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IF AND HOW DO MACHINES DREAM AND HALLUCINATE? THE WORKS OF REFIK ANADOL

Abstract: The article presents, in the broad context of contemporary technological and artistic phenomena, the works of one of the most important artists currently using artificial intelligence in his practice – Refik Anadol. Although the main emphasis is placed on the *Machine Hallucinations* project, developed since 2018 in various versions, and in particular *Unsupervised – Machine Hallucinations* presented at MoMA (at the turn of 2022 and 2023), other projects by Anadol and his studio are also discussed. The work of this artist arouses extreme reactions – from complete depreciation and statements that in this case we are dealing with “screensavers”, “psychedelic slush”, or “relaxation exercises” that pretend to be innovative (technologically) art, to genuine delight and recognition of the Turkish artist’s activities as groundbreaking achievements in the area of the use of algorithms and machine learning procedures. A critical look at the reception of these works and, above all, the author’s interpretation of the significance of using artificial intelligence in art based on Anadol’s work – leads to fundamental questions about *research-based art* and the emerging art of artificial intelligence (AI art).

Keywords: Refik Anadol, *Machine Hallucinations*, AI art, research-based art, data artist

1

Numerous productions by Refik Anadol Studio could become the subject of meticulous analyses, yet in this article I would like to focus mainly on the ongoing project *Machine Hallucinations* which has been implemented in various forms since 2018, with its presentation at MoMA in New York at the turn of 2022 and 2023 entitled *Unsupervised – Machine Hallucinations* being a kind of culmination of the project. For the first time, this theme appeared in relation to two projects: *Machine Hallucinations – Latent Study: Mars* (2018) and *Machine Hallucinations: ISS Dreams* (2018), which were later followed by: *Machine Hallucination – NYC* (2019–2020), *Machine*

Hallucinations – Space: Metaverse (2021), *Machine Hallucinations – Coral Dreams* (2021), *Machine Hallucinations – Nature Dreams* (2021), *Machine Hallucinations – Sphere* (2023).¹

Before focusing on the work presented at MoMA, I would like to synthetically depict two optics that invariably accompany the assessment of Anadol's activities. They are an exemplification not only of an evaluation of the artist's work but can also constitute an illustration of general trends and controversies related to critical assessment of the usage of artificial intelligence in artistic practices. Or such activities which, while faking activities in the field of art, are basically just a sophisticated way of simulating artistic production. Their goal is to create content (based on the tools of production and dissemination of artifacts formatted, so to speak, for sale) generating measurable profits. First of all, financial, although sometimes, as if by the way (?), also works that have some artistic values.

We have lived to see a time when a giant computer screensaver with looping colorful images becomes a work of art. However, unlike a classic screensaver designed by a more or less capable graphic designer, it is a work of AI (artificial intelligence). Refik Anadol – a thirty-eight-year-old Turkish artist who stands behind these “creative” screens, processes databases into colorful and moving images by means of artificial intelligence. Results? Generation Z representatives stare at them with the same delight and thoughtless gaze with which they look at a smartphone in search of another absurd meme which can be described as nothing but stupid.²

This is what the author of the “leading portal on contemporary art in Poland” writes proving also that Anadol's work is a model example of a dilettante approach to new media art, which requires neither intellectual nor physical effort. Her reflections primarily concern *Echoes of the Earth: Living Archive*, Anadol's first individual exhibition in Great Britain, which was held at the Serpentine North Gallery in London (2024), but also refer to the artist's other productions. According to the journalist, Anadol has never been interested in art, only in computer games, his works lack any meaning, in fact he does not create anything, his works are just “pseudo-creations” having nothing to do with art.

“W Sztuce” – because this is the name of the aforementioned portal – spelling, syntax and formal quality of the published texts do not meet high standards (the number of errors is significant, as is typical of the web), but I am being a bit malicious here. Something else is more important: an art critic, or so I reckon, who shows complete ignorance about new media art, easily conducts an exclusionary assessment of the artist's work (because, after all, not the artist himself, according to her), without doing much research concerning the matter of his achievements. On the one hand, she has an inalienable right to her own opinion, but, on the other

¹ Detailed information on these works can be found at: <https://refikanadol.com/works/> (accessed: 7.05.2025).

² D. Wojciechowska, *Refik Anadol, nowy model sztuki*, Wsztuce.net, February 22nd, 2024, <https://wsztuce.net/2024/02/22/refik-anadol-nowy-model-sztuki/> (accessed: 7.05.2025).

hand, this situation proves that art critics (or people who consider themselves as such) have expertise neither in new media technologies nor in new media art. Their simplified and, what is worse, authoritative judgments result from fundamental deficiencies related to the lack of historical, theoretical and critical knowledge of this still niche – within the broadly understood art world – field of new media art. In conclusive sentences, the author states: “When standing in front of Refik’s hallucinogenic animation, can anyone experience the same sensation that accompanies us when we interact with Great Art?”³ I guess there is “someone.” I would not rule out such a situation, although of course it is a matter for discussion.

In his review of the work presented in MoMA, Ben Davis⁴ performs a much more analytical assessment pointing to the subsequent stages of the process of creating *Unsupervised – Machine Hallucinations*. The critic has no doubt that this is not a new look at the history of modern art, but a kind of AI blender which – algorithmically mixing the components, i.e. collected and digitized outstanding works of twentieth-century art – generates a kind of mystification both in conceptual and pictorial terms. This is not, contrary to the creator(s)’ declaration, in any way a new reading of the history of modern art, but only random acts of synthesis and recombination presenting the machine’s ability to create random and aesthetically valueless images.

