

Who Streams Whom? The Loop of Existence in Algorithmic Vision

Abstract

Non es piscis (“You are not a fish”) investigates the entanglement of biological life, algorithmic vision, and human perception within a real-time streaming loop. A ceiling-mounted camera detects and tracks three live goldfish using YOLO11 and DeepSORT; remote viewers enter a web interface and select a tracked fish (track ID), which TouchDesigner maps to a projected light spot on the holographic mirror membrane behind the aquarium. In parallel, the interface activates the viewer’s device camera, streaming the viewer’s face back to the installation and projecting it onto the same membrane as a ghosted image. By closing the circuit of capture, selection, and return, the work treats liveness not as a neutral technical feature but as an operational relation in which visibility becomes a condition for presence. The installation foregrounds the asymmetry between embodied life and computational identity, and shows how presence can be reassigned or momentarily collapse when tracking and thresholds fail. See [artwork video](#).

Keywords

live streaming, algorithmic gaze, posthuman, media ecology, digital being, interactive art, mirror aesthetics

Introduction

Non es piscis (“You are not a fish”) is an interactive installation that stages live streaming as a closed circuit of capture, selection, and return. A camera above a 20-gallon aquarium detects and tracks three goldfish in real time; online viewers enter a web interface, select one tracked fish, and trigger a spotlight that follows its movement. At the same time, the interface activates the viewer’s camera, and the viewer’s face is streamed back into the installation and projected onto a holographic mirror membrane behind the tank. What emerges is not a one-way broadcast but a recursive viewing loop in which fish, algorithms, and humans mutually appear to one another under the conditions set by machine vision.

This work is situated in a broader culture where continuous visibility has become a requirement for social participation and legibility. Under platform metrics and ubiquitous surveillance, presence is increasingly negotiated as data that can be captured, refreshed, and circulated [1]. In such environments, invisibility functions less as privacy than as erasure [2, 3], and the demand for real-time exposure produces an anxiety

of existence. As Byung-Chul Han describes, a “tyranny of visibility” [4] compresses lived complexity into quantifiable streams, producing a digital body that competes with, and often overrides, the physical one.

Rather than treating live streaming [5, 6] as a neutral conduit, *Non es piscis* materializes streaming as an operational regime [7] that allocates existence through algorithmic recognition and human attention. The installation asks: when a living body becomes present only insofar as it is detected, tracked, and selected, what kind of being is produced, and who holds the power to produce it? In the loop, the viewer’s agency is enacted through a constrained interface choice, while the viewer is also captured and reintegrated as an image to be processed and seen. The resulting scene destabilizes familiar binaries of subject and object, watcher and watched, and foregrounds the asymmetry between embodied life and computational identity.

This paper argues that, in such a real-time loop, liveness is not merely a technical attribute but an operational relation that confirms and distributes presence [8] across bodies, data streams, and machine observation. It contributes (1) a cross-species streaming circuit that folds remote spectatorship into the installation as material, (2) an account of how selection and tracking render visibility a condition of existence, and (3) a framework for reading algorithmic misrecognition as evidence of how presence can be reassigned or collapse when it falls below the system’s thresholds. The remainder of the paper situates the work within telepresence and algorithmic gaze scholarship, details the system implementation, and discusses how the loop reconfigures agency, ethics, and being.

Motivation and Related Work

Non es piscis is motivated by the claim that live streaming is no longer a neutral channel but a cultural-technical apparatus that organizes presence through continuous visibility. In this context, liveness is a mediated relation rather than a purely technical property [9], and telepresence art has long staged remote co-presence as an event produced by networks and interfaces (e.g., *Telematic Dreaming*) [10, 11]. Our work extends these trajectories by placing liveness in an interspecies scene and structuring it as a closed loop of *capture, selection, and return*, where the viewer is folded back into the instal-



Figure 1. **Final installation view.** As the audience interacts with the system, their faces are projected onto the back of the fish tank, completing a closed loop in which the viewer observes the fish while simultaneously being observed.

lation as projected image rather than remaining an external observer.

The installation also builds on critiques of the algorithmic and disciplinary gaze [12, 13] and on accounts of “operational images,” where machine vision is inseparable from action and control [14]. Artistic practices that expose machine vision as infrastructure further inform our approach [15]. Here, detection, tracking, and interface selection convert perception into allocation rules, producing a hierarchy of visibility on the projection surface.

