Knowledge Graph 4 Semantics-driven Systems Engineering

https://omilab.org/activities/events/caise2025_kg4sdse/

Tuesday, June 17th, 2025 - Morning

09:00 - 10:20 Welcome & Keynote

Chair's Welcome Message, Robert Buchmann

Keynote: Towards Knowledge-Graphs Enhanced Task-Oriented Dialogue Systems, Gheorghe Cosmin Silaghi

10:30 - 11:00 Coffee Break

11:00 - 11:25 Full paper
Retrieval-Augmented Generation for Entity Alignment in Knowledge Graphs. An Incipient Experiment, Davide Mario Ricardo Bara, Daria Maria Mesesan and Gheorghe Cosmin Silaghi

11:25 - 11:50 Full paper
Dynamic Adaption of Metamodels based on Knowledge Graphs, Alexander Völz, Danial Mohammadi Amlashi and Junsup Song

11:50 - 12:15 Full paper
Using an LLM to Create Situation-Specific Knowledge Graphs Based on a Domain Knowledge Graph: Practical Possibilities and Semantic Challenges, Steven Alter

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Vienna, Austria

17. June 2025

Knowledge **G**raph **4 S**emantics-**d**riven **S**ystems **E**ngineering

Tuesday, June 17th, 2025 - Afternoon

12:30 - 14:00 Lunch Break

14:00 - 14:25 Full paper
Towards Industry 5.0 in Tourism Sector through Conceptual Modeling and Semantic Interoperability for Personalized Travel Itineraries, Andreea Popoviciu and Ana-Maria Ghiran

14:25 - 14:40 Short paper
Benchmarking Knowledge Graph Question Answering via Complexity-aware Queries, Balázs Mosolygó, Andreas Lothe Opdahl, Guohui Xiao, Jiaoyan Chen and Ana Ozaki

14:40 - 15:30 Closing discussion with the Audience (moderated by the workshop chairs): Knowledge Graphs in Systems Engineering

Knowledge **G**raph

4 **S**emantics-**d**riven **S**ystems **E**ngineering

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Towards Knowledge-Graphs Enhanced Task-Oriented Dialogue Systems
Gheorghe Cosmin Silaghi, Babeș-Bolyai University

Task-oriented dialogue (TOD) systems are conversational bots designed to assist users in accomplishing specific tasks within a predefined organizational context or domain. Opposed to general-purpose chatbots which typically draw upon open-domain knowledge to engage users in casual or entertainment-focused interactions, TOD systems operate on proprietary or domain-specific information and are oriented toward facilitating goal-directed, utility-driven conversations.

In this keynote we will investigate the design and development of a rule-based TOD system tailored to handle company-specific private information, structured and managed through knowledge graphs (KGs). We highlight the flexibility introduced by integrating KGs into the system architecture and examine several limitations inherent to the classical rule-based approach. Furthermore, we outline a set of key scientific challenges that must be addressed to mitigate these limitations. Given the growing success of large language models (LLMs) in addressing a wide range of domain-specific tasks, we also present several findings on leveraging LLMs for the development of a KG-enhanced TOD system.

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Gheorghe Cosmin Silaghi is a Full Professor and Director of the Business Informatics Research Center at Babeș-Bolyai University in Cluj-Napoca, Romania. He earned his MSc in Artificial Intelligence from the Free University of Amsterdam in 2002, and his PhD in Business Informatics from Babeș-Bolyai University in 2005, with a dissertation focused on design principles for collaborative multi-agent systems. Between 2006 and 2007, he held a postdoctoral research position in trust management and dependability for distributed systems within the FP6 CoreGRID Network of Excellence, working at STFC Rutherford Appleton Laboratory (UK) and the University of Coimbra (Portugal). Professor Silaghi has conducted research across several computing domains, including collaboration mechanisms in multi-agent systems, dependable resource management in heterogeneous distributed environments such as grid, volunteer, and cloud computing, as well as natural language processing and machine learning. In recent years, his teaching and research have concentrated on machine learning, deep learning, and artificial intelligence, with a particular focus on business process modeling and operation using Large Language Models (LLMs) and Knowledge Graphs (KGs).