AI and IAGEN Application Use Case

Methane Leak Detection in Vaca Muerta, Neuquén, Argentina

Classification of deliverable report 10: "Application of AI and IAGEN for Detection of Methane Leaks in Vaca Muerta, Neuquén, Argentina":

Classification 1: By Main Resource

- Selected option: ÿ Gas (main), Petroleum (secondary).
- Justification:

The report focuses primarily on methane leak detection.
(gas), which has direct implications on the production and operation of the
natural gas, with methane being the main resource monitored and managed.
Although oil is related to the region's operations, the
central objective is specifically the detection and mitigation of emissions of
methane gas, prioritizing the safety and sustainability associated with gas
production.

Classification 2: By Activity within Vaca Muerta

- Selected option: Energy Efficiency and Sustainability
- Justification:

The objective of the report is the implementation of advanced technology for the
accurate and early detection of methane leaks, specifically with the
purpose of mitigating environmental impacts and improving the sustainability of
operations in Vaca Muerta. The focus is clearly on sustainability,
emission reduction and environmental regulatory compliance,
directly contributing to minimizing the environmental footprint of the
operations.

Classification 3: Type of AI Technology Used

- Main selected option:
  1ÿÿGenerative AI Models,
  4ÿÿComputer Vision and Image Analysis Systems, and
  2ÿÿMachine Learning Algorithms.
- Justification:
  The report explicitly details the use of advanced generative models (IAGEN), specific algorithms such as Convolutional Neural Networks (CNN) and semantic segmentation models for the automated visual identification of methane leaks. Computer vision (CV) and application of machine learning techniques constitute central elements of the technological approach, complemented with real-time predictive analytics.

Classification 4: By Strategic Impact on the Industry

1. Selected option: AI for Sustainability and Impact Reduction
   Environmental
2. Justification:
   The report specifically emphasizes the strategic importance of reducing methane emissions through accurate and early leak detection, contributing directly to operational and environmental sustainability. The Implementation of these systems strengthens regulatory compliance and significantly improves safety, in addition to offering competitive advantages in terms of operational efficiency and environmental responsibility in the Vaca Muerta region.