Choreographing Surveillance, Collecting Obfuscated Movement: *On View* and *Human Unreadable* by Operator

–– Ania Catherine

This piece will provide an overview of two artworks, *On View* (2019) and *Human Unreadable* (2023), both of which are conceptual artworks that include technology and performance created by Operator, my collaborative art practice with Dejha Ti established in 2016. My background is in choreography and performance art, and Dejha is a multimedia artist and HCI technologist. Rather than go into deep detail about each of the works in all their complexity, I will give a brief overview of the work as a whole and focus the text on the precise moments and instances in which performance and technology interface. Asking such questions as: how does technology and interface design choreograph participation in the audience? How does performance expose the limits of technical systems? How does performativity emerge in new ways through and within the confines of new technologies? How do these mediums evolve when needing to adapt to the limitations of technology? How does technology perform for us? Also, considering the financial hardships associated with performance and the inevitably stunted growth when the ability to take risks disappears, it is certainly worth asking: does blockchain technology and digital scarcity have a role to play in ensuring that performance practices are able to continue evolving? With theaters increasingly being shut

down, cultural funding cuts ubiquitous, and the difficulty in the US of sustaining an independent dance company or performance practice, one could say that movement and performance are increasingly being relegated to service industries. The impact of infrastructures for art's creation, distribution, financialization, and preservation cannot be overstated; while it is interesting to discuss performance and technology from an artistic innovation perspective, there are equally important considerations and conversations to be had about technology's potential role in supporting the continued evolution of performance as a medium.

On View (2019)

On View is an experiential artwork, commissioned by SCAD Museum of Art in 2018 and opening in February 2019. We set out to create an installation about how selfie culture and experiential marketing were influencing the ways people engaged with art in places like museums. As the focus here is the performance, one could say we were interested in the ways in which *the audience performs the act of going to see art*, identifying the "image takeaway" as the primary goal of a day at the museum. In this way, *On View* is site-specific both physically and conceptually. This was the first work we created that would be experienced in a museum and we wanted to create something that was, in a sense, also about the act of going to a museum–specifically exploring how selfie culture was changing behavior within the walls of art institutions. In our research phase, we inevitably ended up with the question "why is selfie culture and experiential marketing so popular and profitable?", which led us to the subject of the privacy nightmare that is surveillance capitalism. It is however interesting to note that Shoshanna Zuboff's book *The Age of Surveillance Capitalism* (2018) hadn't been published yet, but
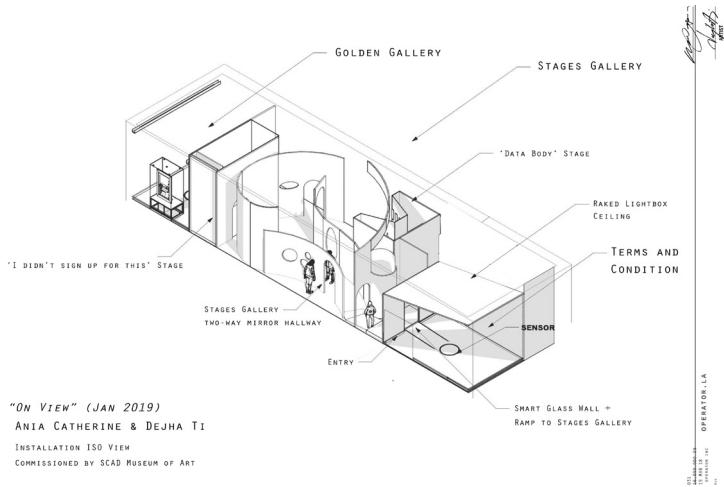
Figure 1. *On View* (2019), Ania Catherine and Dejha Ti. © Operator LLC

traces of what she so thoroughly and poetically lays out in the book were already widely known and documented. We found ourselves facing the root issues causing the selfie phenomenon we wanted to comment on: *On View* was actually about privacy, addictive interfaces, and the sinister results of information asymmetry that were defining the world's online activities. In essence, what happens in *On View* is the audience-participant agrees to become the subject of our artwork, the installation photographs them, and puts them on view—making them the subject of an artwork in a museum. The work was separated into three phases/spaces: (1) Terms and Condition, (2) Stages Gallery, and (3) Golden Gallery (fig. 1).

On View, like social media, doesn't work or do anything unless it has a subject/participant. As an experiential artwork, it requires the participation of the audience, not merely passive viewing. What does it mean to have the audience be the subject of the work, to be performing the role of museumgoer when in actuality they are one? Part of the work was exposing the ways in which the museumgoer is oftentimes already performing, drawing attention to the questions of intention, audience (are they there or online?), and who is actually the designer of that performance. While this work is about technology, it is not about technology itself, rather more about the human

Figure 2. Terms and Condition, *On View* (2019). Photography: Djeneba Aduayom. © Operator, LLC

Figure 3. Terms and Condition, *On View* (2019). Photography: Holden Ramage. © Operator, LLC

inhabiting contemporary dominant digital infrastructures—and the unspoken conditions of that inhabitation—the performance therefore felt important and necessary to the execution. There are many layers of performance in *On View*, which will be detailed below.

