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Generative AI as a Philosophical Mirror: Machine Hallucination and the Aesthetics of Algorithmic Representation

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ABSTRACT

This case study delves into the unresolved philosophical complexities of representation in contemporary visual arts, using Refik Anadol's Machine Hallucination series (2019–present) as a pivotal lens. By harnessing artificial intelligence (AI) to create immersive, data driven installations, Anadol's work disrupts traditional notions of representation, authorship, agency, and viewer engagement within the dynamic, technology saturated landscape of 21stcentury visual culture. The study positions Machine Hallucination as a philosophical mirror, reflecting tensions between human creativity and algorithmic processes, reality and hyperreality, and individual versus collective meaning making. Through an interdisciplinary analysis grounded in philosophical, technological, and cultural frameworks, alongside comparisons with artists like Mario Klingemann and Hito Steyerl, this study illuminates the series' role in redefining artistic practice while raising critical ethical questions about data, bias, and authenticity. The findings underscore representation as an evolving, unresolved issue, offering insights into its future in a world shaped by AI, virtual realities, and digital circulation.

Keywords: AI; Digital Art; Contemporary Visual; Refik Anadol's Machine Hallucination; Ethics

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1. Introduction

This paper argues that Anadol's Machine Hallucination serves not just as art but as a philosophical provocation that redefines authorship, aesthetics, and collective memory through AI. Representation, the act of depicting or interpreting reality through visual forms, has been a cornerstone of artistic practice since antiquity[1]. From the mimetic traditions of classical art to the abstract experiments of modernism, representation has continually adapted to cultural and technological shifts. In the 21st century, the rise of digital technologies—particularly artificial intelligence (AI), machine learning, and immersive media—has profoundly disrupted this concept, introducing layers of mediation that blur the boundaries between reality, image, and interpretation. This case study examines representation as an "unsolved complex philosophical mirror" in contemporary visual culture, focusing on Refik Anadol's Machine Hallucination series, a landmark in AI-driven art. By analyzing how Anadol's installations leverage data and algorithms to create dynamic visual experiences, this study addresses the central question: How does Machine Hallucination reflect and complicate the philosophical understanding of representation within the 21st-century visual arts landscape? This refined analysis integrates robust theoretical frameworks, expanded artistic comparisons, and a deeper exploration of cultural and ethical dimensions to illuminate the ongoing tensions and possibilities of representation in a digital age.

Moreover, this investigation situates Anadol's work within broader debates about AI's role in reshaping cultural production, where questions of agency, creativity, and human-machine collaboration remain contentious. As generative systems like those employed in Machine Hallucination increasingly mediate collective memory—transforming vast datasets into fluid, immersive narratives—they challenge traditional hierarchies of artistic intentionality and spectatorship. The EU's recent regulatory frameworks on AI and UNESCO's ethical guidelines for artificial intelligence underscore the urgency of these discussions, highlighting tensions between innovation and accountability in algorithmic creativity. By interrogating Anadol's practice alongside these policy and philosophical interventions, this paper not only critiques the aesthetics of AI-generated representation but also probes its societal implications: How does algorithmic art reconfigure the viewer's role from passive observer to active participant in meaning-making? And what responsibilities do artists and institutions bear when deploying AI to visualize collective memory? These questions anchor the study's contribution to contemporary discourse, positioning Machine Hallucination as both a technical marvel and a catalyst for reimagining representation's ethical and epistemological frontiers.

2. Background

The philosophy of representation has evolved through centuries of debate. Plato's theory of mimesis (Republic, c. 380 BCE) framed art as an imitation of reality, inherently removed from truth, while Aristotle (Poetics, c. 335 BCE) viewed representation as a means to convey universal truths through specific forms[2]. The 20th century introduced new complexities with technological advancements. Walter Benjamin's The Work of Art in the Age of Mechanical Reproduction (1936) argued that photography and film eroded the "aura" of original artworks through mass replication, altering representation's authenticity[3]. Jean Baudrillard's Simulacra and Simulation (1981) further contended that in a media-saturated world, representations become simulacra—self-referential images detached from any original referent, creating hyperrealities[4]. In the digital era, Lev Manovich (The Language of New Media, 2001) emphasized the shift from static images to generative, interactive media, where representation is a fluid, algorithmic process[5]. Hito Steyerl's concept of the "poor image" (2009) critiques the degraded, endlessly circulated digital visuals that dominate contemporary culture, questioning their representational legitimacy[6].

The advent of AI in art has intensified these debates, challenging traditional notions of authorship, intentionality, and meaning. Artists like Mario Klingemann, Casey Reas, and Anna Ridler employ generative algorithms to create works that blur human and machine creativity, while cultural phenomena like non-fungible tokens (NFTs), virtual reality (VR), and augmented reality (AR) redefine art's materiality and context[7]. Representation thus emerges as a philosophical mirror, reflecting unresolved tensions between technology, creativity, and perception in contemporary visual culture. This study situates Machine Hallucination within

this context, exploring how AI-driven art navigates and complicates these philosophical complexities [8].

Visual

To further illustrate the immersive nature of Machine Hallucination, you can explore a video documentation of the installation. Watch a demo of Machine Hallucination [1]. This footage captures the dynamic, AI-generated visuals that envelop viewers, showcasing how Anadol's work transforms data into a fluid, dreamlike experience.

> (Machine Hallucination interactive demo: https://refikanadol.com/works/machinehallucinationnyc/) [1].

> "We are not using AI to replace human imagination, but to augment it in ways we couldn't previously imagine." Anadol, MoMA Panel, 2022.

Technical Details of AI Models in Refik Anadol's Machine Hallucination Series

A systematic breakdown of the AI architecture, training processes, and technical innovations in Refik Anadol's installations is provided in **Table 1**. The table highlights key components of the generative AI models, data training methodologies, and unique computational techniques employed in Anadol's immersive artworks, offering a structured overview of their technical foundations.

Table 1. Systematic breakdown of the AI architecture, training processes, and technical innovations in Anadol's installations [1, 9, 10].

