

Deep Insights Using Wells Around Formation Issues [WAFI]: A Machine Learning Approach to Identifying Field Issues from Daily Drilling Reports

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Abstract

The objective of this paper is to share and introduce the WAFI [Wells Around Formation Issues] tool, which was developed by PDO Well Engineering and PDO Data Science teams. This tool's function is to extract Issues from the Daily Drilling Operation reports entered by Site team and display them per formation per field.

WAFI [Wells Around Formation Issues] is a cutting-edge Well Engineering solution that employs Text Mining techniques to automatically provide offset well information, significantly enhancing efficiency and reducing manual labor spent on data extraction from disparate databases and analysis in Excel. This advanced solution facilitates a deeper understanding of complex relationships between neighboring wells and the well to be drilled. By optimizing this process, our approach aims to effectively pinpoint potential challenge areas, thereby augmenting drilling operations and sustaining overall project success.

The tool was trialled in 3 fields in PDO, and it managed to pick up most of the drilling and formation issues identified and expected in each field and in offset wells, based on the Trained M.L Model.

The tool picks up the Depth at which the issue occurred, and it links it to the Formation being drilled. The results are viewed in a formation level view or at a Well level view, so it will give an overview of the field issues in offset wells. This will help Team for better planning and preparing for the upcoming wells, and of understanding of the Fields issues.

The tool picks up the following Issues: Tight spots, Over Pulls, Reaming and Back Reaming, Vibrations, Stick & Slip, Bit Balling, Fish, Lost Circulation, Fluid Influx, Stuck Pipe & Drill String Failure.

This is Phase One of the Tool development, and next plan for Phase Two will include more functionalities and more features, Parameters and enhancements to the tool.