Finally, animal studies and posthuman theory frame looking as historically structured and ethically charged [16, 17],

while distributed agency emphasizes co-production across human, animal, and technical actants [18–20]. Within this frame, the work materializes a cybernetic feedback aesthetic [21] in which being is negotiated through real-time recognition, selection, and projection, sharpening the paper’s central question: who, in the loop, is ultimately streaming whom?

Methodology and System Description

Technical Architecture and Implementation

Non es piscis is designed as a closed loop of *capture, selection, and return*, in which liveness is produced as an operational relation rather than a purely technical attribute. A ceiling-mounted Logitech C922 Pro camera captures a live 1080p/30fps feed of a standard 20-gallon aquarium containing three goldfish. The video stream is processed on a local workstation, while remote viewers access the system through a web interface.

Capture: Detection and Tracking as Computational Legibility. The feed is processed by a YOLOv11 object detection model fine-tuned on a custom dataset of over 800 annotated images of goldfish under varying poses and lighting conditions ($mAP@0.5 = 0.85$). YOLOv11 performs *instance detection* of fish per frame, producing bounding boxes and confidence scores. These detections are then passed to DeepSORT [22], which associates detections across time and assigns *persistent track IDs*. In our system, the viewer does not select a biological individual directly, but a track ID, a computational identity maintained by association rules. The DeepSORT [22] matching threshold was empirically set to 0.4 to mitigate identity drift while tolerating brief occlusions.

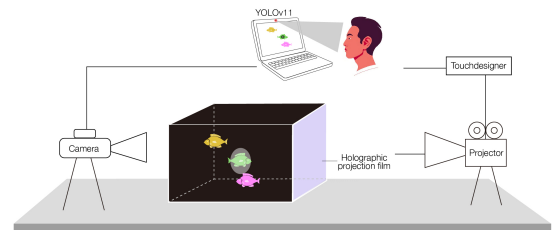


Figure 2. **System Pipeline of *Non es piscis*.** The aquarium camera streams fish motion to the web interface. Viewers select a tracked fish (track ID) to allocate a projected light spot that follows its centroid. Simultaneously, the interface activates the viewer’s device camera; the viewer’s face is streamed back to the installation computer and projected onto the holographic membrane behind the tank, closing the loop between seeing and being seen.

Selection: Attention as an Operational Command. The web portal displays the live video with overlaid bounding boxes and track IDs. When a viewer selects one track (touch or click), the selection is transmitted to TouchDesigner as a

control signal. This action converts spectator attention into an explicit allocation rule: one track is designated as foreground, and its position becomes the reference for subsequent projection cues. In this way, the interface does not merely represent the scene; it produces a hierarchy of visibility.

Actuation and Return: Projected Spotlight Allocation and Recursive Projection. The selected track’s bounding-box centroid is mapped in real time to a *projected light spot* generated in TouchDesigner. Rather than using a physical lamp, the system allocates visibility through projection mapping: a projector casts the light spot *onto the holographic mirror membrane behind the aquarium*, visually foregrounding the selected track within the composite image space. The fish remain physically visible in the water; projection operates as a rear-layer overlay rather than direct illumination of the animals. The mapping from camera coordinates (fish centroid in the captured frame) to projector coordinates is calibrated once per installation using a planar homography, enabling the projected spot to follow the tracked position with stable spatial correspondence.

In parallel, the same web interface requests access to the remote viewer’s device camera. Viewer frames are streamed in real time to the installation computer, processed with a lightweight edge-detection filter, and projected onto the same holographic membrane. TouchDesigner composites the live fish feed, the projected spotlight cue, and the ghosted viewer projection, and renders the composite back into the installation as a single surface of address, thereby folding the viewer into the same visibility regime that governs the fish.

Temporal and Threshold Conditions. The full pipeline operates at 30fps with an average end-to-end latency of 120ms from capture to rendered projection, sustaining a perceptible sense of real-time coupling. At the same time, presence in the loop is conditional: fish are “present” to the system only insofar as they are detected with sufficient confidence and sustained as a track through association over time. When confidence drops or association fails, visibility can be reassigned or temporarily collapse, making the operational nature of liveness observable.

