

COGNITIVE AI FOR REFINERY MANAGEMENT

Improve Profitability and Increase ROI with Explainable AI

Benefits:

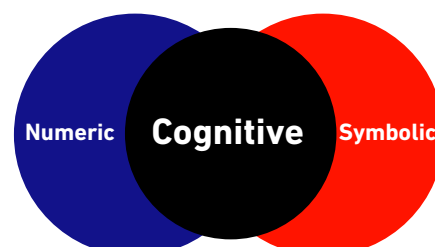
- + Increases visibility into the entire refinery to achieve tight margin targets and track the difference between expected and actual yields that weigh on profitability.
 - + Improve margin performance.
 - + Handle variations in crude feedstock.
 - + Increase refinery efficiency by up to 10%.
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Complex Refineries Need Strong Collaboration

Each day, a large oil refinery can produce millions of gallons of fuel worth tens of millions of dollars. Refinery management encompasses hundreds of people and acres of equipment working 24 hours per day 365 days per year. Maintaining coordination across these tightly interconnected systems, even under the best conditions, is not trivial. When novel, never-seen-before conditions occur, it's backward-looking and can't handle these new conditions. But Cognitive AI systems from Beyond Limits look beyond historical data and are adept at handling change when conventional AI approaches cannot.

A Cognitive Decision Support System Can Help

Refinery planners commonly orchestrate short term (days to weeks) production plans to achieve financial objectives. Refinery operators work in real-time on small segments of the refinery seeking to maximize safety, minimize environmental impact, and drive efficiency throughout. Sitting in between the planners and operators, refinery engineers turn the high-level refinery plan into operational instructions, monitor execution, and identify when planning assumptions no longer match conditions on the ground. Engineers have to navigate competing goals and constraints in a dynamic system that change constantly due to disruptions such as highly variable feedstocks and systems degradation. No single human can hold all of the necessary information in their head, but an intelligent system can help.



A Digital Partner That Never Sleeps

Beyond Limits cognitive technology supports refinery engineers, improves coordination between different stakeholders in the refinery, and optimizes financial performance. The system acts as an expert partner, with objectives and strategies set by an engineer, that can bring the refinery closer to ideal operation and highlight any challenges that it finds. The system constantly monitors sensors for risks to production goals using a cognitive reasoning engine. It detects conditions of interest, isolates the problem, identifies a solution and provides a recommendation for action that includes an explanation for the decision. Beyond Limits Cognitive AI for Refinery Management “thinks” like an engineer and provides expert guidance to solve problems across assets, units and/or systems. It goes beyond conventional asset-only focused approaches to ensure process goals are met.

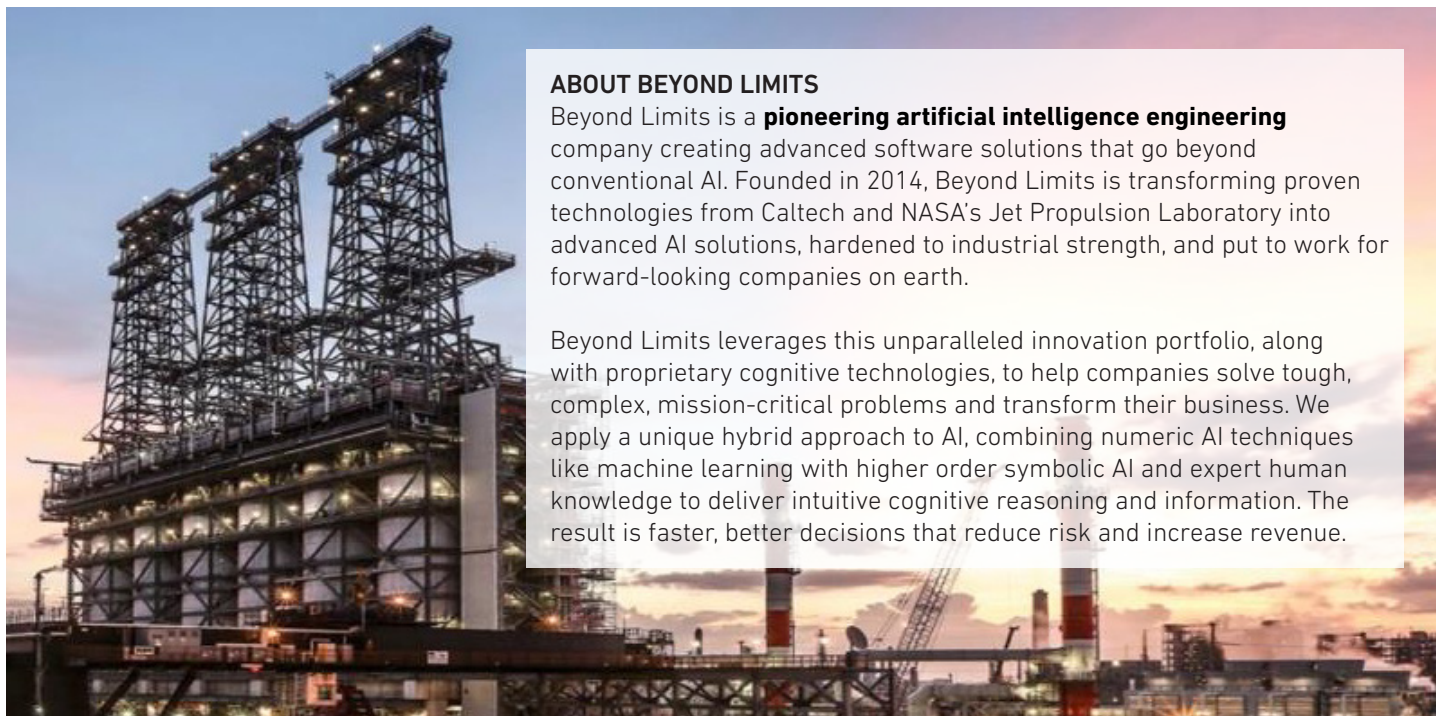
Overcoming the Unexpected

Frequently, changing conditions or modeling approximations produce a plan that is inconsistent with actual operations and current configurations. In addition to identifying opportunities to improve operations, the system can easily identify opportunities to optimize the planning process itself. By harnessing machine-powered monitoring and cognitive capabilities, operations teams have better situational awareness, context and agility to coordinate actions, manage operations-to-plan objectives and deliver improved financial outcomes.

Explainable AI Supports Human Managers and Engineers

While conventional AI can identify an unexpected pattern in data, it can't tell you how to correct the course. Beyond Limits Cognitive AI for Refinery Management goes beyond pattern recognition to ensure that engineering judgment is exercised uniformly, comprehensively, and quickly when problems occur. It explains its reasoning using plain language, to help people apply current best practices and identify where these practices can improve. It serves as a partner to teams throughout operations, engineering, and planning to promote continuous improvement throughout the refinery.

Can your AI do that?



ABOUT BEYOND LIMITS

Beyond Limits is a **pioneering artificial intelligence engineering** company creating advanced software solutions that go beyond conventional AI. Founded in 2014, Beyond Limits is transforming proven technologies from Caltech and NASA's Jet Propulsion Laboratory into advanced AI solutions, hardened to industrial strength, and put to work for forward-looking companies on earth.

Beyond Limits leverages this unparalleled innovation portfolio, along with proprietary cognitive technologies, to help companies solve tough, complex, mission-critical problems and transform their business. We apply a unique hybrid approach to AI, combining numeric AI techniques like machine learning with higher order symbolic AI and expert human knowledge to deliver intuitive cognitive reasoning and information. The result is faster, better decisions that reduce risk and increase revenue.