Part I

Terms and Condition: The Choreography of Consent

The audience-participant enters an immersive contract, called Terms and Condition (fig. 2). The contract, written in a Cheshire Cat-like fashion, gives the artists permission to make the audience-participant the subject of the artwork, to capture their faces, to put them on view. In this stark white room, kept at a temperature just slightly colder than the rest of the museum, and a lightbox ceiling, one encounters a performer who embodies the character of a contract, as if a contract were a person. This performance is reminiscent of/ based on unhelpful tech service phone chatbots, who are (user) friendly, professional, pleasant, but ultimately rigid and unhelpful. The performer invites the audience-participant through a pointing gesture to stand on the circle in the center of the room, which signals agreement to the contract so they can continue the experience. If the audience-participant asks any questions, the performer simply reads an excerpt of the contract on the wall with a friendly smile. A number of people didn't want to sign the contract—we assume because they were intimidated or unsure of what they were actually agreeing to—this could be seen as not a lack of engagement with the work, but actually an alternative ending: choosing not to opt in. In a way, the audience-participant's act of agreeing to the T&C with their entire body, standing there while the circle loads, registered viscerally as something dangerous or unclear.

The choreography of consent transforming from pressing a tiny checkbox with a finger to a full body movement was enough for audience-participants to realize what they might otherwise have not—the vulnerability they invite by agreeing to digital service T&Cs they neither read nor understand. This is an action they likely do weekly on their phones. The actual absence of friendliness in user-friendly interfaces becomes apparent. Those who choose to

agree stand on a smooth white LED circle that animates their feet, once the circle is complete, a sign above the door illuminates, reading: YOU ARE ON VIEW (fig. 3). The relative invisibility of engaging with technology is important to note here. The audience-participant sees a person standing on the squishy physical surface on the floor, which means they are not interacting with a screen, and there are no visible cables. The interface between human and technology is dissolved into the physical realm; technology is hiding itself behind surfaces—a performance to prevent the audience-participant from detecting its presence (and power). We perform for technology, but technology also performs for us. The door goes from opaque to transparent, and the audience-participant, now subject, can walk into the next space.

The audience-participant's body is activated in Terms and Condition, particularly in the action of consenting or not; executing actions in *On View* is a way for embodied experience to be part of the audience, registering the realness of the act of consent simply by asking for a more serious choreographic commitment—standing versus tapping (fig. 4).

Part II

Stages Gallery: Hold the Position

Entering the Stages Gallery, the contrast could not be more extreme from the fluorescent bright Terms and Condition section the subject just left. The Stages Gallery is a dark and disorienting space, with winding walls made of black reflective plexiglass and glass windows. There is no clear exit. Performers are present in the space, moving slowly and connected to themselves and each other using body sculptures with clusters of black cords. We intended for the performance of the trained performers in the Stages Gallery to be environmental or ambient performance—they are not fighting for your attention or asking to be looked at. Rather, if we achieve what we set out to do, it should feel like they are one with the walls and have been cycling in and out of their movements for centuries.

It is unclear whether you are looking at a performer or their reflection, two performers connected through a circular cut-out in the wall,

Figure 4. Terms and Condition, *On View* (2019). Photography: Holden Ramage.
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Figure 5. Stages Gallery, *On View* (2019). © Operator, LLC

or robots that appear to be real humans (fig. 5). Their movements and moments of stillness are atmospheric, their slow movements are eerie, sometimes making the cords block an entire pathway, their bodies becoming breathing architecture. In this environment, there are two stages which are visible through signs outside their entrances, cueing the subject to take a certain position in order to activate each stage. The two stages are called *Data Body* and *I didn't sign up for this.*

After some minutes spent in the Stages Gallery, one realizes that just as easily as they are peering at others in unclear circumstances, so are they also visible to others who they might not be able to see. Everyone watches but is also being watched. People in each of the two photo stages are visible to passersby at the entrance and naturally people start to wait until the stage is available for them to take their turn. At this point in time, experiential marketing was at its peak, events like 29 rooms and other selfie museums/opportunities were on every corner. There is a protocol in these spaces, you wait

until the people who were there before you had their selfie/photo moment, and then, when it is your turn, you go in and have virtually the exact same photo taken that the hundreds who came before you had just taken. We benefited from how commonplace this practice was, and while the photo stages in *On View* followed the same format of a selfie stage, they were a commentary and an exposé of the underbelly of these "free" selfie opportunities.

With *On View*, we grant the audience-participant's wish to become the subject of our artwork, but as it is after all our artwork, we wanted to art-direct exactly *how* they would be the subject. Practically, we could not staff the installation with a human guide to ensure this. How do we enforce the body position and the proper choreography of subjecthood that we designed for the audience-participants? We embedded technology into the environment to automate enforcement of the proper performance of the subject.

Figure 6. Stages Gallery, *On View* (2019). Photography: Holden Ramage. © Operator, LLC

More specifically, we used environmental sensors that needed to be activated by the subject, including an eye contact sensor that ensured proper eye position, and only when all the sensors were activated and the correct body position confirmed, did a voice countdown from 15 to 1 occur, culminating in the photo being taken (fig. 6).

During those 15 seconds, lights flashed, the environment awakened, kinetic winches were activated, adding scenic drama to that moment of being the center of attention, the moment of being seen, and captured. Once the countdown arrived at 1, the installation took the subject's photo. The subject needed to hold the body position for the entirety of the countdown or else everything would reset. The scenic technology was policing the subject's performance, ensuring they were only able to be the subject of our artwork, *On View*, on our terms. Many subjects, conditioned by their performance in selfie museums, started the 15-second countdown with a smile. We observed that the 15-second hold often caused what we called "melting smiles". If the smile that is usually performed in a selfie museum is genuine, why is it unable to be maintained for a 15-second period? This is perhaps a moment in which the subject realizes their own social performativity outside the museum's walls through the inevitable melting smile within *On View*.

