ART

in the Age of Artificial Intelligence

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Artificial intelligence is becoming increasingly skilled at mimicking human behaviour, heralding a new and potentially dystopian age, brought about by what *The Art Newspaper* has called "the AI revolution."[1] Of specific concern to the creative sector, art making has been added to the growing artificial intelligence skillset, thereby introducing a series of ultra-contemporary concerns that threaten to destabilize several of the art world's organizing principles. As AI builds the capacity to independently generate artwork, not only by appropriating existing styles but also creating entirely new ones, human artists, galleries, and collectors must be prepared to ask whether such entities are entitled to attribution, remuneration, and ownership for their creative output. Do machine artists have the potential to supplant their human predecessors?

In the last two years, artworks produced by machine-learning algorithms have appeared in unprecedented numbers in art fairs, galleries, and auction houses. In 2018, SCOPE Miami Beach featured work generated by a technology named AICAN, the brainchild of Ahmed Elgammal, director of the Art & Artificial Intelligence Lab at Rutgers University. AICAN is described as both an artificial intelligence artist and a collaborative creative partner. It has been trained to generate original artworks by priming it with a hundred thousand samples from art history produced over the last five hundred years. The system's outputs reference existing styles within the Western art canon while simultaneously demonstrating the evolution of a unique aesthetic. AICAN's works have been displayed internationally, most recently in New York at HG Contemporary, in a 2019 solo exhibition titled *Faceless Portraits Transcending Time*. Elgammal is eager to emphasize the independence of his software, and he insists that AICAN be the only name credited while the works are on display.

Meanwhile, in October 2018, *Portrait of Edmond de Belamy* was reportedly the first portrait created by a neural network ever to be put on the block by a world-leading auction house—Christie's. The piece was made by the Paris-based collective Obvious (consisting of Hugo Caselles-Dupré, Pierre Fautrel, and Gauthier Vernier) and was purchased through a telephone bid by an anonymous buyer for $432,500 USD. The portrait features what appears to be a painted image of an indistinct man positioned slightly askew on a canvas in a conventional gilded frame. This historic sale and the addition of AICAN into HG Contemporary's stable of artists signalled the increasing presence of semi-autonomous technologies producing saleable work in even the most traditional art environments, ushering in a new breed of artist into an already competitive environment.

Obvious's portrait was created using a system called a generative adversarial network

1 — "Aican the AI artist: putting the art in to artificial intelligence," *The Art Newspaper*, December 26, 2018, https://www.theartnewspaper.com/blog/feel-the-algo-rithm.

AICAN

← *Faceless Portrait #3*, 2019.
Photo : Ahmed Elgammal - AICAN.io

↙ *Faceless Portrait of a Queen*, 2019.
Photo : Ahmed Elgammal - AICAN.io

(GAN), originally developed by Ian Goodfellow in Montréal in 2014. GANs not only can recognize and differentiate between content in a set of images, they can also generate entirely new imagery; *Portrait of Edmond de Belamy*, for example, is based on approximately fifteen thousand paintings from various art-historical periods. Although it is not a replica of a specific existing artwork or a representation of a person (living or dead), the portrait is a conceptual amalgam of all of the paintings that were fed into it during its training process. This productive quality of the GAN technique is generally considered a breakthrough in AI research; and in the art world, work in this style has quickly come to be referred to as GAN-ism.[2]

Had it not been created with the use of artificial intelligence, it is unlikely that *Portrait of Edmond de Belamy* would have garnered the attention of one of the world's most prestigious art auction houses. Despite its ability to mimic the style of traditional portraiture, the aesthetic and technical aspects of the piece fall well short of classical paintings of human origin. Works produced using the GAN technique are often compared to those of British painter Francis Bacon, due to their shared distorted appearance.[3] Bacon's work, however, has found acclaim in part for its evocative and morose depictions of the human condition, demonstrating a level of empathic responsiveness that machines are not capable of—at least, not yet.

GAN-based algorithms have not moved convingly beyond simply appropriating the styles of the data with which they are provided.

