A CYBORG'S MIRROR

EXPLORING POSTHUMAN FEMINIST EMBODIMENT THROUGH A CYBORG-CHOREOGRAPHIC INTERFACE

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This paper presents *A Cyborg's Mirror*, an interactive performance using real-time generative AI and audience inputs to critically examine identity and embodiment in technologically mediated environments. Drawing on cyborg feminism and posthuman theories, the work disrupts binaries like human/machine and physical/virtual, presenting identity as fluid and co-constructed. Through AI-generated imagery and audience interaction, performers' bodies become dynamic sites of negotiation, where technology amplifies societal pressures while enabling new expression. By situating hybrid bodies in hyperreal spaces, the piece explores power, representation, and selfhood, questioning human agency's entanglement with algorithmic processes. This paper discusses the theoretical foundations, design methodology, and insights from public presentations, showing how these interactions redefine embodiment and critique digital mediation's influence on identity in the age of generative AI.

Format: Project

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Introduction

With the rise of large language models and AI imaging technologies, especially recent advancements in hyper-realistic avatar creation and image transposition, these technologies are reshaping how we perceive and represent ourselves in digital spaces. *A Cyborg's Mirror: Bodies in Hyperreality* examines these tensions through a real-time interactive performance system. The work transforms the conventional one-way relationship between viewer and performer into a technologically mediated dialogue, exploring themes of embodiment, control, and expression through a cyborg feminist lens.

This project presents two virtual "mirrors" — one presenting a generative AI interpretation of the performer's image based on the audience's live inputs and one presenting the performer's image with only the skin of their body morphing with the AI-generated visual (see Figure 1). This technological framework creates a dynamic feedback loop: as audience members submit text prompts through their mobile devices, they actively participate in reshaping and redefining the performer's digital representation. The performers then respond physically to these evolving visualizations, establishing a real-time scoring system that guides choreographic choices while leaving space for improvisation. Through this process, the performers, audience, and AI system collectively shape the emergence of movement and meaning.

Building on this technological infrastructure, and drawing from feminist performance art traditions[2], [3], [4] and cyborg feminist theory,[5], [6], [7], [8] this piece explores the complex relationship between power and autonomy in the digital age. Female-identified performers navigate two forms of influence: the AI's machine learning gaze — which carries with it embedded biases[9] — and the real-time desires of audience members expressed through their prompts. Yet rather than being simply subjected to these forces, the performers wield "soft power" — transforming technological constraints into opportunities for embodied agency and erotic self-expression. The performance itself becomes a mirror, reflecting how media and technology can both limit and liberate our expressions of identity. Through this lens, the work invites audiences to reconsider their digital identities not as fixed algorithms but as fluid spaces where submission and autonomy coexist. This reframing opens possibilities for resilient self-expression and collective reimagining of power dynamics in our technology-mediated world.

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[2] Carolee Schneemann, *Interior scroll*, 1975

[3] Annie Sprinkle, *Public cervix announcement*, 1990

[4] Marina Abramović, *Rhythm 0*, 1974

[5] Donna J. Haraway, *A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century*, 1991

[6] Rosi Braidotti, *The posthuman*, 2013

[7] N. Katherine Hayles, *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics*, 1999

[8] Esperanza Miyake, *My, is that cyborg a little bit queer?*, 2004

[9] Abeba Birhane, Vinay Uday Prabhu, and Emmanuel Kahembwe, *Multimodal datasets: Misogyny, pornography, and malignant stereotypes*, 2021

Figure 1. Photographs of A Cyborg's Mirror at First Draft, Human Resources, Los Angeles.

Motivation and Related Works

This project draws on Donna Haraway's *A Cyborg Manifesto*,[10] which uses the cyborg as a metaphor for hybridity and the disruption of binaries like human/machine and natural/artificial. Haraway's vision, alongside the posthuman perspectives of Rosi Braidotti[11] and Katherine Hayles,[12] shapes the exploration of technological interfaces as active agents in redefining identity

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[10] Donna J. Haraway, A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century, 1991
[11] Rosi Braidotti, The posthuman, 2013
[12] N. Katherine Hayles, How we became posthuman: Virtual bodies in cybernetics, literature, and informatics, 1999

and embodiment. Cyberqueer theory[13] extends Haraway's work by merging cyborg and queer perspectives to show how marginalized bodies reclaim agency through technological mediation. Judy Wajcman's *TechnoFeminism*[14] underscores technology's potential to challenge binaries, directly influencing the project's interactive system design.

