Facilitating cognitive synergy: AI's ability to support collaborative cognitive search strategies

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Recent advances in large language models (LLMs) have garnered attention for their unprecedented text generation capabilities. Indeed, in many language-based tasks, the need for human input has been greatly reduced or even eliminated. However, rather than replacing humans, LLMs may serve as cognitive aids to humans particularly when they are engaged in a task requiring open-ended conceptual exploration and creativity. Our perspective is that we are yet to understand how these models may enhance human cognitive abilities in such a paradigm of human-AI interaction. In this study, we explore and evaluate distinct interaction mechanisms designed to enhance the synergy between the cognitive processes of humans and their collaborative LLMs in order to optimize collective performance. By focusing on semantic memory search, a classic cognitive experimental task used to interrogate convergent and divergent thinking in humans, we will be able to tractably analyze large-scale datasets of human-LLM interactions using well-established theoretical tools. In particular, we will test whether such cognitive synergy can enable the paired human-LLM collaboration partners to surpass individual or paired human search performance, and thus overcome previously observed collaborative inhibition effects. More generally, our core hypothesis to be tested in this study is that human-AI collaboration can be designed to synergize cognitive strategies, whereby human contextual understanding and AI's broad associative capabilities may fruitfully combine to explore conceptual spaces more effectively than either can achieve alone. We believe that this would provide solid empirical evidence and guidance regarding an alternative framework for collaborative human-AI engagement.

LLMs, Cognitive Synergies, Cognitive Alignment