the digital twin?

Misconception: Integration will be costly, difficult, and take years to successfully complete.

Open, agnostic architecture enables easy integration with all major IoT platforms, ERP systems, and other manufacturing applications.

Technology Value

- Sight Machine supports open standards, such as OPCUA and MTConnect. However, factory floor data sources are rarely unified – so the Sight Machine data acquisition offering can pull data from all major industrial IT systems, like SQL, Melsec, Modbus, Excel and HTTP. Adapters to proprietary protocols can be quickly created by customers or Sight Machine data engineers.
- The customer owns all the data, and it is stream-processed such that it is immediately available for analytics or live feedback to other systems/platforms via REST and SQL APIs.

Enterprise Scale

- This architecture eliminates the need to rip and replace existing IT and data collection infrastructure. It is flexible and enables rapid scaling across disparate factory IT environments.

Business model designed for ease-of-adoption, quick wins, and enterprise scale.

Productivity Benefit

Sight Machine's "crawl, walk, run" approach enables customers to quickly pilot and easily expand, creating measurable ROI in weeks, not years.

Enterprise Scale

Cost-effective and rapid scaling across the enterprise without the need for people-intensive integration and large implementation teams.



Acquire, Analyze, Visualize

The Sight Machine Platform

Sight Machine enables companies to gain real-time visibility and actionable insights for every part, machine, line, and plant throughout a manufacturing enterprise. Our analytics platform enables manufacturers to use all of their data—no matter where or in what format it's created. We do this with an automated and systematic data intake process that acquires, refines, and contextualizes data, creating a digital twin of each part and process.

Sight Machine attended the [American Manufacturing Summit](#) on March 28-29th in Chicago, IL where the CEO & Co-Founder at Sight Machine, Jon Sobel, discussed how to "Generate Value from Plant Floor Data with AI and the Digital Twin."

Find out more about Sight Machine and the Sight Machine Platform below!

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