



# Hybrid AI for Complex Data: A Case Study in Reducing Costs and Improving Quality



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## Client's Problem Statement

Our client, a B2B SaaS company, provides industry-specific software solutions that process complex data metrics, sourced from both public and private sources. Their product, however, was struggling due to the nature of the data processed. The key challenges they faced included:

- **Data Complexity:** The input data was highly technical, industry-specific, and filled with jargon, making it difficult to train new team members to handle it.
- **Volume:** The data involved around 10,000 pages of information updated annually, requiring significant manual labor to process.
- **Format:** The data was largely unstructured, with numerous possible valid values, making it impossible to hardcode or fully anticipate each variation.
- **Output Requirements:** The data had to be formatted into three interconnected and highly specialized output files, requiring in-depth expertise.

This process was time-consuming and error-prone, with high labor costs. It could take months for their team to process the data, causing delays for customers and introducing a range of human errors that affected both the quality of the product and customer satisfaction.

## 42robotsAI approach to Solving the Problem

We partnered with the client to design an automated solution that would drastically reduce manual labor, improve reliability, and speed up the process. Our approach focused on combining traditional software engineering with AI-driven processes to:

- Break down the data into manageable parts using non-AI code.
- Use well-tuned prompts and large language models (LLMs) to process the complex sections that couldn't be easily handled by deterministic coding.
- Implement an iterative feedback and validation loop, where data passed through multiple layers of automated validation.
- Involve human validation only at the final stages to further ensure accuracy.

This hybrid solution allowed us to retain control over complex technical processes while leveraging the strengths of AI where it was most effective.

## Solution Rollout and Development

The solution was developed through an iterative collaboration with the client's team:

- **Data Analysis:** We began by deeply analyzing the client's complex data and defining how it could be broken down for AI and non-AI processing.
- **Multiple Model Usage:** Instead of relying on one AI model, we utilized multiple LLMs, including GPT-3.5-turbo and Claude 3.5 Sonnet, to handle different tasks across the workflow.
- **Validation & Refinement:** After each AI output, the system performed automated checks. If errors were detected, the process would loop back to make adjustments using feedback. This ensured accuracy and consistency across all outputs.
- **Human Validation:** In the final stages, human workers reviewed the outputs, though their workload was significantly reduced to a fraction of what it was previously.

This hybrid solution—using both AI and traditional coding—helped address the limitations of AI alone while ensuring high-quality, reliable outputs.

## Outcome & Lessons Learned

The results were transformative for the client:

- **Increased Efficiency:** The new system automated approximately 90% of the data processing, reducing the timeline from months to just a few days.
- **Cost Reduction:** The client saved significant costs, as the reliance on skilled human labor decreased dramatically.
- **Improved Accuracy:** With fewer human errors, the quality of the product improved, leading to better customer satisfaction.
- **Competitive Advantage:** Faster processing times and higher-quality outputs gave the client a competitive edge in their market.

## Key Insights and Takeaways

The project also reinforced the importance of a balanced approach in integrating AI. By not over-relying on LLMs and using a hybrid system, we achieved better results than a fully AI-dependent approach could have delivered. Future projects for the client could further automate additional processes, potentially applying similar methods to their other products.



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