Gaze to the Stars: AI, Storytelling and Public Art

Behnaz Farahi
Critical Matter Group *
MIT Media Lab
behnaz_f@mit.edu

Haolei Zhang
Graduate School of Design
Harvard University
haolei_zhang@mde.harvard.edu

Suwan Kim
Department of Architecture
MIT
suwankim@mit.edu

Sergio Mutis
Department of Architecture
MIT
smutis@mit.edu

Yaluo Wang
Graduate School of Design
Harvard University
yaluo_wang@mde.harvard.edu

Chenyue "xdd" Dai
Department of Architecture
MIT
xdd44@mit.edu

Figure 1: *Gaze to the Stars* projection on the MIT Dome, seen from across the Charles River

1 Introduction

What if public buildings could share our dreams and fears? What if, instead of reinforcing authority, architecture could listen, amplifying our stories, vulnerabilities, and hopes?

At MIT, the tradition of "hacking", with complex installations that reimagine campus space, exemplifies this reclamation of institutional architecture. Students have transformed the Great Dome into everything from R2-D2 to a TIE fighter, playfully subverting its authority and redefining it as a canvas for expression [Peterson, 2003]. These acts challenge traditional boundaries, transforming monuments of power into spaces for collective storytelling.

Inspired by the motto "per ardua ad astra" (through difficulties to the stars), *Gaze to the Stars* is a participatory public art installation that reimagines the MIT Great Dome, not as symbol of institutional power, but as a living canvas that reflects the resilience, struggles, and aspirations of those who have shaped, or been shaped by, the MIT community (Figure 1). The project challenges conventional notions of success, instead emphasizing resilience, vulnerability, and the often-unspoken narratives of failure and transformation. The installation projects encoded a summary of personal narratives within close-up videos of 200 participants' eyes. The project invites viewers to see the Dome not as a monument to authority, but as a vessel for vulnerability, memory, and shared humanity.

*Director of Critical Matter Group: https://www.media.mit.edu/groups/critical-matter/

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A more comprehensive account of the project, including its theoretical framing around personal affect, conversational AI, and collective empathy, and additional detail on the technical execution, appears as a companion piece, *Gaze to the Stars: AI and Public Art from Personal Affect and Collective Empathy* [Farahi et al., 2025], in the Paper track of this venue. The next sections describe the project's design principles and technical execution.

2 Technical Description

2.1 Sensory Pod for Data Collection and AI-Driven Interaction

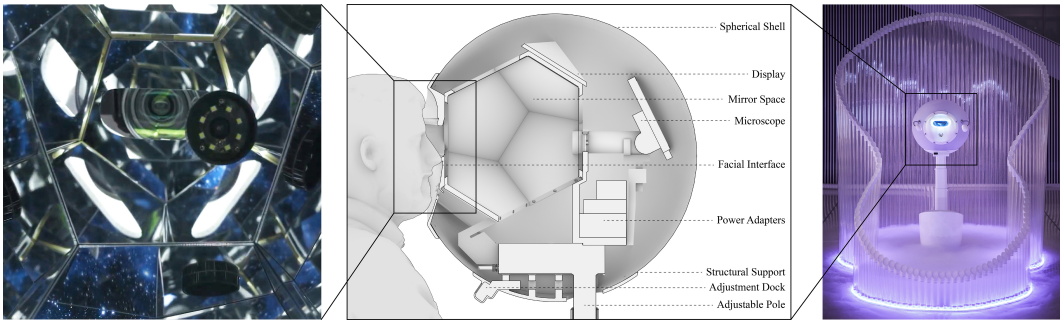

Figure 2: Exterior and interior views of the data collection pod, equipped with a microscope, microphone, and speakers for capturing and responding to participants' stories.

The sensory pod served as the primary interface for capturing participants' stories and eye recordings. Its design is inspired by both traditional phone booths and VR headsets, creating an intimate space for reflection and conversation. The pod features a spherical shell housing a dodecahedral "infinity room" constructed from acrylic mirrors with 3D-printed PLA frames. One mirror surface is replaced by an iPad display, creating an infinite star-like landscape through reflection. A 4K digital microscope embedded behind one mirror captures high-resolution eye footage, while speakers, microphone, and custom lighting optimize the audio-visual experience. The pod is surrounded by a parametrically-designed membrane of 150 hollow polycarbonate tubes, creating a semi-translucent enclosure. Dry ice mist fills this space, enveloping participants in a dreamlike atmosphere that encourages introspection (Figure 2).

Participants engage with an AI system embedded in the pod, embodied as the MIT Dome characterized as a 109-year-old, wise woman who has witnessed the community. Using OpenAI's real-time API with GPT-4o and ElevenLabs' voice synthesis, the system guides participants through themed conversations (dreaming, feeling, struggling, or longing). Each interaction follows a structured format: the Dome shares anonymized stories from the MIT community to foster trust and emotional resonance, then follows up with a reflective question to deepen understanding. The AI provides empathetic, real-time feedback tailored to participants' responses. Sessions last 3-5 minutes, recording both high-resolution eye video and conversation transcript, which are processed into 10-12 word anonymized summaries.

