Thesis Project Portfolio

Simon Says with NAO: Investigating Enjoyment of Social Games with Robots

(Technical Report)

Investigating How Humans Will Interface with an LLM-Integrated Internet

(STS Research Paper)

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Executive Summary

In a hypothetical world where humanoid robots are widely integrated into our society, how will humans feel about interacting with them? This is an increasingly likely scenario considering the rate at which the field of robotics is progressing. Companies such as Boston Dynamics are manufacturing robots that can perform backflips and other acrobatic maneuvers recently thought to be impossible to successfully pull off with robots.

In my technical capstone project, I collaborated with a team of students to explore the impact of human-robot interaction (HRI) in social settings. Our project, "Simon Says with NAO: Investigating Enjoyment of Social Games with Robots," involved designing and conducting an experiment with 24 participants and one NAO robot. The participants were split into control (just humans) and experimental (humans with one NAO) groups in which they played Simon Says. To collect data, we had participants fill out questionnaires following their experiences. The study indicated that the presence of the NAO robot in a social game like Simon Says could enhance enjoyment and lead to positive interactions between humans and the robot. However, it was unclear to what extent the enhanced enjoyment was caused by its novelty. Further work could include a longitudinal study to observe how novelty could have been influencing enjoyment. In addition, improving the robot's competence and effectiveness could be of interest.

This HRI project provided valuable insights into how humans perceive and engage with robots in social environments. We found that the presence of a robot in a social game like Simon Says could enhance enjoyment and lead to positive interactions between humans and robots. This experience provided me with a solid foundation for understanding the complexities and nuances

of human-computer interaction, which served as the basis for my STS research paper on LLM-powered conversational interfaces.

Soon, you will not be sifting through page results; with Large Language Models (LLMs), you will be conversing with the internet. Currently, when seeking information, we choose a search engine and input a set of keywords to find websites that will hopefully contain that information. Sometimes, we input complete sentences as if we're speaking to a sentient being, in the hopes that the engine will "understand" what we truly seek. LLMs are a type of artificial intelligence (AI) which are trained on a large corpus of text (namely, the whole internet) that specialize in predicting the "next word" with very high accuracy given an initial prompt. This enables them to have human-like conversations.

For my STS research paper, I explored how Large Language Models (LLMs) can elevate the convenience of internet search for the average user. Since they are so adept at "understanding" human language and its nuance, we can have more natural-sounding conversations with our computers. Additionally, LLMs can hold back-and-forth conversations with users using context. This opens up a world of opportunities for users to refine what they want to search for. The continuous iteration of information search within the conversation window of an LLM chatbot enables users to acquire knowledge with similar effectiveness to that of speaking with a subject matter expert —one that is available 24/7.

In this paper I employed two strategies within the Value Sensitive Design (VSD) framework to explore how Large Language Models (LLMs) can change how we search the internet. The VSD framework emphasized the importance of human values throughout the design process, guiding the investigation.

I first conducted a literature review. I investigated the history of LLMs/chatbots and how they've evolved by looking into seminal academic papers as well as modern articles to construct a wide overview of the technology. I sought viewpoints from both sides — from those who see the technology as dangerous or unproductive, to those who believe it will pave the way for everything we do in the future. This literature review, conducted through the lens of VSD, evaluated the capabilities and limitations of LLMs, identifying how they can either enrich or hinder the online human experience.

Second, I conducted an interview. I spoke with someone who represents the average internet user and remotely observed their screen as they completed search tasks with and without LLMs. I then inquired about their experience to gain a human perspective on the subject.