# LLMs and KGs

##### Session 2.3 (SEMANTiCS)

#### Time: Wednesday, September 18, 2024 - 13:00 to 14:30

#### Chair: Daniel Garijo

## **Talks**

### Context is Key: How Graph RAG Systems Transform Your Customer Interaction [SP]

A few years ago at SEMANTiCS, we talked about what semantic search can do more than traditional search technologies. Today, we are at a similar point with GenAI. We can talk about the enrichment of RAG technologies with semantics and what the strengths of semantic RAG are. However, development is running much faster today. We can already see the first implementations of Semantic RAG and have user experience and benchmarks available next to the theoretical foundation.

| Andreas Blumauer (SWC/PoolParty) | Andreas Blumauer is CEO and co-founder of Semantic Web Company (SWC), the provider and developer of the PoolParty Semantic Platform. With headquarters in Vienna, Austria, but operating globally, SWC has worked with over 200 commercial, government, and non-profit organizations to deliver AI and semantic search solutions, knowledge platforms, content hubs, and related data modeling and integration services. SWC was named to KMWorld’s prestigious list of “100 Companies that Matter in Knowledge Management” from 2016 to 2021 and has been named multiple times in Gartner’s Magic Quadrant for Metadata Management Solutions and as a Sample Vendor in their Hype Cycle for Natural Language Technologies. |
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### Leveraging Semantic Model and LLM for Bootstrapping a Legal Entity Extraction: An Industrial Use Case

Compliance with legal documents related to industrial maintenance is the company's obligation to oversee, maintain, and repair its equipments. As legal documents endlessly evolve, companies are in favour of automatically processing these texts to facilitate the analysis and compliance. The automatic process involves first, in this pipeline, the extraction of legal entities. However, state-of-the-art approaches, like rule-based, Bi-LSTM or BERT for legal entity extraction have so far required a sufficient amount of data to be effective. Creating these training dataset however is a time-consuming task requiring input from domain experts. In this paper, we bootstrap the legal entity extraction by levering Large Language Models and a semantic model in order to reduce the involvement of the domain experts. We develop the industrial perspective by detailing the technical implementation choices. Consequently, we present our roadmap for an end-to-end pipeline designed expressly for the extraction of legal rules while limiting the involvement of experts.

| Julien Breton | Mokhtar Boumedyen Billami |
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| Max Chevalier | Cassia Trojahn |

### Smart Search: How content enrichment and knowledge graphs can help ground your LLM to improve search experience

The evolution towards smart, semantic search capabilities is pivotal in search technologies. This talk delves into a modular, composable solution at this transformation's forefront. Traditional search systems often fall short of understanding the context and semantics of user queries, leading to suboptimal results. Our proposed modular RAG setup solution addresses these shortcomings by offering unparalleled flexibility and customization. “I want our website to be the place where users find answers on their questions and Smart Search is helping us do that”. We showcase the success of this setup by showing how we made this website better searchable, comparing it to the old website and its user experience. Organizations can seamlessly integrate various language models without altering the core architecture, such as OpenAI API, Azure OpenAI API, or open-source LLMs from Huggingface. The solution’s validation process employs benchmark datasets and user-specific data, ensuring the chosen configuration meets the desired search objectives. Deployable on any Kubernetes cluster, it guarantees data privacy and security, whether in a private or public cloud environment. The incorporation of knowledge graphs and content enrichment techniques grounds large language models and enrich search queries, particularly with non-textual, unstructured data. This talk advocates adopting such a semantic solution, highlighting its business value and benefits to the search domain.

| Harold Selman | Paul Verhaar | Pauline van Nies |
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### Leveraging Business Q&A with LLMs over Product Knowledge Graphs

We present PIM systems powered by knowledge graph and the Graph RAG approach, which highlights the system's capability to answer business questions using natural language. The integration of LLMs with PIM systems knowledge graphs results in context-aware answers to complex business questions in natural language using Graph RAG or query languages using SPARQL. It empowers businesses with comprehensive insights, driving informed decision-making in the dynamic product landscape.

| Amir Laadhar | Nikhil Acharya |
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