Sreeya

There is a high demand for oil and gas as the oil and gas industry contributes significantly to the growth of an economy. Oil and gas companies contains lots of data, thus they often make use of dashboard-based software applications to help them manage it, e.g., Virtual Data Room (VDR) application. The oil and gas industry faces several problems, e.g., identifying wells that contain abundant oil and gas. The wells that do not contain much oil and gas end up abandoned and the company's time and money would have been wasted. Therefore, this thesis will focus on developing an oil and gas predictive model and deploying it as part of the backend service. It will also focus on developing an API for the communication between the client-side application made by the author's team and the oil and gas prediction service. The predictive model would help oil and gas companies drill in wells where there is large amounts of oil and gas which would save the company's time and money. This thesis will conduct a comparative study on the performance of random forest and gradient boosting models in predicting oil and gas production values. The models will be tested on several hyperparameters to determine the best performing model. This thesis will also investigate the effects of data imputation on model performance. As the missing values in the dataset reaches 42%, this method will explore a different method of data imputation, namely self-supervised imputation. The results show that in terms of oil production, based on the Root Mean Square Error (RMSE) value, the gradient boosting model with the self-supervised imputation dataset performed 23% better than the poorest performing model. In terms of gas production, the RMSE values show that the gradient boosting model with the self-supervised imputation dataset performed 15% better than the poorest performing model. The best performing model is then deployed as part of the backend service and an API is developed to allow the client-side application to communicate to the backend service. The client-side application created by the author's teammates would connect to the API endpoints to obtain the oil and gas production values.

Keywords

Oil, gas, gradient boosting, random forest, self-supervised imputation, hyperparameter optimization, API

Vicky

VDR website application is aimed at aiding the oil and gas industry in Indonesia. Aside from the normal concept of VDR, the website application is fully integrated with petrotechnical solutions. The author's team hopes to solve the problem encountered by the client and wish to fulfill their roles to complete the expectation of the client for the prototype. This project is under the supervision and suggestion of both the client and the product owner. The main feature of this website application would be visualizing the oil and gas data, map and data showcase, prediction of oil and gas production value, and file management. The author is responsible for developing the frontend of the website application, by using Vue JS as the frontend framework and Vuetify as the UI library. Moreover, the frontend will be using state management and router provided by Vue official library, the Vuex and Vue-router respectively. The frontend will be connected to API endpoints which would require the access token provided by Oauth2 through the login endpoint to access them. The task of the team will be managed with Jira as an agile team and complete the work in sprints. By the end of the development, both the client and product owner approved of the completion of the project.

Keywords:

VDR, website application, frontend, visualization, file management, vue.

Eliz

There are many beneficiaries of oil and gas that increase the consumption of oil and gas worldwide. More consumption means more economic growth and less unemployment for the country. Unfortunately, more consumption also led to declining oil and gas production. For that reason, many software applications such as Virtual Data Room (VDR) emerge to help the oil and gas industries. Due to the high demand for VDR, this thesis will focus on the author's client desire to develop a VDR website application with customizable features. The customizable features include implementing a Geographic Information System (GIS) in the VDR, which is the author's responsibility. Without GIS, users will find it hard to understand the oil and gas well locations, determining which locations are better in terms of use will be harder, and data can be harder to search, explore and display without a GIS map. Therefore, the author needs to ensure that implementing the GIS features such as base map layers, spatial analysis, and geocoding inside the application has provided advantages. The advantages include a better understanding of mining locations through visualizations, better geographic data documentation, and showcasing of the data. The author uses the open-source JavaScript library, Leaflet to develop the GIS features which were integrated inside the front-end framework, Vue.js. Fortunately, after developing the GIS features for four months and presenting the prototype, the client was satisfied as the advantages were achieved.

Keywords :
Virtual Data Room, Geographic Information System, Leaflet, Vue, Oil, Gas