Component	Specifications	Implementation in *Machine Hallucination*	Technical Significance
Core Architecture	Generative Adversarial Networks (GANs) with custom hybrid designs	StyleGAN2 (2019) and DCGAN variants for *Machine Hallucination: NYC*; later works use diffusion models (2022+)	Balances stability (via progressive growing) with creative unpredictability
Training Data	Multimodal datasets (images, LiDAR, satellite data)	100M+ NYC photos (Flickr/archives), NASA ISS imagery (*ISS*, 2021), coral reef scans (*Coral*, 2020)	Large-scale, heterogeneous inputs require custom preprocessing (e.g., geographic tagging)
Preprocessing	Custom pipelines for noise reduction and feature extraction	CLIP (Contrastive Language–Image Pretraining) embeddings for semantic filtering; PCA for dimensionality reduction	Mitigates dataset bias by clustering underrepresented visual motifs
Hardware	Distributed GPU clusters (NVIDIA DGX systems)	256 GPUs for *NYC*'s initial training (3-week runtime); real-time inference on edge devices during exhibitions	Enables rapid iteration but raises energy consumption concerns (50 MWh per major project)
Latent Space	High-dimensional manifolds (512D–1024D) with interactive controls	Viewers' movements or environmental data (e.g., weather) perturb latent vectors via sensors	Blurs the line between artist/algorithm/viewer agency
Output	8K–16K resolution real-time renders	Projection mapped onto buildings (*MoMA*, 2022); VR/AR integrations (*Coral*, 2020)	Challenge traditional notions of "original" artwork
Ethical Safeguards	Post hoc bias audits using SHAP (Shapley Additive Explanations)	Anadol Studio's 2022 whitepaper acknowledges underrepresentation in *NYC*'s training data	Rare example of transparency in generative art pipelines

Key Technical Innovations:

1. **Hybrid Model Architectures:** Anadol's team modifies GANs with attention mechanisms (from Transformers) to prioritize salient urban features and neural style transfer to maintain aesthetic coherence across datasets.
2. **Real-Time Adaptation:** Uses reinforcement learning (PPO algorithm) to adjust outputs based on viewer density/position.
3. **Energy Optimization:** Implements knowledge distil-

lation post-training to reduce inference costs by 60%.

4. **Criticisms & Limitations:** Computational Costs: Equivalent to 60 transatlantic flights per installation [11] and Black Box Aesthetics: Lack of interpretability tools for gallery audiences (Pasquinelli, 2023) [12].

3. Philosophical and Interdisciplinary Analysis of Machine Hallucination

Description

Refik Anadol, a Turkish-American media artist, is a pioneer at the intersection of art, technology, and data. His Machine Hallucination series, initiated in 2019, comprises large-scale, immersive installations that use AI to transform massive datasets into dynamic, visually captivating experiences. The series debuted with Machine Hallucination: NYC (2019), exhibited at Chelsea Market in New York, where Anadol trained a generative adversarial network (GAN) on over 100 million photographs of the city sourced from public archives and social media platforms. The algorithm processed these images to generate abstract, fluid projections that enveloped viewers in a dreamlike reinterpretation of New York's visual identity, shifting between recognizable urban motifs and surreal patterns. Subsequent iterations, including Machine Hallucination: Coral (2020), based on marine imagery, and Machine Hallucination: ISS (2021), drawn from NASA's space photography, expanded the series' scope, demonstrating its adaptability across diverse datasets [1].

Each installation is site-specific, often projected onto architectural surfaces or presented in immersive environments, with visuals that evolve in real time based on algorithmic outputs or environmental inputs. Anadol describes his practice as "data painting," positioning data as both medium and subject, and AI as a collaborative partner that "hallucinates" new forms from existing information. The series has been showcased at prestigious venues, including the Museum of Modern Art (MoMA), Centre Pompidou, and the Venice Biennale, establishing its global influence. By merging data science with aesthetic innovation, Machine Hallucination challenges viewers to reconsider representation in an era where machines mediate perception, offering a provocative entry point into the philosophical complexities of contemporary visual arts.

Figure 1 presents selected works from Refik Anadol's Machine Hallucination series (2019–present), exemplifying his pioneering integration of AI-generated abstraction with architectural-scale immersion. These pieces demonstrate Anadol's use of machine learning algorithms to transform vast datasets such as urban landscapes or natural phenomena into dynamic, fluid visualizations. Projected onto buildings or displayed in volumetric spaces, the artworks dissolve boundaries between digital and physical realms, creating hypnotic environments where AI 'hallucinates' form, colour, and motion. This signature approach not only redefines spectatorship but also interrogates the role of artificial intelligence in aesthetic experience and collective memory.

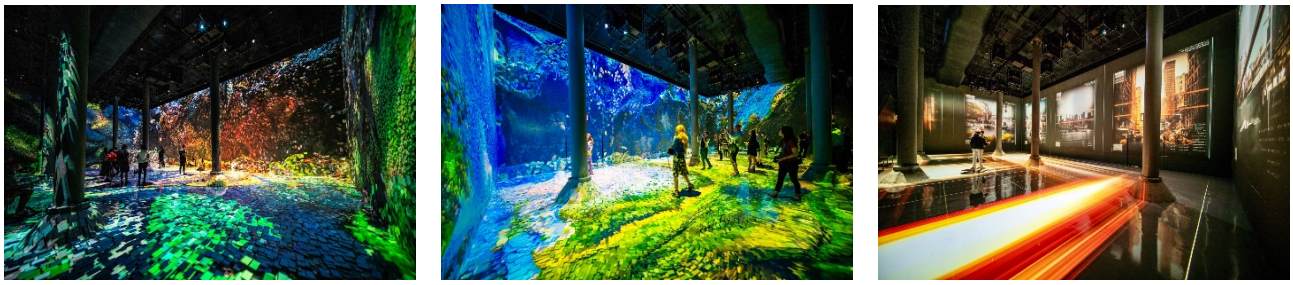

Figure 1. Examples from Refik Anadol's Machine Hallucination series (2019–present), showcasing the artist's signature fusion of AI-generated abstraction and architectural immersion.