Another more subtle layer of performance in this stage is that of the "Hold the position" audio directive and countdown. Taking inspiration from the characteristics of voice assistants such as Siri and Alexa, as well as the strategic use of women's names, voices, likenesses, and a friendly demeanor to control the subject. The voice was the voice of Amon Tobin, who also created the music in the Stages Gallery. Tobin did the speaking, then ran his voice through a filter to make him sound like a woman. The reality behind these female-sounding assistants is that the teams creating them are most likely primarily men. How comfortable would the public be with a machine named Roger sitting in their living room listening to their conversations? It is difficult to imagine, and we believe that the gendering of these predatory devices as female is a way to make the consumer feel safer in letting their guard down. Who doesn't want a friendly female assistant? This detail highlights how it is not only true that we perform for and through technology, but that technology also performs for us. In this case, it performs a particular genre of femininity to create the consumer's feeling of safety and to strengthen its reach into our most intimate spheres.

Figure 7. Stages Gallery, *On View* (2019). Photography: Djeneba Aduayom.
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After having one's photo taken, there is an unspoken assumption that the image will be made available to the subject, as a souvenir, but most likely as social evidence of having been there and "experienced" that artwork. Technology in *On View*, more specifically environmental sensors, kinetic winches, and cameras—connected via TouchDesigner—were used by us to create a scenario of deterministic or predictive choreography, where we could choreograph the audience-participants' poses without anyone needing to be present. The intention of the work required the design of a mechanism to automate enforcement of audience-participants' proper body positioning for the photos (fig. 7). We asked, how can we satisfy the audience's desire to be the subject of an artwork in a museum, but at the same time retain creative control over the art direction and

execution of that wish fulfillment? Successful execution was not only technically necessary but also conceptually, in order to make evident the roles they perhaps unconsciously play, the normative choreography they perform within and outside the walls of *On View*.

Part III

Golden Gallery: Luxury as Performed Boredom

On View culminates in the audience-participant successfully becoming the subject of an artwork and displayed in a museum. As promised in the Terms & Condition, YOU ARE ON VIEW. This takes place in the third phase of the work called the Golden Gallery. The subject enters a room that has a gold floor, white walls, and is lit evenly as a standard fine art gallery would be (fig. 8). Upon entering, one sees

Figure 8. Golden Gallery, *On View* (2019). © Operator, LLC

an art case, a white pedestal, and a gold frame with an image inside, protected by bulletproof glass, complete with a security camera at the top of the glass art case. Standing next to this glass case is what appears to be a security guard, an unamused man dressed in a black suit wearing dress shoes standing next to the art. This security guard is actually a performer. To create this performance, I studied the body language of museum security guards and created a sequence of body positions, poses, and transitions based on what I witnessed observing what they actually do on the job. The art in the case looks like the setting for an expensive and important artwork, including the glass case, the pristine walls, and the gold floor. However, I observed over years of going to see art that the presence of this bored person wearing a suit standing nearby arguably increased the perceived importance of the artwork more than any of the other signifiers. I find it interesting that this "performance" of protecting the artwork is something we might not recognize as performance but is an action done by a person that registers with viewers—often subconsciously—as an indicator of importance or value in settings like museums, fairs, and galleries.

Once again, the subject encounters the glowing LED circle on the floor in the center of the room and they intuitively know that they need to stand here as they did with the Terms and Condition (fig. 9).

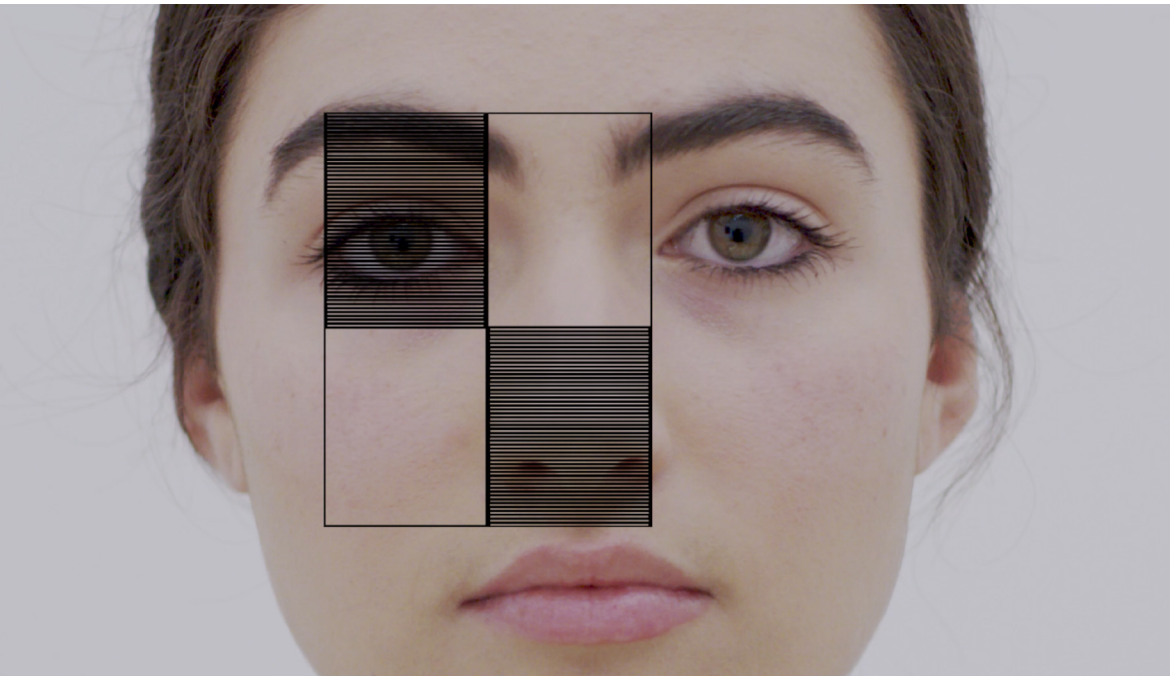Figure 9. Golden Gallery, *On View* (2019). © Operator, LLC

