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Case for **an Oil & Gas Operator**

Anomaly Detection with 93% Accuracy Reduces Turbine Failure Probability_

Infopulse enables efficient gas turbine monitoring with digital twin technology, advanced analytics, and multivariate anomaly detection

Client: SaaS company

Industry: Energy, Oil & Gas

Location: Germany

Employees: 1000+

Client Background

A global industrial SaaS company that serves oil and gas, power and utilities, renewable energy, manufacturing, and other sectors and produces software products focused on OT/ IT data contextualization. Leveraging AI, ML, big data, and 3D modeling, the company helps its customers to effectively operationalize data turning them into actionable insights.

Business Challenge

Our client, a SaaS software company, partnered with Infopulse to help its customer, an Oil & Gas operator, detect anomalies in the operation of gas turbines and identify their root causes. This would allow preventing unintended turbine shutdown and start failures that had previously led to large revenue losses (approximately $400,000 US for each shutdown).

Initially, the operator's data application and dashboard could not gather and analyze real-time data from 250+ IoT sensors placed on a single gas turbine. Besides, the customer used standard monitoring methods and tools that were inefficient in detecting abnormal turbine behavior.

Among the key objectives set by the customer were:

o Implementing a comprehensive data platform to easily access and manage IoT data

o Establishing real-time analytics and anomaly detection to decrease the probability of turbine failure

o Establishing a robust 24/7 fail-safe operation of gas turbines.

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Solution

Infopulse applied its extended advanced analytics and Machine Learning expertise to the project domain and delivered a cost-effective solution providing the following high-value services:

- Used industrial DataOps SaaS platform and enabled a real-time industrial Digital Twin of gas turbine operation. The Digital Twin technology simplified the collection of real-time data from multiple sensors on the gas turbines. Coupled with advanced analytics and ML, it enhanced data visibility and availability, also supporting predictive maintenance.

- Enabled real-time data analysis and multivariate anomaly detection in time series to gather and analyze data from 250+ sensors and their dependencies based on different parameters. This would allow identifying outliers for the entire gas turbine.

- Prepared a large training dataset for teaching a machine learning model that covered:

  - 100 shutdown samples

  - 15 failure shutdown samples

- Built a data science model – a decision tree for the root cause analysis of detected anomalies.

- Came up with data analysis performed after planned gas turbine shutdown in a two-minute outage period that showed higher efficiency in finding outliers.

- Enabled data transformation and analysis using Google Cloud Platform and later Microsoft Azure cloud capabilities.

- Improved data visualization by means of existing client's tools, Power BI, etc.

- Ensured integrations of existing data management applications with a new data platform that was also customized to the needs of business users.

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Technologies

Cognite Data Fusion	Google Cloud Platform	Microsoft Azure	Databricks
TensorFlow	Power BI		

Business Value

Ability to promptly detect abnormal gas turbine behavior with 93% accuracy	Reduced turbine failure probability	Improved gas turbine monitoring efficiency	Optimized data management
(ML model accuracy) and prevent unplanned shutdowns.	due to the early detection of outliers and notifications sent to a turbine service maintenance provider to check on abnormal turbine behavior. The latter lays the ground for predictive maintenance.	with real-time analysis and data analysis after planned shutdown.	and data processing due to a single data platform that ensures faster time to insights.

About Infopulse

Infopulse, part of the leading Nordic digital services company Tietoevry, is an international vendor of services in the areas of Software R&D, Application Management, Cloud & IT Operations, and Cybersecurity to SMEs and Fortune 100 companies across the globe. Founded in 1991, the company has a team of over 2,300 professionals and is represented in 7 countries across Europe and the Americas.

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