Toward Value Scenario Generation Through Large Language Models

HCAILab

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HL EXPLAIN THE BACKGROUND.

In the early stage of technology development, observing the behaviors of target users is crucial, yet difficult, especially when those users are vulnerable populations, such as North Korean defectors, older adults, and children. Besides direct observations, surveys and interviews are used to identify vulnerable populations' challenges. However, **when conducting surveys and interviews with those target users is impossible, researchers create personas and scenarios** describing how users interact with potential technologies.

Among multiple approaches for observing target users to learn about their needs, **value scenario is an extension of scenario-based design, enabling researchers to consider the systemic effects of new technologies.** Value scenarios draw upon five key elements to develop provocative sketches of the future: Stakeholders, Pervasiveness, Time, Systemic Effects, and Value Implications.

HL WHAT IS THE PROBLEM?

Creating value scenarios requires researchers an adequate understanding of the elements of value scenarios and more time and data for a concrete description. **Thus, researchers need to put additional efforts into producing value scenarios.**

HL HOW IMPORTANT IS TO ADDRESS THE PROBLEM?

Addressing the problem is crucial as we could **help researchers reduce their cognitive load when producing value scenarios.** A lowered cognitive load in creating value scenarios would make them more approachable, thus encouraging researchers toward a user-centered approach.

Large Language Models (LLMs) such as GPT4, are powerful tools for generating texts. LLMs can be used to support researchers in generating value scenarios.

Nevertheless, little is known about the feasibility of LLMs in scenario generation.

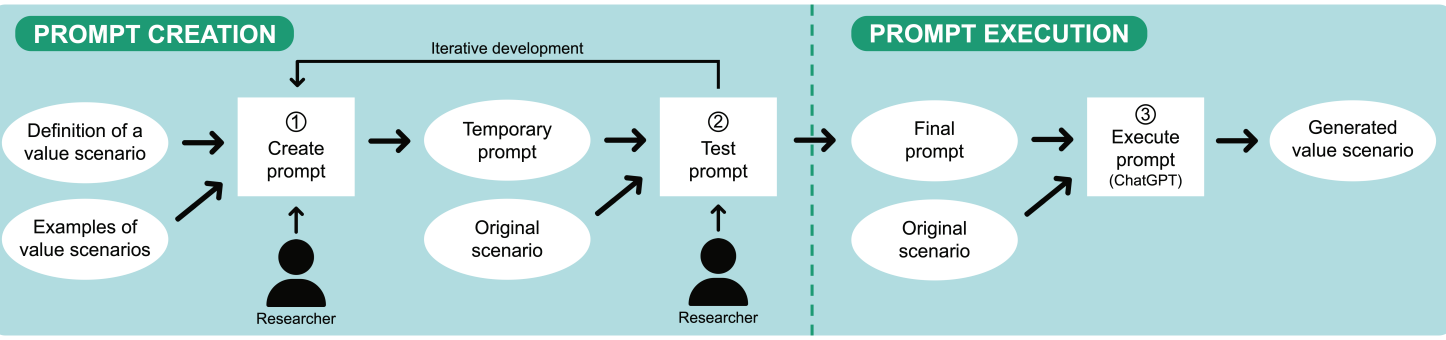
Is it feasible to leverage LLMs in value scenario generation?

1 Propose a method for leveraging LLMs to create value scenarios

The below figure is the process of creating and executing prompts for generating value scenarios. **We used ChatGPT with the version of GPT-4 to generate scenarios.** ChatGPT generated value scenarios using the final prompt developed from PROMPT CREATION and two scenarios containing North Korean defectors (Persona Kim & Lee). We performed this process twice for each scenario, resulting in four value scenarios.

2 Evaluate the method's performance by analyzing the quality of the generated scenarios

We used the five key elements of the value scenario for deductive coding as the initial set of codes. Two researchers identified the five key elements from the ChatGPT-generated value scenarios. Based on the codes, each researcher **measured the quality of each element described in the scenarios from low (1) to high (3) based on how many details.**



HL WHAT ARE THE FINDINGS?

- **LLMs enabled researchers to create structured value scenarios.**
  All four ChatGPT-generated scenarios presented the five key elements of value scenarios.
- **LLMs provided plausible information for certain elements.**
  The levels of detail describing elements, such as Stakeholder, Time, and Value Implications, were higher compared to Pervasiveness and Systemic Effects.

*low ○○○ moderate ●●○ high ●●●

Element	Kim #1	Kim #2	Lee #1	Lee #2
Stakeholder	●●●	●●●	●●●	●●●
Time	●●○	●●○	●●●	●○○
Pervasiveness	●○○	●●●	●○○	●○○
Systematic Effects	●○○	●●○	●●○	●●○
Value Implications	●●●	●●●	●●●	●●●

- **LLMs provided additional information not described in the original scenario.**
  For instance, ChatGPT offered additional information about how the given persona's needs changed or problems resolved over time after using the proposed system.

HL WHAT ARE THE CONTRIBUTIONS?

- We offer a technology leveraging LLMs that enables researchers to generate value scenarios.
- We demonstrate the capacity of LLMs to generate value scenarios in the early stage of technology development.

HL WHAT ARE THE NEXT STEPS?

- Assess the quality of generated value scenarios based on personas of diverse populations other than North Korean defectors.
- Conduct a large-scale study that would allow generalizing the study results by generating and evaluating more scenarios.
- Evaluate value scenarios generated by LLMs thoroughly to determine if they are biased or misleading.

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