Wieland Group

Business Challenge 01 — Advanced Retrieval

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General Briefing

The **Wieland Group**, headquartered in Ulm, Germany, is a global leader in semi-finished copper and copper alloy products. Sustainability and innovation drives its strategy in a fast-evolving market.

The rapid pace of technical advancements, regulatory changes, and market competition demands agile responses—from new alloy development (e.g., for electric vehicles) to expanding product portfolios. In Wieland's digitalized ecosystem, this generates vast data across ERP, MES, CRM and quality systems, challenging traditional data workflows.

For example, tracking "where which alloy is produced" across global sites (Ulm, Vöhringen, etc.) or "real-time order status" relies on fragmented data access. Regulatory shifts, like EU material mandates, require traceable, multilingual documentation, while competitive agility hinges on synthesizing cross-departmental insights regarding technology, production processes, and customer feedback.

To address these challenges without burdening its employees, Wieland requires a system that transforms siloed data into actionable insights. We suggest that the application of AI-driven concepts, such as Retrieval-Augmented Generation (RAG), has the potential to deliver solutions that address this challenge, facilitating straightforward access to enterprise data that is tailored for different user groups while ensuring compliance and maintainability. Furhter, this approach would require minimal modifications to the existing system landscape.

Challenge

The growing flood of corporate data requires intelligent systems that process and make information accessible efficiently. Retrieval-Augmented Generation (RAG) combines AI models with company-specific data to deliver precise answers—a key tool for modern enterprises. The overarching question is as follows:

How can (multi-agent) AI systems enhance Wielands capacity to process and analyze large volumes of data from multiple sources, thereby improving its forecasting and decision-making processes?

Specifically, you may select one of the following business cases:

- Gain transparency regarding the (optimal) production site for specific materials
- Increase visibility of order statuses and approximated completion data
- Analysis of customer insights, in particular on the basis of global visit reports
- Verifiable and comprehensible process documentation based on existing data

To address these business cases, it is necessary to integrate and consolidate data from different source systems and provide a unified view. Your challenge is to understand user requirements, the system landscape, data contents and structure, and to develop a (multi-agent) RAG system using open-source components.

In order to optimize the accuracy of information retrieval, it is recommended to utilize specialized agents for various tasks, such as retrieval, ranking, and summarization. Implementing dynamic contextual weighting can assist in maintaining a balance between the original query and the retrieved information, thereby enhancing the relevance of the generated responses. Furthermore, adopting a modular multi-agent approach facilitates scalability and flexibility by enabling Wieland to add or modify agents as necessary to manage new data sources or evolving requirements in the future.

Further, the solution must utilize exclusively open-source components (MIT/Apache 2.0), operate on Linux/Docker, and be user-friendly, even for those with limited technical expertise.

Mandatory questions

Following questions should definitely be answered as part of your concept and adressed by your MVP

- What are key requirements of the use case selected?
- To what extend are dynamic data updates (e.g., automated re-indexing) required?
- Which stakeholders are involved and what specific unmet needs do they have?
- How does your solution address the key requirements and unmet needs (please also consider simplification of queries and graphical interfaces)?
- What capabilities could what type of AI agent bring in and how can these effectively combined?
- Which open-source components (LLMs, vector databases, frameworks) are suitable for an MIT/Apache-2.0-licensed system?
- What is the potential impact (i.e., business value) of your solution?
- How does the MVP proof your concept, particularly regarding technical feasability and value add?

- What factors must be taken into consideration to ensure the successful implementation and ongoing maintenance of the solution?

Requirements

Measure of impact

It is essential to introduce metrics that allow to evaluate the effectiveness and performance of the solution.

Roles and responsibilities

The solution should consider clearly defined roles and responsibilities for humans and AI in the threat modeling process; AI should be used to complement and enhance human decision-making, not replace it.

Dynamic Data Handling

The solution must support dynamic data updates, such as automated re-indexing, to handle use cases that require real-time data (e.g., order status tracking).

Reliablity

The system must implement mechanisms to minimize AI hallucinations, latency, and the use of outdated data.

Usability

The solution should incorporate graphical interfaces, such as dashboards or low-code tools, to enhance usability for non-expert users. The UI should simplify complex queries and provide intuitive interactions, like search bars with dropdown filters, to make the system accessible to a broader range of users

Scalability and flexibility

The solution should be designed to handle frequent data updates without compromising performance. It should also be designed for flexibility, allowing specialized agents to handle specific tasks. This will make the system more adaptable to changing requirements and diverse data sources.

Technology

The solution must utilize open-source components that are compatible with MIT or Apache-2.0 licenses. This includes LLMs, vector databases, frameworks, and UI tools.

Goals and outcome

The aim is to propose an innovative digital solution that enhances Wieland's capacity to process and analyze large volumes of data from multiple sources, thereby improving its forecasting and decision-making processes. It must be possible to deploy the MVP in one Business Unit of Wieland within a few months to test the concept and verify the business value.

If the proof of concept is successful, there is the opportunity to present the concept in front of the business units SVP and VPs. This is also a great chance to show case yourself for a job after finishing the master program.

Knowledge base

Once you have decided for one use case, you will get details regarding the specific conditions (organizational, technical) as well as the data sources available (structure and contents). In addition, Michael Ruhland is available for Q&A sessions at fixed times.

Bibliography