Artificial Intelligence and Artificial Ignorance

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Abstract

This invited talk first delves into the division between the two primary branches of AI research: symbolic AI, which predominantly focuses on knowledge representation and logical reasoning, and sub-symbolic AI, primarily centered on machine learning employing neural networks. We explore both the notable accomplishments and the challenges encountered in each of these approaches. We provide instances where traditional deep learning encounters limitations, and we elucidate significant obstacles in achieving automated symbolic reasoning. We then discuss the recent groundbreaking advancements in generative AI, driven by language models such as ChatGPT. We showcase instances where these models excel and, conversely, where they exhibit shortcomings and produce erroneous information. We identify and illustrate five key reasons for potential failures in language models, which include:

- **(i)** information loss due to data compression,
- **(ii)** training bias,
- **(iii)** the incorporation of incorrect external data,
- **(iv)** the misordering of results, and
- **(v)** the failure to detect and resolve logical inconsistencies contained in a sequence of LLM-generated prompt-answers.

Lastly, we touch upon the Chat2Data project, which endeavors to leverage language models for the automated verification and enhancement of relational databases, all while mitigating the pitfalls (i)–(v) mentioned earlier.

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