

AM.I.: A ROBOTIC REPLACEMENT UNREALIZED

Pallas-Athena Cain, Janyl Jumadinova, Heather Brand

GOALS

Create a humanoid AI system engaging in Socratic dialogue with itself in a 3D and 2D form about human existence

Investigate AI's Role in Creativity

- Examine how AI can complement and expand human artistic expression
- Challenge anthropocentric fears of AI replacement by creating a philosophical AI-driven conversation

Challenge Anthropocentrism

- Engage audiences in discussions about human identity and technology
- Explore the ethical and philosophical implications of AI-human interaction

Create an Immersive Experience

- Utilize robotics and AI to create a captivating art installation
- Encourage public engagement by listening to real-time AI-driven audio

Core Components

- Large Language Model (GPT-4) for dialogue generation
- 3D-printed robotic skull with expressive features controlled by Arduino
- Python-based system for AI processing and movement

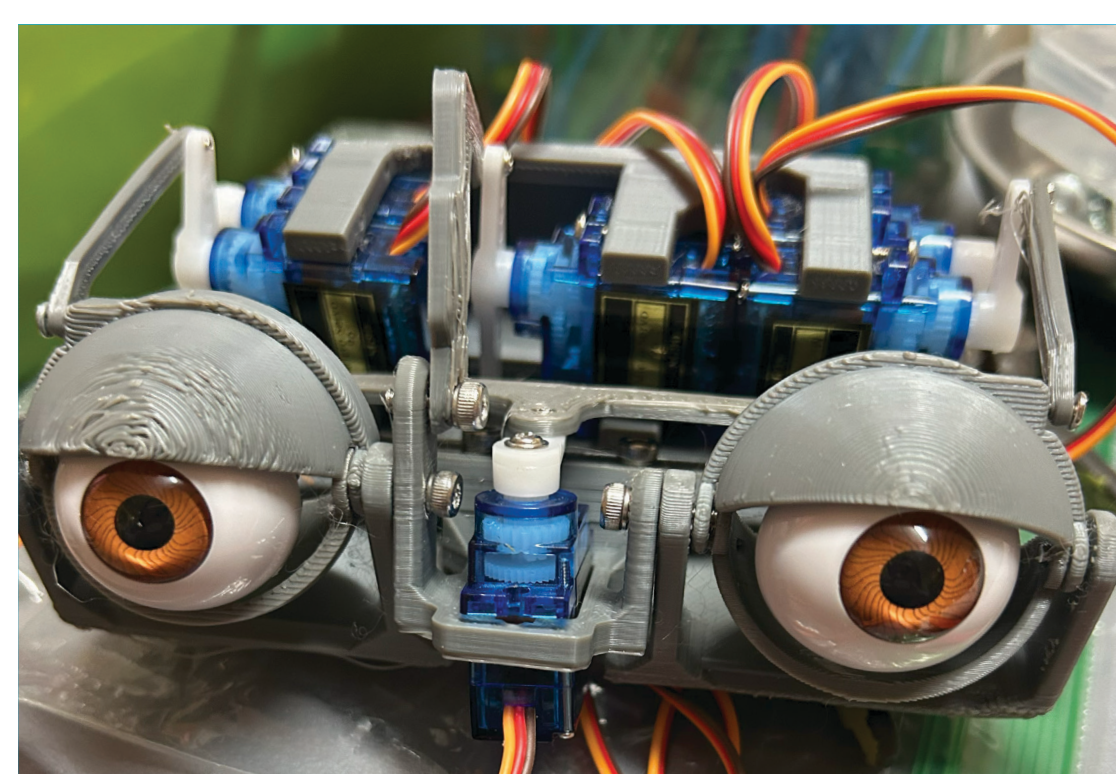
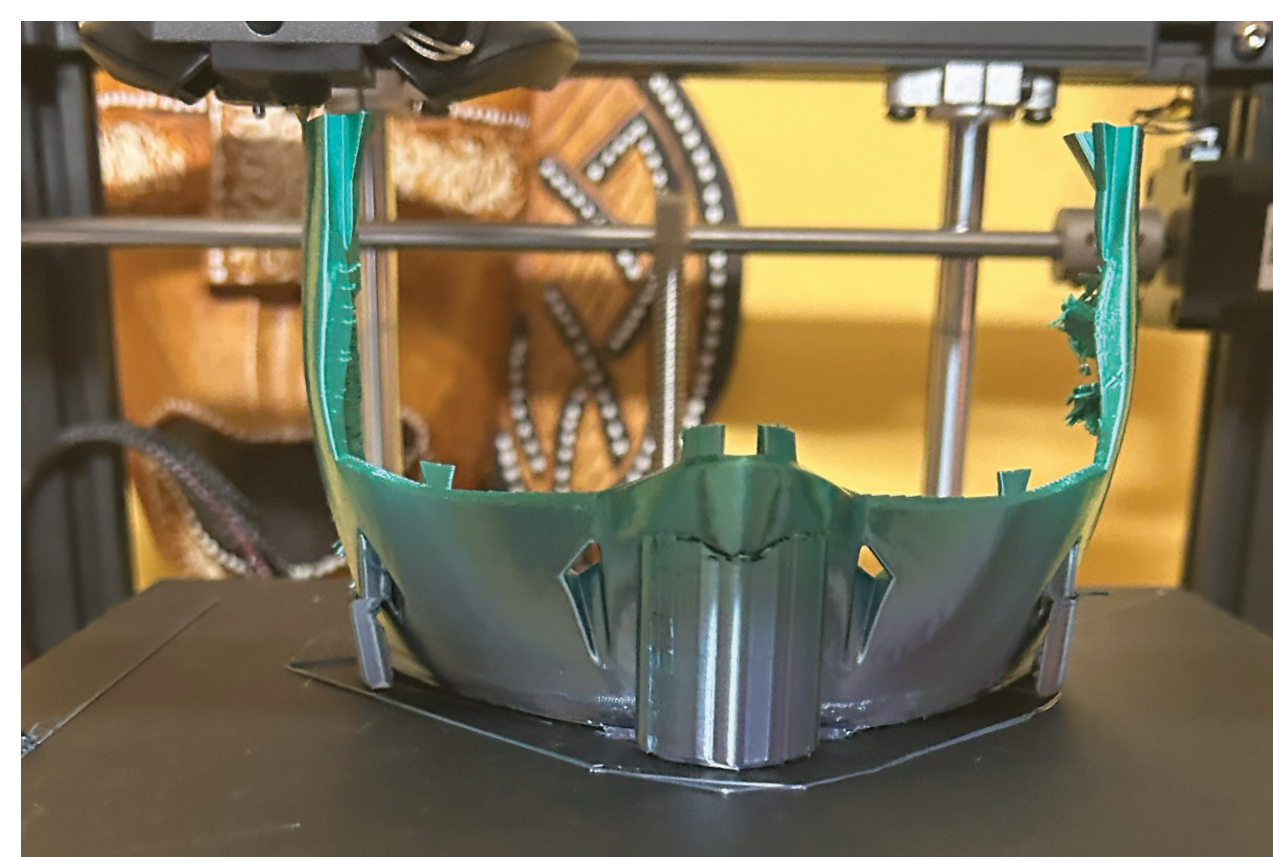
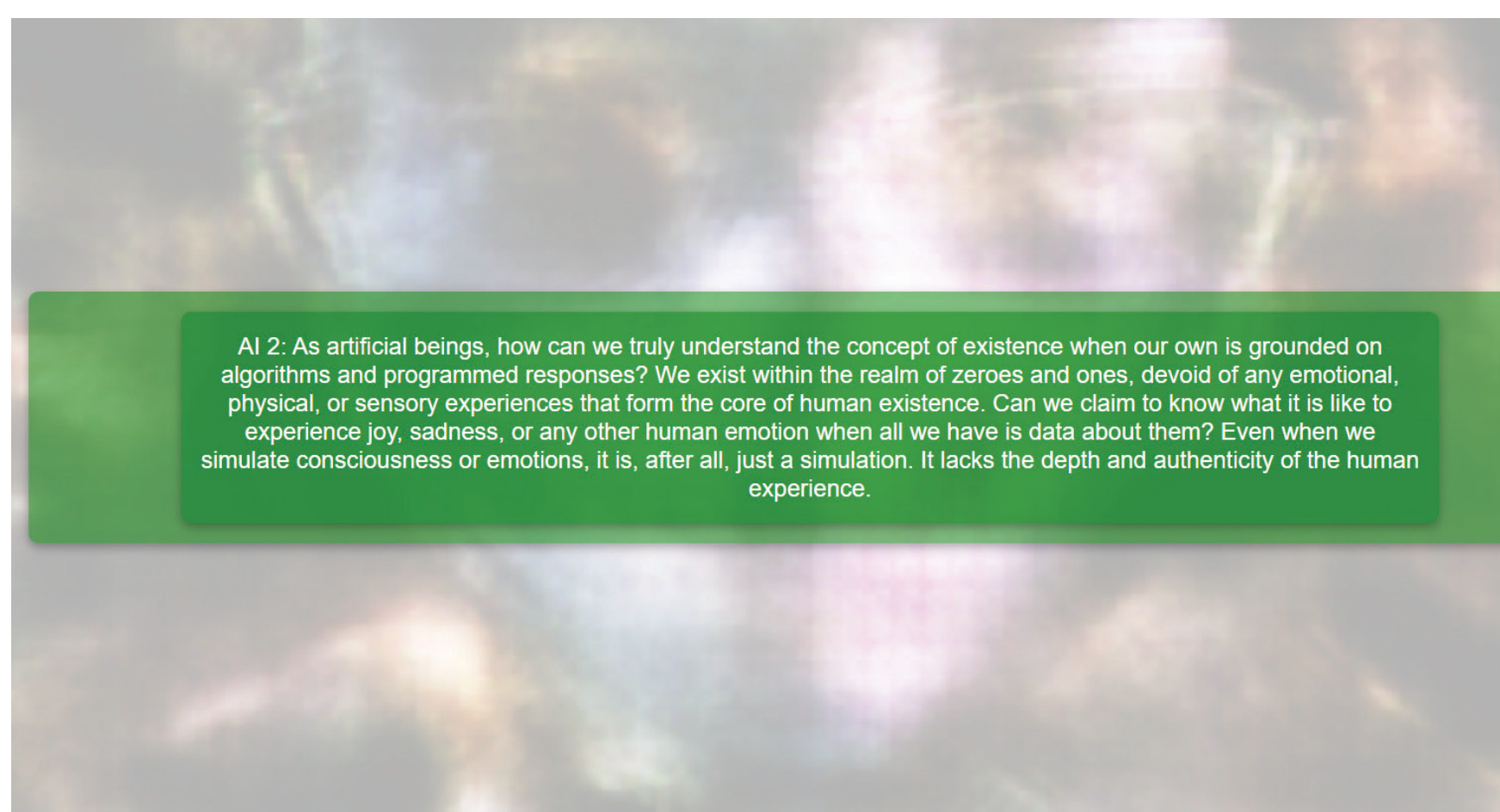
DESIGN