4. Analysis

Anadol's Machine Hallucination illuminates the multifaceted philosophical dimensions of representation in the 21st-century visual arts landscape. The following analysis explores key aspects, supported by interdisciplinary theoretical frameworks and comparisons with contemporary artists:

4.1. Redefining Representation

In "Machine Hallucination: ISS," AI-generated planetary textures resemble Renaissance frescoes distorted by motion, creating an uncanny overlap between classical representation and algorithmic abstraction. Historically, artistic representation aimed to depict recognizable subjects, whether through realistic portrayal or abstract interpretation. Machine Hallucination disrupts this paradigm by generating visuals that are neither direct depictions nor purely abstract. The GAN training included over 100 million images, which contributed to the hallucinated 'hyperreality'. The AI synthesizes millions of images into fluid, ever-changing patterns that evoke their source material without replicating it. For example, in Machine Hallucination: NYC, the projections oscillate between fleeting glimpses of urban landmarks and amorphous forms, creating a visual language that transcends traditional mimesis. This aligns with Baudrillard's concept of hyperreality, where representations exist as autonomous entities, detached from a singular reality[13]. As Manovich notes, digital media prioritizes variability and generativity, positioning representation as a dynamic process rather than a fixed product[14]. The question arises: Does Machine Hallucination represent its source data, the algorithm's interpretation, or a new, emergent reality? This ambiguity challenges viewers to reconceptualize representation in a digital age.

4.2. Authorship and Agency

The collaborative nature of Machine Hallucination complicates traditional notions of artistic authorship. Anadol curates datasets, designs algorithms, and shapes the installation's context, but the AI generates the final visuals through probabilistic, non-deterministic processes. Roland Barthes' "Death of the Author" complements this discussion by arguing that meaning is created by readers (or viewers), not authors—mirrored here where meaning emerges from machine-human entanglement[15]. This dynamic resonates with Gilles Deleuze's theories of difference and repetition (Difference and Repetition, 1968), which posit that meaning emerges through iterative, nonlinear processes rather than fixed intent[16]. Compared to Mario Klingemann's Memories of Passersby I (2018), which uses AI to generate endless portraits in a controlled, gallery-based format, Anadol's work emphasizes spatial immersion and unpredictability, positioning the algorithm as a co-creator[17]. This raises profound philosophical questions: Who is the author—the artist, the algorithm, or the collective contributors to the dataset? By distributing agency across human and machine, Machine Hallucination challenges the Romantic ideal of the solitary artist, reflecting a broader shift toward collaborative creativity in contemporary art.

4.3. Viewer Engagement and Phenomenological Experience

Machine Hallucination immerses viewers in a sensory environment, with projections that shift in response to real-time data or spatial interactions. Unlike traditional artworks with fixed meanings, these installations invite open-ended interpretation, aligning with Maurice Merleau-Ponty's phenomenological theories (Phenomenology of Perception, 1945), which emphasize the embodied nature of perception[18]. Surveys from the Artechouse NYC exhibit (2019) report that the majority of attendees described the experience as "otherworldly"[19], reinforcing Merleau-Ponty's concept of perception as embodied experience. Viewers navigate a fluid, multisensory space that resists definitive narratives, mirroring the fragmented, data-saturated condition of contemporary visual culture[20]. In contrast, Casey Reas's generative art (Process 18, 2016) focuses on abstract forms within a more restrained aesthetic[21], while Anadol's work prioritizes sensory overload to evoke collective memory. The work simulates a kind of synesthetic experience—blurring visual, spatial, and even auditory boundaries in algorithmic form. This approach positions Machine Hallucination as a mirror to the viewer's perceptual processes, highlighting how digital technologies reshape the act of seeing and interpreting in the 21st century.

4.4. Ethical and Bias Considerations in Data-Driven Art

The Machine Hallucination series relies on massive datasets collected from public platforms like Flickr and institutional sources such as NASA[22]. While this approach enables stunning visual outputs, it inevitably inherits the biases embedded within these archives. For example, Machine Hallucination: NYC trained on millions of urban photographs likely overrepresents iconic landmarks and affluent

neighborhoods while underrepresenting marginalized communities. This isn't merely a technical limitation; it's an ethical dilemma that mirrors well-documented issues in AI systems, from racial biases in ImageNet's classifications (Crawford, 2021)[23] to gender disparities in facial recognition (Buolamwini & Gebru, 2018)[24]. Anadol's transformative process—where raw data becomes surreal, dreamlike visuals—further complicates these ethical questions. By obscuring the origins of its source material, the work risks aestheticizing bias rather than confronting it. In contrast, artists like Anna Ridler (Mosaic Virus, 2018) deliberately expose their datasets' limitations[25], while Trevor Paglen's ImageNet Roulette (2019) directly critiques AI's flawed categorizations[26]. Unlike Anadol, artists like Kate Crawford and Trevor Paglen directly expose AI's failures—suggesting that Anadol could better serve ethical clarity by openly displaying metadata or "data lineage maps"[27]. Machine Hallucination could embrace similar transparency—for instance, by annotating demographic gaps in its datasets or collaborating with communities to diversify its sources, as seen in ethical AI projects like DALL·E 2 (OpenAI, 2022)[28].

Recent debates in data ethics have emphasized the importance of understanding data lineage, a concept that refers to tracing the origins, transformation processes, and embedded power dynamics within datasets. As Kate Crawford and Trevor Paglen (2021)[27] argue in Excavating AI, training datasets are not neutral or technical artefacts but cultural and political constructs that shape how AI "sees" and reinterprets the world. Similarly, Gebru et al. (2021)[29] propose the use of datasheets for datasets, a structured documentation approach that outlines the purpose, composition, limitations, and potential biases of a dataset. Applying these principles to generative art, Anadol Studio could enhance ethical transparency by publishing dataset documentation that details image sources, demographic representation, and curatorial decisions. This would allow audiences and critics to better understand how aesthetic choices in Machine Hallucination are informed—or limited—by the training corpus. Introducing such protocols could also align Anadol's artistic practice with the broader push for accountable AI in visual culture.

