Preface for the Second International Workshop on Retrieval-Augmented Generation Enabled by Knowledge Graphs (RAGE-KG 2025)

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RAGE-KG[1] is an academic venue for outstanding research and bold proposals that integrate retrieval-augmented generation (RAG) with knowledge graphs (KGs). As generative AI continues to mature, research at the intersection of language modelling (LM) and knowledge representation (KR) is driven by the need to produce reliable, verifiable, and context-aware responses grounded in structured, decentralised, and authoritative data sources. By uniting symbolic and subsymbolic approaches, RAG systems can address majour shortcomings of generative AI, strengthening trust in AI and fostering interpretability of AI pipelines. The importance of this research area today is evident in its widespread adoption across both academic research and industrial applications. Over 29% of all Research Track contributions accepted at ISWC 2025 [1] focus on integrating semantic technologies with LLMs, while an impressive 73% of Industry Track contributions[2] target this intersection, emphasising its wide and growing practical appeal.

Looking back, in many ways, RAG connects to the foundational vision of the semantic web. Even before the emergence of knowledge graphs, the semantic web was motivated by the idea of *intelligent agents* [2], software programmes that autonomously retrieve, process, and reason over structured information to assist humans in everyday tasks. For decades, however, the agent's inability to sufficiently understand natural language and perform "hausverstand" (i.e., common-sense) reasoning in practical contexts remained a majour obstacle, stalling real-world applications. With the advent of large language models demonstrating contextual proficiency and linguistic understanding, such agents are no longer merely aspirational but fully realisable, enabled by a productive synthesis of symbolic and subsymbolic AI at the nexus of RAG.

The workshop's scope has accordingly evolved considerably since its inception. What began as an effort to address LLM shortcomings such as hallucinations and knowledge cut-offs has transformed into a comprehensive research agenda. RAG technologies now underpin diverse semantic web applications, from knowledge extraction and entity linking to automated query generation and ontology learning. Recent advances in Agentic RAG, GraphRAG architectures, and knowledge-grounded reasoning demonstrate that the field has moved to establish new paradigms for combining symbolic knowledge with

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[1]See: https://rage-kg.org/
[2]See: https://web.archive.org/web/20251020113000/https://iswc2025.semanticweb.org/#/program/acceptedpapers

neural language models.

In 2025,[3] the workshop received 21 submissions, of which 15 were accepted for inclusion in these proceedings. Each contribution received 3–4 reviews during the peer review process. We thank the authors for their high-quality contributions, the programme committee for their diligent reviews, and all participants for their thoughtful engagement in discussions throughout the workshop.

Keynote

The workshop is honoured to feature a keynote presentation by **Roberto Navigli**, full professor[4] of Natural Language Processing at Sapienza University of Rome, Fellow of AAAI, ACL, EurAI, and ELLIS. Roberto Navigli is the creator of BabelNet,[5] the largest multilingual encyclopedic computational dictionary, and co-founder of Babelscape,[6] which focuses on multilingual Natural Language Understanding. His pioneering work in knowledge graphs and semantic technologies positions him at the forefront of GraphRAG research, bridging the gap between structured knowledge and large language models. He leads the Minerva LLM family project,[7] the first pretrained LLM in Italian, and has received prestigious ERC grants for his groundbreaking research in AI and NLP.

Title:
BabelNet, NounAtlas, Concept-pedia, and Other Marvels: Exploring Semantics in the Age of LLMs

Abstract:
Large Language Models (LLMs) have redefined the distributional paradigm in semantics, demonstrating that large-scale statistical learning can yield emergent representations of meaning. Yet, while these models exhibit impressive linguistic fluency and versatility, their internal representations of meaning remain largely opaque, data-driven, and detached from explicit conceptual structure. This talk revisits the problem of meaning representation from a complementary, knowledge-based perspective, presenting an integrated view of several large-scale semantic resources — including BabelNet, NounAtlas, and Concept-pedia — that aim to provide interpretable, multilingual, and multimodal conceptually-grounded frameworks for modeling lexical and conceptual knowledge.

We will also discuss the potential of explicit semantics to interface with LLMs for enhanced interpretability and semantic alignment. In doing so, the talk argues for a renewed synthesis between symbolic and subsymbolic approaches to meaning, illustrating how curated, multilingual knowledge graphs and data-driven models can jointly contribute to a more comprehensive and transparent account of semantics in the era of large-scale neural language modelling.

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[3] See: https://2025.rage-kg.org/
[4] See: http://www.diag.uniroma1.it/navigli/
[5] See: https://babelnet.org
[6] See: https://babelscape.com
[7] See: https://minerva-ai.org

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[2] J. Hendler, O. Lassila, T. Berners-Lee, The semantic web, Scientific American 284 (2001) 34–43.