Semantic Data Management and Analytics with Knowledge Graphs

Knowledge graphs (i.e. knowledge bases that adopt a graph-based data model), capture semantic representations of real-world concepts, entities, events and relations, while providing rich information regarding their context and connectivity. Modern large-scale knowledge graphs, with popular examples including Wikidata, DBpedia and EventKG, build a basis for a variety of Artificial Intelligence (AI) applications related to data analytics, retrieval and interaction. In this presentation I will discuss selected research challenges related to knowledge graph completion and adoption of knowledge graphs in AI applications. I will exemplify knowledge graph completion approaches in the context of event-centric and spatio-temporal data. Then I will discuss selected AI methods that adopt knowledge graphs to facilitate semantic data analytics, exploration and retrieval. Specific attention is given to event-centric and cross-lingual data analytics on the Web and within Web archives. Finally, I will briefly illustrate the role of knowledge graphs in novel semantic machine learning workflows and exemplify related data analytics applications in the mobility domain.

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