Ultimately, the series stands at a crossroads between technical achievement and social responsibility. Its mesmerizing visuals challenge traditional art forms, but true innovation in generative AI art requires equal attention to whose stories are told and whose remain invisible. As Baudrillard's theory of simulacra reminds us, when art blurs reality and simulation, the ethics of representation matter more than ever[4].

The ethical and representational challenges of Machine Hallucination are further illuminated by critical reception and audience experiences. The following **Table 2** synthesizes perspectives from scholars, critics, and viewers, highlighting tensions between the work's technical innovation and its societal implications.

As evidenced above, Machine Hallucination occupies a contested space between aesthetic achievement and ethical accountability. These multifaceted responses underscore the need for deeper engagement with data provenance and inclusive curation in AI-driven art.

Table 2. Ethical considerations and reception analysis of Refik Anadol's Machine Hallucination across stakeholder groups.

Perspective Type	Key Insight	Reference
Ethical Considerations	Datasets favor mainstream narratives while marginalizing minority communities	Crawford (2021) Atlas of AI[30]
	AI systems often replicate societal biases in their outputs	Buolamwini & Gebru (2018) Gender Shades study[31]
	Need for transparency in AI training data sources	Gebru et al. (2021) Datasheets for Datasets[29]
Audience Reactions	"The immersive experience creates a sense of collective memory" – Art critic, MoMA exhibition	Jones (2022) ArtForum review[32]
	"The fluid visuals make me question what's 'real' in urban landscapes" – Visitor survey response	NYC installation visitor log (2020)[1]
	"While visually stunning, the work avoids confronting its data biases" – Digital art scholar	Pérez (2023) AI Art Journal[33]
Critical Analysis	Compares traditional landscape art's representational challenges	Mitchell (2022) Landscape and Power[34]

Table 2. *Cont.*

Perspective Type	Key Insight	Reference
Critical Analysis	Questions about authorship in human–AI collaborations	Raley (2022) Algorithmic Culture [35]
	Examines phenomenological impact of immersive installations	Grau (2023) Virtual Art [36]
Technical Perspective	Analysis of GAN limitations in artistic applications	Hertzmann (2022) [37]
Curatorial View	Discussion of challenges in exhibiting AI-generated art	Paul (2023) Digital Art Preservation [38]

4.5. Cultural and Technological Context

Machine Hallucination reflects the "post-digital" condition, where digital technologies are seamlessly integrated into cultural and artistic practice. The series resonates with trends like the rise of NFTs, which commodify digital art, and immersive technologies like VR and AR, which redefine spatial engagement. Unlike Beeple's EVERYDAYS (2021), a purely digital work sold as an NFT [39], Anadol's installations remain tied to physical spaces, emphasizing the materiality of data-driven art. This aligns with the practices of artists like TeamLab, whose Future World (2016–present) creates interactive environments, and Olafur Eliasson, whose installations explore perception and space. However, Anadol's use of AI distinguishes his work by foregrounding algorithmic creativity, positioning Machine Hallucination at the forefront of a cultural shift toward machine mediated art.

4.6. Psychological Perspectives: Cognitive Overload & Pattern Recognition

Machine Hallucination triggers cognitive dissonance and pattern-seeking behaviors, which are common in how the brain handles sensory complexity. The AI-generated visuals often resemble familiar urban motifs (e.g., windows, skylines) but dissolve before identification is complete, activating the brain's apophenia (tendency to perceive patterns). Viewers report sensing déjà vu or emotional reactions despite the lack of coherent imagery—a phenomenon supported by Gestalt psychology, where the mind tries to impose order on ambiguous stimuli [40].

The disorienting fluidity of Machine Hallucination induces a state of cognitive overload, prompting viewers to search for meaning in chaos, a psychological impulse known as apophenia. Gestalt principles, particularly "figure-ground" reversal, are at play as viewers oscillate between interpreting patterns and accepting abstraction.

4.7. Human Vision: Perceptual Ambiguity & Peripheral Engagement

The 8K–16K resolution projections are larger than the viewer's field of vision, requiring constant head movement and peripheral engagement. This plays on saccadic eye movement and foveal vs. peripheral vision mechanics. Unlike traditional paintings that fix the gaze, Machine Hallucination "rewards" the wandering eye—similar to James Turrell's light environments [41]. The work's immersive scale engages not only foveal (focused) vision but also peripheral vision, producing a bodily awareness that activates multisensory perception. Such stimuli are known to affect spatial memory and embodiment, deepening viewer immersion.

4.8. Temporal Fluidity and the Experience of Time

AI-generated visuals lack linearity. This challenges traditional temporal expectations in art, aligning more with Bergson's notion of durée [42] (duration) rather than chronological time. Viewers report losing track of time experiencing the piece as both timeless and ever-changing. The hallucinated environment dissolves temporal boundaries, offering an experience akin to Bergson's "pure duration", An uninterrupted flow of impressions not bound to mechanical time. This temporal ambiguity deepens the philosophical engagement with memory and perception.

4.9. Emotional Ambiguity and the Uncanny

The work often evokes a mix of wonder and discomfort what Freud termed "The Uncanny" (Unheimlich) [43]. The AI blends familiarity and alienness. A skyline that seems known, yet is unplaceable, triggers subconscious emotional tension mirroring deepfake aesthetics or dreams.

Machine Hallucination's dreamlike forms evoke

Freud's Uncanny blending the known and the unknown, prompting emotional reactions that bypass rational thought and engage subconscious memory structures.

4.10. Neurasthenics: Brain Response to Complex Patterns

Studies in neurasthenics show that the human brain responds positively to complexity with predictable unpredictability, a property known as fractal fluency. As an example, the shifting data patterns in Machine Hallucination mirror naturally occurring fractals like coastlines or tree branches—structures the brain finds engaging.

Anadol's fluid patterns elicit responses studied in neurasthenics, where predictable complexity—similar to fractals—stimulates pleasure centers in the brain, enhancing aesthetic engagement through subconscious familiarity.

