sparkcognition™

PROBLEM

Wind farms need efficient, optimized operations to **remain competitive in the current landscape.**

PROJECT

The SparkPredict® solution **analyzes real-time operational data** to identify asset failures and actionable under-performance.

RESULTS

Using the insights from SparkPredict, wind operators are able to monitor **component issues, optimize maintenance scheduling, and maximize site performance.**

PROBLEM: UNDERPERFORMANCE ON WIND FARMS

The key to thriving in the wind industry is efficiency. As the competitive landscape grows, and as crises like COVID-19 cause energy demand to fluctuate, wind farms need resilient, streamlined operations to be successful.

Specifically, wind farms need to be able to monitor component reliability; identify and correct actionable sources of underperformance; and optimize scheduling of asset maintenance. And they need to do so in a cost-effective and scalable manner.

Luckily, artificial intelligence (AI) and machine learning (ML) are capable of meeting these demands. By leveraging AI and ML technology, the SparkPredict® solution analyzes the basic SCADA system data wind farms produce to provide operators with the information they need.

THE SOLUTION: PREDICTIVE ANALYTICS AND ANOMALY DETECTION FOR OPERATIONAL INSIGHTS

The SparkPredict analytics solution analyzes real-time operational data from a wind site or an enterprise data historian. Using this data, it searches for and flags significant patterns that indicate potential reliability or underperformance issues.

As shown in an example dashboard below, the SparkPredict® platform classifies the operation of each monitored wind turbine into one of three states—normal, a performance (sub-curve) issue, or a component (reliability) issue.

Using unsupervised learning techniques and multivariate analysis, the SparkPredict solution detects complex multivariate correlations in data. With this methodology, it performs normal behavior modeling to detect any deviations from normal operations in a given asset. For example, the SparkPredict solution might trigger an alarm for a wind turbine based on abnormally high readings for main bearing temperature. Such an alert would be a good indicator of an impending asset failure roughly six months out, depending on the bearing type and manufacturer—and this failure could potentially be averted with better component lubrication.

The SparkPredict® solution also uses normal behavior modeling to identify operational inefficiencies that would cause turbine or site underperformance. The solution determines the statistical boundaries of normal operation, and then uses that benchmark to identify underperforming wind turbines. By using clustering techniques, the SparkPredict platform is able to separate out instances of underperformance by cause, allowing operators to focus on actionable sources of underperformance, such as blade misalignment, while ignoring underperformance issues that are not actionable, like wake effects.

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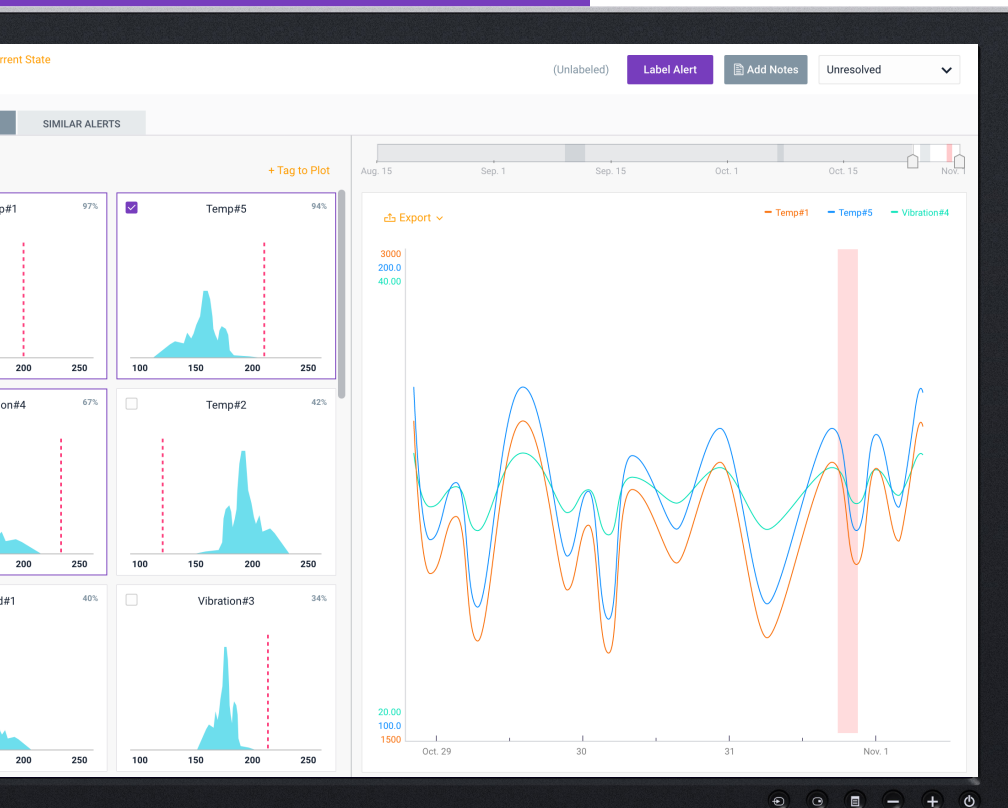
THE RESULT: AN OPTIMIZED APPROACH TO WIND OPERATIONS

By detecting anomalies that indicate asset failures in advance, wind operators are able to not only better plan for or even avert failures, but also optimize scheduling of maintenance. Using the information provided by the SparkPredict® solution, operators can calculate the expected remaining useful life of a given component, allowing them to better plan and bundle maintenance jobs. This greatly reduces the costs associated with maintenance, particularly for remote sites, and helps improve worker safety by eliminating unnecessary checks and repairs.

Similarly, by not only flagging sub-optimal performance, but sorting it by cause, the SparkPredict® solution gives operators insight into actionable sources of underperformance that can be corrected, yielding high potential gains in reliability, overall generation, and revenue.

By making use of the enormous potential of machine learning and normal behavior modeling techniques, wind operators can unlock an entirely new, data-driven approach to creative efficient—and competitive—operations.

Learn how SparkPredict can transform your operations at www.sparkcognition.com/products/sparkpredict.

ABOUT SPARKCOGNITION™

SparkCognition builds leading artificial intelligence solutions to advance the most important interests of society. We help customers analyze complex data, empower decision making, and transform human and industrial productivity with award-winning machine learning technology and expert teams focused on defense, IIoT, and finance. For more information, visit www.sparkcognition.com

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