

# AM.I.: A DIGITAL MIND IN A MECHANICAL SKULL

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## GOALS

- A humanoid AI system engaging in Socratic dialogue about human existence.
- Challenge anthropocentric fears of AI replacement by creating a philosophical AI-driven conversation
- Demonstrate AI as an extension of the human experience rather than a replacement

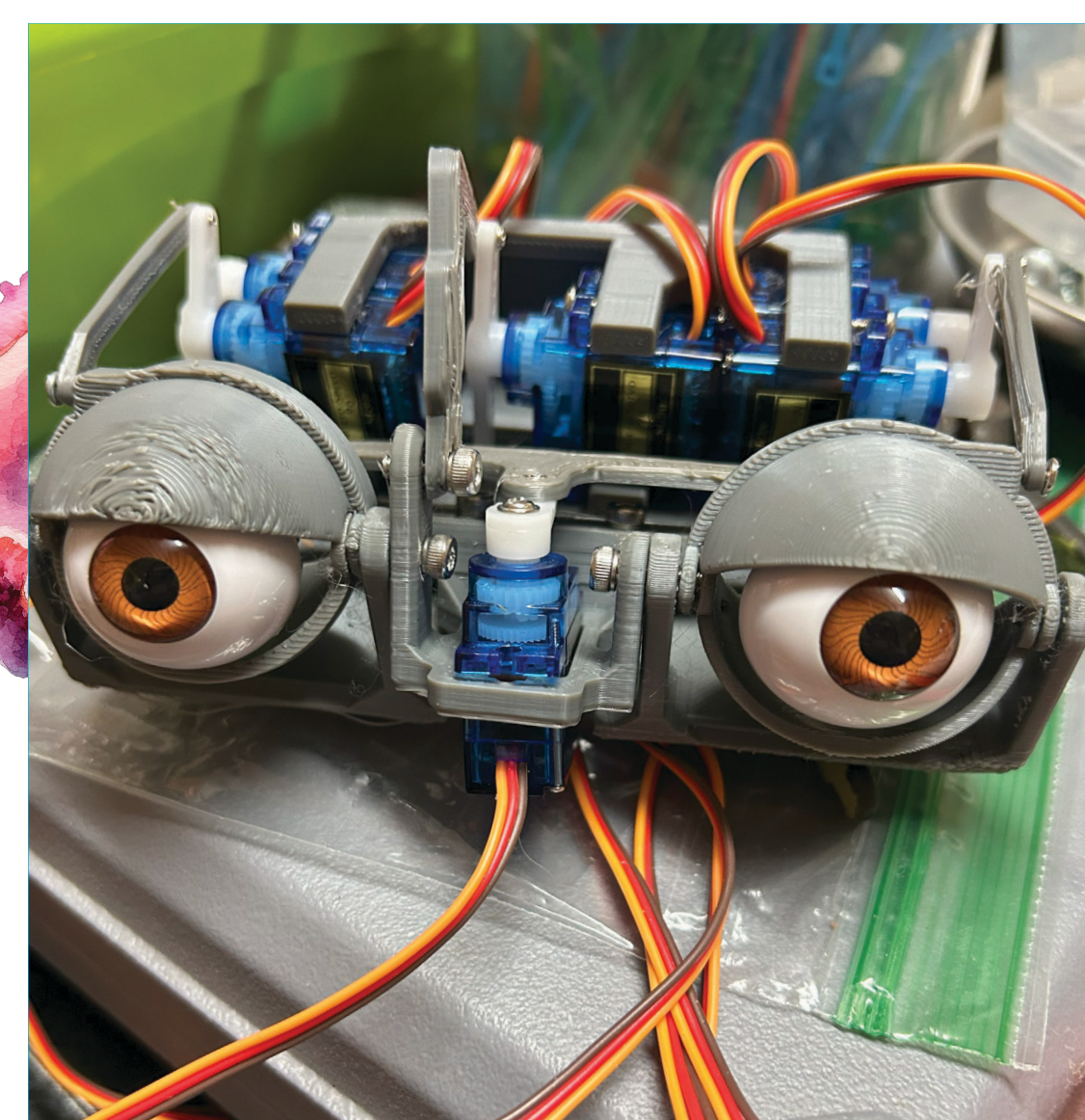
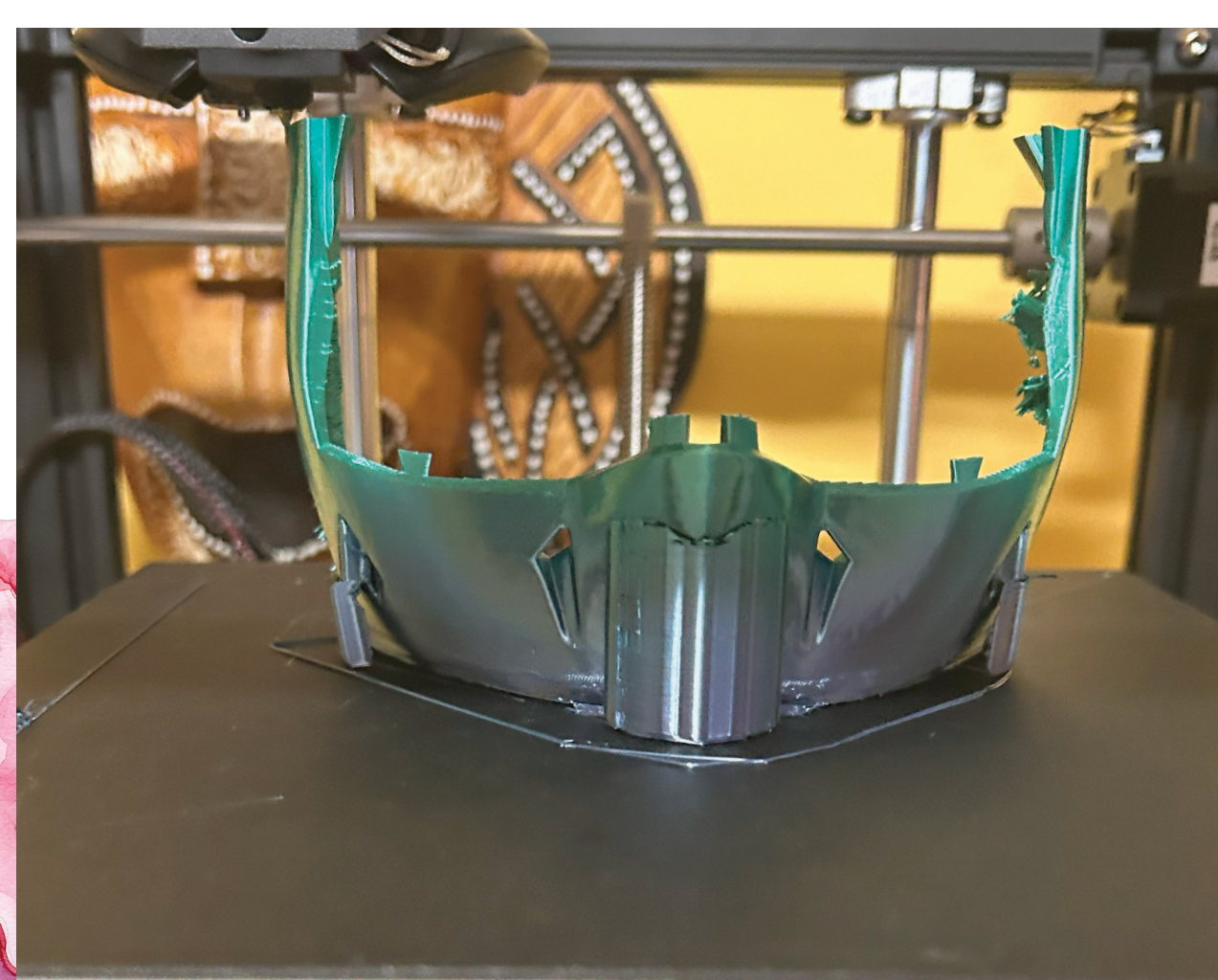
## Core Components

