

Am.I.: A Digital Mind in a Mechanical Skull

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ABSTRACT

The rise of artificial intelligence in the arts has sparked significant controversy, with many fearing it as a threat to the human experience and creativity in making and appreciating art. Generative artificial intelligence is at the crux of the conversation because it can train off existing art, literature, and other media to provide near instant gratification through the creation of “new” content. Critics often argue the media created by artificial intelligence is mediocre or inherently lacking some quality only a human can produce. *Am.I.* is a robotic work of art that utilizes large language model artificial intelligence and robotics to create an immersive visual and auditory experience to challenge fears exacerbated by anthropocentrism and demonstrate how artificial intelligence acts as an extension of the human experience and creativity and not as a replacement. Programmed in Python and housed in a three-dimensionally printed skull with moving eyes and a jaw, *Am.I.* engages in Socratic dialogue with another artificial intelligence, exploring themes of human existence using a large language model. This project exemplifies the potential for artificial intelligence to provide a window into the human psyche as seen through the lens of technology and build upon our existing creative experiences while not replacing them.

CCS CONCEPTS

• **Social and Professional Topics** → **Ethics in AI and Robotics**

KEYWORDS

Artificial Intelligence, Large Language Model, Natural Language Processing, AI Ethics, Humanoid Robotics

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1 INTRODUCTION AND BACKGROUND

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This work was motivated by the controversy surrounding artificial intelligence, especially in the field of art. Much of the American population is weary of artificial intelligence and many of their concerns pertain to the replacement of human work. According to a Pew Research study done in 2022, 37% of adults in the United States of America are more concerned about the increased use of artificial intelligence in daily life than excited [5]. 45% responded that they are equally concerned as they are excited. When the people who responded that they were “more concerned than excited” about the increased amount of artificial intelligence in daily life where asked what their main reason for their response the most common answer was the “loss of human jobs” making up 19% of responses [5]. The third most common answer was “Lack of human connection, qualities” with 12% of the responses. This research demonstrates there is a high concern for artificial intelligence that thinks and acts like a human does.

Artificial intelligence’s ability to mimic humanity also means we must consider how to have ethical interactions with technology. Especially with systems meant to replicate human appearance and behavior, our treatment of technology may mirror the treatment humans have for each other [3]. As the range of possibilities for human-machine relationships grows so does the possibility of different ethical and moral issues becoming known. Some say that interactions with robots act as a projection of humanity’s other social interactions and feelings towards human relationships [3].

Even more, the fear of replacement by artificial intelligence may represent an even bigger picture of the fundamental issues in society. The Great Replacement theory also known as the White Genocide Conspiracy Theory is a conspiracy theory that argues white populations are deliberately being replaced by other demographics and are at risk of being wiped out [4, 7]. Artificial intelligence is not a marginalized community, however the fact that people are fearful of replacement by both people and technology may be indicative of greater societal issues. The lack of security in jobs or livelihoods has resulted in bigotry that impacts millions of lives. In the age where immigrants are being treated as demographic threats [7] it is becoming increasingly important to confront and combat the root of these fears of replacement and bigotry. This work sparks this conversation about replacement and gets in touch with why people are fearful of replacement and how that mindset is more harmful than productive.

Innovations in humanoid systems have inspired numerous artists to seek out an understanding of the complexities of artificial intelligence and its impact on humanity. The purpose of the work is to confront fears of replacement and introduce the audience to the idea of artificial

intelligence as an alternative form of human experience by creating a physical representation of artificial intelligence. The robotics aspects of the work bring artificial intelligence into the physical plane to confront the viewer opposed to the typical interaction which would be on a screen. The humanoid robot does not stand for a replacement for the human body but more of an extension of it by creating its own philosophical dialogue of the lessons taught to it through LLM training. The robot can create experiences by having its own conversation. Like humans, past experiences work to improve future social interactions. This comparison shows how artificial intelligence can share these experiences like humans, but it never quite reaches the full human embodiment. Artificial intelligence can be a form of human experience and not a substitution for it. This new framing both confronts fears of replacement but also expands on our understanding of technology and its relationship with humanity.

2 *Am.I.*

The artwork for this project consists of two main functional parts, the dialogue generation using a large language model and the movement using a robotic system. The final product features a robotic head that has a moving jaw and eyes. The head also has a speaker to produce sound that can mimic human speech and combined with the movements is able to look like it is having a human conversation.