As eager as galleries have been to tout the autonomous aspect of AI-generated artefacts, in reality the independence of these systems is largely exaggerated. Richard Lloyd, the International Head of Prints & Multiples at Christie's, placed emphasis on the intentional limiting of human intervention in the making of *Portrait of Edmond de Belamy* in order to showcase "the 'purist' form of creativity expressed by the machine."[4] Whereas Aparajita Jain, co-director of the New Delhi gallery Nature Morte (which featured the first-ever mainstream exhibition of AI works), rails against this tendency, noting, "It is an artist's name on the work (and the paycheck), not a machine's."[5] In the case of the Edmond de Belamy portrait, it is generally agreed that since Obvious set the AI in motion, the collective is the author of the work. But attributing authorship becomes slightly more complicated when we acknowledge that the code used to create the painting borrows substantially from designs developed by Robbie Barrat, a French artist who circulated his algorithmic research online, a practice not uncommon in the AI world. Obvious appropriated Barrat's dataset, making only a few minor changes to the neural network, to produce *Portrait of Edmond de Belamy*.

In spite of this, Barrat has made no claims to the proceeds from the artwork's sale, which exceeded the auction house's original appraisal by a factor of almost forty-five. In a cheeky move, the Obvious collective included a signature on the painting's lower right corner reading, $\min_G \max_D \mathbb{E}_x [\log(D(x))] + \mathbb{E}_z [\log(1 - D(G(z)))]$, a fragment of the differential calculus used to generate the work. The gesture lends a strangely impersonal mythology to the work's creator, confounding the question of authorship and thus amplifying the role of the AI in the production of the piece.

The impulse for artificial intelligence artists to produce works in traditional styles is likely motivated by an effort to legitimize the form. The common use of conventional gilded frames by Obvious and AICAN is a dimension of this campaign. One of the first projects to exemplify this trend was *The Next Rembrandt* (2016), produced by a partnership of several organizations, including Microsoft, the Mauritshuis Museum (The Hague), and J. Walter Thompson Amsterdam (an advertising firm based in the Netherlands). Together they developed an AI capable of producing a 3D painting in the exact style of the Dutch master Rembrandt. This raises questions about how advanced technology can function not only to create contemporary works, but also to resurrect deceased masters by reanimating their unique styles.

The single portrait generated through the project uncannily possesses the texture of an oil painting, the shades of a Rembrandt, and a subject who convincingly appears to be of the seventeenth century. This outcome was made possible by priming the algorithm with data consisting of high-resolution images of Rembrandt's three hundred and forty-six known paintings, in addition to imaging the surface topographies of his works in order to replicate their physical depth and materiality. A team of twenty technicians, data scientists, and art historians collaborated for over eighteen months to create the final work, which was eventually exhibited alongside genuine Rembrandt paintings at the Musée Jacquemart-André in Paris.

AI artists using the GAN technique and the same raw datasets have been critiqued for their tendency to produce visually similar works.[6] GAN-based algorithms have not moved

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2 — Pierre Fautrel et al., "Obvious, Explained," *Medium*, February 14, 2018, https://medium.com/@hello.obvious/ai-the-rise-of-a-new-art-movement-f6efe0a51f2e.

3 — Luba Elliott, "AI through the Technologist's Eye," *Flash Art*, December 5, 2017, https://flash---art.com/article/mario-klingemann/.

4 — Tim Schneider and Naomi Rea, "Has Artificial Intelligence Given Us the Next Great Art Movement? Experts Say Slow Down, the 'Field Is in Its Infancy,'" *Artnet News*, September 25, 2018, https://news.artnet.com/art-world/ai-art-comes-to-market-is-it-worth-the-hype-1352011.

5 — Naomi Rea, "AI-Generated Art Just Got Its First Mainstream Gallery Show. See It Here—and Get Ready," *Artnet News*, August 29, 2018, https://news.artnet.com/exhibitions/ai-generated-art-gallery-show-1339445.

6 — Schneider and Rea, "Has Artificial Intelligence Given Us the Next Great Art Movement?"

convincingly beyond simply appropriating the styles of the data with which they are provided. Mario Klingemann is an exception, and is known for imbuing AI technology with his own unique aesthetic. In March 2019, Sotheby's auctioned his piece *Memories of Passersby I* (2018), an installation consisting of two framed screens and an AI model that continuously generates and displays artificial human portraits. The pioneering piece is described by the auction house as "fully autonomous" and a "self-contained creative agent,"[7] in which original images are generated successively, blending into each other to nightmarish effect. They are based on a sample dataset consisting of paintings from the 1700s to the 1900s selected by Klingemann, who has targeted certain compositional features in such a way that the system will reproduce elements he likes best from the collection, essentially "grooming" his algorithm to produce artworks that suit his tastes. The catalogue notes circulated at the Sotheby's auction promote the viewer's opportunity to watch the "AI's brain 'think.'"[8] Here we see yet another tendency to anthropomorphize AI systems as independent agents, contributing to the broader panic that surrounds their development.