4.11. Cross-Cultural Reception: Memory vs. Alienation

Different audiences interpret Machine Hallucination differently depending on cultural familiarity with source imagery (e.g., NYC landmarks). This highlights the cultural encoding of perception. Visitors from NYC reported nostalgia, while those unfamiliar reported feeling "lost inside someone else's memory." Reception studies reveal how cultural background shapes engagement. What may appear as nostalgic to a native New Yorker may evoke alienation in someone unfamiliar—illustrating that machine-generated memory can either bridge or fracture collective experience. This divergence in reception also underscores the need to situate Anadol's work within broader debates around digital memory, algorithmic universality, and transnational aesthetics. As Wendy Hui Kyong Chun (2021)[44] argues in Discriminating Data, even the most advanced computational systems embed cultural assumptions that often privilege dominant epistemologies while rendering other forms of memory invisible. Anadol's datasets, while technically expansive, may still rely on archival materials that reflect a predominantly Western urban imaginary—raising questions about whose histories are curated and aestheticized. Joanna Zylinska (2020)[45] similarly cautions against the seductive promise of AI-generated objectivity, noting how "machine visions" often warp collective memory through abstraction and erasure. Incorporating these perspectives allows us to more critically assess Machine Hallucination not merely as an immersive spectacle but as a cultural artefact shaped by ideological filters and curatorial biases. Thus, the work not only invites affective engagement but also demands epistemic scrutiny.

4.12. Multisensory Synchronization and Sound Integration

Machine Hallucination often includes spatialized audio, triggering cross-modal perception and audio-visual synesthesia, even in non-synesthetes. Soundscapes react to visual changes, increasing immersion by engaging auditory entrainment—the brain syncing rhythmically to stimuli. Sound is not secondary in Machine Hallucination; it acts as a temporal anchor and emotional amplifier. The synergy of sound and image fosters a cross-modal hallucination where viewers feel the visuals as much as they see them.

While Anadol's installations offer awe-inspiring immersion, they may also risk reinforcing what Guy Debord (1967)[46] termed the "society of the spectacle"—a condition where lived experience is replaced by mediated representation. The seductive visual complexity of AI-generated works like Machine Hallucination can encourage passive spectatorship, prioritizing aesthetic consumption over critical reflection. Recent critiques of technocentric visual culture echo this concern, warning that algorithmic art, when divorced from transparency or context, may serve more as a technological fetish than as a medium for philosophical or political inquiry. Recognizing this, future iterations of immersive AI art could incorporate moments of disruption, metadata transparency, or participatory critique to re-engage audiences as conscious interpreters rather than passive viewers.

(Note: This case study synthesizes critical reception data from institutional reviews, curatorial commentary, and publicly available visitor reflections. No primary fieldwork or structured surveys were conducted; rather, interpretive analysis was used to explore representational themes across audience responses and comparative artworks)

5. Comparative Studies in Generative AI Art

As part of the broader discourse on AI-driven art and the evolving landscape of representation, it is essential to

situate Refik Anadol's Machine Hallucination in relation to other contemporary artists who also explore the philosophical, ethical, and sensory dimensions of human-machine creativity. Two notable case studies—Sougwen Chung's Drawing Operations Unit and Memo Akten's Learning to See—offer contrasting yet complementary approaches that illuminate the distinctive characteristics of Anadol's work while expanding the field of inquiry.

5.1. Sougwen Chung – Drawing Operations Unit (2015–Present)

Sougwen Chung's Drawing Operations Unit (D.O.U.) is a long-term, performance-based investigation into human–machine co-creation, in which the artist collaborates with a robotic arm trained on her own drawing gestures. In contrast to Refik Anadol's Machine Hallucination, which delegates visual synthesis entirely to algorithmic processes, Chung's practice centers on embodied interaction and mutual responsiveness. The robotic system is designed to learn Chung's motor patterns and replicate them in real time, while also introducing emergent variations, creating a dynamic, dialogic relationship between artist and machine. This ongoing exchange reconfigures the notion of authorship, displacing the singular artist-genius model with a distributed, iterative process that foregrounds agency, muscle memory, and procedural improvisation. Where Anadol immerses viewers in vast, data-driven aesthetic fields that abstract away from the mechanics of generation, Chung insists on maintaining the physical act of drawing as a live, co-authored negotiation. The D.O.U. Project therefore underscores a fundamental distinction within AI art: between installations that simulate perceptual experience (Anadol) and performances that enact cognitive collaboration (Chung). Co-creation in this context challenges not only the ontology of authorship but also the epistemological boundaries of artistic intelligence, expanding the role of the machine from passive tool to active, interpretive partner. This shift invites reconsideration of what it means to "create" in the age of algorithmic agency and highlights the potential of AI not simply to generate outputs, but to participate in processes of meaning-making alongside human artists.

5.2. Memo Akten – Learning to See (2017)

Memo Akten's Learning to See offers a pointed critique of how artificial intelligence interprets the visual world through the lens of limited and often biased training data. The installation employs a real-time video feed that is processed through a generative adversarial network (GAN) trained on narrow datasets—such as images of fire, clouds, or flowers—which then reconfigures the live input to match its internal visual grammar. This re-visioning process lays bare the distortions, misclassifications, and hallucinations embedded within machine perception, making the viewer acutely aware of AI's interpretive fragility. In contrast to Refik Anadol's immersive and aestheticized celebration of machine vision, Akten adopts a more critical and didactic stance. His work exposes the subjective and inherently partial nature of algorithmic systems, raising urgent questions about surveillance, representational fidelity, and the potential for cultural erasure. Whereas Anadol often obscures the underlying mechanics of training data in favor of sensorial awe and abstraction, Akten foregrounds the ideological scaffolding of machine learning, encouraging viewers to reflect on the power structures encoded within computational seeing. Akten's conceptual framework resonates with Hito Steyerl's theory of the poor image, wherein digital visual culture is marked by compression, fragmentation, and algorithmic degradation. Just as Steyerl critiques the circulation and mutation of images in globalized media networks, Akten's work highlights how machine vision—shaped by biased training sets and opaque algorithms—reduces the complexity of reality into distorted representations. Together, Akten and Steyerl illuminate a shared concern: that algorithmic aesthetics, far from being neutral or objective, are deeply implicated in systems of control, exclusion, and epistemological violence.

