

PROBLEM

Manufacturers focused on consumer packaged goods (CPG) face highly competitive conditions. Margins are narrow, so they need to focus on efficiency and process optimization, like digitizing plant operations and other Industry 4.0 strategies, to reach revenue targets. In this context, a global beverage manufacturer engaged SparkCognition to unlock granular, data-driven insight into end-to-end production performance at a research and development plant.

SOLUTION

SparkCognition deployed Industrial AI Suite to leverage local data that helped the company (1) monitor key plant performance indicators, (2) identify when plant performance is affected, and (3) implement AI-based models capable of detecting anomalies in process degradation.

RESULTS

Industrial AI Suite enabled real-time transparency into the customer's operations at KPI and process levels through novel insights gleaned from AI-based models. This insight empowers their process engineers and plant operators to investigate anomalies and take any necessary action to remediate or avoid emerging problems. The solution is expected to play an increasingly crucial role in optimizing the plant's efficiency by minimizing resource wastage and costs and substantially mitigating the likelihood of a service failure or outage.

THE CHALLENGE: IMPROVING PLANT EFFICIENCY THROUGH QUANTIFIED, GRANULAR INSIGHT INTO CURRENT AND FUTURE PERFORMANCE ISSUES

For a global beverage manufacturer with multiple plants, efficiency was the key metric to consider in assessing whether a given plant was hitting business targets. However, that efficiency was also difficult to establish, quantify, or improve in a swift and accurate fashion.

Efficiency reports were generated manually at periodic intervals. This delay reduced the organization's overall agility in recognizing and addressing any emerging problems and also made it more difficult to predict and avoid future problems. Additionally, the manual process introduced the possibility of inadvertent human error while also making it slower and more difficult to detect problems and determine root causes.

Consequently, while the organization had invested substantially in digitization, that investment wasn't delivering as much value as expected. This was partly because the majority of deployed sensors weren't generating data suited to analytics (because it was of the wrong type or required extensive cleaning), and also because management systems didn't provide real-time KPI-driven analysis, time series trending and analysis, or advanced predictive analytics. Instead of a formalized, systemic approach, the manufacturer's problem detection and remediation processes revolved around skilled individuals with deep tribal knowledge.

For these reasons, the organization decided it was essential to improve operational visibility, accelerate efficiency reports, improve those reports' accuracy, make the results more granular, and thus dramatically reduce the time needed to pinpoint emerging problems and determine their root causes. Additionally, it was clear that resource consumption and waste should be tracked in different categories such as power, heat, and water, to suggest and inform waste-reduction strategies. Together, these enhancements would increase overall efficiency.

THE SOLUTION: AI MODELING FOR PREDICTIVE ANALYTICS

In order to deliver the best possible implementation of these ideas, the manufacturer decided an AI-driven solution was necessary. Specific benefits expected from an AI solution include:

- Model creation and refinement (evolution). AI solutions are tailored to the actual assets via ingestion and analysis of historical data compared to generalized traditional approaches. They can also continually learn from emerging data and thus evolve in parallel with a changing operating environment.
- Anomaly detection that takes into account not just current data but historical data. By leveraging data associated with past anomalies, operators can more rapidly identify the possible root causes of current anomalies.

The initial stages of the six-month project revolved around real-time data integration. SparkCognition deployed its proprietary data ingestion connectors to tap into existing data sources and securely pull real-time data, then subjected the data to basic quality validation and cleaning. Toward these ends, an extensible modular architecture, created by SparkCognition to be flexible enough for varying use cases, was leveraged.

Once the data was ingested, validated, and cleaned, SparkCognition developed deep learning models to detect anomalies in resource consumption, machine health, and overall process efficiency. These models, tailored to suit the local context, were developed via cognitive modeling and deployed into SparkCognition's AI platform for real-time model execution and KPI-driven reporting.

As more data is ingested by the solution over time, Industrial AI Suite will leverage that data to predict future problems based on historical trends it has detected. To do this, it will correlate changes in sensor information to patterns it has previously determined will lead in time to performance degradation or failure.

This AI-powered insight can potentially reduce the business impact of such issues to zero. Because the organization will be informed in advance of the potential for a problem, it can take remediating action immediately, precluding that problem from ever actually manifesting.

Finally, to make the solution's insights and overall tracking as accessible as possible, the SparkCognition team created a customized dashboard that reflects key performance indicators and status levels with different degrees of granularity. This dashboard delivers at-a-glance visualization of the plant's efficiency, and its information can also be streamed in real time wherever and however the organization can best make use of it.

THE RESULTS: QUANTIFIED INSIGHT INTO PLANT EFFICIENCY AND ACCELERATED PROBLEM DETECTION AND RESOLUTION

Industrial AI Suite has provided quantified new insight into production line operations, both holistically across this facility and via granular analysis of all pertinent assets.

New key performance indicators reflecting dynamic status levels in areas including water usage, water balance, power consumption, heat generation, and waste production not only keep executives apprised of changing conditions but also drive and refine future plant optimization.

As such granular data is gathered and analyzed over time via the seven new anomaly detection models, more subtle operational patterns will be discovered, more technical shortfalls of reliability or performance will be resolved, and more outages or asset failures will be prevented from occurring altogether.

Because Industrial AI Suite's KPI-driven insights reflect resource consumption in varying areas, the manufacturer can more easily create and improve sustainability initiatives now and in the future. Even modest reductions in wasted resources such as water or power will translate into extraordinary total cost savings every year. These cost savings, in turn, will help the organization become and remain more competitive, even given the extraordinarily low margins associated with the beverage industry.

Maintenance processes can also be refined to become more cost-effective, increasing asset lifecycles and the return on investment those assets deliver. This allows the manufacturer to replace planned capital investments with a just-in-time investment strategy.

Because the insights from the solution are accessible to anyone who needs them, it will also inform different executives and operational teams going forward in ways that match their job duties, with key information required to drive new strategies and initiatives. For instance, if the goal is to develop new products of a particular type faster to fulfill emerging demand in a particular country, Industrial AI Suite can quantify whether current efficiency will likely support increased output (and if not, establish what will be required). Then, the plant can take on new responsibilities in confidence that production lines will be able to support business goals.

This deployment serves as a foundation for future applications of varying types to be developed per the organization's changing needs. The advanced machine learning capabilities delivered by Industrial AI Suite and SparkCognition's underlying AI platform can be applied in many additional operational contexts, as well as integrated with other solutions—both those already deployed and those to come, delivering more value within this facility as well as others that depend on it.

ABOUT SPARKCOGNITION

SparkCognition's award-winning AI solutions allow organizations to predict future outcomes, prescribe next actions, empower people, and protect assets. We partner with the world's industry leaders to analyze, optimize, and learn from all types of data, augment human intelligence, drive profitable growth, and achieve operational excellence. Our patented AI technologies include machine learning, deep neural networks, natural language processing, generative AI, and computer vision—enabling productivity, innovation, and accelerating digital transformation. Our solutions solve critical problems, prevent unexpected downtime, maximize asset performance, deliver net-zero initiatives, proactively address safety, and prevent cyberattacks. To learn more about how SparkCognition's AI solutions can unlock the power in your data, visit www.sparkcognition.com.