There continues to be a disjuncture within both the science and art communities concerning the language used in relation to AI models, which inevitably impacts the extent to which they are attributed agency. The terms (artificial) *intelligence* and (machine) *learning* especially sow confusion. Describing algorithmic systems using agential words such as "consciousness" and "creativity" further complicates the notion of authorship, and referring to the "mind" of the machine validates a discourse of autonomy. The unrestrained enthusiasm for, and limited understanding of, AI by general audiences has so far benefited the major auction houses and commercial galleries, enabling high-end art retailers to profit, in part, from the fear and curiosity that these futuristic technologies elicit.

Computer scientist Aaron Hertzmann is particularly concerned with the general underestimation of the degree of human input that is necessary for AI systems to function. He notes, "All art algorithms, including methods based on machine learning, are tools for artists; they are not themselves artists."[9] The temptation to attribute agency to AI has a number of risks; for instance, not only do the human artists receive less credit but they may also be perceived as being so distanced from the work that they are no longer accountable for what the AI creates.

A concrete example of estrangement from authorship involved Canadian artist Adam Basanta and his automated artwork *All We'd Ever Need is One Another* (2018). The installation is composed of two consumer-grade tabletop digital scanners positioned on their sides, which scan each other in an infinite loop, producing an endless stream of unique renderings. Thanks to variations introduced by an automated mouse that alters the commercial scanning software's settings, each pictorial outcome is distinct, and many manifest as colourful electric abstractions.

Once the installation has generated an image, a machine learning program takes over, comparing it to 1.5 million human-made artworks stored in an online database. If the computer-generated image registers as comparable to any existing works in the database by a factor of 83% or more, the other artist's name and title of their work is posted on the installation's website and in its social media feeds. The new artworks that satisfy the program's similarity criteria are titled in relation to their match (for example, one piece in the collection is assigned the title *86.47% _match: Brian Eno "Sargasso", 2017*).

Though incidental, the similarities between the images produced by Basanta's machine and those identified in the online database became a point of legal dispute when Amel Chamandy, creator of an artwork titled *Your World Without Paper* (2009), discovered Basanta's *85.81% _match: Amel Chamandy "Your World Without Paper", 2009* (2018) through a Google Search of her name.[10] The consequent trademark and copyright infringement suit lodged against Basanta is ongoing and is considered to be the first in Canada, forcing policy makers to consider the expanding boundaries of intellectual property protection.

From this ferment, it is clear that contemporary notions surrounding the essential nature of creativity and artistic voice will continue to evolve alongside AI. In this regard, the University of Toronto's Avery Slater asks, "What transformation is underway once the work of art in the age of its mechanical (re)producibility is replaced, as a problematic, with the work of art in the age of its computational generativity?"[11]

No matter how advanced artificial intelligence becomes, the artworks it produces will continue to lack an ephemeral essence that is at the very core of artistic authorship—the human aspect of their provenance. The artist's embodied experience, identity, and intent remain components that imbue an artwork with the critical depth that extends beyond the surface spectacle of which an AI-authored work is capable. The ability to materialize a painting in the exact visual likeness of a Rembrandt, even down to the pixel or pigment, does not a Rembrandt make.

Indeed, artworks are extensions of the artist's biography. Through their very procedures of art generation, AI systems operate without ever knowing what drivers of artistic production they will always lack. Under these terms, the aura of the artist's hand will continue to supersede the tools that she or he deploys in practise. Although AI has proved to be a prolific creator, its works remain the expression of the artists who operate them. ●