The fact that such a work could appear in MoMA also derives from a special pandemic and post-pandemic situation which brought significant financial losses to this institution. It should be added that, according to Davis, Anadol’s presence at MoMA could be a step calculated to attract new (young) viewers to the museum, as well as to trigger speculations related to the use of NFT as a new tool for promotion and sale of works of art. This first goal was fully accomplished – the exhibition turned out to be extremely popular, it was visited by hundreds of thousands of viewers. At that moment, Refik Anadol began to intensively develop the sale of non-fungible tokens (NFT) of his works, including the one shown at MoMA. A special type of contract guaranteed the New York institution 17% of the profits from the primary sale and another 5% from each subsequent operation, which at the time of the actual closure of the museum could be perceived as an extremely attractive option to finance this institution. I abandon this thread of Anadol’s involvement in innovative ventures related to, I guess it can be already said today, new tools for monetization of artistic deeds in the form of NFT and to what happened, for example, in connection with the media storm related to the activities of artists such as Mike Winkelmann (aka Beeple).

The memorable *Everydays: The First 5000 Days* sold in 2021 for nearly seventy million dollars (of course in the form of cryptocurrencies), followed by the sale of the *HUMAN ONE* (2021) installation for over twenty-eight million dollars. This time

³ Ibidem.

⁴ B. Davis, *An Extremely Intelligent Lava Lamp: Refik Anadol’s A.I. Art Extravaganza at MoMA Is Fun, Just Don’t Think About It Too Hard*, Artnet.com, January 22nd, 2023, <https://news.artnet.com/art-world/refik-anadol-unsupervised-moma-2242329> (accessed: 7.05.2025).

as both a physical artifact and NFT components.⁵ Today, it seems that it was just another search for market tools in order to look for new business areas, rather than a permanent change in the art market. Although, at the same time, looking at this phenomenon from a broader perspective, one can agree with the opinion of Michelle Kuo, who aptly notes that “[i]n the context of art, it’s tempting to say, well, NFTs are just the logical conclusion of Conceptual art.”⁶ I cite her statement also because she was the curator of the Anadol’s exhibition at MoMA. Was it a kind of breakthrough in thinking about technology-based art as a phenomenon of contemporary art fully accepted by the most prestigious institutions, or just a financial calculation? This question seems to be unresolvable at the moment.

After all, there is no doubt that Refik Anadol is (was) perfectly able to fit into the network of connections between purely commercial projects, such as presenting installations in public spaces (airports) or shopping centers. Not to mention such spectacular events as *Living Architecture: Casa Batlló* (2022), when tens of thousands of people admired his, it must be admitted, unusual mapping using the architecture of an icon of Barcelona, namely a building designed by Antonio Gaudí. And, at the same time, he made excellent use of the economic situation related to the NFT. MoMA also entered this “business” with some success, it seems – from a kind of critical approach to approval and acceptance of new rules of the art market. The fact that it quickly turned out to be another “bubble” would require a separate story.⁷

Coming back to Davis – his conclusion concerning the evaluation of Anadol’s activities, and particularly *Unsupervised*, is actually included in the title of the text devoted to the New York exhibition: *An Extremely Intelligent Lava Lamp*. According to the author, it is only an expression of the deepening process of blurring the differences between commercial and non-commercial activities at the intersection of art and the art market. Let me just add that for many years these two spheres have already been inseparable, but a kind of “romantic” vision of art that functions outside the rules of the market is constantly returning in the critical discourse. Thus, Anadol’s work – in the approach proposed by Davis – is merely a gigantic lava lamp, i.e. a kind of attraction, or a visual gadget for those who want to admire (?) abstract

⁵ During the Ars Electronica Festival in 2024 in Francisco Carolinum in Linz I saw the first exhibition in history, or at least it was advertised as such, entitled *PROOF OF ART* which was devoted to the history of NFT and the use of blockchain in digital art. Refik Anadol was also presented there. Cf. A. Weidinger (ed.), *Proof of Art: A Short History of NFTs. From the Beginning of Digital Art to the Metaverse*, Distanz Verlag, Berlin 2021.

⁶ S. Price, M. Kuo, *What NFTs Mean for Contemporary Art*, Moma.org.magazine, April 29th, 2021, <https://www.moma.org/magazine/articles/547> (accessed: 7.05.2025).

⁷ A very insightful interpretation of these phenomena can be found in: Z. Small, *Token Supremacy: The Art of Finance, the Finance of Art, and the Great Crypto Crash of 2022*, Alfred A. Knopf, New York 2024. Fragments of the book referring to Anadol, among others, are published in: Z. Small, *An Inside Look at How Refik Anadol and Digital Art Were Finally Welcomed into MoMA and the Traditional Art World*, Artnews.com, May 16th, 2024, <https://www.artnews.com/art-news/news/how-refik-anadol-digital-art-entered-moma-ny-art-world-1234707079/> (accessed: 7.05.2025).

visual effects. Such as those resulting from a small bulb which heats wax immersed in a specially composed liquid. Although it might be a captivating experience, it has nothing to do with art.

In a similar vein as Davis, New York art critic Jerry Saltz writes about “psychedelic slush”, “bacterial blobs”, “relaxation exercises”, “narcotic pudding”, “pointless museum mediocrity”, “curatorial mumbo-jumbo”, “a half-million-dollar screen-saver” and, as a result, he concludes that if an artist feels the need to create poetic algorithms for meditation experiences in the metaverse, they should work for Facebook. According to the critic, the basic problem of artists, or rather AI programs, results from the fact that using (in different ways) existing (textual and visual) materials they are by no means able to exceed the source material, use it creatively, they are not able to offer anything new. In this sense, they become only “a digital version of the dead-on-arrival Zombie Formalism of the 2010s.”⁸ What was this phenomenon?

