New Machine Analytics Software Offers “Digital Twin” Modeling of the Factory Floor

Manufacturing Engineering: Your company recently released an update of its manufacturing analytics platform. What’s new in Sight Machine 2.0?

Jon Sobel: Our focus has always been on helping manufacturers improve quality, productivity and visibility. In Sight Machine 2.0, among other things, we’ve added a set of enhancements to improve visibility.

At the core of our platform is what we believe is the world’s only plant digital twin. We’ve seen companies like GE and Siemens use the digital twin concept to describe digital models of individual machines like jet engines. By contrast, our plant digital twin offers sets of analytical models that mirror the entire production process, encompassing machines, lines, plants or supply chains.

The breadth and depth of visibility needed by a user depends a great deal on the user’s job function. Sight Machine 2.0 introduced Contextualized Dashboards, which can be configured to provide different users with the views their roles demand. While the machine operator tracks sensors on an individual machine to monitor quality or troubleshoot, the corporate manager can perform analyses that encompass whole plants, divisions or regions.

We’ve also added Global Ops View, which on one screen lets executives track output in real time, worldwide or by country, plant, machine, machine type or contract manufacturer.

The Downtime Classifier in Sight Machine 2.0 uses machine learning techniques to quickly identify the cause of unplanned downtime. It is calibrated during initial setup, and then continuously improves its capabilities through machine learning. We have also continually added more analytical tools and improved our existing ones.

ME: How critical is it for builders in today’s fast-paced manufacturing environment to have manufacturing data analytics?

Sobel: Digital capabilities are increasingly seen as a must-have for manufacturers. The first reason is that manufacturing analytics solve manufacturing’s perennial challenges: ensuring quality and improving productivity. Additionally, manufacturers are contending with new forces: legally-mandated traceability; distributed manufacturing; increasing customization and build-to-order; and growing demands to manage attenuated supply chains.

Perhaps most important, manufacturing leadership at many companies has deemed digital technology a strategic imperative. Major companies are investing heavily in building out data strategies that ultimately link PLM and design, production, and product lifecycle data, as well as finance, and sales and marketing information. These efforts are seen as essential to achieving and sustaining leadership. Those companies that systematically develop capabilities to understand and use production data will lead; those that don’t will lag.

ME: What manufacturing operations are best using this type of technology today?

Sobel: This technology is appropriate for any type of manufacturing process where data is captured. Our current customers run the gamut of industries, including in the automotive sector [at both the OEM and supplier levels], ap-
parel, pharmaceuticals, oil and gas, personal care products, building materials and textiles. We’ve done implementations ranging from a single machine to a manufacturing process that spans multiple plants and a very broad range of production equipment and processes. We’re also working across links in the supply chain. One of our customers is using Sight Machine in plants owned and operated by its contract manufacturers.

**ME:** Describe how one customer is processing billions of data points per week, optimizing its global manufacturing. What are the productivity gains made with this type of technology?

**Sobel:** This company uses contract manufacturers in multiple countries to make the same product. The company invested heavily in new production equipment, which it configured and then installed at the contractor facilities. Each one of these machines contains hundreds of sensors constantly outputting data.

Even though machines at different plants are identical, they sometimes perform differently. The data tells the client why and enables the client to develop and improve standardized best practices and raise overall efficiency.

In one example, downtime at one of the client’s facilities was consistently higher than at the other facilities. Using the digital twin of their operation created with the Sight Machine platform, the client was able to determine there was nothing wrong with the machine, the configuration or the way it was being operated. Instead, the problem was ambient atmospheric conditions. This is the kind of systematic data-driven analysis that allows companies to move to proactive, automatic, and continuous analysis of operations.

**ME:** How much progress have manufacturing operations made in implementing advanced data analytics, leveraging technologies like Big Data and the Industrial Internet of Things?

**Sobel:** A lot of companies have learned that collecting data isn’t the same as using it. Companies have invested enormous sums in things like data lakes, which by themselves don’t do anything. What they’re really looking for is...
results. Putting all the data in one place without a way to make sense of it isn’t a result.

