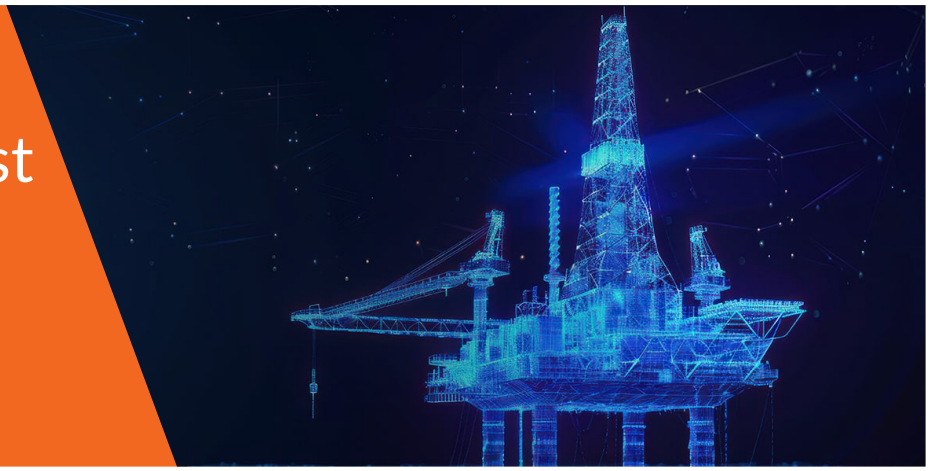
Reducing Downtime & Cost with AI-Powered Predictive Maintenance



The Customer

A major Oil & Gas operator managing complex assets and large multi-source datasets across downhole and surface equipment—seeking to predict failures earlier, optimize production, and improve operational visibility and efficiency.

The Challenge

Build accurate, explainable failure prediction and optimization across the lifecycle by:

- Predicting downhole failures (rod parts, pumps, tubing, casing, formation issues).
- Monitoring surface issues (pump jack parts, flow lines, valves, leaks, pressures).
- Deriving ML patterns (e.g., warranty-to-failure) with weather/operations sub-factors.
- Ingesting high-resolution visual and sensor data in near-real-time.
- Archiving data for historical reporting and deeper analysis.

The Solution

An AI/ML-driven analytics platform tailored for Oil & Gas operations:

- Downhole analytics: Predictive models for critical subsurface components and conditions.
- Surface analytics: Monitoring flow lines, vents, leaks, pressures, and related equipment.
- Derived analytics: ML-based pattern detection including warranty-to-failure analyses with context sub-factors.
- Realtime monitoring: Dynamometer cards and fact analytics via browser and mobile.
- Data acquisition: Drone-captured visual inspections; seamless well & sensor data ingestion.
- Data archiving: Persistent storage for history, reporting, and model refinement.

The Results

The solution improved reliability and operational outcomes:

- Earlier failure detection: Actionable lead time to intervene.
- Optimized production: Insights to tune operations and throughput.
- Cost savings: Fewer breakdowns and targeted maintenance.
- Scalable architecture: Secure APIs and integrated data flows supported expansion.

Impact Delivered

- Higher failure prediction accuracy
- Reduced unplanned downtime
- Lower maintenance costs
- Improved operational efficiency

Solution Components

- Momentum-powered RESTful APIs; Neural-network models
- Real-time monitoring (dynamometer cards & fact analytics)
- High-resolution visual inspections (drones)
- Secure data acquisition & archiving
- Integrated data platform