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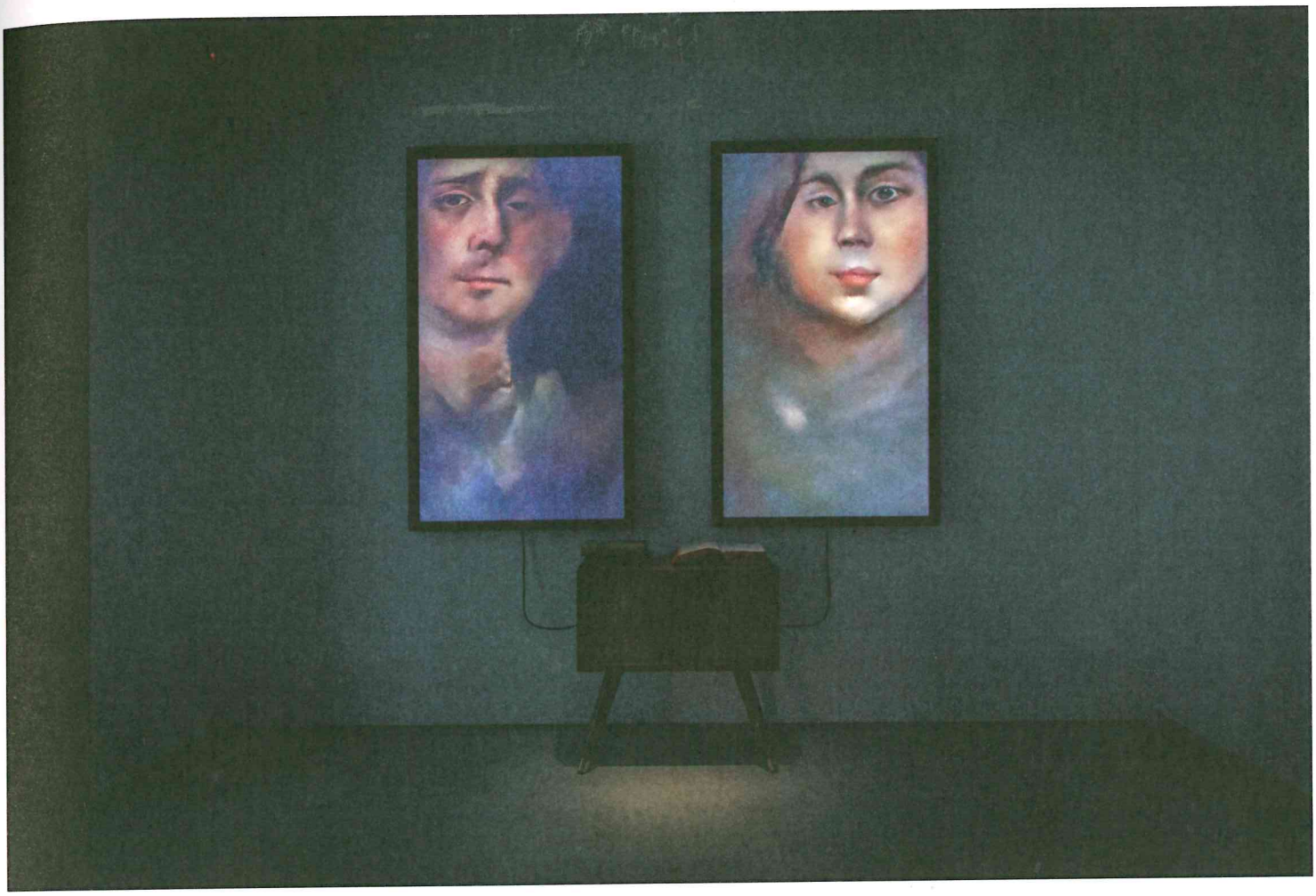
7 — "Artificial Intelligence and the Art of Mario Klingemann," *Sotheby's Contemporary Art Day Auction*, February 8, 2019, https://www.sothebys.com/en/articles/artificial-intelligence-and-the-art-of-mario-klingemann.

8 — Ibid.

9 — Aaron Hertzmann, "Can Computers Create Art?" *Arts*, vol. 7, no. 2 (May 2018): 16.

10 — Chris Hannay, "Artist Faces Lawsuit over Computer System that Creates Randomly Generated Images," *The Globe and Mail*, October 4, 2018.

11 — Avery Slater, "Crypto-Monolingualism: Machine Translation and the Poetics of Automation," *Amodern 8: Translation-Machination*, January 2018, http://amodern.net/article/crypto-monolingualism/.



Mario Klingemann
Memories of Passerby I, 2018.
Photo : courtesy of Onkaos

Obvious
Portrait of Edmond de Belamy, 2018.
Photo : © Obvious