It’s been fascinating to watch. Twelve to 24 months ago, it seemed every large manufacturer had tasked a team with figuring out how to make use of all their factory data. The companies that moved forward did one of two things. Some took a broad approach and tried everything they could get their hands on, without attacking a specific problem that needed to be resolved. Those companies often failed to make much progress. Other companies took an alternate approach that we’ve found to be much more successful: pick a specific, definable business problem, apply technology to solve the problem, and build up from there. In order for a project to succeed, there needs to be a real business problem to be solved.

If the project is properly defined, the results can be seen in as little as a few weeks. We worked with a major industrial company that had a high scrap rate with the silicon chips used in its pressure sensors. The company’s manufacturing excellence team was tasked with finding the root cause, but analyzing production and quality data at scale was a challenge due to manually-intensive processes. We brought in our analytics platform to automate the data acquisition, analysis and visualization processes. Within three weeks the company was able to cut the scrap rate by 30%. They also identified a process improvement in a very sophisticated production process they would never have been able to see otherwise.

Several management-related factors helped the company achieve rapid results. The project had a cross-functional executive champion with accountability and responsibility, and Sight Machine was given access to engineers and data owners with knowledge of the manufacturing OT [operational technology] and IT.

Once companies embark on this path, they often find a need to break down silos and improve their collaboration across functions. Historically, factory floor data has been the domain of the operations technology team and was rarely integrated with the corporate information systems that track financial, customer, marketing and human resources data. There was no good way to roll up that data in the same way financial software has long been able to let companies zoom in and out at will.

With the availability of real-time data and analytics on production and quality, those silos are breaking down. We’ve even seen companies create new functions that meld OT and IT.

**ME:** Your company was recently cited by analysts at LNS Research as a key technology player to watch. What’s the future direction for Sight Machine’s manufacturing technology?

**Sobel:** In traditional structured data software, the boundaries of data types and analytical processes are built into the software. If a user wants to bring in a new type of data or produce a different type of report, it often requires an IT process involving project managers and offshore developers and timelines of weeks or months. That’s not going to work with manufacturing analytics. It’s quite common for new sensors to be put on a machine, and then that new data needs to be incorporated, even if it has an entirely different format than the other data you’re already collecting. In a traditional database structure, that is going to break your model.

Modern data analytics software puts much more control in the hands of users. Big data by definition involves a large variety of data types [along with high volume and high velocity]. To be effective, artificial intelligence and analytics platforms need to support self-serve analytics. That means letting non-specialist users bring in new data and data types and then design and perform the analysis themselves.

In the first half of 2017, we’re releasing Sight Machine Commander, which will let our clients and services integrators add new data sources and data types themselves, and will let them control how that data is conditioned and analyzed.
New Releases

ERP software developer SAP SE (Walldorf, Germany) has released its S/4HANA 1610 release, a major enhancement of its ERP software. By using a simplified data model and SAP Fiori 2.0, the release helps reduce complexity and improve business productivity.

The latest update includes prediction and pattern recognition capabilities along with machine learning, laying the foundation to reduce exception management for more routine transactions, the company said, empowering the workforce to focus on higher-value tasks with embedded analytics and real-time insights. “With this third major on-premise release of SAP S/4HANA, companies of all sizes can take advantage of innovations offered across lines of business and industries,” said Wieland Schreiner, SAP executive vice president, SAP S/4HANA. “Innovations in line of business and industry functionality allow companies to realize productivity gains and dramatically simplify their IT landscapes. SAP S/4HANA is the digital core that helps companies run live in today’s digital world.”

Deals

Medical equipment supplier Fujifilm (Tokyo) and PLM developer Aras (Andover, MA) announced Fujifilm’s Medical Systems Business Division, a provider of diagnostic imaging and information systems, has selected Aras Innovator as the Quality Management system platform for the company’s global medical products and equipment business.

Simulation developer MSC Software (Newport Beach, CA) announced a partnership with Objectivity Inc. (San Jose, CA), developer of scalable graph analytics platforms. Objectivity’s technology, which powers the MSC Apex suite, is said to offer efficiency gains as much as tenfold.

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