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Refik Anadol's *Unsupervised* creates imagery inspired by works at the Museum of Modern Art that mesmerizes viewers.

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ESSAY

Art in the age of artificial intelligence

There is more to art than AI-created artifacts, but computational creativity is worth pursuing

By Joanna Zylinska

After being expelled from the Royal Academy of Fine Arts in Madrid just before graduation in 1926 for insulting the examination panel, 22-year-old Salvador Dalí headed for Paris. This change of location proved transformative, both for the young artist and for art itself. In France, Dalí went from imitating his masters to developing his own distinctive style. Merging imagery inspired by Sigmund Freud's interpretations of erotic dreams with surreal hallucinations, Dalí embraced association and automaticity as his creative method. This shift led to an exuberant production of canvases and other artifacts, an energetic pace that he maintained until his death in 1989. It is therefore highly apt that when, in 2021, OpenAI launched its deep-learning model capable of generating novel images from natural-language descriptions, it called the program "DALL-E."

A tribute to the famous surrealist artist as well as to Pixar's animated robot WALL-E, the current version of the model—known as

DALL-E 2—features automaticity, generativity, and a dreamy aesthetic. Made widely available, DALL-E 2 and its fellow image generators Midjourney and Stable Diffusion have evoked fascination and horror in both the art community and the general public. And understandably so, given that such models have the potential to be more transformational than even Dalí.

Artificial intelligence (AI)-based image generators have raised the prospect of the emergence not just of a radically new art movement but of the end of art itself—and especially of the artist as individual human genius. Their arrival has also posed a fundamental philosophical question: Can machines be truly creative (1)? Salvador Dalí's artistic trajectory can help us find some answers, illustrating rather poignantly the key issues that underpin AI art, or, to give the phenomenon its proper name, multisensory computational creativity enabled by machine learning (ML).

CODIFYING CREATIVITY

One precursor to Dalí's artistic shift was his adoption of a "style transfer" through which he painted first like a Renaissance master and then like Picasso. This same imitative method is presently employed in projects

such as Microsoft's *The Next Rembrandt*.

Throughout his career, Dalí mined existing repositories of art history resources and used what he found there as inspiration to produce strikingly new artifacts. In effect, the Spanish artist adopted a "combinatorial" method, remixing earlier styles and tropes to arrive at something that looked truly original to his contemporaries. With this approach, Dalí put into practice an understanding of creativity as "the ability to come up with ideas or artefacts that are *new*, *surprising*, and *valuable*" that was codified nearly a century later by computer scientist Margaret Boden in her celebrated book *Creativity and Art* (2).

Boden's definition is itself novel because it allows for the possibility that creativity may be exercised by both humans and machines, thus opening the door to defining art in a way that exceeds its humanist legacy. Her understanding of creativity can be applied to both Dalí and DALL-E if we recognize humans' continuous evolution with and through technologies, from stone tools and weapons, through industrial machines, to digital networks—an idea articulated by philosopher Bernard Stiegler (3).

It is worth remembering that the anxiety evoked by ML technology in relation to

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art has historical precedence. In the early 1820s, for example, it was feared that the invention of photography would lead to the death of painting. Instead, photography generated an explosion of new ways to see and create images—including painted ones.

AVERAGED DATA, AVERAGE ARTIFACTS

Novelty and exuberance aside, the first phase of AI art enabled by ML was premised on an engineering-based approach to creativity—and on quite a conservative idea of art. Art in this context amounted to little more than the averaging of possibilities, as evidenced in the works of computer science-trained creators such as Mike Tyka, Mario Klingemann, and Memo Akten.

Deploying generative adversarial network (GAN) technology, their images explored the visual effects that arise when an ML model is trained on a database of photographs of human faces or historical artworks and made to produce their approximations. Divergences from the source material, obtained through manipulating the learning algorithm and an inevitable element of surprise, led models to create hallucinogenic images of still or morphing faces in the style of Francis Bacon, with a sprinkling of Dalí's "melting clock" aesthetic. The result was thus not just the averaging of data but also the production of rather average artifacts, albeit ones enveloped in narratives about AI's supposed revolutionary potential.

How should we think about the qualities of these new artifacts deemed "art," and by whom should judgments about them be made? First, we must recognize that there is a history to art that must be approached critically. Art-making is not merely the production of "beautiful" artifacts; the very notion of beauty is itself historical and contextual. In addition, art has recipients to whom its various meanings matter, contested as they may be. In some iterations, art also has financial value, is treated as an investment, and functions as part of a global exchange of capital.

