HUB TECH IA

Deliverable report 12

AI and IAGEN Application Use Case

Analysis of Geological and Seismic Data for Area Identification with Shale Gas in Vaca Muerta

Executive Summary – IAGEN Application for Geological and Geophysical Data Analysis
Seismic events in Vaca Muerta.

This executive summary presents a strategic application of generative artificial intelligence (IAGEN) in the energy sector, specifically in the analysis of geological and seismic data for the identification of areas with shale gas in the formation.
Vaca Muerta. This is a key opportunity to maximize efficiency.
exploratory, reduce costs and minimize risks in one of the reserves not
most important conventional in the world.

Use case classification

The report classifies this IAGEN application based on four axes:

1. By main resource: gas (main) and oil (secondary).
2. By activity: information management and decision-making.
3. By technology: generative models (GANs, Transformers), learning
   deep machine learning and computer vision.
4. By strategic impact: improvement in strategic decision-making and analysis
   of data.

1. Opportunities for using AI and IAGEN in the sector.
Specific opportunities include automation of seismic analysis,
generation of synthetic geological models, optimization of well location

and the reduction of uncertainty in the interpretation of underground formations. These Applications allow the detection of structures with shale gas potential with greater precision and less human intervention.

2. Expected benefits

The adoption of these technologies allows:

- Improve the accuracy of reserve identification.
- Reduce operating costs and unnecessary exploration.
- Reduce environmental impact by optimizing drilling. • Accelerate the exploration and extraction cycle, improving overall efficiency. the projects.

3. Application of AI

The approach integrates different generative AI models to analyze geological data and complex seismic models. GANs are used to create synthetic seismic models, Transformers for time series analysis, and machine learning techniques are used to reinforcement to optimize drilling strategies. These tools allow interpret multi-format data and generate interactive 3D visualizations of the subsurface.

4. Proposed AI Agent

The report proposes the design of an intelligent agent composed of five modules: Data sensing, geoscientific analysis, 3D visualization, recommendation geostrategic and technical feedback. Its main function is to assist geologists and engineers in decision making through automated processing large volumes of information. The main benefit of the agent is its ability to generate accurate recommendations and accessible visualizations, speeding up exploration processes.

5. Conclusion

The incorporation of IAGEN in the exploration of shale gas in Vaca Muerta represents a significant transformation towards a more efficient, profitable and exploratory model

sustainable. Through its responsible and collaborative implementation, this technology can position Argentina as a competitive player in the energy market global, promoting the country's productive and energy development.