The artist and critic Walter Robinson coined the phrase in a 2014 piece, “Flipping and the Rise of Zombie Formalism,” addressing the vogue for a certain type of painting among collectors known for their speculative investment in young artists. They’d snap up artworks for relatively low prices and flip the works at auctions soon afterward. The work they favored – by artists like Oscar Murillo, Lucien Smith, and Jacob Kassay – was ubiquitous three or four years ago. And, as the critic Jerry Saltz noted with dismay [...] a lot of it looked the same. It was a brand of abstraction that wavered between two poles. On the one hand were paintings whose slapdash creation lent them the look of a painter’s drop cloth, or, as a writer for Bloomberg flippantly noted, a “doodle.” On the other were paintings resembling degraded Minimalist monochromes or Color Field paintings, as if someone had left, say, a Barnett Newman out in the rain.⁹

Anadol as a creative (or reproductive) continuator of zombie formalism? It sounds intriguing, and at the same time places him in the context of activities calculated mainly for financial success by playing to the gallery. What in combination with the extremely current and publicized issues of artificial intelligence (also in art) perfectly fits into the possibilities of monetization of works, their value is not as problematic as the above-mentioned critics assess it, in fact it balances on the edge of kitsch, or impersonates “real” art with the use of new media technologies and decorates it with high-flown manifestos and declarations that in no way confirm the novelty or groundbreaking significance of this type of activities.

A vast minority of critics praised Anadol’s exhibition, for instance, Lloyd Wise from the prestigious magazine “Artforum” published a short but extremely positive opinion in the magazine online version. According to him, the results of Anadol stu-

⁸ J. Saltz, *MoMA’s Glorified Lava Lamp Refik Anadol’s Unsupervised is a Crowd-Pleasing, Like-Generating Mediocrity*, Vulture.com, February 22nd 2023, <https://www.vulture.com/article/jerry-saltz-moma-refik-anadol-unsupervised.html> (accessed: 7.05.2025).

⁹ C. Wiley, *The Toxic Legacy of Zombie Formalism. Part 1: How an Unhinged Economy Spawned a New World of “Debt Aesthetics”*, News.artnet.com, July 25th, 2018, <https://news.artnet.com/art-world-archives/history-zombie-formalism-1318352> (accessed: 7.05.2025).

dio's works presented on a massive LED wall in the museum lobby were simply "hypnotizing."

Familiar motifs from the modernist tradition effloresce, hybridize, and vanish: A blossoming of Fauvist color transforms into allover patterning; a biomechanical shape attenuates into graphic registrations on a printed page; a loose grid melts into Cubist planes.¹⁰

According to him, between the machine learning tools used by Anadol and the practices of modernist artists, for example surrealists, one can see a number of (indeed) non-obvious analogies and relations. This may sound like an exaggerated association, but does not the strategy of repainting or grattage, at this moment treated in a way, so to speak, metaphorical, and not as a specific painting practice consisting in scraping paint from canvas, lead to the anticipation of current artistic activities? Search in the area of practices undetermined by the intention of the creator, computer-based randomization of the effects of activities, various forms of aleatoricity, generativism as a method of creation and generative art as a separate trend in contemporary art, iterative systems (repetition with the intention to recompose and remix basic data) – all these phenomena have been an important part of new media art. AI (used by artists) forces us to reconsider them.

Wise writes about the "prominent display" of the artist who comes from a different (than strictly artistic) world. For many critics, rather than viewers, his activity may be a kind of clear evidence of the fall or a belief in the end/death of art articulated in various ways. Did MoMA want to commit something like institutional suicide by inviting Anadol into its space? Or maybe exhibiting the artist's work in the same place which held Marina Abramović's performance *The Artist Is Present* (2010)¹¹ was supposed to be a progressive movement showing that this respectable institution is still alive and open to new challenges?

R.H. Loosin writes about promoting Refik Anadol's activities at MoMA from a completely different perspective, i.e. in the spirit of conspiracy theories regarding the propagandistic use of art for the purpose of building the image of the United States as a cultural hegemon.¹² Again, there is a comparison to a screensaver, but this time embedded in reflections on technological boosterism,¹³ which can be treated as a kind of colonization of both collective space and imagination. Loosin evokes a distant parallel here, but it is not quite as fantastic as it might seem at first. Well, it resembles a special type of MoMA entanglement from the past, namely in the un-

¹⁰ L. Wise, *Refik Anadol. MoMA – The Museum of Modern Art*, Artforum.com, November 19th, 2023, <https://www.artforum.com/events/refik-anadol-250940> (accessed: 7.05.2025).

¹¹ I wrote about it in another text some time ago. Cf. P. Zawojski, *Twarz innej. Marina Abramović w MoMA*, "Opcje" 2013, No. 4, pp. 42–45.

¹² R.H. Loosin, *Refik Anadol's "Unsupervised"*, e-Flux.com, March 14th, 2023, <https://www.e-flux.com/criticism/527236/refik-anadol-s-unsupervised> (accessed: 7.05.2025).

