Symbolic vs Subsymbolic Knowledge Representation, an Epic Dilemma?

Harald Sack

Karlsruher Institut für Technologie

Résumé Over the last decade, deep learning methods made tremendous progress. Massive parallelization via GPUs, huge training data harvested from the Web, and efficient neural network architectures enable humanlike or even superhuman performance in specific areas. Huge pre-trained language models seem to capture complex semantics of natural languages and obtain outstanding results in classification, prediction, or generation tasks. The same holds for the image generation domain with models like Stable Diffusion or Dall-E. As a result, do we still need symbolic knowledge representations and logics? Will Deep Learning models take over and will symbolic logic, ontologies, or knowledge graphs become an obsolete niche product? In this talk, we will look at various examples from both worlds and show that each by itself alone might fail. Both sides will have to join forces to succeed and move forward.

Bio Harald Sack is Professor of Information Service Engineering at FIZ Karlsruhe - Leibniz Institute for Information Infrastructure and Karlsruhe Institute of Technology (KIT). After graduating in computer science at the University of the Federal Forces Munich, he worked as a network engineer and project manager in the signal intelligence corps of the German Air Force. In 1997 he became an associated member of the graduate program 'mathematical optimization' at the University of Trier and obtained a PhD in computer science in 2002. After working as a postdoctoral researcher at the Friedrich-Schiller-University in Jena, he headed the research group Semantic Technologies and Multimedia Retrieval at Hasso Plattner-Institute for IT-Systems Engineering at the University of Potsdam from 2009 to 2016. His current areas of research include semantic technologies, knowledge discovery as well as applications of hybrid symbolic and subsymbolic AI. He has served as General Chair, PC Chair, and (Senior) PC member of numerous international conferences and workshops. Harald Sack has published more than 200 scientific papers in peer reviewed international journals and conferences including several standard textbooks.