The project draws inspiration from feminist performance art that interrogates identity and critiques female body representation. Carolee Schneemann's *Interior Scroll* (1975)[15] highlights the body as a site of resistance to patriarchal control. Marina Abramović's *Rhythm 0* (1974)[16] reveals dark truths about human nature and control, forcing audiences to confront their capacity for harm. Annie Sprinkle's *Public Cervix Announcement* (1990)[17] explores how reclaiming agency through audience participation subverts power dynamics. These works inform the project's use of technology as a collaborator in reimagining selfhood and embodiment, inspiring choreographic strategies that navigate the tension between submission and control in technological mediation.

A central aim of this project is to integrate machine learning-powered image transformation into live interactive experiences to examine agency and representation. Memo Akten's *Learning to See* (2017)[18] inspires the use of real-time neural networks to interrogate biases in machine perception and the politics of algorithmic vision. Theodoros Papatheodorou and Jessica Wolpert's *Lights! Dance! Freeze!* (2023)[19] informs our approach to embodied interaction via MediaPipe tracking, showing how technology can expand rather than constrain bodily expression. Likewise, GROUPTHINK[20] demonstrates how collective audience participation redistributes creative agency, challenging traditional artistic hierarchies.

This work builds on these precedents and aims to develop an innovative interactive AI-driven live performance to address the following goals:

- Design a system that merges real-time audience inputs with AI-driven outputs to create a performative space, exploring the intersection between human and machine agency, physical and virtual presence, and individual and collective identities.

- Challenge the fixed binaries between human and machine, physical and virtual, and individual and collective identities. Investigate the fluid and hybrid nature of identity, emphasizing its construction through technological and social interactions.

- Engage audiences simultaneously act as co-creators and enforcers, shaping bodily representation and identity through their collective participation, expectations, and normative pressures.

- Speculate on hybrid embodiment's implications for the future of identity in an era of pervasive artificial intelligence and digital interfaces.

Design of an Interactive Performance System Driven by Audience and AI

The system's core visual elements consist of two "virtual mirrors" that work in tandem to explore the tension between physical presence and digital mediation (see Figure 2). The primary mirror dominates the visual field with AI-generated imagery derived from the performer's live feed, creating an expansive canvas where stable diffusion transformations visualize the overwhelming pressures of digital mediation on the body. The secondary mirror isolates and fragments specific body regions

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[13] Esperanza Miyake, My, is that cyborg a little bit queer?, 2004

[14] Judy Wajcman, *TechnoFeminism*, 2004

[15] Carolee Schneemann, *Interior scroll*, 1975

[16] Marina Abramović, *Rhythm 0*, 1974

[17] Annie Sprinkle, *Public cervix announcement*, 1990

[18] Memo Akten, Rebecca Fiebrink, and Mick Grierson, *Learning to see: You are what you see*, 2019

[19] Theodoros Papatheodorou and Jessica Wolpert, *Lights! Dance! Freeze! - exploring the dance-musical filmic space using embodied search in an interactive installation*, 2023

[20] Theodoros Papatheodorou and Jessica Wolpert, *GROUPTHINK: Telepresence and agency during live performance*, 2022.

