HUB TECH IA

Deliverable report 34

AI and IAGEN Application Use Case

Documentation Automation in Vaca Muerta, Neuquén, Argentina.

I. Introduction

The energy industry in Vaca Muerta, Neuquén, Argentina, faces the challenge of managing a large amount of documentation for its logistics and production operations. Transport guides, cargo reports, safety logs, and internal audits are just a few examples of the documents handled daily. Currently, much of this documentation is written manually, which consumes time and resources, increasing the likelihood of errors and inconsistencies in the information.

II. IAGEN for documentation automation

Generative Artificial Intelligence (GENI) is a branch of artificial intelligence that focuses on creating new content, such as models, images, code, or text, from existing data. This technology uses advanced algorithms to analyze large amounts of information, identify patterns, and generate new, original content that is often indistinguishable from human-created content.

Generative Artificial Intelligence (GENA) is presented as an innovative solution for automating document generation in the Vaca Muerta energy sector. This model, through real-time processing of data from sensors and integrated systems (IoT), can automatically generate standardized documents in digital and physical formats.

III. Application of Generative AI-powered agents in the activity

IV. **IAGEN Agents Concept**

In recent years, generative artificial intelligence (GAI) has revolutionized the way we interact with technology, enabling the development of systems capable of generating content, answering complex questions, and assisting with highly demanding cognitive tasks. From this capability, a new technological architecture has emerged: GAI-powered agents. These agents are not simple conversational interfaces, but autonomous systems that can interpret instructions, make decisions, execute tasks, and learn from their interactions with the environment.

An IAGen agent combines large language models with additional components such as external tools, memory, planning, and autonomous execution. This allows them to operate in complex environments, with the ability to break down objectives into steps, coordinate multiple actions, interact with digital systems (such as databases, APIs, or documents), and adapt to context changes in real time. These qualities distinguish them from traditional chatbots and open up a range of more sophisticated and customizable applications.

At the organizational level, these agents are being used to automate processes, generate data analysis, assist in decision-making, and improve the user experience, both internally and externally. For example, they can take on human resources, legal, financial, or logistics tasks, and even tasks linked to the technical areas of production processes, acting as intelligent assistants that collaborate with human teams. This ability to integrate knowledge and execute tasks autonomously transforms the way organizations can scale their operations without losing quality or control.

Furthermore, agentic workflows—structures where multiple agents collaborate to solve complex problems—allow responsibilities to be distributed among different agent profiles, each with specific functions. This creates hybrid work environments where humans and agents coexist, optimizing time, costs, and results. The ability to connect agents with tools such as Google Drive, CRMs, or document management platforms further expands their capabilities.

The development of IAGen-powered agents represents a crucial step toward a new era of intelligent automation.

Among the benefits of authentic workflows powered by generative AI models is the ability to automate entire production processes, end-to-end, and even add value by leveraging the capabilities of language models based on these technologies.

However, its implementation also poses technical, ethical, and legal challenges, ranging from responsible design to human oversight. Therefore, understanding its architecture, operational logic, and potential impacts is critical for its effective and safe adoption in diverse professional contexts.

2. Agentic Flow design proposal for implementation

Phase 1: Automatic Data Capture

- Sensor Agents (IoT): Different types of sensors, such as pressure, temperature and flow meters, are used to capture and transmit relevant data from trucks and logistics points (weight, schedules, routes) in real time.

Phase 2: Processing and Validation

- RPA Agents: Extract and validate information from existing ERP systems.
- GPT-4 (Generating Agent): Receives validated data and automatically generates official documents and forms, formatted according to specific requirements.

Phase 3: Automatic Distribution

- Digital Distribution Agent: Automatically distributes generated documents to relevant recipients (driver, logistics supervisor, administrative base) via email, internal platform, or enterprise cloud.

Where can this agent be applied?

- Water/gas pumping equipment (ESP, PCP)
- High pressure control valves
- Water treatment systems (osmosis, clarification, disinfection)
- Motors and compressors
- Surface phase separation units
- Gas or water distribution networks.

V. Concrete example of optimized flow

A truck transports fuel from a logistics center in Neuquén to an oil well in Vaca Muerta.