¹³ What can be understood as an enthusiastic attitude towards some phenomena, but also an intensive promotion of them.

precedented promotion of American abstract expressionism during the Cold War and the “cultural war” of two powers, i.e. the Soviet Union and the United States in the 1950s and 1960s. Over the years, the CIA’s role in supporting and promoting works of Jackson Pollock or Mark Rothko (who obviously had no idea about it) was treated as a kind of rumor or joke, but after many decades, American secret service officers obliged to absolute secrecy began to disclose top secret facts about the “long leash” policy serving, of course, the foundation of *Pax Americana*.¹⁴ This is a fascinating thread to study, yet I only indicate it in this paper. Loosin’s considerations sound provocative in this context: referring to the issues mentioned above and the role of MoMA, the most important institution of contemporary art in America, or perhaps in the world, she addresses an important question not only of building the image of the museum as a place keeping up with the latest trends in contemporary art, including the one using the latest technologies, but rather as a creator of those trends.

So, just like in the middle of the last century artists became a useful tool of soft propaganda (it seems that without realizing it they functioned as the so-called useful idiots), nowadays Refik Anadol and other artists using artificial intelligence in their work (and presenting it in the most prestigious locations) might possibly function (incidentally, or maybe not?) as pawns in the global game of power and domination. Paradoxically, abstract expressionist works not being burdened with, so to speak, an unambiguous message, operating primarily with formal qualities, and works by Anadol, including those from the *Machine Hallucinations* series, seem somehow similar. Perhaps that is why they may prove the technological dominance of the US over the rest of the world. Not only cultural, but also military, in the multiple sense of the word. Loosin writes:

A quick survey of AI companies on the internet will inform you that in the near future military dominance will be defined by the performance of its algorithms. This may be one reason why the Department of Defense has chosen Nvidia, the AI company that helps Anadol create the most boring dreams ever, as one of the recipients for funding from their new Advanced Robotics Manufacturing (ARM) institute.¹⁵

At the same time, I remember that great visions of how artificial intelligences can (and will increasingly be able to) shape our reality must be constantly supplemented with knowledge about their repressive potential on many levels and in many areas – from economy, through the social and cultural dimension, to military issues. Above

¹⁴ F.S. Saunders writes about this in an article published in 1995 in “The Independent”, *Modern Art was CIA “Weapon”*, Independent.co.uk, October 22nd, 1995, <https://www.independent.co.uk/news/world/modern-art-was-cia-weapon-1578808.html> (accessed: 7.05.2025). After a few years, the author published a fascinating book presenting extensive material devoted to the topic of progressive American art being a kind of weapon in the fight against the miasmas of socialist realist doctrines. Cf. F.S. Saunders, *The Cultural Cold War: The CIA and the World of Arts and Letters*, The New Press, New York 2000.

¹⁵ R.H. Loosin, *Refik Anadol’s “Unsupervised”*, op. cit.

all, however, I remember that they are not neutral or transparent, and this, I think, is the main threat associated with their development and usage. Also by artists.

2

The theoretical output of Refik Anadol, compared, for example, to the one of Memo Akten's, seems more than modest. A short article entitled *Machines that Dream: How AI-Human Collaborations in Art Deepen Audience Engagement*, written together with Pelin Kivrak (introduced as a senior researcher at Anadol Studio), is a kind of manifesto, but also a summary of hitherto artistic practice.¹⁶ The concepts that the artist repeatedly recalls in his numerous statements and interviews appear in a slogan-like manner. Hybrid forms in the AI-based-art domain are an area of his creative strategy consisting in visualizing the invisible world of data, the original (debatable, one may add) concept of data paintings and data sculptures;¹⁷ references to immersive sense of space¹⁸ and architectural consciousness.¹⁹ The issue of the technological display of his works also occupies a special place in these considerations: a huge LED screen (10m x 10m) used during the *Quantum Memories* show²⁰ at the National Gallery in Melbourne will subsequently also be used in MoMA. As the authors write, the largest screen of this type used so far, which is related to the quality of the images presented on it, but it probably resonates more with the specific intention of putting viewers in a situation of physical contact with images (and four-channel sound) which can completely dominate them.

¹⁶ R. Anadol, P. Kivrak, *Machines That Dream: How AI-Human Collaborations in Art Deepen Audience Engagement*, "Management and Business Review" 2023, Vol. 3, Iss. 1–2, pp. 101–107.

¹⁷ According to Anadol, he began using these terms already in 2008. Cf. A. Cohen, *Refik Anadol's Mesmerizing Data Paintings Are Captivating Audiences Worldwide*, Artsy.net, February 15th, 2023, <https://www.artsy.net/article/artsy-editorial-refik-anadols-mesmerizing-data-paintings-captivating-audiences-worldwide> (accessed: 7.05.2025).

¹⁸ The project *Sense of Space: Connectome Architecture* was presented in 2021 at the Venice Architecture Biennale as an example of "molecular architecture." Cf. F. Dolzani, G. Gasparato, E. Testori, L. Toso (eds.), *How We Will Live Together?*, La Biennale di Venezia, Venezia 2021, p. 51. More than two million people in 48 countries have seen the work *Infinity Room* (2015). I saw it at an excellent exhibition at the Kunsthalle in Prague in 2022. Cf. P. Kivrak, *Infinity Room* [in:] P. Weibel, C. Havranek (eds.), *Kinetismus: 100 Years of Electricity in Art*, Kunsthalle Praha Services, Prague 2022, pp. 184–187.

¹⁹ A term appearing in relation to the WDCH Dreams project (2018), i.e. a visualization of the Walt Disney Concert Hall archive. Cf. Carina Y, *Creating Art with Generative Adversarial Network. Refik Anadol's Walt Disney Concert Hall Dreams*, Medium.com, March 1st, 2022, <https://medium.com/@ymingcarina/creating-art-with-generative-adversarial-network-refik-anadols-wdch-dreams-159a6eac762d> (accessed: 7.05.2025).