through MediaPipe segmentation,[21], [22], creating uncanny juxtapositions where skin and flesh merge with synthetic textures.
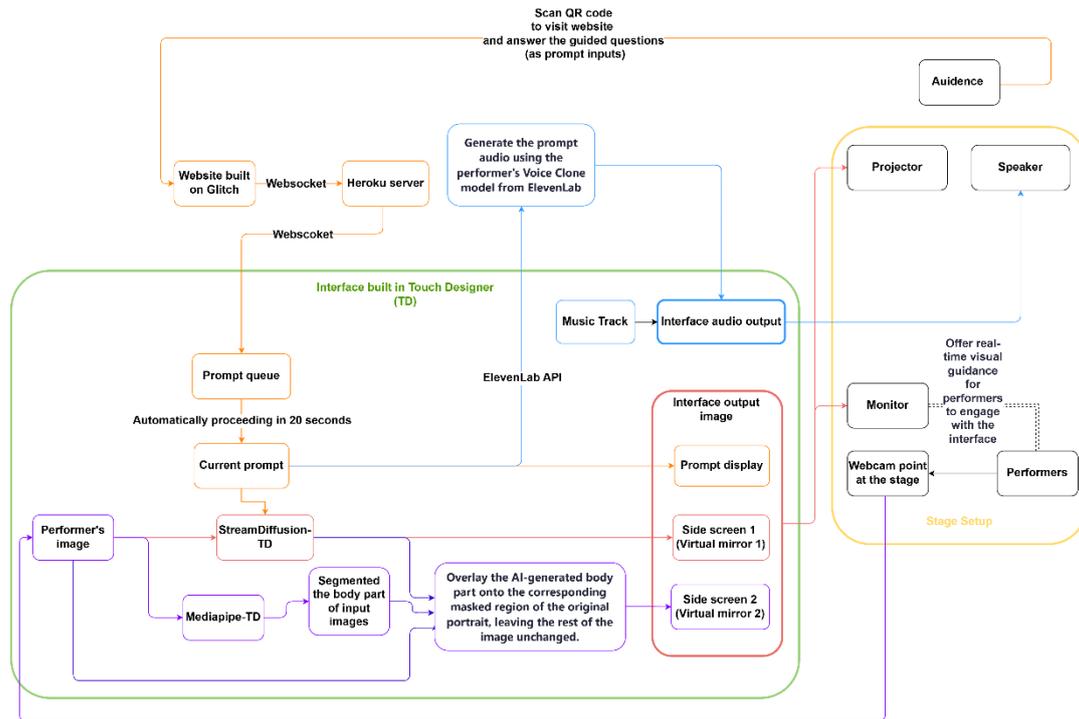

Figure 2. Workflow diagram for the interactive AI-driven performance system.

Using StreamDiffusion,[23], [24], the system generates real-time transformations that amplify and distort the performers' bodies. An oscillating T-index parameter creates a pulsing rhythm between recognition and abstraction - moments where bodies appear almost hyperreal before dissolving into algorithmic interpretationsn(Figure 3).

The performers engage with their own digitally-mediated images and their movements both responding to and shaping the AI's interpretations. A feedback monitor allows them to see these transformations in real-time, creating moments where they must negotiate between their intended choreography and the system's unpredictable reconfigurations of their bodies. This interplay manifests the theoretical tension between agency and submission central to the work.

Audience members become implicated in this negotiation through a web interface hosted on Glitch. After scanning a QR code, they can submit text prompts that directly influence how the AI system interprets and transforms the performers' bodies (Figure 4). These prompts are processed through a queue system at 20-second intervals via WebSocket and Heroku server, creating a measured rhythm of collective intervention. This technical structure enables moments where audience inputs can radically reshape the performers' digital embodiment, making visible the social pressures and expectations that technology often mediates.

The system further dissolves boundaries between human and machine expression through its auditory dimension. Using ElevenLab's API, the system transforms audience text prompts into synthesized speech using a voice clone of the performer. This combination of AI-generated visuals and

[21] Google AI Edge, MediaPipe: A framework for building perception pipelines
[22] Torin Michael Boyle, Mediapipe-touchdesigner
[23] Akio Kodaira, Chenfeng Xu, Toshiki Hazama, Takanori Yoshimoto, Kohei Ohno, Shogo Mitsuhori, Soichi Sugano, Hanying Cho, Zhijian Liu, and Kurt Keutzer, StreamDiffusion: A pipeline-level solution for real-time interactive generation, 2023
[24] DotSimulate, StreamDiffusionTD 0.1.0

synthetic voice produces moments where the performer's identity is both fragmented and multiplied. Their physical presence mirrored and transformed through visual and sonic dimensions.