PERFORMING CREATIVE POSSIBILITIES

Artist Refik Anadol's *Unsupervised* (2021–2023) takes the GAN aesthetic and logic to an extreme—but it also opens up some intriguing visual and conceptual avenues. For the project, Anadol trained an ML model on a database of works from the Museum of Modern Art's collection, which includes pieces created over a span of 200 years. The resulting display, shown on a huge vertical screen, offers mesmerizing sequences of morphic images that hint at its data source while creating some new connections between, and reworkings of, the original pieces.

Ungenerous readings have compared this project to a screensaver or a lava lamp, but acerbic reviews do not convey the palpable pleasure experienced by audiences standing in front of Anadol's work. Viewers are often visibly affected by the display, moving their bodies with the undulations of the screen images.

Unsupervised manifests deep existential undertones, unwittingly enacting a proposition by the cybernetics-inspired philosopher of technology Vilém Flusser about image-making being always also a function of the apparatus, and not just of the discrete human mind (4). Acknowledging that his work is the outcome of a collaboration between human and machine, Anadol explains: "With the same data, we can gener-



The surprising amalgamations that appear in *Unsupervised* invite audiences to reflect on a potential role for machine learning in the creative process.

ate infinite versions of the same sculpture, but choosing this moment, and creating this moment in time and space, is the moment of creation" (5).

Because of the computational power available today, infinite variations can be enacted for us by machines. The force of Anadol's work therefore lies not only in its mesmerizing visuality but also in its performance of the possibilities within the latent space of the ML model.

AI ART ENABLES REFLECTION

To say that machines can simulate intelligence, identify patterns, generate novel outputs, or cocreate work with humans is not to suggest their sentience or sapience. Rather it is to recognize that what humans see as intelligent behavior, patterns, and outputs is conditioned by both our cortico-corporeal apparatus and by our environment. By returning our values and meanings back to us for further reflection, machines can help us see ourselves as embodied beings who exist

in a sociocultural context.

Many artists working today engage in this kind of second-level inquiry into the conditions of artistic and technological creation with AI. These include studies of algorithmic bias in the works of Jake Elwes and Murad Khan as well as Katja Novitskova's exploration of AI art as "art for another intelligence" (6).

POLICY, NOT PANIC, WILL HELP ARTISTS

What lies beneath current questions about machinic creativity is a deeper anxiety about the ways humans can continue to be creative, for how much longer, and at what cost. Given the outpouring of visual, textual, and sonic artifacts enabled by AI, we have begun to ponder the future of human creative professions and pastimes. These developments raise questions about labor, about how we value artifacts and institutions that enable the experience of art, and about art education. Even though artists have always borrowed, copied, and remixed material to produce their wares, the plundering of cultural repositories, without due compensation or, indeed, recognition of individual creators, for the sake of the construction of AI training models needs to be interrogated, for reasons of moral and economic justice, if not humanist panic.

More ominously, however, reducing art to the production of artifacts, in the way hype around "generative AI" has managed to do, could be read as part of a deeper agenda; one concerned with devaluing any form of human cultural activity that cannot be easily discretized and monetized. If we want to live in a world in which there is room for future Dalís and not just new iterations of DALL-E, we need less moral panic about "creative AI" and more sensible policy work around creative education, art institutions, and funding models that ensures such practices are not governed only by the logic of the financial markets or the optimization efforts of Big Tech. ■

REFERENCES AND NOTES

1. For a critical take on this question, see Joanna Zylińska's *AI Art: Machine Visions and Warped Dreams* (Open Humanities Press, 2020).
2. M. A. Boden, *Creativity and Art: Three Roads to Surprise* (Oxford Univ. Press, 2010), p. 29.
3. B. Stiegler, *Technics and Time, I: The Fault of Epimetheus* (Stanford Univ. Press, 1998).
4. V. Flusser, *Towards a Philosophy of Photography* (Reaktion Books, 2000), pp. 26–27.
5. R. Anadol et al., "Modern dream: How Refik Anadol is using machine learning and NFTs to interpret MoMA's collection," *MoMA Magazine*, 15 November 2021; <https://www.moma.org/magazine/articles/658>.
6. T. Lykkeberg, "Art for another intelligence" in *If Only You Could See What I've Seen with Your Eyes*, K. Ilves, K. Novitskova, Eds. (Sternberg Press, 2017), pp. 28–40.



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