HUB TECH IA

AI and IAGEN Application Use Case

Monitoring and Maintenance of Equipment for the detection of anomalies in equipment using artificial vision to anticipate failures and optimize maintenance

Classification of deliverable report 44: "Equipment Monitoring and Maintenance" Using Artificial Vision and IAGEN for the Detection of Anomalies in Vaca Muerta":

Classification 1: By Main Resource

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

   The report applies computer vision and AIGEN to both the oil and gas and renewable energy (solar and wind) sectors, also including references to efficient water and energy use. Due to its cross-cutting scope and application to multiple energy sources, a comprehensive classification is required.

Classification 2: By Activity within Vaca Muerta

• Selected option: Optimization of Production Processes
• Justification:

   The focus of the report is on anomaly detection, failure anticipation, and optimization of critical equipment maintenance using artificial vision, both in fossil and renewable energy facilities. All of these actions are aligned with improving productive performance and continuity

operational.

Classification 3: Type of AI Technology Used

• Main selected option: 1ÿÿGenerative

AI Models, 2ÿÿMachine

Learning Algorithms, 4ÿÿComputer Vision

and Image Analysis Systems, 5ÿÿAI Systems Based on

Intelligent Agents, 6ÿÿAI Platforms for Data Integration

and Big Data, 3ÿÿNatural Language Processing (NLP)

Systems (complementary).

• Justification:

The report describes the use of GANs, VAEs, Vision Transformers, SSLs, CNNs and

real-time video analysis, applied to computer vision and combined with

IAGEN. The use of IoT sensors, edge computing, and flows is also mentioned.

agents with real-time monitoring and predictive reporting. It is

a case with complete integration of AI technologies applied to

maintenance and inspection.

Classification 4: By Strategic Impact on the Industry

• Selected option: AI for Production and Quality Optimization

Infrastructure

• Justification:

The strategic impact is focused on reducing failures, improving the

equipment availability, proactive maintenance and optimization

asset performance, all of which strengthens critical infrastructure

energy production. It also addresses the improvement of security,

operational efficiency and sustainability.