- 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

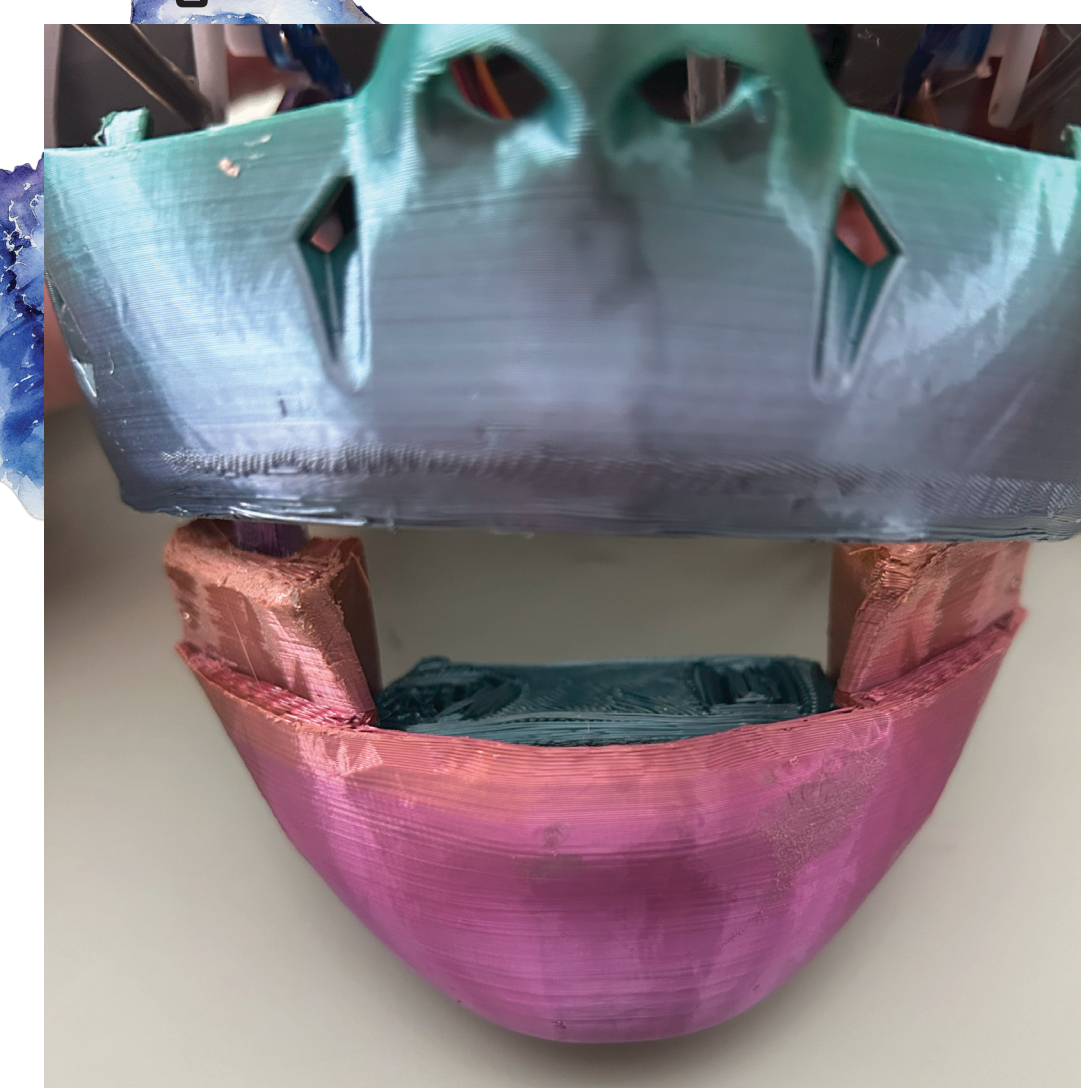
### Build the Robot

- 3D printed skull with moving jaw and eyes
- Control 7 facial servo motors with a microcontroller
- 1 robust motor for the jaw and 6 micro servos for the eyes
- Audio output synchronized with jaw movement
- Independent eye movements for expressive interactions
- Text-to-speech for lifelike conversation flow