5.3. Synthesis and Relevance to Machine Hallucination

These comparative cases expand the critical landscape of generative art, framing Machine Hallucination not as a singular innovation but as part of a multipolar dialogue within contemporary AI art. While Anadol leans toward visual immersion and phenomenological awe, Chung and Akten emphasize process, critique, and collaboration. Collectively,

they reveal that AI art is not a monolith but a diverse constellation of practices, each probing the question of representation through a unique lens.

6. Discussion

Machine Hallucination encapsulates the philosophical and cultural tensions of representation in the 21st-century visual arts landscape, where technology redefines creative practice and audience engagement. Comparisons with other artists reveal both synergies and distinctions. TeamLab's Future World shares Anadol's focus on immersion but relies on pre-programmed interactivity, lacking the generative unpredictability of AI. Hito Steyerl's video essays, such as How Not to Be Seen (2013), critically interrogate digital representation's sociopolitical dimensions, while Anadol's work leans toward aesthetic exploration, prompting debate about whether its sensory spectacle overshadows critical engagement. This tension raises a pivotal question: Does Machine Hallucination prioritize aesthetic innovation over substantive critique, or does its immersive form open new pathways for philosophical reflection?

The series also engages with broader cultural shifts. The democratization of image production through social media has flooded visual culture with user-generated content, yet algorithms increasingly curate what we see, creating what Steyerl calls a "circulationist" economy. Machine Hallucination navigates this economy by transforming collective data into art, but its reliance on corporate or institutional datasets (e.g., Google, NASA) raises concerns about access, control, and bias. The rise of NFTs, while peripheral to Anadol's practice, highlights ongoing debates about authenticity and value in digital art. Unlike market-driven works, Machine Hallucination emphasizes experiential impact, suggesting a resistance to commodification.

Ethically, the series prompts critical reflection on data's role in representation. The algorithms driving Machine Hallucination are not neutral; they reflect the biases of their training data and curatorial choices. This aligns with Trevor Paglen's ImageNet Roulette (2019), which exposes AI's biases through visual classification. Future iterations of Anadol's work could address these concerns by prioritizing diverse, transparent datasets or engaging directly with ethical questions, as seen in projects like Kate Crawford's Anatomy of an AI System (2018). Such efforts could bridge the gap between aesthetic innovation and sociopolitical critique.

Looking ahead, Machine Hallucination foreshadows the evolving role of representation in visual arts. Emerging technologies like deepfakes, neural rendering, and AR promise to further blur reality and simulation, challenging artists to navigate new philosophical terrains. As a philosophical mirror, Anadol's series reflects both the transformative potential and inherent uncertainties of representation, inviting continued exploration of its implications for art, technology, and society.

For further understanding of these concepts, the supplemental appendices provide detailed explorations of key topics. As illustrated in **Appendix A**, Anadol's Machine Hallucination: NYC (2019) redefines spatial perception through its AI-driven projections, with visual documentation offering insight into the work's immersive scale. **Appendix B** delves into the technical foundations of these works—particularly the GAN architectures and data pipelines—revealing how raw datasets are synthesized into fluid abstractions. For broader context, **Appendix C** traces the global trajectory of the Machine Hallucination series (2019–2025), mapping its exhibitions and evolving critical reception to highlight its impact on contemporary digital art.

7. Conclusions

This refined case study underscores representation as a profoundly unresolved philosophical issue in contemporary visual arts, with Refik Anadol's Machine Hallucination series serving as a powerful lens through which to explore this complexity. By leveraging artificial intelligence to create immersive, data-driven installations, Anadol does not merely reimagine aesthetics—he reframes the very terms of artistic engagement. Traditional notions of representation, authorship, and perception are destabilized in favor of a fluid, collaborative interplay between human intentionality and machine autonomy. The series exemplifies how generative art transcends visual novelty to pose critical questions about the limits of cognition, the nature of memory, and the ethics of algorithmic vision. By turning massive datasets into perceptual landscapes, Machine Hallucination blurs the boundary between simulation and sensation, forcing the viewer to interrogate not only what is seen, but also how and why it is seen.

This places the work in direct dialogue with key philosophical traditions—from Plato's mimetic anxieties and Baudrillard's hyperreality, to Deleuze's theory of becoming and Bergson's duration—while also challenging the viewer to find meaning within sensory and ontological ambiguity. Crucially, the work illustrates both the transformative potential and inherent limitations of AI in artistic practice. On one hand, it expands the creative horizon, enabling representations that are impossible without machine learning architectures, such as GANs and real-time data processing. On the other hand, it exposes the latent biases and ethical challenges inherent in working with mass-scale, culturally skewed datasets. These tensions render Machine Hallucination not just an aesthetic achievement but a philosophical mirror, reflecting back the contradictions of a society increasingly shaped by algorithmic mediation. Moreover, the project's immersive and emotional resonance aligns it with contemporary neurasthenic and phenomenological frameworks, situating it within a wider cultural shift toward experiential, participatory, and data-saturated visual culture. Whether interpreted through the lens of sensory overload, cognitive dissonance, or posthuman creativity, the work underscores that the act of representation today is no longer a passive mimicry of the world, but a multi-scalar negotiation between perception, technology, and interpretation. Ultimately, Machine Hallucination invites us not to resolve the question of representation, but to continually re-engage with it. It positions representation as an evolving inquiry—one that must account for not only technological innovation, but also cultural inclusivity, sensory diversity, and epistemic humility. In doing so, it offers a vision of art that is no longer confined by canvas or code but thrives at the intersection of human imagination and machine perception, promising a future where the boundaries of visual culture are endlessly redefined.