²⁰ More on this project can be found in: J. Shin, *A Study on the Interaction Between Human Consciousness and Artificial Intelligence in Refik Anadol's "Quantum Memories": The Creation of "Quantum Memories" by the Many Worlds Interpretation of Quantum Physics*, "International Journal of Creative Multimedia" 2024, Vol. 5, No. 1, pp. 101–117.

The cited article is in no way theoretically embedded in considerations on the extent to which the use of AI procedures in art changes the shape of contemporary new media practices. It rather resembles reflections of a practitioner who tries (with better or worse effect) to explain his actions *post factum*. Most often, however, he does so in numerous interviews. You can find there a number of very lofty-sounding declarations which often seem to be not only a kind of marketing self-promotion, but also an unbearable *cliché* mixed with interesting observations. Speaking of architecture as a form of canvas, in the spirit of mapping strategies, Anadol declares: “I love the physical world too, but I do find my language in the virtual”²¹. And at the same time, his extraordinary, not to say hypnotizing, work *Living Architecture: Casa Batlló* (2022), a kind of an audiovisual performance based on a residential building designed by Antoni Gaudí, makes a stunning impression. This way of multimedia rearrangement of the iconic Barcelona building was, of course, aimed at a spectacular attendance success, but at the same time it was an astonishing event, innovatively redefining the way new media can transform our thinking about iconic modernist buildings.

Anadol, emphasizing his educational roots in the field of broadly understood design – first in Turkey and later in UCLA in the USA, adds that he realized very early on that his artistic practice should be related to the use of large datasets, and therefore the formula of data artist, i.e. someone who makes invisible datasets visible through algorithmic procedures – this is the area he is interested in. Data is becoming the most desirable material not only from the point of view of the technological giants of Big Tech (GAFAM²²) but can also be the material that data artists can feed on. When sporadic references to non-technological contexts appear in his interviews, it is immediately clear that his competences in this area are, euphemistically speaking, not very extensive. Of course, anyone can make a more, or rather less, interesting comment on Juval Noah Harari, but not everyone is aware that it exposes the banality of their own judgments.

I think that Harari also says that free will is already in the control of machines and systems. If the machine knows where I am going, what I am buying, what I am liking commenting, sharing... I mean, the machine knows everything about me... almost. It's so simple to manipulate someone's free will with a simple notification on a machine. So in a world like this, I don't think anyone is really aware yet of why we are becoming like this. I am just rushing to say to humanity that, before this happens, please be aware and appreciate the senses that we have, before they become too simulated.²³

²¹ R. Anadol, *I'm Imagining a Different World*, The-talks.com, February 20th, 2020, <https://the-talks.com/interview/refik-anadol/> (accessed: 7.05.2025).

²² It is an acronym of Google, Amazon, Facebook, Apple and Microsoft.

²³ A. Gilliams, *Augmenting Perception: An Interview with Media Artist, Refik Anadol*, Xibtmagazine.com, September 23rd, 2022, <https://www.xibtmagazine.com/2020/10/augmenting-perception-an-interview-with-media-artist-refik-anadol/> (accessed: 7.05.2025).

While studying at UCLA, Anadol met Casey Reas who became not only Anadol's teacher but also a kind of mentor. Reas is a creator who fundamentally changed thinking about programming due to Processing created together with Ben Fry. Processing became one of the basic tools of new media artists. Its presentation at Ars Electronica in 2003²⁴ was a breakthrough in thinking about the use of programming languages by artists and is still one of the basic tools of many creators working within computational aesthetics.

In the dialogue between Reas, Anadol and the curators of the exhibition at MoMA, Michelle Kuoi and Paola Antonelli,²⁵ the Turkish artist points to the source of his inspiration: namely getting acquainted with the DeepDream program that allows you to process photos by means of artificial intelligence using a neural network to create images resembling dreams or perceptual psychedelic experiences.²⁶ It was a kind of coincidence, but also realization that the processes of machine operations are not very distant from human thinking. Of course, there are fundamental differences, such as the fact that it is a human characteristic to forget, whereas machines always remember. The issue of randomness in art has also a broader context: automation of the creation process – from surrealism, Fluxus and concrete art to generative procedures related to the use of computer programs and software strategies – is, after all, the basis for data artists and data art.

Thinking about the possibility of using huge databases, for example those gathered in GitHub, a platform hosting codes and open source projects, as well as digitized MoMA collections, was a kind of thought leaven directing the artist's attention towards application of these materials in his work. But, what is important, to do it in cooperation with algorithmic procedures used by artificial intelligence based on the philosophy of deep machine learning. A machine understood in this way becomes a very specific, though virtual, partner in the process of creation. It is not just a tool in the hands of an artist, programmer, software creator – it is an authentic partner and co-creator. Perhaps this term is much more adequate here than in relation to a previously mythologized interactor in the domain of interactive art, in which it very often became a mechanical addition to the installation demanding some form of cooperation, very often involving completion of a strictly defined task. In short – it became a human part of the algorithm, because deprived of actual causative power, it

²⁴ Cf. C. Reas, *Programming Media* [in:] G. Stocker, C. Schöpf (eds.), *Code: The Language of Our Time*, Hatje Cantz Verlag, Ostfildern-Ruit 2003, pp. 174–176.

