CYIENT

Medical

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PREDICTIVE ANALYTICS SOLUTION TO PREDICT FAILURES IN ULTRA LOW TEMPERATURE FREEZERS FOR A LEADING BIOTECHNOLOGY PRODUCT DEVELOPMENT COMPANY

How we work with our clients to help overcome challenges for a better tomorrow

Overview

Client was facing challenges in managing the massive data collected from their Ultra Low Temperature (ULT) freezers deployed across the globe.

Our client, a leading laboratory equipment manufacturing company, collects data from their Ultra Low Temperature (ULT) freezers deployed across the globe using multiple sensors. They faced challenges in managing this massive data, and barely used it to identify critical failures in the freezers so that immediate maintenance actions can be taken up.

The critical freezer components need proper prognostic management to preserve the asset health reliably. The client therefore sought ways to manage their field failures with early issue detection and improved predictability. By applying advanced algorithms and big data programming techniques to the historical sensor data from numerous freezers, we built a system health dashboard backed by a predictive engine. This helps the company predict critical failures anywhere between a couple of hours to a week before they occur.

We combined our extensive experience in engineering operations and advanced analytics to build a predictive maintenance solution that helps improve reliability and customer satisfaction significantly.

Client
A leading biotechnology, genetic testing and precision laboratory equipment manufacturing company

Industry
Laboratory equipment

Offering
Innovation through advanced analytics

About the Client

Our client is one of the leading companies in biotechnology product development, genetic testing and precision laboratory equipment markets. It focuses on providing laboratory equipment, chemicals, supplies and services used in healthcare, scientific research, safety, and education.

Business Challenge

The huge volume of data and a tight schedule made it difficult for the client to track potential issues and keep the system up all the time, resulting in a greater maintenance effort and cost.

Our client collects system health data generated from multiple sensors deployed in each of the thousands of ULT freezers from across the globe to monitor systemic issues and take maintenance actions.

Understanding this humongous data and extracting the right information under tight schedules is a challenging task. In spite of their huge effort, maintenance was always reactive in nature, and the company failed to keep the system up all the time.

While the data collected from freezers gave indications of past failures and potential issues, often the delay in extracting these issues from the data resulted in increased gravity of failures. The company thus contended with greater maintenance effort and cost.

The client therefore targeted early detection of issues and the ability to predict critical failures in advance to significantly improve the reliability of these equipment and customer satisfaction.

Our Solution

Our solution has significantly improved issue and failure detection and enabled maintenance teams to predict critical failures well in advance resulting in improved reliability of freezers.

We identified the opportunity to build an analytics engine that can predict impending failures well in advance, so that proactive maintenance action can be taken to avoid system outages.

Analyzing the historical data from numerous freezers, we built specific patterns for critical failures. We created an analytical model that can detect the possibility of such failures in any other freezer from hours to days in advance. This is achieved by running the model using current data from the freezer.

We also built a comprehensive system health dashboard that gives insights into the nuances of freezer behaviour from multiple perspectives. Using visual analytics, the dashboard shows the impact of various internal and external factors on the health of the freezer. The factors could be power fluctuations, door openings (user behaviour) and ambient temperature. The system enables early issue and failure detection by uncovering system abuse, and providing quick issue categorization.

Results

Results
The solution has significantly improved issue detection and enabled maintenance teams to predict critical failures well in advance so that system breakdowns are controlled. This has lead to improved reliability of freezers and increased customer satisfaction.

Issue categorization
The solution leverages visual analytics to categorize the data from hundreds of freezers into issues, patterns and usage behaviors.

Failure identification
The system health dashboard identifies all the known critical failures within a few minutes of loading the data into it. It also facilitates immediate decision making on maintenance actions.

System abuse
The system extracts any abuse of freezers by using them beyond their design limits like excessive door openings, and extreme ambient temperatures.

Window of prediction
The predictive analytics engine consistently predicts critical failures like first stage compressor failure about two hours before the actual failure with 95% confidence level. The engine predicts failures up to nine days in advance in some cases.

About Cyient Insights

Cyient Insights is a subsidiary of Cyient Limited, a leader in Engineering, Network and Operations services and solutions. Combining domain expertise and data sciences core competence, Cyient Insights helps customers across several industries, leverage business and operational insights through advanced analytics solutions.

About Cyient

We create and deliver services that enhance your business agility. Our leading-edge solutions enable major organizations worldwide to achieve measurable and substantial benefits. Solutions include product development and life-cycle support, process and network engineering, plus data transformation and analytics.

We utilize a global delivery model. And we have more than 12,500 associates across 38 global locations, with delivery centers in North America, Europe, the Middle East and Asia Pacific. We are experts in the aerospace, consumer, energy, medical, oil and gas, mining, heavy equipment, semiconductor, rail transportation, communications and utilities industries.

This makes us your ideal partner. Whether you want to design innovative products faster, optimize R&D costs, improve time to market, enhance operational efficiency or maximize the return on investment in your networks, we help you make a difference to your customer. This might be a quieter flight, a longer-lasting toothbrush, more robust broadband connectivity, or more reliable GPS navigation.

We are proud of our robust internal processes. To ensure your IP security, solution quality and on-time delivery, we align with industry best practices and internationally renowned standards and frameworks. These include ISO 9001:2008, ISO 27001:2005 (information security), AS9100 C (aerospace), and ISO 13485 (medical devices). Cyient is a public limited company and listed on the NSE/BSE stock exchange.

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