Figure 3. Photographs of presentations merging generative AI imagery with human bodies: the top shows audience engagement after the show, while the middle and bottom feature performers interacting with the system.
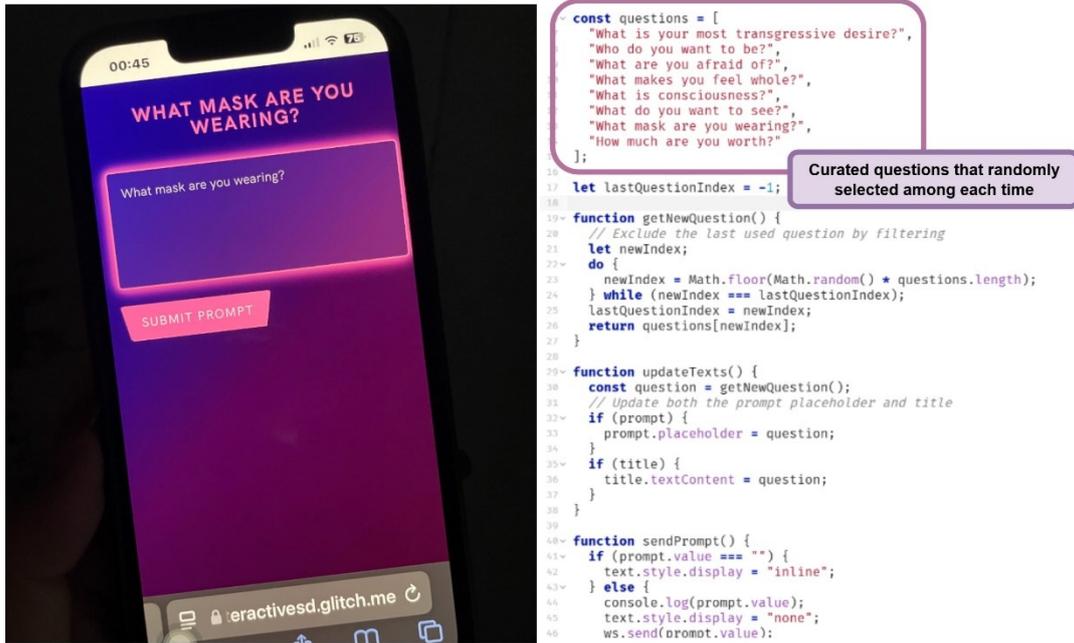
Web-based interface built on Glitch

QR code for accessing the web-based interface

Figure 4. Web-based interface design on Glitch with QR code access

Challenges, Refinements and Public Presentations

The design of the above system is the result of multiple iterations, with refinements made through public presentations as shown in Figure 5. Key challenges, solutions, and insights are detailed below.

Presented at "Future Stages" event in New York

Presented at "(Machine) Learning to Be" at Brown Arts Institute

Presented at "First Draft" of Human Resources in Los Angeles

Figure 5. Photographs from the three prior public presentations

The first presentation at the Future Stages event in New York introduced the piece as a live performance with the system interface projected as a background element. This iteration revealed the need for clearer audience guidance within the web application, as some participants struggled to align their inputs with the work's themes. In response, we incorporated guiding questions into the web app to frame audience contributions and enhance thematic coherence.

At a performance workshop hosted by Institution B, we presented the work in a station setup with the performer interacting behind a translucent scrim, where projections blended physical and virtual elements. This configuration deepened our exploration of hybrid embodiment through MediaPipe segmentation's[25], [26] creation of blurred, hybrid representations. During rehearsals, we discovered concerning outputs in the AI-generated imagery on performers' bodies that would be inappropriate for institutional presentation. These, regarded as problematic outputs, reveal the embedded biases and limitations of AI systems, which are an issue central to our exploration of technological control over body representation. However, we needed to balance this critique with institutional requirements. Our solution implemented StreamDiffusion's "negative prompt" function to filter specific visual elements while maintaining the work's critical examination of how AI systems distort and reshape bodily representation.

Another piece of feedback from previous presentations revealed that prompts asking viewers to reflect on identity generate more meaningful engagement than open-ended imagination. For our latest iteration at First Draft, Human Resources in Los Angeles, we implemented a dynamic set of rotating prompts about embodiment and transformation in the interface (see Figure 5).

Key Themes from Audience Feedback

In the latest presentation at Human Resources, we invited written audience feedback. Nine responses provided valuable insights into the work's concept and experience.

One prominent theme was the exploration of transformation and desire, with viewers engaging deeply in the performance's interrogation of identity as unstable and ever-evolving. One participant observed, "The always-morphing stable diffusion network points to an impossibility of ever reaching a stable or satisfying transformation through media; but also a constant searching/mania for an idealized body." This dynamic, compounded by the performer's bodily modifications, resonated with audiences as a critique of societal pressures and the relentless expectations placed on femme-identifying bodies. Another viewer noted, "The layering of body modifications, AI distortions, and audience prompts reads as weight, pressure, and a standard of expectation that seems insurmountable."