Figure 10. *On View* (2019). © Operator, LLC

They stand inside, the circle completes around their feet and suddenly, their image (taken in one of the other stages) fills the luxurious gold frame. There is a moment of excitement around being on view in a museum. They are the subject of the artwork, they don't just have a photo takeaway but are actually a featured protagonist of an artwork that is so important it needs to be protected. Shortly after this excitement fades there is the inevitable question, *how did the frame know it was me?* This is a defining moment of *On View*. However, there is the question of how the frame knows to pull up their specific image at that moment, and they also learn there is no way to receive their image. The answer to the question of the frame's knowledge is that facial recognition was used throughout the experience, and the system we configured using TouchDesigner was tracking the movement of the subject from the second they entered the Stages Gallery. The facial recognition camera was building a user profile of them quietly behind the scenes as they navigated the space (fig. 10).

The technology was invisible, as is the promise—or nightmare—of the age of the Internet of Things or Ubiquitous Computing. There aren't visible screens in *On View*, everything feels physical and analog, but there is a sophisticated system running fiber optic cables through the floor, sensors hiding in wood, a subtle use of technology environmentally. There is a glossy experience with glimpses of creepiness but never enough to stop them from continuing, an opportunity for 15 seconds of fame, and the anticipation of seeing the photo of that moment to have as evidence of the art experience—how convenient. Then the subject is finally at the point of seeing their image in the gold frame, the thing everyone came to the museum to see, but they are not able to take that image with them or share it online. So, what was the point of all that? Yet this is another defining moment of the work: realizing that in the absence of an image to take away, time spent with art might have no value or serve no purpose.

Most subjects took a photo of themselves on view in the gold frame as a substitute (fig 11). It probably feels unfair to have the image of their participation in the stages not being offered something that they then have access to or control over, but this is something that happens anytime their photo is posted on a social media platform. People assume that an image of them belongs to them, but the reality is—and the point of *On View* by pointing this out via experiential art—data about us does not necessarily belong to us. Our online performativity depicting enjoyment of events, art, experiences, life, when shared online becomes something extremely valuable to others. As the now cliché, yet still useful saying goes *when the service is free, you are the product*. Zuboff takes this a step further saying, "You are not the product; you are the abandoned carcass" (377).

Figure 11. *On View* (2019).
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Final Remarks on *On View*

While digital art is often thought to be by default decorporealizing, *On View*, as a highly digital work, invites participation and engagement of the audience-participants' bodies. Beyond that, it facilitates tapping into physical intuition as a way to guide awareness of the safety—or lack thereof—of digital services. There are many layers of performance embedded into this work, which is ultimately about data privacy and surveillance capitalism. It utilizes performance as a medium in the case of the trained live performers in each phase, while simultaneously exposing the performative qualities of going to see art in the context of selfie culture and social media (e.g., performing the art-interested subject for a social media post), the way that bodies and choreographies take on new meaning in contexts like museums (e.g., the security guards), and also commenting on the subtle ways that technology products perform for us. Specifically, the way our devices speak to, act towards, and respond, even their intonation, is a performance of tech companies to elicit a desired state from users that helps them achieve their goals. It is evident that performance and technology intersect in this work in a myriad of ways, all held together by the concept and a custom system using TouchDesigner, which serves as the nucleus for a hyperbolic experience using corporal engagement and advanced technologies to expose the hidden forces at work in the age of surveillance capitalism.

Human Unreadable (2023)

Human Unreadable is part of Operator's Privacy Collection (2020 - present), an exploration of the tension between privacy and transparency in blockchain technology through a series of crypto artworks that aims to reintroduce the body into—what we observed to be—a disembodied digital art landscape. Curious to understand the landscape of blockchain art to that point, we started researching. We quickly noticed that the human body as a consideration, as a represented entity visually, technically, and conceptually, and performance as a medium, was lacking in 2021. Given that the use of performance is arguably an exceptional case for blockchain technology with its ability to introduce digital scarcity to an otherwise ephemeral art form—which has not been easily sold in the art market—this came as a surprise. All works within the Privacy Collection follow specific

criteria, which are (1) they are site-specific to crypto culture, (2) the materiality of glass, light, and x-ray, (3) the body in focus, and (4) they explore humans hiding within seemingly transparent systems. The more narrow "site" within crypto culture that we chose to create *Human Unreadable* for was long-form, on-chain generative art, specifically the platform Art Blocks. We arrived at the following overarching concept for the work: *Human Unreadable* hides human movement and expression on the blockchain, thus allowing collectors/the public to slowly recover the human in a three-act experience spread over a timeline of 1 to 2 years. We looked at the rich history of chance operations in choreography, à la Cunningham, brought it to blockchain, and replaced dice rolling with an on-chain generative algorithm. Each time someone minted/collected an artwork, a unique movement sequence was generated by the algorithm, and the motion data of that unique sequence would create a visual art image using p5.js. Each of the 400 *Human Unreadable* outputs are generative artworks that are actually a visualization of a unique dance that remains hidden behind the image. In the second act, the collectors reveal the underlying choreography that created their piece in the form of an on-chain movement score. In the third act, select movement sequences in the collection are used as the raw material for us to create an original evening-length performance. The human obfuscation ends, and the audience/collectors finally face the human body in the absence of any form of technological mediation.