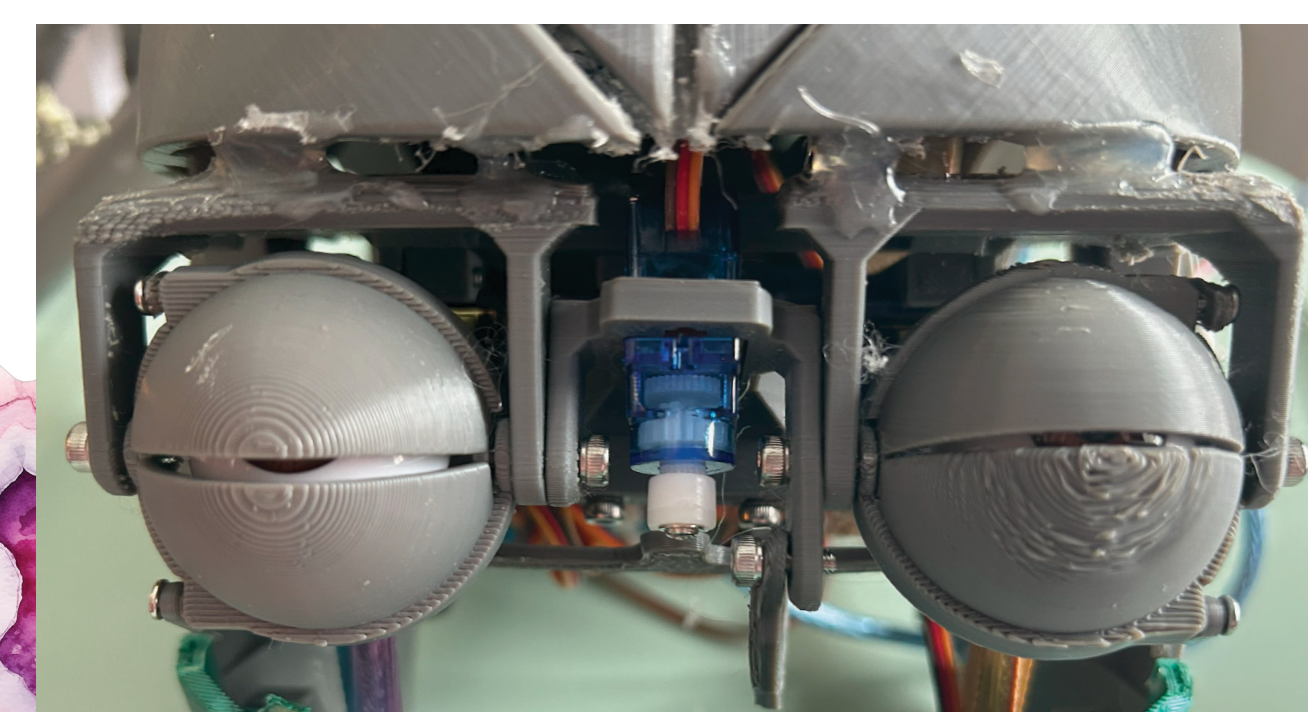