The work's feminist undertones were recognized as a continuation of feminist performance art traditions, contextualized through AI. By combining the performer's vulnerability with audience-driven transformations, the performance reframed the femme body as a site of resistance and creation. One participant remarked that it "calls upon generations of feminist performance art—adding the layer of AI," while another reflected on how the interplay between physicality and technological mediation captured the tension between self-representation and external projections.

The participatory framework, which allowed audiences to shape real-time generative outputs, was praised for fostering collective imagination and engagement. Viewers described the interplay of audience-driven AI prompts as a "fascinating exploration of how AI has the capability of bringing out our collective dreams and fears." However, some suggested deeper conceptual integration of audience interactions to enhance the thematic resonance of their contributions.

The performance's juxtaposition of live actions with AI-generated imagery provoked reflections on reality and hyperreality. One viewer likened the experience to "watching a computer's ADHD brain work while it searches for relationships to understand the present," raising questions about the blurred boundaries between physical and virtual realms. "What are we missing in the real experience when consumed by the image?" asked another, underscoring the performance's ability to challenge perceptions of representation in a mediated world.

Finally, the maximalist aesthetic of the AI-generated outputs elicited mixed reactions. While some recognized it as a deliberate critique of digital saturation, others craved moments of simplicity to

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[25] Torin Michael Boyle, *Mediapipe-touchdesigner*
[26] Google AI Edge, *MediaPipe: A framework for building perception pipelines*

reconnect with the performer's physical presence. One participant noted, "It made me crave the beauty of the human body and simplicity of not constantly being overwhelmed by generic internet art/AI." This feedback highlights the importance of balancing technological chaos with embodied presence to foster deeper engagement.

Limitation and Future Directions

This experience revealed several limitations that highlight areas for refinement. While the curated prompts deepened audience engagement with themes of identity and embodiment, the system needs mechanisms to better pace participation - perhaps implementing waiting periods between submissions to encourage more considered responses. Additionally, the overwhelming nature of continuous AI-generated imagery was a recurring critique. Although this maximalist aesthetic effectively embodied the saturation of digital mediation, it sometimes overshadowed the performers' physical presence and vulnerability. Future iterations could explore movement-triggered generation or moments of visual simplicity to better balance technological and human elements.

Our experimentation with different spatial configurations through three presentations revealed intriguing possibilities for future staging. We observed that the distance between performers and the camera significantly affected the AI system's interpretation of bodies: close proximity emphasized intimate bodily transformations, while greater distance allowed figures to dissolve into and emerge from larger generative landscapes. This suggests the potential for future iterations to incorporate mobile cameras, either held by or attached to performers, enabling them to actively choreograph their relationship with the AI's gaze as their movements shift through spatial and generative contexts. In addition, the use of translucent scrims introduced additional layers of mediated reality, where physical movements seamlessly blended with projections to form hybrid expressions. Building on this, future explorations could expand these immersive layers, using materials and interfaces that further fragment and recompose the boundaries between physical and digital embodiment.

Reflection and Conclusion

The work demonstrated the transformative potential of real-time interaction between performers, audience, and AI systems. The dual submission to both machine learning algorithms and audience inputs created a complex negotiation of agency, where performers navigate between technological mediation and social pressures. This tension revealed how digital identities are neither purely algorithmic nor solely human-constructed, but emerge through a constant interplay between machine processes, collective expectations, and individual expression. The unpredictable nature of AI transformations, combined with the vulnerability of live performance, created moments where traditional binaries between human/machine and individual/collective broke down, suggesting new possibilities for understanding identity in our increasingly digital-mediated world. Rather than offering definitive answers, the work raises provocative questions about future forms of embodiment: As AI systems become more pervasive in shaping our self-representation, how do we maintain agency while acknowledging our inevitable entanglement with these technologies? What new forms of identity and expression might emerge when we embrace rather than resist this hybridity? In this way, the work contributes to ongoing dialogues about identity, agency, and embodiment in technologically mediated performance, while suggesting new directions for feminist artistic practice in the age of generative AI.

About the Author

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