Hiding raw human expression—via movement—on the Ethereum blockchain seemed like a reasonable thing to desire. After all, our aim was to meaningfully bring the body into a very influential corner of the crypto art world. Once we started, we quickly realized why nobody had tried it before. Perhaps nobody had tried, or perhaps people had tried and run into the same issues we immediately faced and decided to give up. Below I will detail more information on the context *Human Unreadable* was situated in (conceptually and technically) within the on-chain generative art landscape, what we learned about the body's simultaneous complexity and simplicity, which became apparent in our efforts of turning it into data, the relationship between time, blockchain, and performance, and how we approached making people not only think about and see movement, but actually move as the result of encountering a blockchain-based artwork (fig. 12).

I: REVEAL   II: UNCOVER   III: WITNESS

Figure 12. Three acts overview, *Human Unreadable* (2023-2024).
© Operator, LLC

Structure (Conceptual Arc: The Slow Recovery of the Human)

Act I: Reveal visual artwork on Art Blocks
Act II: Uncover the underlying choreographic score via the second token
Act III: Witness live performance

Historical Lineages

Creating a process for generative choreography using blockchain naturally prompted an interest in understanding the history of computational choreography and the even broader subject of auto-mated theater: Analivia Cordeiro's *M3x3* (1975) in which she "utilized the computer in the creative act, giving greater potential for new aesthetic results" (Alvarez 4); Jeanne Beaman's *Random Dances* (1967), for which she created choreographic sequences using an IBM computer; and A. Michael Noll's *Computer Ballet* (1965). Each of these performances, in unique ways, demonstrated an interest and experimentation in how computers and automated processes could open up new possibilities for dance. The machine was not seen as something that interfered with the creation of movement, but some-

thing that could liberate it from the norms, habits, and patterns of the choreographer, which could enable them to create unexpected results through techno-human collaboration. Other choreographers shared this sentiment/excitement for the synchronicity that was enabled by leaving decisions to chance, the most well-known among them being Merce Cunningham. Cunningham's "Chance Dance" method used dice and chance operations to structure movement sequences. Finally, the E.A.T. (Experiments in Art and Technology) movement of the 1960s was another important historical lineage in which *Human Unreadable* sits. The premise behind E.A.T. was to bring together the best engineers and most advanced technologies with contemporary artists interested in pushing the boundaries of what was possible. This resulted in a groundbreaking cultural moment. Performance was central to E.A.T., with choreographers such as Yvonne Rainer, Simone Forti, and Deborah Hay as participants. *9 Evenings*: *Theater and Engineering* (1966) was a pinnacle moment and to this day one of the best examples of the potential for the convergence of performance art and advanced technologies. *Human Unreadable* is situated at the crossroads of these histories of computational choreography, intense engineer-artist collaboration, the centrality of performance to multimedia art, and the embrace of chance as a strategy to go beyond what we would normally produce.

Context: Opportunities and Restrictions

On-chain, long-form generative art is a type of generative art in which an artist creates an algorithm that generates visual art using a program like Processing or p5.js. Upon minting, an artwork that neither the artist nor the collector has ever seen is generated from that algorithm. The collections are typically between 100 and 1000 pieces. As *Human Unreadable*'s intention is to represent individuals hiding within a transparent system—in this case, blockchain—we hid movement sequences behind the generated artworks. Collectors might have only thought that they were collecting an artwork generated with code, but what became clear later is that while they did collect an artwork generated with code, they were also collecting the motion data of a unique movement sequence underneath it. To achieve this, we needed to add an extra step: the creation of a *choreographic hash,* which creates a unique movement score upon the minting, drawing from a library of 31 movements, the motion data of which are all stored on the Ethereum blockchain. After months of

refining the movement library—which took many iterations in order to receive a sense of balance and consistently desirable results when the movements were put in different orders—we recorded each of the 31 movements through high-fidelity motion capture. Wearing the same kind of suit that is used to record motion for a Hollywood film avatar, I performed each movement for the library one by one. We needed the data of each movement because later in the process, this data would be used to control the visual compositions of the visual artworks (fig. 13).

The first major issue faced was how to store motion data on-chain without spending literally hundreds of thousands of dollars, as blockchain is certainly not designed to store large quantities of data. Another aspect of the "site" of long-form, on-chain generative art that we wanted to very intentionally expose/puncture was the dominance of art that was aesthetically leaning into modernist graphic design. This resulted in aesthetics that match what you expect the computer to be "good" at doing. The works within this genre that had been successful, sold for the highest amounts and the most praised, tended to be artworks that were minimal, geometric, clean, quite disembodied, and at least aware, if not loyal to, the Swiss grid. What we found to be interesting was the lack of reflection on the fact that modernist design as a system has gendered values, and it leaves, by design, very little room for the body, emotions, chaos, sensuality, and subjectivity, all historically coded as feminine, to creep in. Considering that the intention of *Human Unreadable* is to

