Geminus

Optimizing Well Networks for Productivity and Emissions

An oilfield with a fixed amount of available energy must be distributed to individual electric submersible pumps (ESPs) across the well network. **The goal is to allocate the power optimally across the pumps while maximizing the net oil flow out of the wells.** This level of insight can enable more productivity for a given carbon footprint, or a reduced carbon footprint while maintaining current production.

Neither data nor simulations can optimize in real time

In order to determine the best distribution of power, you need more than historical process data. This data alone does not provide an adequate understanding of the complex physics of a single well, let alone the flow interactions in tens or hundreds of wells. When looking at wells at various positions on the network, you must also consider varying water cuts, reservoir pressures, completion details, and more. A simulator, with proper tuning, can match actual behavior with high accuracy. **However, this incurs a computational cost that prohibits real-time optimization.**

## Fusing simulation and data to create powerful ML models

The Geminus Platform leverages existing information sources to create production-grade machine learning models in just hours. In this case, we used data from PIPESIM, a multiphase flow simulator that captures the physics of fluid flow in the network of wells with high accuracy. When coupled with Geminus, the combination can access those rigorous insights in real-time to scan all the relevant possible operational strategies and recommend the best one.

Geminus AI Model Error Compared to High-Fidelity Simulation	
Oil Flowrate	0.04%
Water Cut	0.05%
Total ESP Power	0.24%

An intelligent advisor app enables exploration

Geminus produces a model that matches the simulator's accuracy with high inferencing speed. Our optimization tools run thousands of scenarios per second, identifying the ideal power distribution across the well network.

The operator can also virtually adjust the setpoints for each ESP in real time and see the impact on oil flow in an intelligent advisor app (below).
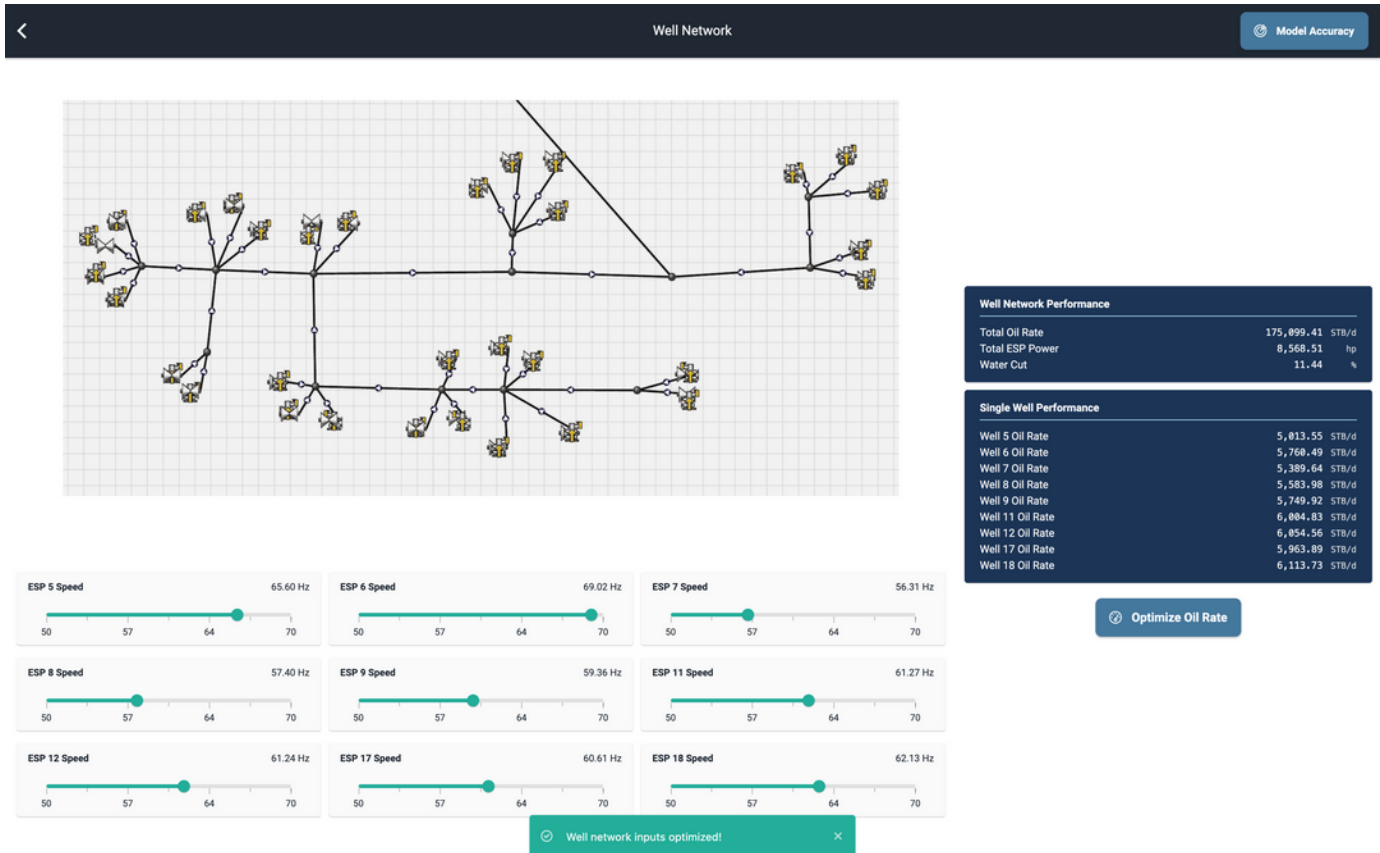
With this kind of accuracy and speed, a user can optimize for:
- Increased productivity with a fixed amount of power and emissions
- Reduced power consumption and emissions while maintaining productivity

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Geminus is an industrial AI optimization platform challenging the AI status quo. Our next-generation predictive intelligence solution fuses measurement data and physics to power resilient and efficient digital twins. This approach enables model creation in hours, rather than months. It's industrial AI, made easy.

Get in Touch

geminus.ai

info@geminus.ai

geminus.ai