HUB TECH IA

AI and IAGEN Application Use Case

Energy Optimization: Digital Twins, simulation of Operations to improve efficiency in Vaca Muerta

Classification of report deliverable 43: "Energy Optimization in Vaca Muerta: Digital Twins and Operations Simulation to Improve Efficiency":

Classification 1: By Main Resource

- Selected option: Oil, Gas, Water + energy (comprehensive approach).
- Justification:

The report takes an in-depth look at the use of digital twins and IAGEN to optimize energy consumption, operational performance, maintenance predictive and safety in oil and gas production operations.
In addition, emphasis is placed on energy efficiency and sustainability, which justifies a comprehensive classification involving the three main resources.

Classification 2: By Activity within Vaca Muerta

- Selected option: Energy Efficiency and Sustainability
- Justification:

The purpose of the report is to improve the overall energy performance of the system through digital technologies, real-time simulations and decisions automated. Reducing energy consumption is explicitly addressed, Production optimization and environmental compliance, all objectives

Machine Translated by Google

key in the search for operational sustainability.

Classification 3: Type of AI Technology Used

• Main selected option:

1ÿÿGenerative AI Models,
2ÿÿMachine Learning Algorithms, 6ÿÿAI
Platforms for Data Integration and Big Data, 4ÿÿComputer
Vision and Image Analysis Systems, 5ÿÿAI Systems
Based on Intelligent Agents.

• Justification:

The document describes a complete agentic flow with IoT sensors, simulation dynamics, predictive maintenance, operational data analysis and visualization advanced. It includes algorithms such as CNN, RNN, Transformers, GANs and Integration into energy monitoring platforms, allowing simulations of scenarios and autonomous decisions in real time.

Classification 4: By Strategic Impact on the Industry

• Selected option: AI for Sustainability and Impact Reduction
Environmental

• Justification:

The report highlights that the application of digital twins together with IAGEN reduces energy consumption, minimizes environmental impact, improves the regulatory compliance and extends the useful life of assets. In addition, it strengthens the ability to predict and react to changing operating conditions, positioning AI as a strategic tool for an energy transition efficient and sustainable.