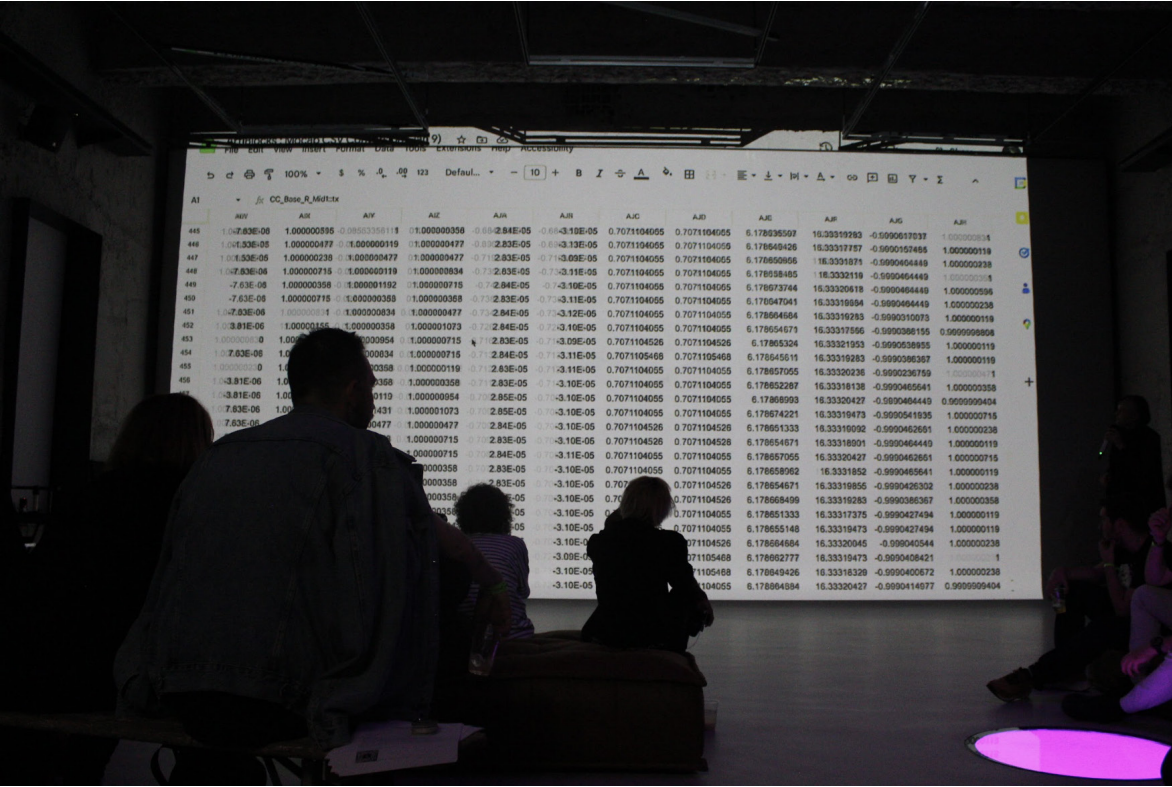Figure 13. Motion capture, *Human Unreadable* (2023). © Operator, LLC

Figure 14. Presentation by Dejha Ti at NFTRome (2023). © Operator, LLC

hide the human—and all its messiness—within this rigid technical container, it was essential that we simplified the raw expression enough to *work* technically, while still maintaining its essence. This has been a guiding tension throughout the creative and technical process. It is also, in our eyes, a continuation of work that women have been doing since the beginning of digital art, as Grant David Taylor notes: "Women artists deliberately subverted the precision and symmetry of the computer, pushing their practice towards inexactness and disorder [...] In response to the disembodied, masculinized abstraction of late modernist movements, feminists celebrated the physicality of the body and the subjectivity of personhood" (12-13). It was startling to come across this reflection about women artists working with computers 60 years ago, because it remains so rele-

vant today with similar preferences and biases within digital art. It felt to us that to bring the body with its complexity, curves, liquids, contradictions, and desires, both literally and figuratively, onto a blockchain and into a highly commercialized corner of generative art, was a protest against this idea that valuable digital art needed to be clean, *objective*, and avoid certain subjects or intense feelings. What we didn't realize was that the task of transforming this kind of human expression into usable data was immense, and hence the need for us within the process to create several custom tools just to be able to store motion data on the Ethereum blockchain.

What amazed me personally as a choreographer, was how difficult it was for data to capture what the body can do almost effortlessly. Three seconds of movement, even a simple hand gesture, when turned into motion data, filled hundreds of cells in Excel—and even with all that information, there was still so much texture about that movement, that moment, that body, that person, that mood, that could never be captured even if we filled thousands more (fig. 14).

The processes of translating movement into data made me less impressed with what we think of as technology and more impressed with the body as technology—as a remarkable synthesis and conveyor of information.

Downsampling the Body

There is one moment that really stands out to me from this process. I was on my laptop, working in a spreadsheet that listed several bones and movements (fig. 15). My task that day was to do each movement in the library (all 31 performed one-by-one as many times as needed) and decide which bones in my body I needed in order for that movement to be expressed sufficiently.

The reason for this part of the process, which was just one part of the data downsampling pipeline that Dejha and our lead engineer Isaac Patka designed, was to make sure that we were not uploading any unnecessary data on-chain to save storage costs. For example, if the movement was a simple arm movement sliding across my torso in a circle and I wanted to upload that movement on-chain, it is unnecessary to store the motion data of my entire body including

