

How will Generative AI change decision-making processes in manufacturing

Davide Carneiro, 09/11/2023

INESC TEC - Institute for Systems and
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Science



HCI for seamless interaction with Enterprise Systems

Challenges/Needs:

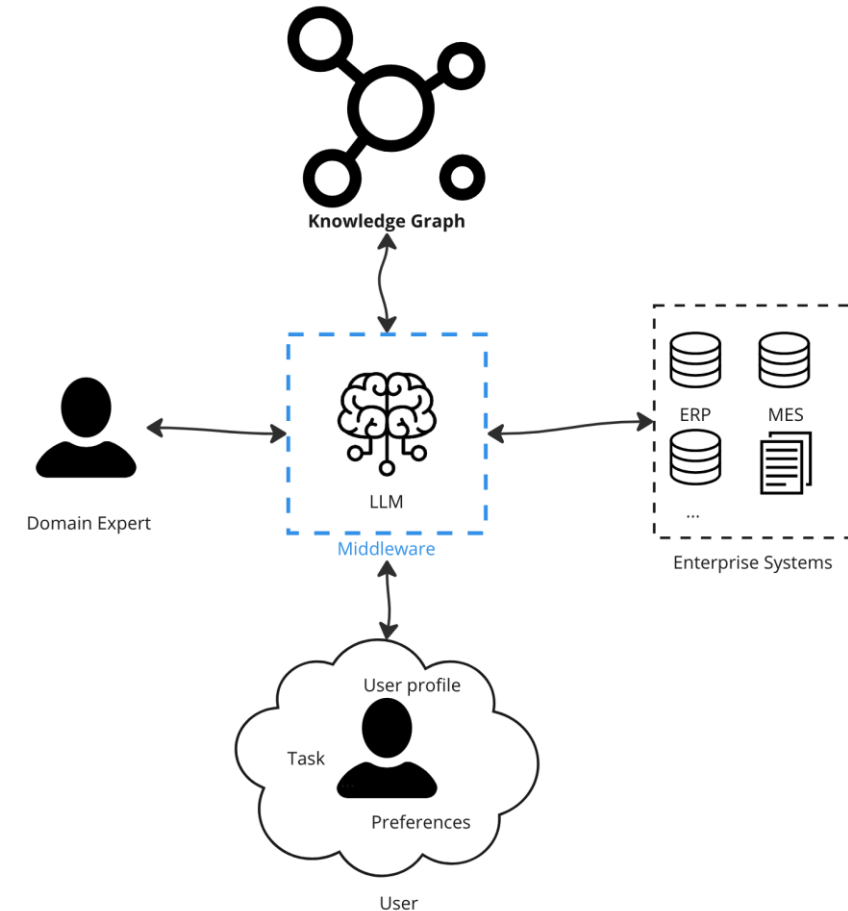
- Information in ES is scattered in different silos
- Compiling valuable information to answer complex needs requires technical knowledge, and the involvement of multiple roles/systems
- Processes are still highly manual and human-dependent

Solution:

- Middleware wrapping an LLM
- Assisted generation of ontology / knowledge graph, based on combined existing data sources
- Natural language interface to query data
- Multi-modal answers

Benefits:

- Move from human-dependent to human-centric
- Barrier-free access to information
- Personalized, adaptable, secure



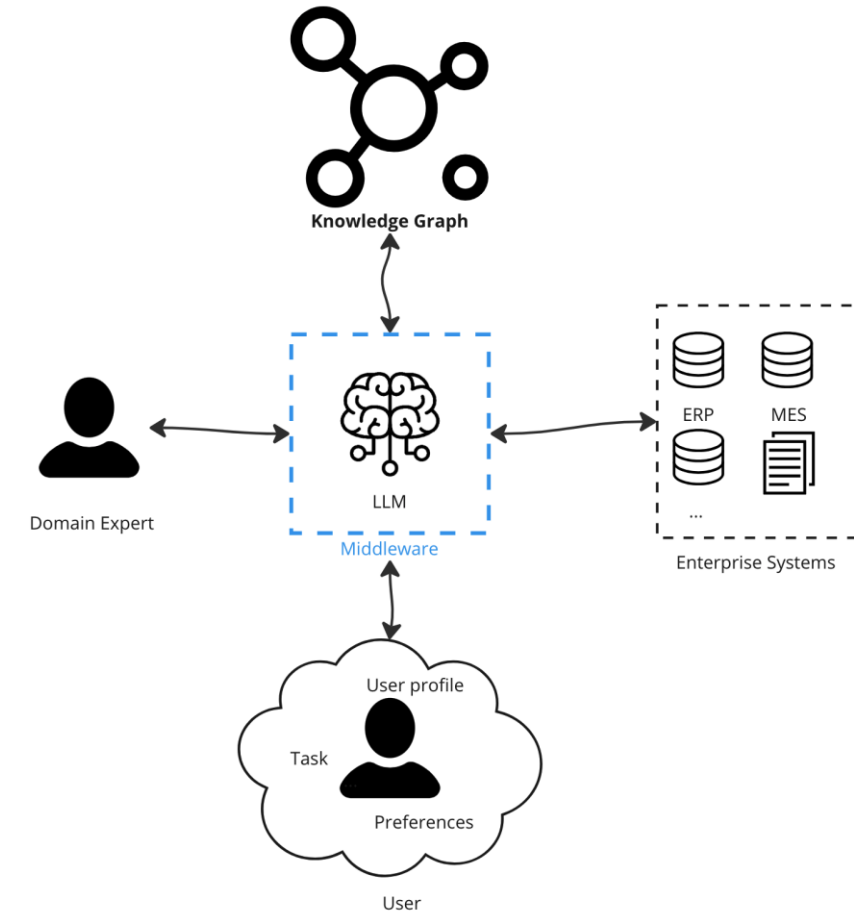
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Development Challenges:

- How to identify relevant concepts and populate a knowledge graph
- How to anchor LLM to the existing knowledge in the organization
- How to ensure data access policies
- How to make the model recognize what it doesn't know (avoid hallucinations)
- How to adapt/personalize answers to individual users

Deployment Challenges:

- Heterogeneous data (sources)
- Low-quality data
- Acceptance from organizations
- Utility vs. value

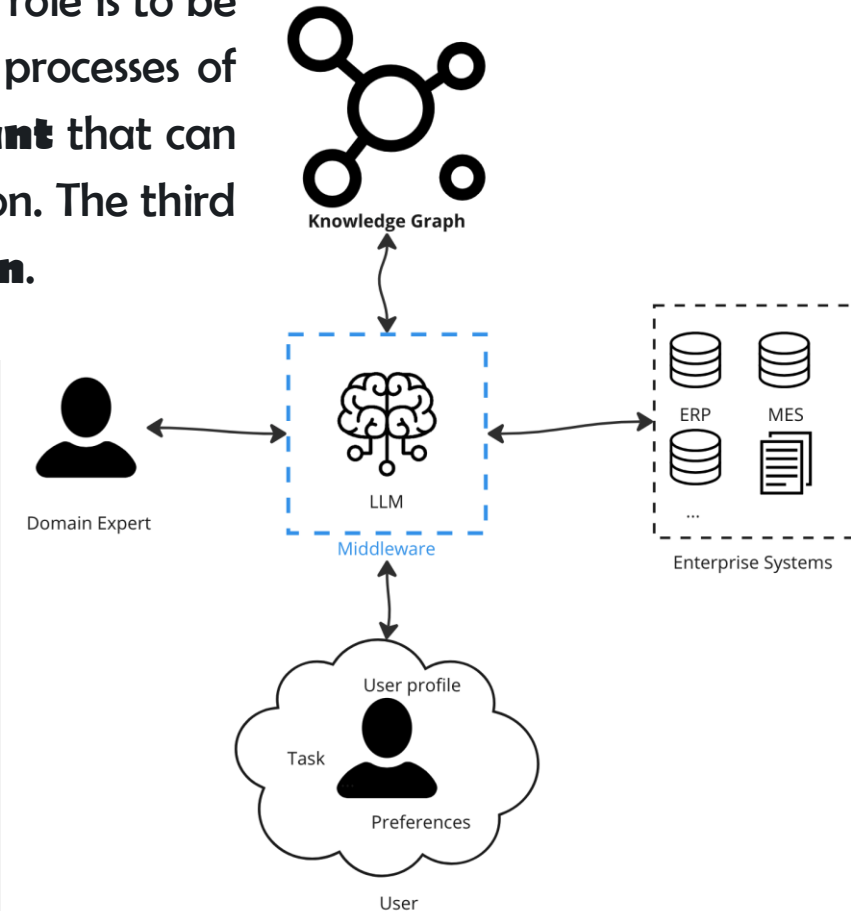


Potential Use cases

In the manufacturing industry, a chatbot has three essential roles. The first role is to be a **technical assistant** in getting accurate information regarding some processes of different levels of production. The second role is to be a **virtual consultant** that can support domain expert describing a problem and prescribe the best solution. The third role is to be a facilitator to **manage activities within the supply chain**.

Examples of Opportunities / Needs

- Describe and understand current production system performance
- Predict and evaluate what-if scenarios to analyze trade-offs
- Prescribe best future solutions based on a multi-dimensional analysis
- Generate customized reports for board meetings
- Supplies and inventory check



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