Unsupervised specialization of LLMs for QA

Courses: MEI; MCD
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Context and objectives

Recent advancements in large language models (LLMs) have revolutionised how we interact with technology, enabling models to "understand" and generate human-like text, and directly respond to natural language queries. Apart from the popular and sometimes amusing "hallucinations", LLMs display other limitations such as the lack of depth in specific subjects, particularly if the information needed resides outside their training data, which is aggravated by the inability to update their knowledge base after training.

The objective of this work is to study and propose a method for "cheaply", and without any training data, turning an existing open-domain LLM into a domain expert with the capability of answering questions using knowledge retrieved from an external document collection (outside the LLM training data).

This work will also give continuity to the group's successful participation in the BioASQ challenge (http://www.bioasq.org/participate/eleventh-challenge-winners).

Technologies and frameworks: The work will be based on deep learning frameworks, namely PyTorch and HuggingFace.

Work plan

- Literature review on LLMs and neural information retrieval (IR)
- Design and development of the LLM specialization method
- Validation of resulting models on available benchmark datasets
- Application and validation on the BioASQ challenge (subject to results and timeline of work)
- Dissertation writing