²⁵ R. Anadol, C. Reas, M. Kuo, P. Antonelli, *Modern Dream: How Refik Anadol Is Using Machine Learning and NFTs to Interpret MoMA's Collection*, Moma.org.magazine, November 15th, 2021, <https://www.moma.org/magazine/articles/658> (accessed: 7.05.2025).

²⁶ This program and, more broadly, training of artificial neural networks, are discussed by the program creator, Alexander Mordvintsev [in:] A. Mordvintsev, C. Olah, M. Tyka, *Inceptionism: Going Deeper into Neural Networks*, <https://research.google/blog/inceptionism-going-deeper-into-neural-networks/> (accessed: 7.05.2025).

was, paradoxically, used as a machine in the process of activating certain procedures launching the operation of, for example, an interactive installation.

Responding very specifically to the question about the sources of inspiration, Anadol lists such different areas as: abstract art, systemic art (inspired by cybernetics and Ludwig von Bertalanffy's theory of systems), surrealism, expressionism, the Light and Space movement, optical illusionism, minimalist and geometric abstraction, expanded cinema (as interpreted by Gene Youngblood) and artists such as James Turrell, Bruce Nauman and Dan Flavin. He also mentions the first digital work he saw (at the ZKM in Karlsruhe), which was Jeffrey Shaw's *The Lisible City*.²⁷ It might seem that this is a set of completely random references, typical of contemporary artists drawing from various sources, not forming a logically composed or consistently implemented cognitive plan. But is this even possible today? And yet, these clues say something about the preferences and quests for a kind of context(s) for developing one's own vision of art based on the use of datasets and information deposited in digital form as a base (or database) material for data art (or art of data).²⁸

Unsupervised – Machine Hallucinations presented at MoMA not only gained unprecedented publicity, elevated Refik Anadol to the position of a leading creator using algorithmic procedures and AI, but also provoked polemics which I have already tried to briefly demonstrate. Yet, what is this work, how was it created, how can it be described and how can we reflect upon its meaning? – in the multiple sense of the word: from the question of whether it proposes any new content in the process of machine reading of classic works of contemporary/modern art, to the question of whether such activities as Anadol and his studio proposed actually “make sense”. I draw attention to this because the projects are signed by the artist, but they are created as part of his studio employing twenty people speaking fifteen languages and coming from ten different countries. The interdisciplinarity of this type of projects is embedded not only in the areas of expertise of particular co-creators (including architects, engineers, musicians, programmers, scientists specializing in AI), but also in a unique cultural contribution made by each team member. It is a teamwork, Refik Anadol is merely the face of these long-lasting and complex creative processes.²⁹

The procedures for working on individual projects within *Machine Hallucinations* are similar, although different datasets are used. Almost at the same time as the project for MoMA, Anadol Studio prepared an installation presented at Palazzo

²⁷ R. Anadol, *On AI, Algorithms, and the Machine as Witness*, Moma.org.magazine, December 22nd, 2022, <https://www.moma.org/magazine/articles/821> (accessed: 7.05.2025).

²⁸ I once discussed the art of data (“datamatics”) while presenting the achievements of Ryoji Ikeda. Cf. P. Zawojcki, *Ryoji Ikeda. Sztuka danych – sonowizulane stymulanty doświadczeń polisensorycznych* [in:] idem, *Technokultura i jej manifestacje artystyczne. Medialny świat hybryd i hybrydyzacji*, Wydawnictwo Uniwersytetu Śląskiego, Katowice 2016, pp. 216–253.

²⁹ Cf. M. Wołyński, *Refik Anadol: From Pixels to Emotions. AI with a Human Touch*, Contemporarylynx.co.uk, June 11th, 2024, <https://contemporarylynx.co.uk/refik-anadol-from-pixels-to-emotions-ai-with-a-human-touch> (accessed: 7.05.2025).

Strozzi in Florence, entitled *Renaissance Dreams* (2022), as part of an exhibition entitled *Let's Get Digital!* which aimed at familiarizing the audience with the NFT revolution. I will only add that this revolutionary nature is already highly problematic today. Palazzo Strozzi is a special place where works by contemporary new media artists are often presented in the context of the art of old masters.

The 2017 memorable retrospective of the recently deceased Bill Viola entitled *Electronic Renaissance* can serve as a very good example of this³⁰. Renaissance paintings and texts created between the year 1300 and 1600 were used to create *Renaissance Dreams* – a dynamic audiovisual form. It was incorporated into the specific space of the Palazzo, which took the form of a site-specific (although the artist himself referred to it as AI data sculpture) due to its particular location as well as a reference to the historical contexts of Florence being the city where Renaissance art was born. The collection of a huge amount of digitized data, i.e. images and texts by Renaissance artists, became material processed primarily by the Generative Adversarial Network (GAN).³¹ This multimedia installation was divided into four parts, each of them features separately: painting, sculpture, literary texts and architectural works. In this way, according to the intention of the authors, a unique opportunity was created for a completely new perspective at the history of art owing to the ability of a machine that (exceeding the human possibilities to master such a huge set of works – in this case treated as data used to train artificial intelligence) proposes an unprecedented reading of the art of the past using the technology of the future.