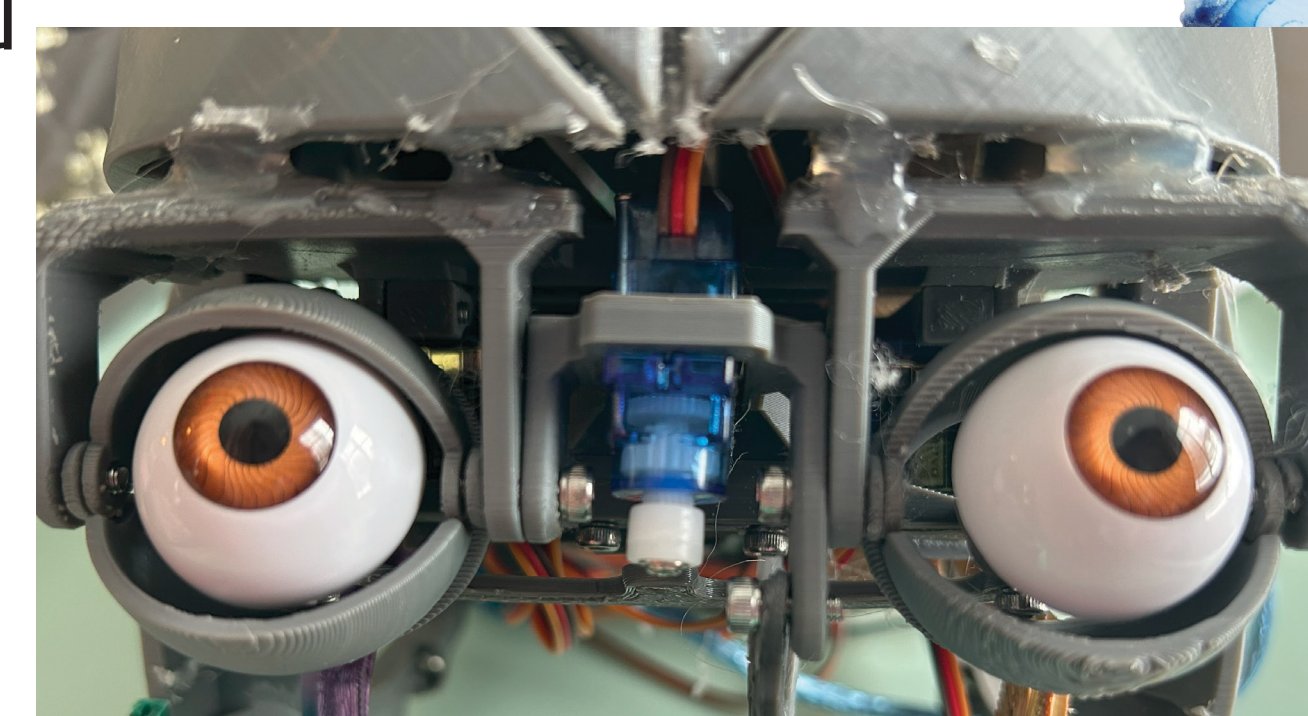
### Jaw Movement