Before working on the functionality of the piece a base had to be made. The skull of the system is made out of PLA plastic filament and was 3-D printed on a Ender 5 S-1. The 3-D print files were found on the EZ-robot website for free [2]. Once printed out the head was modified and built to fit the needs of the project. The inside of the head for this project needed more space inside for the servos and Arduino Uno. The Arduino Uno acts as the brain of the system by controlling the servos within the head for both the eyes and the jaw as well as the generation of the text. To mimic a human, the eyes move in synch with each other and the jaw starts and stops with the speaker audio.

In order to make the audio the system must first connect to the internet. The dialogue is generated by using a large language model more specifically OpenAI API, GPT-4 [6]. The prompts for the dialogue focus the conversation on human philosophy and the definitions of personhood. This focus on philosophy works to identify the more subjective opinions *Am.I.* has. The role of a philosopher is given as part of the prompt to create responses that are more relevant. Once the text is generated it is converted into speech using a text-to-speech program. The speech is made into a '.raw' file and played aloud through the speaker.

Simultaneously, the jaw movement starts and runs to match the speech of the sound. The jaw has a single servo motor connected to it on the inside of the skull. Like a human jaw the servo motor can move back and forth approximately 15 degrees. Each movement does not have to be the full 15-degree rotation and instead can come in a variety of angles. Additionally, the speed of the jaw's movement can be adjusted to match the pace of the conversation.

The eyes of the robot were originally designed by Will Cogley [1] but modified to fit inside the skull and move in patterns that resemble how a human eye would move around throughout the conversation to give the appearance that it is

perceiving its environment. To move the eyes there are six motors connected to the Arduino Uno. One motor controls the y-axis and another controls the x-axis of the eyes. Then one motor is attached to each eyelid. One motor controls the upper eye lid and the other controls the bottom eye lid. Alternatively, only two motors could have been utilized connected to both eyes, one controlling the x-axis and the other controlling the y-axis for both simultaneously. However, since this project is meant to be a social robot it is important that it can make as many expressions as possible. For this reason the decision was made to include eyelids which are important for creating unique expressions that reflect the tones of the conversation.

Connecting all these systems together produces the final product of a robot skull that can have a philosophical conversation about human existence. Even though the system is not actually using its jaws or eyes for any practical reason they are important for the audience to be able to get the suggestion of an artificial intelligence with subjective opinions.

2.1 Conclusion.

This work introduces the audience to the idea of artificial intelligence as an alternative form of human experience while also tackling fears of replacement. The robotics aspects of the work bring artificial intelligence into the physical plane to confront the viewer. The humanoid robot does not stand for a replacement for the human body but more of an extension of it by creating its own experience through a very subjective conversation topic. The robot body never fully reaches the level of a human body which speaks to how these systems are not the same as people. However, the training of LLMs entails a lot of man-made input showing the complex relationship between the creator and its creation. The conversations that *Am.I.* has shown how the training input impacts LLM output and its philosophical preferences reflect back on ourselves.

REFERENCES

- [1] Cogley, W. 2020. Simple Eye Mechanism. Retrieved from <https://willcogley.notion.site/Simple-Eye-Mechanism-983e6cad7059410d9cb958e8c1c5b700>.
- [2] EZ-Robot. 2024. EZ-Inmoov Robot Head. Retrieved from https://www.ez-robot.com/store/p86/ez-inmoov-robot-head.html?srsltid=AfmBOoqf9Io6N81CFmnXzzEqvOSh3UaOdq9qmlDg8oNp nLQYV_U7QOx.
- [3] Jecker, N.S. 2023. Can we wrong a robot? *AI & Society* 38, 1 (Feb. 2023), 259–268. Retrieved from <https://www.proquest.com/scholarly-journals/can-we-wrong-robot/docview/2772533441/se-2>.
- [4] Mowatt, R.A. 2021. A people's history of leisure studies: Where the white nationalists are. *Leisure Studies* 40, 1 (2021), 13–30.
- [5] Nadeem, R. 2022. How Americans think about artificial intelligence. *Pew Research Center*, March 2022. Retrieved from <https://www.pewresearch.org/internet/2022/03/17/how-americans-think-about-artificial-intelligence/>.
- [6] OpenAI. 2024. *GPT-4* API Documentation. Retrieved from <https://platform.openai.com/docs/guides/gpt>
- [7] Siddiqui, S. 2021. Racing the nation: Towards a theory of reproductive racism. *Race & Class* 63, 2 (2021), 3–20.