At the beginning of the project, Christian Burke, lead data scientist and head of engineering at RAS, interestingly presents questions that might have been posed by the artists from the past. A digital reinterpretation of the works of old masters such as Botticelli, Michelangelo or Donatello may seem sacrilegious, but at the same time it may provoke reflection on their relevance in the modern world. The audiovisual installation presented in this particular place is not only a kind of provocation, but it can also be treated primarily as initiating a dialogue with the art of the past. Burke declares:

Here at RAS, we'd like to think that connecting the past to the present via immersive digital art serves to inspire and encourage other artists around the world to follow their own dreams. We do this by continuously pushing technological and artistic boundaries, and by making our process clear and accessible. To that end, we released video of the process of incorporating AI algorithms and datasets into the installation for the purpose of enhancing accessibility.³²

It is interesting that the author of these words believes that the old masters would probably not perceive generative art, based on procedures using AI, as disrespectful

³⁰ Cf. P. Zawojcki, *Bill Viola we Florencji*, "Opcje" 2017, No. 3–4, pp. 120–122.

³¹ Simply put, a generative tool using machine learning algorithms based on neural networks, which allows for production of completely new data on the basis of collected data (for example, images).

³² C. Burke, *The Old Masters Meet Machine Dreams*, Medium.com, October 24th, 2024 https://medium.com/@christian_burke/the-old-masters-meet-machine-dreams-83dea07a8407 (accessed: 7.05.2025).

towards the canon of art – an accusation often posed to contemporary new media artists. Quite the contrary, they would appreciate the effort put into re-reading their work(s). Metaphorically speaking, into their rebirth by means of new media. It is also a kind of tribute to the masters – their brilliant concepts are the base material being developed by the contemporary artists working with novel technological achievements. For example, the chiaroscuro explored in works of Italian Renaissance painters nowadays takes various forms as part of 3D effects imitating various textures of paintings. These numerous affinities between contemporary artists using the latest media technologies and Renaissance artists being also researchers looking for new technological solutions, constitute an endless path where artists and scientists, art and science, meet.

In his next article, Christian Burke³³ outlines basic assumptions of RAS during the project in MoMA. It is important to make a preliminary remark regarding access to works of art collected since the foundation of this institution, i.e. since 1929. I mean, of course, the works which have been digitized and used to train neural networks, a dataset that contains 138,151 objects. However, raw data developed by machines (the creators used primarily Nvidia StyleGAN2 and custom software called Latent Space Browser which RAS has been developing since 2017) require human participation – generative systems are not fully autonomous, creative systems even more so. Although Burke is not an artist, as he claims, his work consists in writing and improving code, I am reminded of an important text by Laurent Mignonneau and Christy Sommerer treating coding as “the language of our time”, which is sometimes considered to be a special type of poetry.³⁴

Burke points out that the discussed project was not only about creating a synthesis of data entered into the program, but about creating something new, original, more than a mere sum of tens of thousands of parts. It is an expression of truly digital art. A giant led screen with an unprecedented resolution of 3840 by 3960 pixels was placed in MoMA (in the lobby), which meant that the presented images literally and figuratively looked like “living beings.” An additional aspect is the issues of real-time and interactivity.

A building not far from MoMA has a weather station that collects weather-related data. We’ve fed that data into *Unsupervised*, meaning that whether it’s cloudy, sunny, rainy, or foggy at any given time, the machine incorporates the ambiance of the world outside into its indoor display. Second, the exhibit incorporates real-time data from the viewers themselves. A camera in the ceiling of the lobby feeds data into the machine about the number of visitors and their motions. The machine then considers that data as it displays its artistic dreams.³⁵

³³ C. Burke, *Free from Limitations: The Validation of Machine Hallucinations at MoMA*, Towardsdatascience.com, August 31st, 2023, <https://towardsdatascience.com/free-from-limitations-the-validation-of-machine-hallucinations-at-moma-7d56a38c335a> (accessed: 7.05.2025).

³⁴ Cf. L. Mignonneau, C. Sommerer, *From the Poesy of Programming to Research as an Art Form* [in:] G. Stocker, C. Schöpf (eds.), *Code...*, op. cit., pp. 242–249.

³⁵ C. Burke, *Free from Limitations...*, op. cit.

The introduction of these elements of interaction – even if viewers realize (some of them do not) that their behavior in front of the screen affects constantly developing new images in real time – can be treated as an indication of the cooperative dimension of this work. AI becomes a partner, not just a type of tool used by people. According to Refik Anadol's concept referring to the aesthetics of data, the images that are created and constantly changing are dreams, machine hallucinations based on the collective visual memory contained in the output of artists whose works are included in the collection of the New York institution. They cover nearly 200 years of the history of modern art and – when processed by AI – they offer us their own (machine) vision of this history.

However, does such an artistic – and somewhat theoretical – vision of a new archive actually bring any innovative interpretations of modern art? Changing motifs, intense colors, a strong impression of three-dimensionality, music creating an uplifting atmosphere – all of these can dazzle with visual beauty and formal sophistication. The viewer's experience related to contact with this work – and more broadly: with this type of audiovisual installations – is an opportunity to trigger an extremely sensual and emotional reception that also engages our body. Dynamically changing forms are not ways of remixing artifacts from the past, from the museum archive, but an attempt to create something that can become (it is still disputable whether it really becomes) a part of this archive, and therefore an autonomous work in every sense of the word. The co-curator of this exhibition – Michelle Kuo³⁶ – draws attention to the fact that *Unsupervised* can be analyzed through the prism of theoretical proposals appearing in one of the pioneering books on “art in the age of machine learning” by Sofian Audry. It was published in 2021 which is crucial as it means that it was prior to the introduction of the OpenAI chatbot (November 30, 2022).