#	Signature	Head ▾	L_Foot ▾	L_Knee ▾	L_Wrist ▾	L_Wrist ▾	L_Wrist ▾	L_Ankle ▾	L_Wrist ▾
19	Exists	Y	Y	Y	Y	Y	Y	Y	Y
20	Bones								
21	Head	Y	Y	Y	Y	Y	Y	Y	Y
22	Hip	Y	N	Y	N	N	Y	Y	Y
23	Breast	N	N	N	Y	Y	N	Y	Y
24	Calf	Y	Y	Y	N	N	Y	N	N
25	Clavicle	N	Y	N	Y	Y	N	Y	Y
26	Elbow	N	Y	Y	Y	N	Y	Y	Y
27	Ankle	Y	Y	Y	N	Y	Y	Y	Y
28	Forearm	N	Y	Y	Y	N	Y	Y	Y
29	Wrist	Y	Y	Y	Y	Y	Y	Y	Y
30	Knee	Y	Y	Y	Y	N	Y	Y	Y
31	Thigh	Y	Y	Y	Y	N	Y	Y	Y
32	Thigh2	Y	N	Y	Y	Y	Y	Y	Y
33	Foot	Y	Y	N	N	Y	Y	Y	N
34	Shoulder	N	Y	Y	Y	Y	Y	Y	Y
35	UpperArm	N	Y	Y	Y	Y	Y	Y	Y
36	Spine1	Y	Y	Y	Y	Y	Y	Y	Y
37	Spine2	Y	Y	Y	Y	Y	Y	Y	Y
38	Waist	Y	N	Y	Y	Y	N	Y	N
39	BigToe	N	N	N	N	Y	Y	N	N
40	IndexToe	N	N	N	N	N	N	N	N
41	MidToe	N	N	N	N	N	N	Y	N
42	PinkyToe	N	N	N	N	N	N	N	N
43	RingToe	N	N	N	N	N	N	N	N

Figure 15. Bone pruning spreadsheet, *Human Unreadable* (2022).
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my toes or my skull, because they aren't required for that specific movement. After a while I developed new cost saving strategies just by thinking about anatomy, for example, *if my thigh is doing this particular thing, then there is only one thing my knee could be doing, so I don't need to include the motion data of my knee for this movement.* In these moments I was thinking: where does choreography begin and end? Does it start and end with imagining a movement? Does doing this sort of bone selection that determines which parts of the body are unessential or essential to the essence of a movement constitute as choreography? It seemed ridiculous, and then I considered for three seconds having someone else do the bone selection and it felt completely inappropriate. How could I? These were very intuitive choices, and precisely the microdecisions that determine the fate of how this movement meets the world. For me, designing the 31 movements in the movement library was the beginning, and I felt I was nurturing these movements through their countless transitions, adaptations, minimizations, and translations throughout the entire

process, and continue to do so today. In this way, the technical constraints of creating this blockchain choreography method also led to significant reflections on what choreographing means.

On-chain Choreographic Scores

Act I of *Human Unreadable* entailed the release of 400 artworks on the platform Art Blocks in May 2023. What was visible at the time of collecting/minting was an artwork that featured the human form, which looked primarily black and white, featuring compositions of light, glass, and x-ray effect. These images were generated entirely with code. These images, with their fragmented body parts, hint *the body is here* without revealing anything about the hidden movement sequence that created them. Six months later, we released Act II, during which collectors could reveal the choreographic score NFT that shows the movement sequence that created their piece. At this phase, the movement becomes a bit more human-readable through stick figure drawings of the movements (fig. 16). *Human Unreadable* collectors would either try the movement themselves, ask a dancer

Figure 16. *Human Unreadable* #63, Act I and Act II (2023). © Operator, LLC

Figure 17. Jason Bailey performing his choreographic score (2024).
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to interpret, or, in most cases, show the score to their children and have them interpret it to reveal the movement sequence. Aware of the rich history of various methods of dance notation but also aware that our audience was just being introduced to movement and not wanting to alienate anyone, we decided to approach the choreographic score design with accessibility in mind. We depicted the movements with stick figures and some guiding text prompts. The drawings were iterated with dancers through multiple sessions to ensure the drawings were clear. A degree of variation in inter-pretation is welcome, but we wanted to eliminate any egregiously misleading or confusing drawings. The moment when the collector or the public sees the score and starts to interpret/perform is pivotal for *Human Unreadable*, because it is the moment that generative art leaves the screen and enters the body (fig. 17). The invisible potentiality of performance that lay dormant in the pieces becomes apparent, and anyone who can see the choreographic scores is able to embody generative art. We were quite moved to hear from some collectors that Act II was a significant moment for them because it gave them "permission", or even an excuse, to dance.

Collecting Choreography

The history of performance and the art market is complicated. How does one sell or own a performance? A dance? A choreography? A moment? Being an artist is difficult, but being an artist with nothing to sell certainly makes it harder. For artists whose medium happens to be movement or performance, participation in the art market is often a distant dream. This has undoubtedly changed in the last few years with increasing visibility of artists working with performance in museums (e.g., Marina Abramovic, Tino Seghal, Anne Imhof, Miles Greenberg). Typically, if an artist is famous enough, then their performance works are monetized through the sales of photographs, performance documentation, or perhaps props used in a performance. There are limited cases where dance/choreography works have been sold as art objects. One recent example is Merce Cunningham's *Loops* (1971), to which the rights were sold as a digital artwork using motion capture technology in 2019. In other instances choreographic scores have been collected as art objects. One question that *Human Unreadable* addresses practically is: can the economics of choreography transition on a wider scale from being service-oriented (i.e. movement artists monetize their skills and vision being hired by entertainment industries) to movement becoming an art object that is transactable?

