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Empowering Transformers for Evidence-Based Medicine

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Abstract : Breaking the barrier for practicing evidence-based medicine relies on effective methods for rapidly identifying relevant evidence from the body of biomedical literature. An important challenge confronted by medical practitioners is the long time needed to browse, filter, summarize and compile information from different medical resources. Deep learning can help in solving this based on automatic question answering (Q&A) and transformers. However, Q&A and transformer technologies are not trained to answer clinical queries that can be used for evidence-based practice, nor can they respond to structured clinical questioning protocols like PICO (Patient/Problem, Intervention, Comparison and Outcome). This article describes the use of deep learning techniques for Q&A that are based on transformer models like BERT and GPT to answer PICO clinical questions that can be used for evidence-based practice extracted from sound medical research resources like PubMed. We are reporting acceptable clinical answers that are supported by findings from PubMed. Our transformer methods are reaching an acceptable state-of-the-art performance based on two staged bootstrapping processes involving filtering relevant articles followed by identifying articles that support the requested outcome expressed by the PICO question. Moreover, we are also reporting experimentations to empower our bootstrapping techniques with patch attention to the most important keywords in the clinical case and the PICO questions. Our bootstrapped patched with attention is showing relevancy of the evidence collected based on entropy metrics.

Keywords : automatic question answering, PICO questions, evidence-based medicine, generative models, LLM transformers
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