

# Agentic AMS Resolution Assistant

### Use Case / Objective

- Automate and optimize SAP ticket resolution using multi-agent GenAI flow.
- Handle triaging, RCA, fixes, 8D reports, KB generation, and business impact estimation.

### Technical Solution

- Built with Streamlit UI and GPT-3.5 API integration.
- Uses FAISS for vector storage of resolved tickets.
- Auto-refresh and stepwise state management via session\_state.
- Tabs for each resolution step: Summary, 5 Whys, Fix Suggestion, 8D, KB, RCA Validation, etc.

### Benefits

- Faster ticket triaging and RCA generation.
- Reduced repetitive manual investigation effort.
- Proactive fix suggestion and KB auto-generation.
- Executive visibility via business impact summaries.

# Storm Water Management LLM

### Use Case / Objective

- Predict and prevent storm overflow scenarios in urban drainage systems.
- Enable dynamic overflow control via SCADA, MQTT, OPC-UA, and Modbus protocols.

### Technical Solution

- Uses rainfall and tank telemetry to estimate overflow risk.
- Integrates with multiple control systems for valve/pump actuation.
- Logs risk actions and generates GPT-4-based advisory reports.
- Supports simulation + real-time integration configs.

### Benefits

- Automated response to overflow risk.
- Reduced flooding and environmental violations.
- Supports compliance and advisory workflows.
- Easily extendable to new locations via config DB.

# Reservoir Simulation and Exploration Assistant

### Use Case / Objective

- Help petroleum engineers pick optimal drilling spots via simulator data.
- Compare field performance across multiple simulation tools.

### Technical Solution

- Supports 5 simulators: Eclipse, CMG, tNavigator, OPM, MRST.
- Mock + real CSV-based simulation data ingestion.
- AI analysis across pressure, oil rate, water cut, and seismic inputs.
- Interactive drill targeting and rock typing via logs.

### Benefits

- Unified simulation comparison platform.
- AI-led drill zone recommendation.
- Supports both real and synthetic log inputs.
- Cuts reservoir characterization turnaround time.

# UK Drilling Safety Assistant

### Use Case / Objective

- Monitor safety hazards and operational anomalies in UK drilling operations.
- Provide GenAI advisory for preventive actions.

### Technical Solution

- Tabs for seismic risk, drilling sensors, bit wear, auto tuning, logs, etc.
- Uses GenAI to aggregate and forecast safety risks.
- Supports simulated live feeds and user query resolution.

### Benefits

- Reduces likelihood of blowouts and equipment failure.
- Improves worker safety through real-time alerts.
- AI aggregates multi-tab hazards into one forecast.
- Field-to-command center friendly UI.

### Drilling Optimization Assistant

#### Use Case / Objective

- Improve drilling performance by analyzing real-time sensor inputs like torque, ROP, WOB, RPM, and mud flow.
- Trigger alerts and GenAI guidance when unsafe or inefficient conditions are detected.

#### Technical Solution

- Streamlit UI with sidebar refresh controls for drilling type and intervals.
- Sensor inputs from CSV (real-time simulated for Oil & Gas, Mining, Geothermal).
- Visualizations via line charts (ROP, WOB, RPM, Torque).
- Condition-based alerting logic.
- GPT-3.5 Turbo API call generates optimization advice based on latest sensor parameters.
- Supports refresh intervals and auto-detection of formation-specific anomalies.

#### Benefits

- Real-time drilling insights.
- Faster bit wear detection and torque/WOB imbalance mitigation.
- Improved operational safety and lower cost-per-foot drilled.

# Asset Integrity GenAI Advisor

### Use Case / Objective

- Monitor health, degradation, and replacement needs of critical field equipment.
- Provide GenAI-driven recommendations for inspection, repair, or replacement.

### Technical Solution

- Simulated asset registry with parameters: RUL, degradation %, corrosion, vibration, temperature.
- Streamlit frontend with 10 diagnostic tabs including Lifespan Estimator, Failure Mode Predictor, Work Order Optimizer.
- Color-coded alerts based on RUL thresholds.
- GPT-3.5 Turbo integration for per-asset advisory reasoning.
- Visual fault summarizer (simulated image input) and regulatory forecast tab.
- Dataframe styling for lifecycle risk heatmap.

### Benefits

- Minimizes unexpected asset failures.
- Improves compliance readiness.
- Helps plan maintenance budgets and staff load proactively.

### Oil & Gas GenAI Operational Suite

#### Use Case / Objective

- Optimize upstream oil and gas operations across drilling, lifting, compliance, and production.
- Provide AI commentary and visual analytics across 12 operational areas.

#### Technical Solution

- Streamlit app with tabs: Drilling Efficiency, Lift Optimization, Weather Sensitivity, Frac Efficiency, Netback Margin, etc.
- Synthetic datasets for wells, ROP, interventions, flow rates, frac stages, weather events.
- Altair for multi-variate charting.
- GPT-3.5 Turbo summarization of operational trends for each tab.
- Live tab-based auto-advisory system.
- Simulated telemetry for gas/oil/compression metrics.

#### Benefits

- Cross-domain performance insight (drilling, compliance, maintenance).
- Better netback margin tracking.
- Simplifies field-wide decision-making using AI.

# Chemical Formulation Expert

### Use Case / Objective

- Recommend optimized corrosion inhibitor blends for UK offshore fields.
- Balance lab test efficacy, cost, and regulatory compliance.

### Technical Solution

- Simulated data generators for field metadata, lab test results, formation profiles, and vendor pricing.
- Streamlit app with 12 tabs: Blend Generator, Lab Results, Compliance, Weather Impact, Pricing, Final Report.
- OpenAI GPT-4 calls for blend recommendation and impact explanation.
- Mock REACH compliance logic based on blend type.
- Tabular comparison of blends using simulated test scores (efficacy, corrosion rate, \$/bbl).

### Benefits

- Faster blend selection process.
- Reduces corrosion risk and chemical cost.
- Ensures compliance with offshore chemical standards.



# Demand Forecasting Assistant

### Use Case / Objective

- Forecast 30-day UK oil & gas prices using historical data and scenario simulation.
- Provide GenAI-based investment insights and trading narratives.

### Technical Solution

- Yahoo Finance integration (BZ=F, NG=F) for 90-day historical data.
- Streamlit UI with two views: Overview and Dashboard.
- Forecast simulation with volatility factor per scenario.
- Interactive scenario logic for cold weather, supply shock, recession, geopolitics.
- GPT-4 prompts to generate forecast commentary, deviation reasoning, buy/sell signals.

### Benefits

- Actionable investment signals and scenario-wise hedging plans.
- Combines statistical logic with GenAI narrative generation.
- Enables executive-level forecast understanding in simple terms.

# Energy Management Optimizer

### Use Case / Objective

- Track and optimize energy usage across industrial assets using AI and tariff modeling.
- Recommend cost-saving actions and reduce carbon footprint.

### Technical Solution

- Simulated energy dataset (48-hour load) with kWh, temperature readings.
- Asset list with operating hour constraints.
- Dynamic tariff planner with TOU logic.
- Streamlit tabs: Load Forecasting, Asset Efficiency, Carbon Footprint, Bill Auditor, GenAI Advisory.
- GPT-3.5 used to analyze daily energy trends and suggest timing for equipment runs.
- Optimization engine suggests lowest-cost run windows per asset constraint.

### Benefits

- Peak load shifting to cheaper time windows.
- Energy and cost savings with advisory overlay.
- Supports carbon tracking and renewable transition planning.