

PROBLEM: THE NEED FOR A BETTER MAINTENANCE PARADIGM

Preventing asset failures and accidents is critical for the manufacturing sector. Unexpected incidents can grind operations to a halt for extended periods of time and necessitate expensive repairs. But most of the industry still relies on preventive maintenance to avert failures, checking on and repairing assets at pre-scheduled intervals. This approach is better than simply allowing assets to fail before repairing. However, this is particularly wasteful, as it uses valuable production and personnel time, as well as repair materials on assets that are not always in need of attention, while still often failing to catch unexpected or unusual failures.

Better approaches do exist. By making use of the sensor data they already have, manufacturers can switch to a predictive maintenance approach, enabling them to stop wasting time and resources and start predicting and preventing asset failures before they occur, while leaving assets that do not need maintenance to continue running smoothly.

Predictive maintenance uses machine learning algorithms to ingest historical sensor data from a facility's operations. This data is then used to build a model that acts as a profile of what normal operations look like. The normal behavior model can then analyze facility sensor data in real-time, and identify and flag any values that deviate from this established norm. Using the historical sensor data, as well as added knowledge from subject matter experts (SMEs), this model also uses the sensor data values to pinpoint exactly when and how a failure will take place, rather than simply warning that a component is at risk.

Essentially, predictive maintenance is akin to having a wearable medical device, like a wristband, that is constantly scanning a patient's body, examining every aspect of their health as they go about their day and continually assessing the results in real time. This device could then inform the patient that they need to see a doctor for medical treatment to avert a heart attack they will otherwise have on a specific date. This is a powerful capability, and one manufacturers should take advantage of.

SOLUTION: AI-POWERED PREDICTIVE MAINTENANCE

The best way to truly derive value from predictive maintenance is by using an AI-powered platform such as SparkCognition's SparkPredict® product. Predictive maintenance can be (and has been) done without the use of artificial intelligence (AI) and machine learning, but machine learning alleviates—or even eliminates—many of the difficulties associated with predictive maintenance.

Addressing speed and scale

Predictive maintenance requires large amounts of data, at a scale that is cumbersome and prohibitively time-consuming for human analysts, particularly at the scale of a large operation.

Machine learning can unlock the insights in this data quickly, efficiently, and accurately. The SparkPredict product analyzes large volumes of data, identifies anomalous behavior, and understands causal relationships using advanced unsupervised learning techniques. This system provides operators with faster insights into asset failure prevention for any size of operation.

Alleviating the cost and burden of model upkeep

Another problem machine learning addresses is maintaining the models over time. With traditional predictive models that don't employ AI, a change in even a single variable, such as a replaced part, necessitates reworking the entire model. This also applies to the normal changes an asset goes through over time as it is used; a pump that has been in service a long period of time is not going to run the same as when it was brand new.

Machine learning (ML) models avert these problems because they dynamically learn and maintain themselves by adjusting to any component or asset and adapting to changes over time.

Overcoming the lack of sufficient, structured data

Not all systems or subsystems have the sensors to provide the amounts of data predictive maintenance requires. Machine learning alone can't solve this dilemma, but ML-powered natural language processing (NLP) can. Most software is only able to analyze structured data, or data containing numbers or categories.

AI-powered NLP platforms, like SparkCognition's DeepNLP™ product, can decipher and use unstructured data as well—be it PDFs, books, journals, audio, video, images, notes, analog data, or any other source imaginable. This capability is valuable for manufacturers

because with NLP, predictive maintenance models can use sources of data beyond sensors. This includes all manner of associated data about an asset, such as maintenance records. By extracting facts, figures, entities, and contextual data from an asset's maintenance history, predictive maintenance solutions outfitted with NLP find causal patterns that indicate potential failures, even in so-called dark subsystems that lack sensors.

Realizing the potential of predictive + prescriptive maintenance

Predictive analytics, while invaluable, is only part of the value that machine learning delivers. After all, predictive maintenance doesn't absolve operators from having to perform maintenance.

By incorporating NLP technology, maintenance solutions are able to ingest historical records and service manuals, as well as past courses of action taken by subject matter experts. Using this bank of information, the solution can speed up maintenance processes by listing possible next steps and suggesting corrective measures.

RESULTS: RELIABLE MANUFACTURING FOR A STRONGER BOTTOM LINE

Research from McKinsey suggests that predictive maintenance generally reduces machine downtime by 30-50%, and increases asset life by 20-40%.

A wide array of industries has already adopted predictive maintenance, to dramatic results. One hydropower utility was able to use this technology to avert a failure that would have cost an estimated \$1.5 million. An oil and gas supermajor's use of predictive maintenance has increased their production by about \$30 million per year on each of their offshore platforms. And a major electric utility was able to avoid a major maintenance event and avert roughly \$500,000 in repairs within a single month of implementation. An airline in eastern Asia has implemented this technology, reducing their maintenance time by 20 minutes. In doing so, along with fewer false positives and other benefits of predictive maintenance, they've saved roughly \$40 million a year.

Manufacturers can and should be enjoying these same benefits, without wasting unnecessary resources, time, and manpower on scheduled maintenance or having to scramble to recover from unexpected failures. Industrial operations are often full of uncertainty—but they don't have to be. Machine learning technologies are already allowing major operators to truly leverage the potential of their data, enabling safer and more predictable operations.

Discover how you can reimagine asset maintenance and transform your operations.

ABOUT SPARKCOGNITION

We catalyze sustainable growth for our clients throughout the world with proven artificial intelligence (AI) systems, award-winning machine learning technology, and a multinational team of AI thought leaders. Our clients partner with SparkCognition to understand their industry's most pressing challenges, analyze complex data, empower decision-making, and transform human and industrial productivity. To learn more about how SparkCognition's AI applications can unlock the power in your data, visit www.sparkcognition.com.