UBIQUITOUS KNOWLEDGE PROCESSING

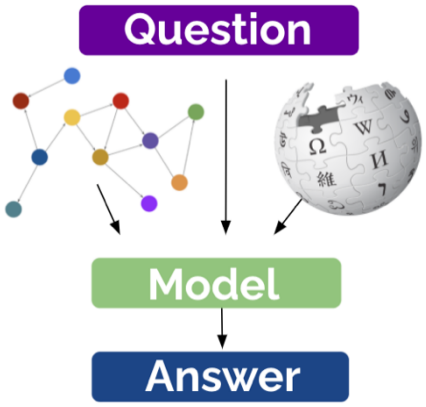
Master Thesis

TECHNISCHE UNIVERSITÄT DARMSTADT

Reasoning with Knowledge Graphs for Question Answering

Motivation

Question answering (QA) models must be capable of obtaining appropriate knowledge and reason over it (e.g., multi-hop reasoning). Typically, knowledge can be implicitly encoded in large pretrained language models (PLMs), or explicitly represented in structured knowledge graphs (KGs), such as DBPedia and ConceptNet, where nodes are entities and edges represent relations between them. PLMs have comprehensive coverage of knowledge, but they do not empirically perform well on structured reasoning. On the other hand, KGs are more suited for structured reasoning. This project aims to develop and research deep learning techniques to answer questions using knowledge from pre-trained language models (PLMs) and knowledge graphs (KGs).



Task Description

- Propose new ideas for QA based on Knowledge Graphs
- Improve and extend QA models (PyTorch / Pytorch-geometric, Huggingface Transformers)
- Study Graph Neural Networks as graph/node/edge encoder for multi-hop reasoning
- Propose, train and evaluate distinct QA models
- Evaluate the proposed models on the different datasets

References

- Learning to Retrieve Reasoning Paths over Wikipedia Graph for Question Answering Akari Asai, Kazuma Hashimoto, Hannaneh Hajishirzi, Richard Socher, Caiming Xiong. ICLR 2020
- Improving Multi-hop Question Answering over Knowledge Graphs using Knowledge Base Embeddings Apoorv Saxena, Aditay Tripathi, Partha Talukdar. ACL 2020
- QA-GNN: Reasoning with Language Models and Knowledge Graphs for Question Answering Michihiro Yasunaga, Hongyu Ren, Antoine Bosselut, Percy Liang, Jure Leskovec. NAACL 2021

Analysis	■■■■□
Programming	■■■■□
Literature	■■■■□

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