It might be helpful here to point at the ways in which another artistic field has made that shift: digital art. Prior to NFTs, digital artists were often working for advertising agencies and companies because their digital art had no way of being monetized through the established art market. With the introduction of digital scarcity via NFTs as a digital asset, one could prove ownership of and transfer a digital item. Yes, anyone can see the digital artwork on their screen, but there is an immutable decentralized ledger, the blockchain that can say: *this item exists*, this is how many there are, this is who made it, this is how much it sold for. This revolutionized the art world in ways that we can still see unfolding daily, but the introduction of digital scarcity to digital artworks via blockchain has certainly meant that there is a path other than working in advertising for a digital artist. Digital art can be seen, treated, and transacted just as any other art object can. Poets are now also bypassing traditional routes of publication and distribution of poems and sales through books, and are now minting poems on blockchain, selling one poem

as an art object via a NFT. One poem by Ana Maria Caballero just sold in a Sotheby's auction in January 2024 for several thousand euros.

Performance and movement practices suffer from a similar predicament. How can one prove ownership over something ephemeral? With cultural funding in many countries being cut dramatically, support for true experimentation in these fields is inadequate. Without cultural funding, how can one sustain an artistic practice in which there is nothing to sell? Through *Human Unreadable* and the tools/method we created, we successfully sold choreographic sequences as art objects—over 200 collectors around the world now own choreography. The Ethereum equivalent of $1.5 million between primary and secondary sales has been spent collecting *Human Unreadable* pieces, a dance-centric artwork using NFTs. With the open sourcing of our tools, it is our hope that a pipeline can be established for people who create movement as art so that they might have a previously unprecedented way to engage with the art market.

A New Appreciation for Dance

A surprise for us in the unfolding of this work has been seeing people/collectors, who previously had no interest in dance or movement whatsoever, unexpectedly finding themselves as collectors of choreography. Even beyond these collectors moving in new ways themselves, this was all sparked by their interest in crypto and decentralized technology. While it is often assumed that technology stands largely in opposition to the body, or something that is primarily a source of interference with our bodies or sense of embodiment, the opposite is true in *Human Unreadable*, as participation prompts consideration and activation of the audience's bodies. *Human Unreadable* extends the experience of movement and embodiment beyond that of the performer. Through its very specific context and format, the project leads to movement experimentation, thinking, and new experiences of embodiment with a new audience/collector/public. Many people in the crypto art sphere, until *Human Unreadable*, had no idea how deeply embedded dance and performance were in the history of computer art. We now regularly receive messages from collectors who are anxiously awaiting the moment they can experience Act III of the work, the final performance where they can see their sequence embodied live in an institution. Would they be as interested in going

to see dance at their local theater? Probably not. Is the novelty of the sheer *ownership of movement* their primary motivation to experience Act III? Likely so. While not the most romantic motivation, it has provided us with the opportunity to continue innovating, touring the work, securing partnerships, and building bridges to extend our generative choreography method to others, providing paid opportunities to dancers around the world to rehearse, interpret scores, and perform in museums and installations. One dancer we hired to perform the *Human Unreadable* movement library during a major art fair, after the week of engagements, shared with us that these performances were the first time she had the chance to dance in front of an audience in the four years since her graduation from Julliard and that the job gave her hope to continue pursuing dance. If the ownership of movement on a small scale offered by this one project has such ripple effects, it is promising to imagine what could happen if this process becomes infrastructural and can lead to new ways for artists to secure resources that allow them to continue creating. We see an opportunity for the introduction of monetary value to foster cultural value and appreciation.

Concluding Thoughts

In April 2023, we participated in an event hosted by JPG and Gallery of Crypto Art held in Manhattan. We were almost at the point of completing the generative model, but wanted to see how the dances it produced looked performed live, through the body, before putting our pens down. This happened live during the event, so an audience watched the tuning process for a choreographic generative model. We would run the model, have the dancers perform live what it produced, and make notes on how it could be adjusted to produce more balanced sequences (fig. 18). In conversation with the dancers who would perform the generative sequences in rehearsals, many of them stated that after several hours their bodies weren't tired but their brains were. There is a strange tension when performing these sequences, thinking of movements as numbers, mentally arranging them in different orders, tempos, emotional climates, and then telling your body to do that and not make it look like you're thinking. This issue seemed to be much more universal than we realized at the time, because what is the story of contemporary life if not to figure out how to live and be present in our bodies, to move, while being

Figure 18. Choreographic tuning session, *Human Unreadable* (2023). Photographer: Art Davison © Operator, LLC

dictated by algorithms but trying not to look like it. No wonder so many of us have chronic headaches.

The body is technology and technology is a performance. Through both *On View* and *Human Unreadable*, the line between technology and performance is not clear. It is not that there is a *performance part* and a *technology part*, or a situation where dance is causing this reaction through technology, or technological capability is demonstrated through dance. Technology certainly can be a barrier to embodiment, numbing us, mediating our interactions—I type this now crouched over a laptop with a horrible posture—however, it can also be an invitation. As a performance maker, I can say that technology has

helped me break patterns, reflect on the profundity of our bodies as machines, give people an excuse to dance, find nuances of movement making and distribution that I would never have thought about otherwise, reach new audiences that would have been completely unreachable, and *sell my work*. Conversely, looking at technology through a performance lens is also very fruitful. What can we learn about technology companies by viewing UX design as performance? What types of performances do social media algorithms incentivize? How much of what we do in our daily life is actually done for the sake of sharing on the internet later? In our opinion, many efforts merging performance and technology end with one in service of the other, or as a technical demonstration, which always produces a result that from an art perspective, falls flat. As long as we keep thinking about performance and technology as separate worlds that come together and meet for a moment, we are selling ourselves and the public short. These are not separate spheres; there are themes, conceptual containers, human questions that if asked can only be answered by dwelling in the crevices between the human and machine, the real and imagined, the performed and the lived, and the embodied and the mechanical.

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