

Envisioning: The Cognitive Challenge of Prompt-based LLM Interactions

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Abstract

Large language models (LLMs) such as ChatGPT have replaced conventional interface designs with prompt-based natural language interactions. LLMs exhibit dynamic capabilities to fulfill a broad range of tasks and ad-hoc functionalities (e.g., “rewrite these appliance installation instructions for a five-year-old”). However, their open-ended interface replaces Norman’s gulf of execution with a new cognitive challenge for end-users; namely, the gulf of envisioning clear intentions and task descriptions in prompts to obtain a desired LLM response. To address this gap, we propose a cognitive model of the Envisioning process based on protocols of generative AI prompt-based interactions. The model highlights three cognitive challenges people face when requesting help from LLMs: (1) what the task should be (intentionality gap), (2) how to give instructions to do the task (instruction gap), and (3) what to expect in the LLM’s output (capability gap). We make recommendations to narrow the gulf of envisioning in human-LLM interactions.