

Scalable AI – From Scalable Data Management to Neurosymbolic AI

Date: 6 September 2024 (Friday)

Time: 2:00pm - 3:00pm

Zoom: <https://cityu.zoom.us/j/85853246737>



ABSTRACT

Scalability in computer science is often associated with speed. When we talk about scalability in Artificial Intelligence, this is one important aspect – but not the only one. We do not only want answers from our AI systems, we want explanations of these answers. With growing input sizes, can explanations scale so that they remain useful to us as humans? Second, we need our AI systems to be sustainable – so scale down the resource usage and still give good results. Third is we need the AI systems to scale with growing complexity – in my research related to Knowledge Graphs, this is often associated with complexity measures of large graphs and expressive knowledge.

A second key point is broadness: We need broad AI system that scale on all their core components. This first includes scalable data management, allowing effective access to data. Second and third it includes strong scalability in the combinations of the two main AI families: sub-symbolic AI – that is machine learning – and symbolic AI – including logical reasoning. This combination is typically called neurosymbolic AI. Getting all three parts closely working together is not easy, but it is crucial.

In this talk I will give an overview of these points and illustrate them in particular in the area of Knowledge Graphs, where we have need for all of the above: Extremely large real-world graphs with very complex knowledge, the need for clear explanations, and sustainability as a key concern and application at the same time. For this one needs scalable graph data management and both sub-symbolic AI methods such as Knowledge Graph Embeddings or Graph Neural Networks – and symbolic AI methods such as Datalog- and Vatalog-based reasoning. I will give many concrete examples of my work in these areas.



Prof. Emanuel Sallinger

GUEST SPEAKER'S PROFILE

Emanuel Sallinger is professor and Vice Dean of Academic Affairs for Data Science and Business Informatics at the Faculty of Informatics at TU Wien. He leads the Knowledge Graph Lab at TU Wien, a WWTF Vienna Research Group, the SIG Knowledge Graphs at the Center for AI and ML (CAIML), and directed the VADA Laboratory at the University of Oxford. Prof. Sallinger is also lecturer of the courses Databases and Knowledge Graphs at the University of Oxford. He is a Senior Fellow of the Higher Education Academy (SFHEA).