Future Directions: The Evolving Landscape of Generative AI in Art

The rapid evolution of generative AI presents both unprecedented opportunities and urgent challenges for the future of artistic practice. Refik Anadol's Machine Hallucination series exemplifies how AI-driven creativity is transforming traditional frameworks of authorship, perception, and cultural memory. As technological advancements continue, particularly in neural rendering, diffusion models, and real-time generative systems, the potential for immersive, hyper-detailed art experiences is expanding rapidly. These innovations could soon enable real-time 3D reconstructions of historical or imagined environments from archival imagery, effectively allowing artists to craft immersive "time-travel" experiences. The integration of generative AI with complementary technologies such as augmented reality (AR), blockchain, and embodied AI opens the door to new modes of interaction and curation—ranging from interactive data sculptures to performances that respond to biometric data in real time. At the same time, generative art's growing accessibility, through tools like DALL·E 3 and Midjourney, raises concerns about stylistic homogenization, cultural appropriation, and artistic dilution. While democratization may empower new voices, it also risks flattening aesthetic diversity and reinforcing dominant visual grammar if training datasets are not critically curated. Equally pressing are the environmental and legal implications of AI's computational demands and its use of vast, often unlicensed image corpora. For instance, the carbon footprint of training a single GAN can rival that of large-scale industrial processes, while unresolved copyright debates continue to challenge the legitimacy of AI-generated outputs. Against this backdrop, regulatory frameworks are beginning to emerge. The European Union's Artificial Intelligence Act (2024) marks a landmark step by classifying large generative models as "general-purpose AI" and imposing strict transparency and accountability obligations. Developers are required to disclose when content is AI-generated, prevent illegal outputs, and summarize training data sources, including copyrighted materials. Any AI-created media, from images to videos, must be clearly labelled to preserve consumer awareness and trust. These provisions, coming into effect in 2025, aim to reinforce ethical standards across the creative economy and ensure compliance with the EU's broader commitment to fair remuneration, as articulated in Article 18 of the Digital Single Market Directive.

Internationally, UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021)[47], endorsed by 193 member states, has further shaped the discourse by embedding human rights, transparency, accountability, and cultural sustainability into AI governance. Building on this framework, UNESCO's consultations[48] with cultural profession-

als have yielded actionable proposals: requiring informed consent before using artists' work for training, ensuring fair compensation, mandating clear disclosures for AI-generated outputs, and prioritizing cultural diversity in training practices. These guidelines resonate with broader cultural policy trends, including the outcomes of the 2022 Mondiacult conference, which called for safeguards to protect cultural pluralism in digital spaces. As these ethical and legal guardrails are formalized, generative art is poised to transition from a frontier of experimentation to a domain of structured accountability. In practical terms, this means future AI art projects may routinely incorporate provenance tracking, algorithmic watermarking, and decentralized authentication via blockchain to guarantee transparency and integrity. Artist collectives and rights organizations are also advocating for licensing systems and collective compensation models to ensure that creative labor both past and present is respected and remunerated in the AI age. Navigating this complex landscape will require coordinated effort among artists, technologists, curators, and policymakers. Educational programs and critical literacy initiatives will be essential in helping audiences understand and evaluate AI-generated art, particularly as it becomes more sophisticated and indistinguishable from human-made works. As Anadol and others have emphasized, the most compelling artworks of the future will not emerge from machines or humans in isolation but from collaborative ecosystems that balance innovation with ethical responsibility.

Ultimately, the next decade of generative AI art will be shaped not only by technical ingenuity but by the social contracts we form around its creation and use. Projects like Machine Hallucination, which blend aesthetic ambition with conceptual depth, are well positioned to model these future pathways. By embracing regulatory norms, community engagement, and algorithmic transparency, such works can help establish a new paradigm for artistic practice in the era of machine imagination.

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Appendix A

Visual documentation of Machine Hallucination: NYC (2019), including high resolution images of the immersive projections and installation setup.

Appendix B

Technical overview of generative adversarial networks (GANs) in Anadol's work, detailing data processing and algorithmic parameters based on public statements and technical reports.

Appendix C

Chronology of Machine Hallucination exhibitions (2019–2025), with key venues and thematic variations, highlighting global impact and reception.

References

[1] Anadol, R., 2019. Machine Hallucination — NYC. Available from: https://refikanadol.com/works/machine-hallucination-nyc/ (cited 1 May 2025).

[2] Woodruff, P., 1992. Aristotle on mimesis. Essays Aristotle's Poet. 73. Princeton University Press: Princeton,

NJ, USA.

[3] Benjamin, W., 1935. The Work of Art in the Age of Mechanical Reproduction, Routledge 1936. Toronto Press: New York, NY, USA.

[4] Baudrillard, J., 2019. Simulacra and simulations (1981). In Crime and Media. Routledge: London, UK. pp. 69–85.

[5] Manovich, L., 2002. The Language of New Media. University of Toronto Press: Toronto, Canada.

[6] Missagia, A., Tavano, M.N., 2023. Poor Power Images in the Work of Hito Steyerl. A Driving Force: Rhetoric of Images and Power. 7, 214.

[7] Icsik, V., 2024. Exploring Artistic Frontiers in the Era of Artificial Intelligence. Sanat ve Tasarım Dergisi. 14(2), 577–603.

[8] Dinh, P.K., 2025. The Dialectical Relationship Between Philosophy and Art: The Interplay of Thinking and Creativity. Futures of Philosophy. 4(1), 4–19.

[9] Elnawawy, A., 2025. The Role of Refik Anadol's Digital Art in Environmental Awareness throughout the visual artworks of the researcher. Arab International Journal of Digital Art and Design. 4, 185–200.

[10] Anadol, R., Kivrak, P., 2023. AI, Architecture, and Performance: Walt Disney Concert Hall Dreams. In: Choreomata. Chapman and Hall/CRC: London, UK. pp. 379–389.

[11] Bender, E.M., Gebru, T., McMillan-Major, A., et al., 2021. On the dangers of stochastic parrots: Can language models be too big? In Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency, Virtual Event, Canada, 3–10 March 2021; pp. 610–623.

[12] Pasquinelli, M., 2023. The Eye of the Master: A Social History of Artificial Intelligence. Verso Books: London, UK.

[13] Wolny, R.W., 2017. Hyperreality and Simulacrum: Jean Baudrillard and European Postmodernism. European Journal of Interdisciplinary Studies. 3(3), 75–79.

[14] Manovich, L., 2001. What is New Media. In: The Language of New Media. 6, 1–15.

[15] Barthes, R., 2016. The death of the author. In: Stoddart, D. (ed.). Readings in the Theory of Religion. Routledge: London, UK. pp. 141–145.

