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 synconized with jaw movement
- Independent eye movements for expressive interactions
- Text-to-speech for lifelike conversation flow

Create a 2D Conversant Dashboard

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

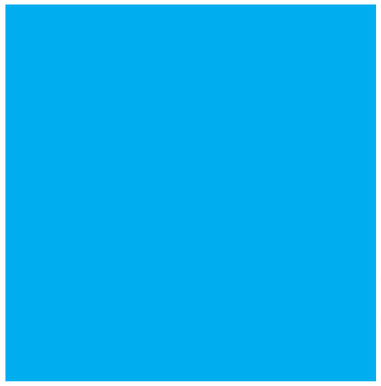
FEATURES

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 philisophical dialogues
- Prompts are designed to focus conversations on human existance 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 relacmeent 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: Gallary 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.

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