Figure 3: (Left) Iris segmentation masks with overlaid pupil positions; (Right) Encoded Braille message embedded within one participant's iris.

2.2 Data Visualization and Analysis

Using Meta's SAM2 model integrated into a custom workflow, we performed frame-wise iris segmentation on the eye videos. Starting from a single user-marked frame, the model propagates masks across the entire sequence, with post-processing ensuring clean segmentation. Participants' message summaries were translated into Braille and rendered as dynamic particle systems using Unity's Visual Effect Graph. The Braille dots were positioned in polar coordinates around the pupil and combined with reactive particles that responded to real-time eye-tracking data. As the participant's iris moved, the particles shifted accordingly (Figure 3).

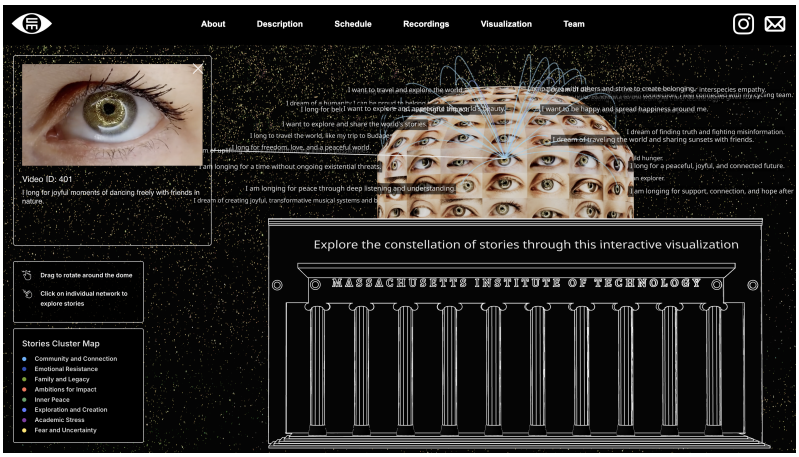

Figure 4: The interactive webpage of story data visualization

The final visuals were composed as transitions between individual eye videos (10 seconds) and collective grids (18 seconds) using Blender's Python API. Madmapper software handled the non-planar projection mapping onto the dome surface. Commissioned by Artfinity, an Institute-sponsored event celebrating creativity and community at MIT, the eye footage was projected onto the MIT Dome for three nights (March 12-14, 2025), with simultaneous YouTube livestreaming that included overlays showing participant nicknames, IDs, and story summaries. All content remains accessible through the project website with searchable archives [Critical-Matter-Group, 2025].

After the data collection and live event, to reveal thematic connections across 200 stories, we employed a clustering pipeline:

(1) Text embeddings using OpenAI's text-embedding-3-large model (2) item Dimensionality reduction via UMAP to 2D space (3) HDBSCAN clustering, yielding eight themes: community & connection, emotional resistance, family & legacy, ambitions for impact, inner peace, exploration & creation, academic stress, and uncertainty (4) Connections between stories constructed based on their clusters and their relative positions in the 2D space.

The resulting relationships were visualized as an interactive Three.js web experience, where users explore a virtual dome covered in eye videos (Figure 4). Hovering reveals color-coded connections between thematically related stories, while clicking provides detailed context, creating a navigable constellation of shared human experience.

3 Reflection and Future Works

Gaze to the Stars transformed MIT's Great Dome from a symbol of institutional power into a vessel for collective storytelling, reversing the traditional gaze by projecting participants' eyes and encoded personal narratives onto this historic landmark. The installation's scale activated Cambridge and Boston, with viewers describing it as "surreal" and noting how it "stops you in your tracks" [Truitt, 2025]. The project deliberately broadcast intimate stories into public space with participants' consent. This tension between private experience and public display raised ongoing questions about the ethics of externalizing inner life in shared spaces. Future iterations could expand into a distributed network of listening pods across campus and public spaces, collecting reflections that generate visualizations

revealing emotional constellations over time—ultimately reimagining public space not as a mirror of power, but as a platform for listening, sharing, and being seen.

4 Short Biographies

Behnaz Farahi is an award winning designer and critical maker. She is an Assistant Professor at MIT Media Lab where she leads the Critical Matter research group.

Sergio Mutis is an architect, computational designer, and a SMArchS Computation Fellow at MIT.

Chenyue "xdd" Dai is a programmer and photographer pursuing Master of Architecture at MIT.

Haolei Zhang is an HCAI design engineer and master student at Harvard, visiting student at MIT Critical Matter.

Suwan Kim is a designer and computational researcher pursuing a dual master's degree in architecture and computer science at MIT.

Yaluo Wang is a designer and researcher pursuing a Master of Design Engineering at Harvard University, navigating bio-integrated digital fabrication, and speculative design.

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