Large Language Models as Syntactic Annotation Labelers for Logical Information Retrieval

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Abstract

This paper presents what we believe is a novel research question: can *large language models* act as *linguists* to facilitate *open-domain semantic parsing*? Open-domain semantic parsing would allow a new kind of information retrieval based on *logical proofs*, and would be highly valuable, but has historically been rate-limited by the cost and reliability of *human syntactic annotations*. We present a careful review of past results—as well as important *new* results—that together show that LLMs *can* reliably perform syntactic annotation, but that this ability is highly dependent on the choice of *prompt*. We analyze past findings that LLMs cannot act as zero-shot CoNLL dependency parsers, and present a novel analysis as to why, based on the computational complexity of dependency parsing. We also present several novel experimental results further showing that LLMs *can* act reliably as linguists, especially in tasks closely related to *semantic parsing*. The performance level of the LLM appears comparable to that of a human annotator. We believe these results suggest that full open-domain semantic parsing should be possible, given the right *agentic* control flow—that is, a sequence of calls to LLMs and other tools—thus unlocking a new kind of *logical* information retrieval.