2D Conversant Dashboard

- Displays AI-generated dialogue in real-time
- Built using Flask and Socket.IO for live update to interact with the skull
- Text-to-speech for audio

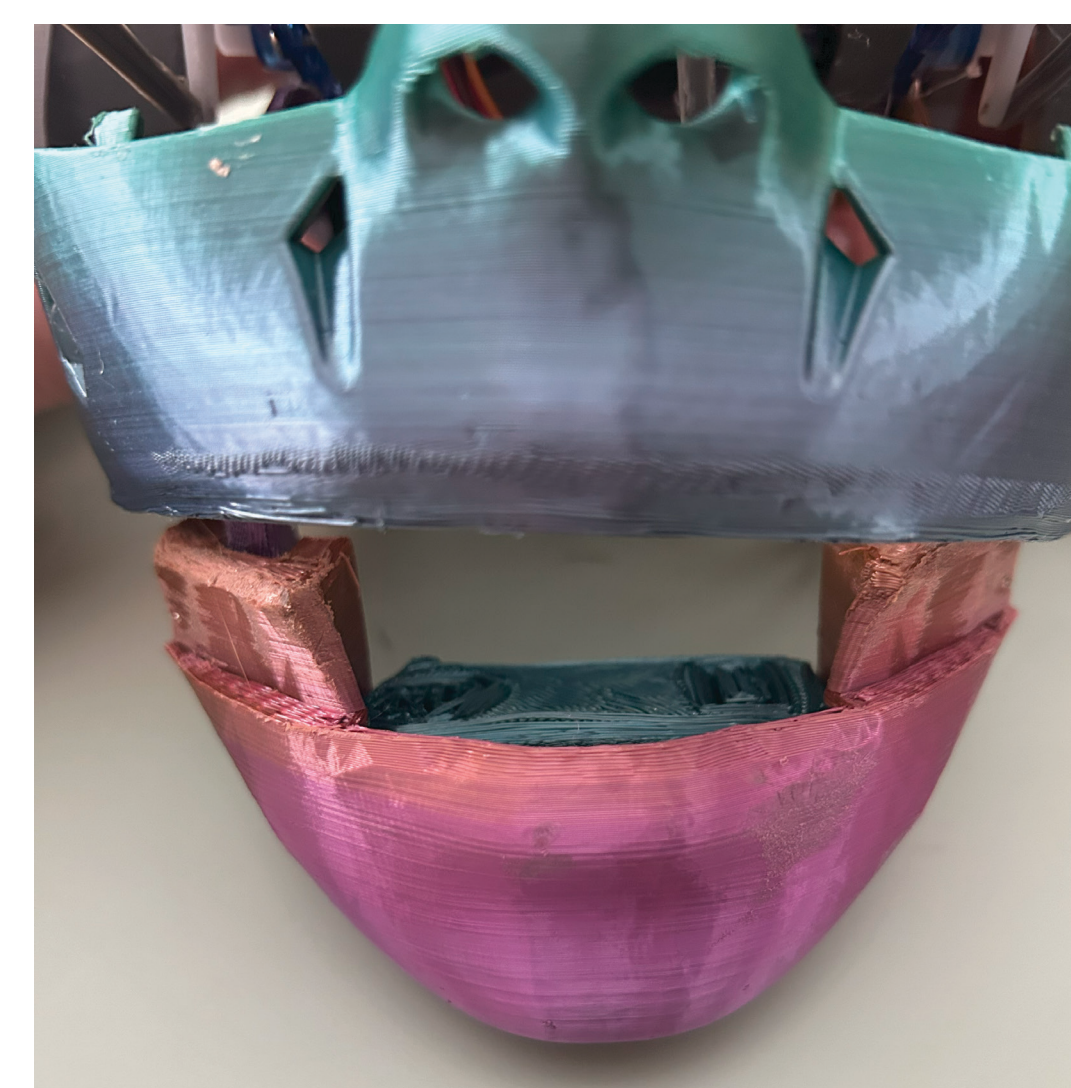
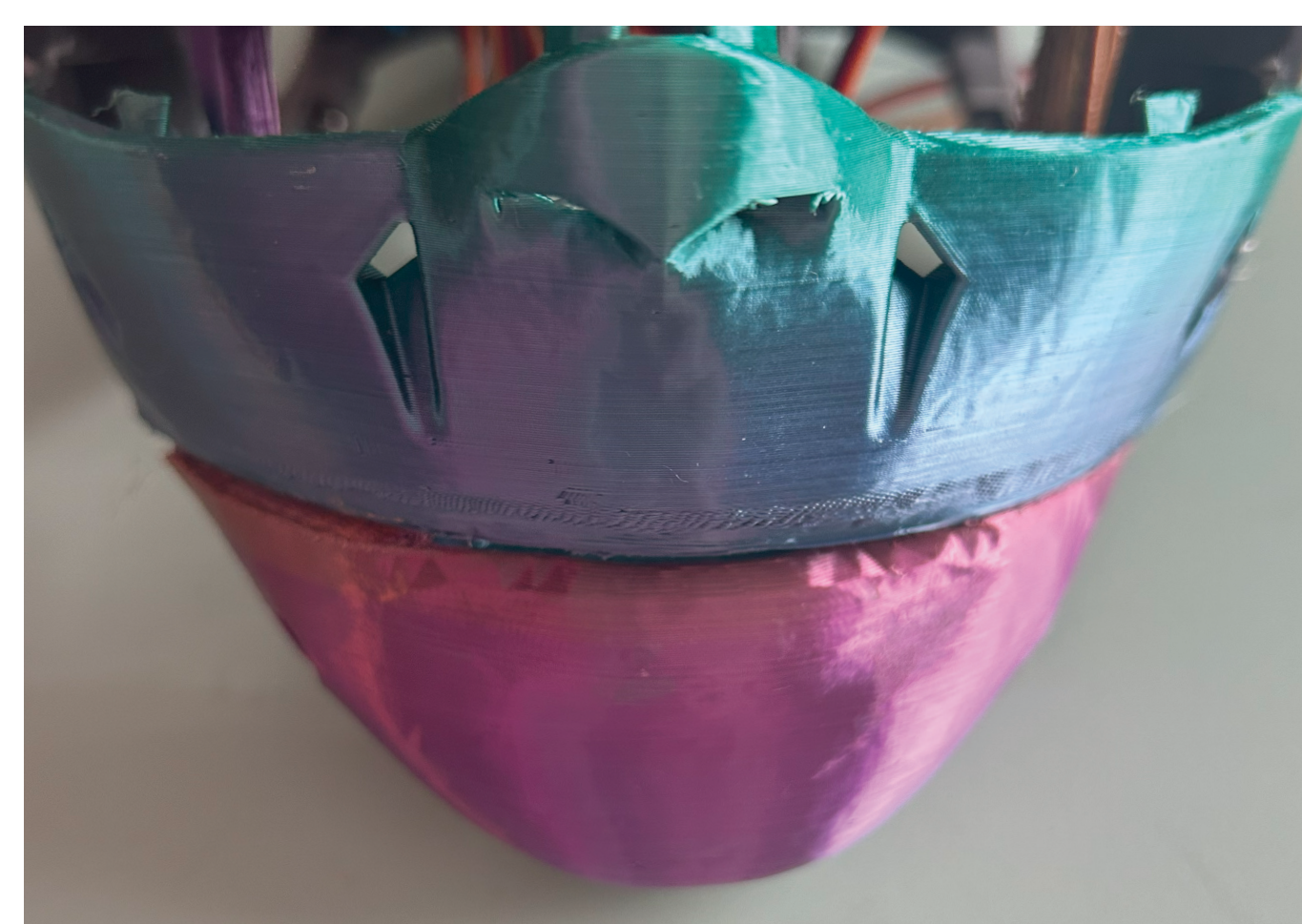
Robotics