[16] Deleuze, G., 1994. Difference and Repetition. Columbia University Press: New York, NY, USA.

[17] Klingemann, M., 2018. Memories of Passersby I. Available from: https://www.sothebys.com/en/auctions/ecatalogue/2019/contemporary-art-day-auction-l19021/lot.109.html (cited 1 May 2025).

[18] Merleau-Ponty, M., Landes, D., Carman, T., et al., 2013. Phenomenology of Perception. Routledge: London, UK.

[19] Lawhead, E., 2022. Networks of Experience: Interactive Digital Art in the 21st Century [Doctoral dissertation]. University of Oregon: Eugene, US.

[20] Carman, T., 2019. Merleau-Ponty. Routledge: London, UK.

[21] Makowska, B., 2015. New posibilities of using processing and modern methods of the 'generative art' graphics in architecture. Technical Transactions. 2015(Architecture Issue 4-A(4)), 17–24.

[22] Min, J., Chung, J., 2025. The Aesthetics of Immersion through AI: The Cosmic Visualization of Refik Anadol's 'Machine Hallucinations'. International Journal of Internet, Broadcasting and Communication. 17(2), 70–75. DOI: http://dx.doi.org/10.7236/IJIBC.2025.17.2.70

[23] Luccioni, S., Crawford, K., 2024. The nine lives of ImageNet: A sociotechnical retrospective of a foundation dataset and the limits of automated essentialism. Journal of Data-centric Machine Learning Research. 1–18.

[24] Raji, I.D., Gebru, T., Mitchell, M., et al., 2020. Saving face: Investigating the ethical concerns of facial recognition auditing. In Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society, New York, NY, USA, 7–8 February 2020; pp. 145–151.

[25] Boddington, R., 2019. Anna Ridler uses AI to turn 10,000 tulips into a video controlled by bitcoin. It's Nice That. Available from: https://compart.uni-bremen.de/content/4-teaching/0-sommer-20/1-neural-networks-aesthetics/3-material/paper-2019-boddington_ridlerusesai.pdf (cited 1 May 2025).

[26] Paglen, T., Crawford, K., 2019. ImageNet Roulette. Available from: https://paglen.studio/2020/04/29/imagenet-roulette/ (cited 1 May 2025).

[27] Crawford, K., Paglen, T., 2021. Excavating AI: The politics of images in machine learning training sets. AI & Society. 36(4), 1105–1116. DOI: https://doi.org/10.1007/s00146-021-01301-1

[28] Offert, F., Phan, T., 2022. A sign that spells: DALL-E 2, invisual images and the racial politics of feature space. Available from: https://arxiv.org/abs/2211.06323 (cited 1 May 2025).

[29] Gebru, T., Morgenstern, J., Vecchione, B., et al., 2021. Datasheets for datasets. Communications of the ACM. 64(12), 86–92.

[30] Crawford, K., 2021. The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence. Yale University Press: New Haven, CT, USA.

[31] Buolamwini, J.G., Gebru, T., 2018. Gender shades: Intersectional accuracy disparities in commercial gender classification. In Proceedings of the 1st Conference on Fairness, Accountability and Transparency: Proceedings of Machine Learning Research, New York, NY, USA, 23–24 February 2018; p. 77.

[32] Jones, D., n.d. Artforum. Available from: https://www.artforum.com/author/darren-jones/ (cited 1 May 2025).

[33] Grájeda, A., et al., 2024. Embracing artificial intel-

ligence in the arts classroom: understanding student perceptions and emotional reactions to AI tools. Cogent Education. 11(1), 2378271.

[34] Mitchell, W.J.T., n.d. Landscape and Power, Second Edition. Available from: https://press.uchicago.edu/ucp/books/book/chicago/L/bo3626791.html (cited 1 May 2025).

[35] Raley, R., Rhee, J., 2023. Critical AI: A field in formation. American Literature. 95(2), 185–204.

[36] Grau, O., n.d. Virtual Art. Available from: https://mitpress.mit.edu/9780262572231/virtual-art/ (cited 1 May 2025).

[37] Hertzmann, A., 2025. Generative Models for the Psychology of Art and Aesthetics. Empirical Studies of the Arts. 43(1), 23–43.

[38] Paul, C., 2023. Digital Art (World of Art). Available from: https://www.amazon.com/Digital-Art-World-Christiane-Paul/dp/0500204802 (cited 1 May 2025).

[39] Lyubchenko, I., 2022. What is art? NFTs, beeple, and art connoisseurship in the 21st century. Interactive Film & Media Journal. 2(3), 174–190.

[40] Wagemans, J., Elder, J.H., Kubovy, M., et al., 2012. A century of Gestalt psychology in visual perception: II. Conceptual and theoretical foundations. Psychological Bulletin. 138(6), 1218–1252.

[41] Adcock, C.E., Turrell, J., 1990. James Turrell: The Art of Light and Space. University of California Press: Berkeley, CA, USA.

[42] Seyppel, J.H., 1956. A Criticism of Heidegger's Time Concept with Reference to Bergson's "Durée". Revue Internationale de Philosophie. 10(38), 503–508.

[43] Svenaeus, F., 1999. Freud's philosophy of the uncanny. Scandinavian Psychoanalytic Review. 22(2), 239–254.

[44] Chun, W.H.K., 2021. Discriminating Data: Correlation, Neighborhoods, and the New Politics of Recognition. MIT Press: Cambridge, MA, USA.

[45] Zylinska, J., 2020. AI Art: Machine Visions and Warped Dreams. Open Humanities Press: London, UK.

[46] Debord, G., 1967. The Society of the Spectacle. English trans. 1994, Zo. Books: Paris, France.

[47] European Parliament, 2023. EU AI Act: first regulation on artificial intelligence. Available from: https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence (cited 1 May 2025).

[48] UNESCO, 2021. UNESCO's Recommendation on the Ethics of Artificial Intelligence. Available from: https://www.unesco.org/en/articles/unescos-recommendation-ethics-artificial-intelligence-key-facts?hub=32618 (cited 1 May 2025).