

From Strings to Things and Back: Putting Logic-based Reasoning into Action in a Central Bank

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Abstract

The talk will present a story of the development of new methodologies, tools, and systems in the Datalog+/- realm, conducted through multiple projects with the Joint Knowledge Graph Lab, which includes the Applied Research Team of the Bank of Italy and the KG Lab of TU Wien. Specifically, a concise overview of recent advancements in implementing scalable Datalog+/- fragments in the Vadalog System will be interleaved with real-world applications in the central banking domain. These applications cover areas such as banking supervision, economic research, data privacy, and large-scale reasoning in complex financial Knowledge Graphs.

Given the recent emergence of Large Language Models, the talk will be an opportunity to discuss the evolving role of logic-based reasoning systems based on Knowledge Graphs (“things, not strings”, as Google stated in 2012). These systems, such as Vadalog, have a unique potential to balance the data-driven, deterministic, and explainable nature of deductive reasoning with the flexibility of modern natural language processing (“strings, not things,” as we might say), which often fails, especially when addressing enterprise questions requiring data and knowledge not available in established public databases. Finally, the talk will offer a chance to comment on the challenges an R&D team faces when spinning off production-ready projects from core database research, which, despite the difficulties, often results in high user satisfaction due to the unique qualities of logic-based approaches, such as explainability, scalability, and the creation of valuable enterprise data assets.

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