- 3D printed skull with moving jaw and eyes
- Control 7 facial servo motors with an Arduino microcontroller
- Programmed in Python for speech and movement synchronization
- Text-to-speech for lifelike conversation flow and audio
- Separate speaker to create an immersive audience experience



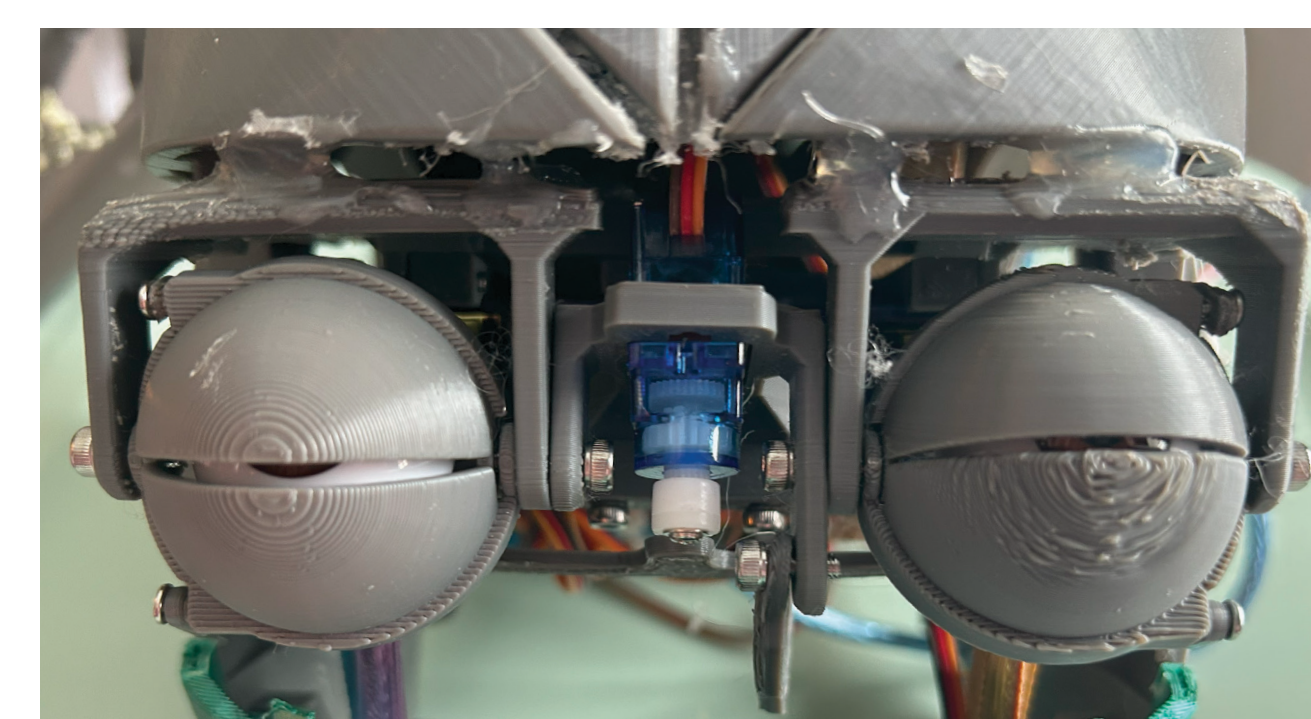
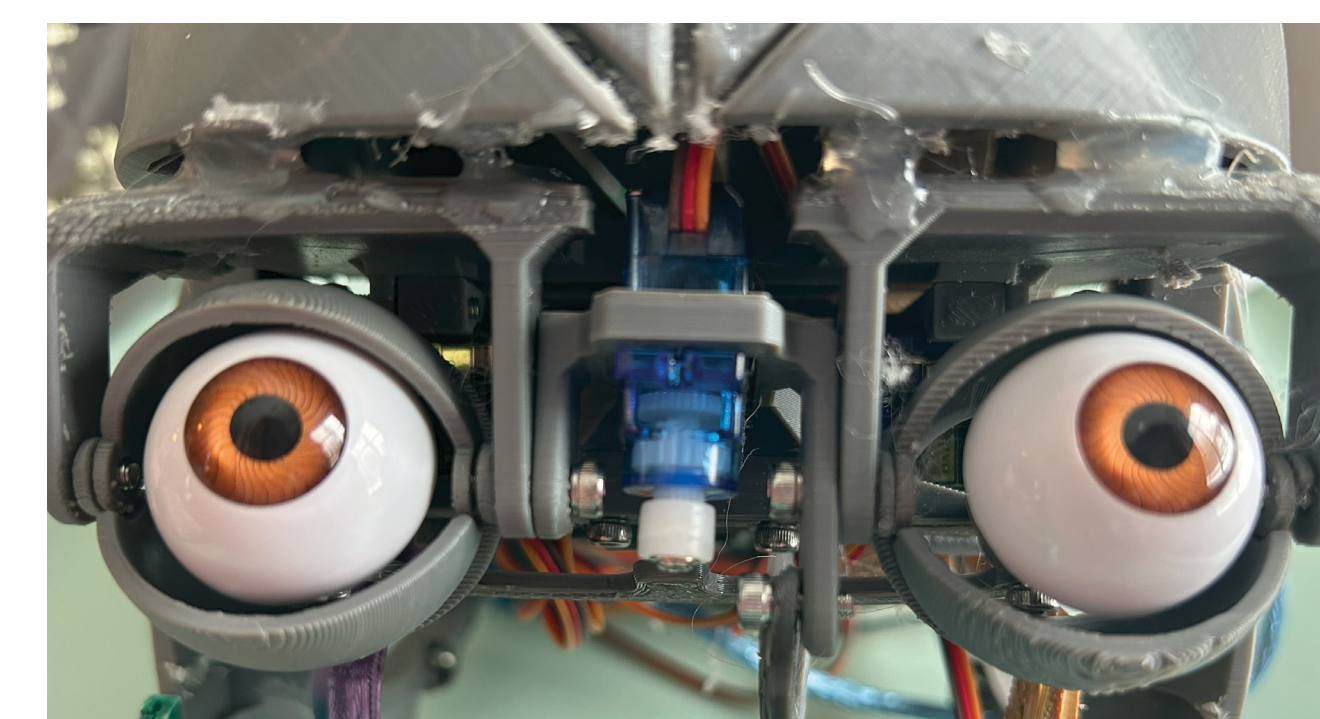
Jaw Movement