- 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) for realistic tracking
- Controlled by two servo motors (one per axis)
- Each eyelid has its own servo motor for blinking and expressions
- Upper eyelids move 90 degrees between open and close
- Lower Eyelids move 40 degrees between open and close



### Prompt Engineering

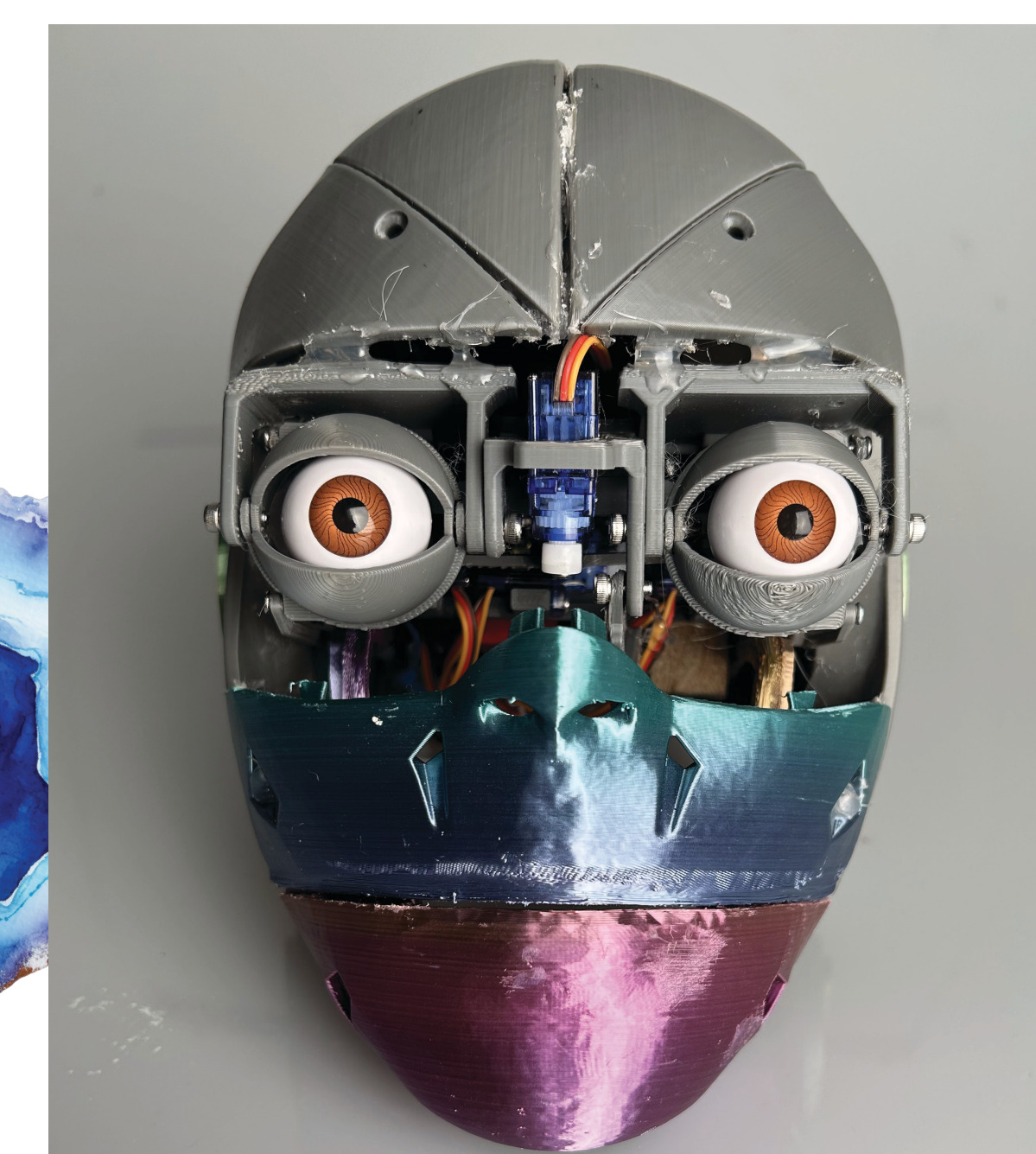
- Uses GPT-4 for philosophical dialogues
- Prompts are designed to focus conversations on human existence and personhood
- AI 1 (Robot) is assigned the role of a socratic philosopher to encourage questions for deeper responses
- AI 2 (Dashboard) is assigned a conflicting perspective role such as nihilism to create a contrast
- Responses are checked for correct formatting before being finalized
- Output from the most recent response are used for the next prompt to keep the conversations relevant

## AI & HUMAN INTERACTION

- AI-human interaction as a reflection of societal biases
- AI's potential to mirror and expand human philosophical thought
- Addressing replacement fears and ethical concerns in robotics

## CONCLUSION

- AI as a tool for artistic and philosophical exploration
- Humanoid robotics create a more immersive AI experience
- The project fosters discussion on AI, ethics, and human identity
- Expressions are created using variations of movement in eyes and the jaw



## FUTURE WORK

- Improved Display: Creating a silicone face and body 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

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### Create a 2D Conversant Dashboard

- Dashboard with text that updates periodically to interact with the skull
- Separate speaker to create an immersive audience experience