Machine learning brings us into a postvirtual era woven out of unending flows of data. These torrents of information are mobilized by adaptive systems of representation that defy rational understanding through advanced forms of machinic intuition. This new age of adaptive automation is already having a strong impact on society, notably through novel processes of control and surveillance that silently reconfigure relations of power and domination [...]. In the hands of artists, machine learning systems become a new material whose autonomy resists artistic control. Unable to rationally explain machine learning art works, viewers can only fully experience them using their emotional intuition, heralding a new era in contemporary digital art. In contrast to approaches based on chance or self-organization, machine learning art opens new opportunities to establish relationships with various aspects of the real world.³⁷

Kuo refers primarily to the concept of adaptive systems which are constantly changing in response to their surroundings in order to improve their own performance, in this particular case of Anadol's work these changes take place on many

³⁶ J. Kee, M. Kuo, *Deep Learning: AI, Art History, and the Museum*, Moma.org.magazine, June 15th, 2023, <https://www.moma.org/magazine/articles/839> (accessed: 7.05.2025).

³⁷ S. Audry, *Art in the Age of Machine Learning*, The MIT Press, Cambridge, MA–London 2021, p. 186.

levels (interaction with viewers, usage of weather data and, above all, internal processes taking place in the dataset). But, of course, it would be possible to extend the topic and add, for example, the issue of interpretation of the work being a derivative of the (self-)learning procedures of machines. It seems extremely dubious that a viewer standing/sitting in front of a huge screen without first in-depth acquaintance with the assumptions, implementation procedures, additional information about the technology used – could notice at least some of the clues mentioned above. Certainly, attempts to interpret this work by looking for some symbolic tropes, asking questions about “meaning”, “content”, “sense”, “message” seem to be a complete misunderstanding. We know this well from the past, from reactions to various forms of visual abstraction, visual music, pure cinema, absolute film, etc. Therefore, I perceive this project (apart from its purely formal dimension offering “visual pleasure”) as a work growing out of fascination with new media technologies, but also as a largely conceptual one. Undoubtedly, it provokes fundamental questions regarding the relationship between artists (people) and machines in the age of AI, but not in the spirit of often mentioned “competitiveness”, “threats”, “the end of art” (implicitly: the one created by human), but of cooperation and mutual support.

The title *Unsupervised*, or “unsupervised learning”, has at least two fields of reference. The first one recalls a type of machine learning (used in RAS) that assumes minimal human intervention and independent discovery of patterns, while “supervised learning”, used much more often, assumes strict human supervision over machine learning processes – which I present here in a nutshell. The second field, suggested by the title of Anadol’s work, should be linked to the concept of “hallucinating machines”, which, encouraged by us, create their own visions of pictorial worlds so different from those created by humans. Vision machines use a logic of vision completely different from ours, which should not be surprising because the addressees of their images are usually other vision machines. However, not this time. In *Unsupervised*, you can actually see the vision of machines, some even claim that “Anadol by realizing a work of which makes the viewer feel the utmost creative capacity of the machine entity.”³⁸

The question about the creativity of machines (its lack or a potential possibility of its existence in the future) is a recurring theme in considerations devoted to art using artificial intelligences. The output of Refik Anadol and his studio presented in a spec-

³⁸ B. Aktaş, *The Utopian Performative & Ontological Theatre: An Analysis of Refik Anadol’s “Machine Hallucination”* (2019), https://www.researchgate.net/publication/357752612_The_Utopian_Performative_Ontological_Theatre_An_Analysis_of_Refik_Anadol%27s_Machine_Hallucination_2019 (accessed: 7.05.2025). The author refers to *Machine Hallucination – NYC* shown in New York at the turn of 2019 and 2020 in the form of an immersive environment nowadays known from so many multisensory and multimedia shows. In 2023, I had an opportunity to visit one of the oldest (permanent) venues holding this type of shows, the Parisian digital art center Atelier des Lumières, where, in addition to presentations addressed to a wide audience, The Immersive Art Festival was also held in the past (2019).

tacular way both in public spaces and in the most important world museums undoubtedly illustrates the issues of the use of artificial intelligence by artists. The artistic and aesthetic value of his works for many critics and theoreticians of contemporary art is problematic to say the least, very often it is completely negated. Technological and formal innovation is treated as a kind of audio-visually attractive activities that are in fact devoid of deeper, or any other, content. In my opinion, this is a significant simplification, the value (not in the market dimension, because this one is only increasing) of his proposal lies not so much in his often exaggerated declarations and effusive judgments, but rather in practically implemented cognitive strategies. This type of research-based art, which should not be confused with art-based research, can be considered one of the most important challenges that contemporary artists want and should face.³⁹ In this particular case: in the field of the most current and fundamental issues related to the extremely complicated relations between human and nonhuman intelligence.

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³⁹ I refer here to Claire Bishop's reflections. They do not concern AI art, but they may provide an interesting context for analyzing Anadol's output treated as a kind of continuation of both archival-based work and many activities of artists creating research-based art, such as Chris Marker, Harun Farocki, Hans Haacke, Hito Steyerl. Cf. C. Bishop, *Information Overload*, Artforum.com, April 15th, 2023, <https://www.artforum.com/features/claire-bishop-on-the-superabundance-of-research-based-art-252571/> (accessed: 7.05.2025). On the specificity of artistic activities in the field of *research-based art* writes C. Ha Thuc, *Research-Based Art Practices in Southeast Asia: The Artist as Producer of Knowledge*, Palgrave Macmillan, Cham 2022. See also: K. Moon, *Research Art is Everywhere. But Some Artists Do It Better Than Others*, Artnews.com, March 8th, 2023, <https://www.artnews.com/art-in-america/features/what-is-artistic-research-1234660125/> (accessed: 7.05.2025).

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