BP

RESERVOIR QUALITY FACTOR

A BJSS Case Study

BP's existing reservoir quality process had previously been handled through Excel and VBA. This relied on many manual interventions and a time investment from Subject Matter Experts to build forecasts.

It created a very slow and user-heavy process to generate even a single forecast for a field. It was criticised for providing insufficient insight into the most important measurements to deriving quality of the field. And it was unsympathetic to small changes in those measurements too.

BJSS Solution

By using Python and a range of Dimensionality Reduction and Regression tools – such as Principal Component Analysis and Random Forests – BJSS validated a new forecasting algorithm against known historic data.

This algorithm was demonstrably better than the existing process.

After the fundamental algorithm was validated and could flag anomalies, a Monte Carlo approach was applied to the sensitivities. We did this by sampling known distributions for the input parameters to allow insight into the impact on the quality score.

In the time taken for an analyst to execute a single forecast, approximately 1,000 Monte Carlo simulations aggregated the most likely value, and distribution of values.

We built a Cloud Native solution using Azure ML Studio to create the model and corresponding web services. A web application front-end was developed for analysts, with a corresponding back-end that can scale up and down dynamically.

Our solution reduced the execution time from several hours (including manual processes) for a single run, to under one minute to generate 1,000 runs. Crucially, it also provides a unified and versionable tool that ensures consistency across the company.

Business Outcomes

We delivered efficiency savings of around 25 per cent, and have enabled greater insight and a better-informed decision making process that benefits the whole business.

With the Cloud Native architecture of the application, BP has now developed the capability to substantially expand the number of oil fields it is considering for purchase or disposal. It has also improved reliability, and has enabled a team of over 450 analysts to focus on the revenue-enhancing aspects of their roles.