1. IoT sensors transmit weight, volume, and real-time departure/arrival time.
2. IAGen automatically generates the transport guide and safety sheet, validated and ready for audit.
3. Documentation is instantly sent to the driver, logistics supervisor, and administrative base.

V. Advanced Document Analysis with AI

In addition to automated document generation, AI can be used to analyze document content and extract valuable insights. Using natural language processing (NLP) techniques, key elements can be extracted, information categorized, and connected to other systems for analysis. This allows, for example, to identify patterns, detect anomalies, and generate reports that facilitate decision-making.

VI. Operational and strategic benefits

Automating documentation using IAGEN offers several benefits:

- Elimination of manual errors: By automating the process, human error is eliminated, ensuring the accuracy and consistency of information.
- Immediate document generation: Documents are generated in real time, streamlining processes and reducing wait times.
- Increased accuracy and consistency: Ensures consistency in document generation,

complying with standards and regulations.

- Reduction in administrative time: Administrative staff can dedicate their time to more strategic tasks.
- Greater traceability and regulatory compliance: Information tracking is made easier and regulatory compliance is ensured.
- Improved decision-making: Real-time data analysis, enabled by systems integration and data capture via IoT [2], enables better resource allocation and greater operational efficiency.

VII. Measurable impact

The implementation of this solution has a positive and quantifiable impact in several areas:

- Efficiency: 80% increase in document processing speed.
- Costs: 60% reduction in administrative costs related to errors and reprocessing.
- Time: 70% reduction in the time spent by administrative staff on routine tasks.
- Security: Greater traceability and compliance with regulatory standards.

Safety and Environmental Benefits

Automating documentation with IAGEN not only improves administrative efficiency but also has a positive impact on safety and environmental compliance at Vaca Muerta. Automated data capture and analysis enables constant monitoring of transportation operations, facilitating the identification of potential risks and the implementation of preventive measures. Furthermore, accurate, real-time reporting on fuel consumption and emissions contributes to better environmental management and a reduction in the impact of operations on the environment.

VIII. Challenges and strategies to overcome them

The implementation of this solution presents some challenges that must be addressed strategically:

- Integration of legacy or isolated systems: To overcome the difficulty of integrating legacy or isolated systems, it is proposed to implement intermediate integration modules with open APIs.
- Short-term investment in AI agent implementation teams in technology and training: Investment is required in proofs of concept and pilot testing. The focus here must be on developing the talent needed to implement these solutions, as there is a trend toward cost reduction in systems that enable "no-code" and "low-code" automation. For the first stage, it is also recommended to recruit teams with experience in AI agent design and implementation. Finally, it is key to form an in-house team to support and foster an agentic culture that redefines human-machine interaction.
- Legal approval for AI-generated documents: Advance regulatory approval must be managed through pilot projects validated by regulatory bodies, ensuring that the solution complies with current legislation.
- Resistance to change among administrative staff: It is crucial to implement ongoing training and awareness strategies to demonstrate the tangible benefits to the staff involved, facilitating the adoption of the solution.

VIII. Conclusions

Automating documentation through IAGEN in Vaca Muerta presents an opportunity to significantly improve administrative efficiency in the energy sector. The solution, based on GPT-4, IoT, and RPA, offers a series of tangible benefits, such as error elimination, cost reduction, and time optimization. Furthermore, AI's ability to analyze information in real time enables better decision-making and greater operational efficiency, which translates into greater competitiveness for companies in the sector.

While there are technical, regulatory, and cultural challenges, research shows that there are strategies to overcome them. The adoption of IoT in the industry, the availability of RPA solutions, and the compatibility of existing systems with API integration are factors that favor implementation.

It's essential to implement a change management plan that includes staff training, effective communication, and the adaptation of internal processes. Collaboration between different areas of the company and stakeholder engagement are key to project success.

The automation of documentation through IAGEN at Vaca Muerta not only represents an optimization of operations but also drives the digital transformation of the energy sector in Argentina. This technology has the potential to generate new job opportunities in the technology sector, attract investment in AI and automation, and position Vaca Muerta as a benchmark in the modernization of the energy industry in Latin America.

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