Visual Ecology and Performance

The aquarium becomes a “technical niche” [23–25] in which biological motion, algorithmic recognition, and spectator attention are mutually entangled. The fish acts as an unintentional performer whose movement drives detection and tracking; the algorithm performs its intelligence by sustaining computational identities and allocating visibility; the viewer performs agency through selection while simultaneously being captured and returned as projected image. Rather than stabilizing roles of actor and audience, the loop continuously reconfigures them: what appears as agency is formatted by the interface, and what appears as presence is maintained by thresholds, timing, and association. The system thus enacts

the cycle of existence proposed in this paper, where being is confirmed, distributed, and occasionally destabilized through real-time observation.

Discussion and Future Work

Non es piscis frames liveness not as a purely technical property but as an *operational relation* produced by a loop of capture, selection, and projection. Within this circuit, the fish becomes legible to the system only insofar as it is detected and tracked; the viewer’s agency is expressed primarily as an interface action that allocates attention; and the return projection folds the viewer back into the scene as an image to be processed and seen. In this sense, the work stages a redistribution of subjecthood: existence in the installation is not simply represented but conditionally *confirmed and assigned* through continuous algorithmic visibility.

Crucially, the system’s failures do not function as a romanticized “glitch aesthetic,” but as observable evidence of algorithmic vision’s ontology. When occlusion triggers identity drift, the spotlight remains loyal to a track ID rather than to a biological individual, revealing that the viewer is selecting a computational identity whose continuity is negotiated by thresholds and matching rules. Likewise, shifts in illumination and transient detection loss expose how presence [8] can momentarily collapse into nonexistence when it falls below the system’s confidence and timing constraints. These episodes make the loop’s asymmetry explicit: what counts as “being” is decided less by bodies than by the operational stability of recognition.

Future iterations will therefore focus on strengthening the loop’s legibility and ethical stability rather than adding new layers of instrumentation. A multi-camera setup may reduce occlusion-induced identity drift and provide richer spatial cues for tracking, clarifying the distinction between embodied life and computational identity. We also plan to implement safeguards such as bounded illumination intensity, enforced resting intervals, and interaction-rate limits to minimize animal stress while preserving the work’s critical inquiry into visibility as a condition of being. Finally, instead of formal laboratory-style studies, we will employ exhibition-situated methods such as short exit interviews and field observations to document how viewers interpret agency, co-presence, and their own incorporation into the loop.

Ethical Considerations

This project involves live goldfish and therefore prioritizes animal welfare throughout design and exhibition. The system uses **vision-only, non-contact observation**: no tagging, attachment, marking, or invasive sensing was applied. Husbandry followed established care best practices, with water quality, aeration/filtration, stocking density, and light exposure monitored to minimize stress and avoid direct high-

intensity illumination. No punitive or coercive feedback was used; the fish were free to swim without behavioral conditioning. After the exhibition, the animals were transferred to **long-term care**.

Regarding human participants, the facial capture system operates strictly in real-time. No biometric data or personal images were stored, recorded, or transmitted for secondary use, ensuring the privacy and anonymity of the viewers within the ephemeral loop of the installation. Conceptually, the work acknowledges the ethical tension of **instrumentalizing life**, and makes this apparatus of observation visible for critical scrutiny.

Conclusion

Non es piscis reconfigures live streaming as a closed loop in which capture, selection, and return do not merely depict the world but actively condition what can count as present [26]. By binding YOLO-based detection and DeepSORT tracking [22, 27] to an interface act of selection, the work makes visibility an allocated resource: the “chosen” fish is foregrounded as a computational identity sustained by association rules rather than as a stable biological individual. By returning the viewer’s face to the same holographic membrane on which the projected light spot and fish visibility are composed, the installation collapses the outside position of spectatorship and exposes viewing as participation in an operational regime. Moments of identity drift and transient disappearance are not aesthetic ornaments but empirical signs that presence in the loop is contingent, revisable, and susceptible to collapse under thresholds and timing constraints. In this sense, the work does not simply ask who streams whom; it demonstrates how the loop streams all participants by distributing agency and existence across bodies, interfaces, and algorithmic observation.

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