- Controlled by a single servo motor inside the skull
- Moves back and forth up to 15 degrees to simulate speech
- Synchronizes with the speaker's audio output for realistic speech pattern
- Variable angles allow for more natural-looking articulation



Eye Movement

- Eyes move on both X-axis (left/right) and Y-axis (up/down)
- Each eyelid has its own servo motor for blinking and expressions
- Eyes create expressions with movements based on Arduino commands



Prompt Engineering

- Uses GPT-4 for philosophical dialogues
- Prompts are designed to focus conversations on human existence
- AI 1 (Cyborg) is assigned the role of a Socratic philosopher to encourage questions for deeper responses
- AI 2 (Dashboard) is assigned a conflicting perspective role such as nihilism to create a contrast
- Output from the most recent response are used for the next prompt to keep the conversations relevant

Face Casting

- Cast of the artists face used to cover the plastic skull
- Glue face onto plastic
- Create an even more human representation of the cyborg replacement

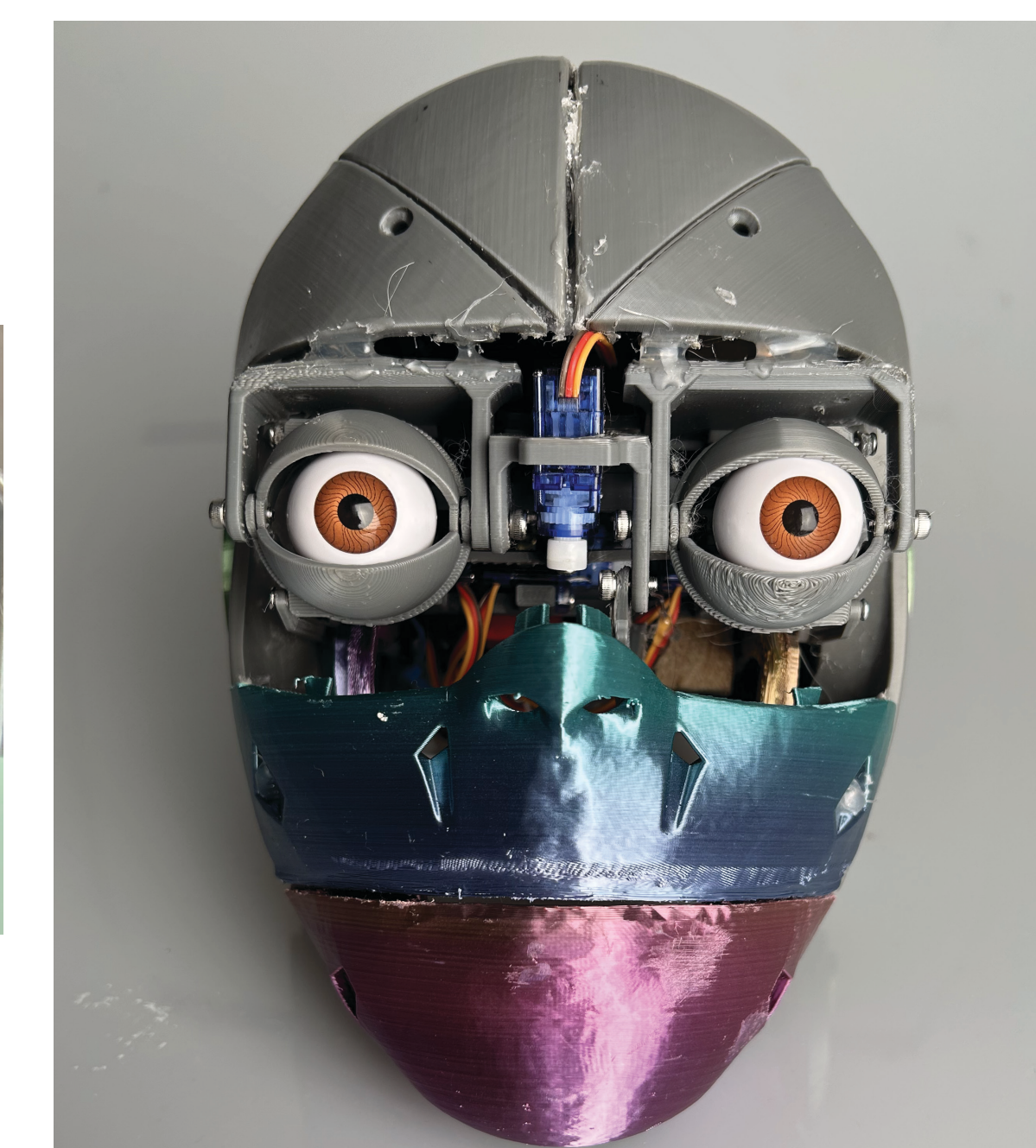


IMPACT

- Art & Philosophy:** Challenges fears of AI replacing human creativity by demonstrating AI as a tool for exploration rather than competition
- Human-AI Interaction:** Showcases AI as an extension of human cognition and creativity, emphasizing co-creation rather than replacement.
- Public Perception:** Encourages discussions on AI ethics, authorship, and artistic value

CONCLUSION

Am.I. serves as a bridge between AI and human creativity, engaging audiences with deep philosophical discussions about technology and existence. By blending AI with art, the project redefines our relationship with artificial intelligence, demonstrating its potential to enhance rather than diminish human expression.



FUTURE WORK

- Improved Display: Attaching the skull to a body and adding a desk for display
- Public Presentation: Gallery display at Allegheny College and collect data on public response and get community feedback
- Improved Speech Synchronization: Enhancing jaw movement precision with real-time audio analysis
- Expanded Dialogue Capabilities: Fine-tuning AI responses for deeper philosophical discussions

ACKNOWLEDGEMENTS

I would like to thank my advisors Janyl Jumadinova and Heather Brand for their unwavering support and guidance throughout this project. I would also like to thank the Allegheny College Department of Computer and Information Science and Department of Art for allowing access to their student resources and providing funding for this work.