SUCCESS STORY

IOT DRIVEN PREDICTIVE ANALYTICS & EQUIPMENT FAILURE MONITORING FOR OIL & GAS INDUSTRY

PROJECT OVERVIEW

The client was seeking a solution to help them achieve their main objective, which was to provide upstream oil industry expertise to prevent equipment failure. The goal is to develop a cloud-based, online, mobile, scalable, flexible, modular, and secure end-to-end IoT-driven predictive analytics and equipment failure monitoring software suite.

SOLUTION DELIVERED

IoT & Predictive Analytics

CLIENT DOMAIN

Oil & Gas (O&G)

KEY HIGHLIGHTS

- 50% Time-to-market (TTM) is cut by using the product.
- With predictive maintenance and enhanced failure prevention, minimized downtime costs and maximized productivity by 30%.

ABOUT CLIENT

The client, an oil and gas consulting firm, leverages IoT-driven analytics to assist O&G companies in enhancing and optimizing their operations.

BUSINESS REQUIREMENTS

The reason Indium was selected was due to its track record of accomplishment in the Big Data Analytics field, particularly when dealing with IoT data. One of the most important things to take into account was Indium's significant experience handling the massive volumes of data that IoT devices produce at a high rate. The following elements were included in the software package:

- Sensor data (IoT) ingestion from a time-series database to a NoSQL database.
- Statistical model for predicting Time to Failure (TTF) of devices/equipment using near real-time data.
- Automated system to send mobile push notifications to all stakeholders regarding predicted failure events.
- User Interface (UI) for monitoring and managing the entire process.

SOLUTION HIGHLIGHTS

The software suite's development had been split into three phases and completed as a greenfield project.

Phase 1

- Time-series-based IoT sensor data ingestion Utilising PI JDBC 1.0, PI Historian database may be connected to Oracle NoSQL 3.0.5 database. Quartz 2.2.1's data intake job scheduling.
- Predicting the Time to Failure (TTF) of any equipment or device was sreamlined using a Shapelet model programme in R 3.1.1. Because of the following, Shapelet were chosen over Random Forest and Logistic Regression:
- The real catch was a scalable way to quickly and accurately extract patterns from huge datasets.
- Predicting lead time to failure (TTF) and being able to investigate only failure trends helped on-the-ground engineers avoid downtime.

Phase 2

- This phase saw the enhancement of the Oracle NoSQL data model's modification to support data ingestion from various equipment sets.
- The statistical model was improved to accommodate multithreading and the processing of data from over 30 IoT sensor tags.

Phase 3

- HTML 5, jQuery 2.1.1, and Web services (using Apache Spring) were used in the development of the User Interface to monitor and manage all processes.
- The UI was hosted on a Tomcat server 7. The Apache Kafka Queue 0.8.2.2 message broker system allowed for mobile push alerts on anticipated Time to Failure (TTF).
- Integrating Drools 6.3.0 business rule engine to improve the user interface. Users were able to add their own unique rules for Drools to process as a result.

BUSINESS IMPACT

- Due to the product, the company was able to cut the Time-to-market (TTM) by almost 50%, which resulted in significant cost savings.
- The opportunity to increase productivity and efficiency of extraction while lowering expenses associated with downtime and negative environmental effects is created through predictive maintenance and enhanced failure prevention for O&G equipment.
- The company was able to target many new business prospects in the Oil & Gas industry and other industries thanks to a ready-to-deploy solution.
- A business software provider indicated interest in collaborating with the organisation. Integration of pertinent software and internet services from the possible partner with the software suite was proposed.

TECH STACK

ABOUT INDIUM

Indium Software is a fast-growing Digital Engineering company, focused on building modern solutions across Applications, Data, and Gaming for its clients. With deep expertise in next-gen offerings combining data and applications, Indium offers a wide range of services including Product Engineering, Low-Code development, Data Engineering, Ai/ML, Digital Assurance, and end-to-end Gaming services.

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