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## ART IN THE AGE OF GENERATIVE MACHINES

**ABSTRACT:** This paper proposes that generative machines force a reconsideration of creativity not as originality *ex nihilo*, but as a structured practice of imitation, variation, and recursion. Rather than inaugurating an unprecedented form of artistic autonomy, contemporary AI systems revive pre-modern theories of art as *mimesis*, in which invention emerges through the transformation of inherited forms. Tracing a lineage from cybernetic feedback and conceptual art to machine-learning aesthetics, the paper argues that automation displaces authorship from the production of images to the construction of processes, aligning artistic agency with the epistemological act of framing, limiting, selecting, and choreographing generative systems. Situating contemporary AI practices within longer histories of imitation and programmed aesthetics, the paper contends that intelligent automata operate less as autonomous authors than as experimental apparatuses, epistemic devices, or serendipitous machines that expose the structural, mimetic, and recursive foundations of human creativity itself.

**KEYWORDS:** art, agency, artificial intelligence, cybernetics, mimesis

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## CYBERNETICS, SERENDIPITY, AND PLAY

On 2 August 1968, at the Institute of Contemporary Arts in London, the exhibition *Cybernetic Serendipity: The Computer and the Arts* opened, marking a turning point in the visual arts in the age of information technology. As stated in the press release, the exhibition aimed to offer an overview of “all aspects of computer-assisted creative activity: art, music, poetry, dance, sculpture, animation.”<sup>2</sup> Robots, poetry machines, musical and painting devices programmed through randomized algorithms were presented alongside early computational graphics and animations. Chance was employed as a way to inject surprise and awe into otherwise deterministic computational protocols.

The term *serendipity* derives from *The Three Princes of Serendip* by Horace Walpole (1754) and describes the ability to make happy and accidental discoveries. The curators’ ambition was to show the influence of cybernetics—already discussed and applied in scientific fields—within contemporary artistic practice. The encounter between art and science did not merely introduce new tools but new epistemologies and structures of thought. Form, play, authorship, creativity, movement, automation, and participation became central concerns of a new artistic paradigm.

Art in the age of information technology thus addressed, simultaneously, very old and very new questions. The term *cybernetics*, from the Greek *κυβερνήτης* (helmsman), was first used in 1948 by Norbert Wiener as the title of his book *Cybernetics: Communication and Control in Animals and Machines*. According to Heinz von Foerster, one of the founders of the discipline and a collaborator of Wiener, cybernetics is the ability to think in a circular way: in cybernetic systems, “A leads to B, B to C, and C can return to A.”<sup>3</sup> A device responds to external stimuli and, through feedback, influences the environment that generated those stimuli in the first place.

It is precisely on this principle of feedback loops that early computational artworks sought to develop new forms of participation. The devices on display at the ICA reacted to their environment and interacted with visitors by producing sound, light, or movement. Alongside Nam

<sup>1</sup> J. Reichardt (ed.), *Cybernetic Serendipity: The Computer and the Arts*, Studio International, London, 1968.

<sup>2</sup> *Ibid.*, p. 5.

<sup>3</sup> H. von Foerster, “Ethics and Second-Order Cybernetics,” *Understanding Understanding: Essays on Cybernetics and Cognition*, Springer, New York, 2003, p. 289.

June Paik's *Robot K-456* and Jean Tinguely's *Meta-Matics*—painting machines that ironized authorship and mechanized gesture—the exhibition displayed algorithms and machines capable of producing music, poetry, graphics, and animation. Michael Noll experimented with computers and printers to generate images resembling Mondrian's *Compositions with Lines*, inviting visitors to distinguish the copy from the original.

Play and participation thus became central strategies. Artists sought opportunities to develop new forms of engagement and discovery through computational machines. In architecture, Cedric Price and Gordon Pask, a polymath cybernetician based in London, developed a project as innovative as it was utopian: the *Fun Palace*. Through cybernetic mechanisms establishing human–machine feedback, users could reconfigure the building according to their needs. Pask described architecture in the computer age as a predictive discipline, capable of incorporating an increasing number of parameters and adapting to change.<sup>4</sup>

If the enhancement of human capabilities through machines often generated scepticism or fear, machines nevertheless functioned as tools of knowledge. Today, for instance, the ubiquity of algorithms in daily life is frequently perceived as an invasive form of control and surveillance. At the same time, algorithms allow us to understand patterns governing natural phenomena and human behaviour. While cloud computing depletes resources and contributes to the climate crisis, it also enables the observation of global warming and the deployment of mitigation strategies. Like a perverse cybernetic system, input produces output, which in turn becomes new input in a recursive loop.

The visual arts have long perceived this tension and transformed it into devices, artifacts, and interactive machines. Unlike architecture—where algorithmic automation is often associated with efficiency, control, and optimization—artists have sensed the expressive potential of computation and begun to experiment with its languages. Mathematics became a shared language, though understood in a structuralist sense. Linguistic research initiated by Ferdinand de Saussure and developed by Noam Chomsky in the 1960s fundamentally influenced computational programming.

Sol LeWitt's "mathematical" works, articulated through instructions written in natural language, developed processes, variations, and systems

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<sup>4</sup> G. Pask, "The Architectural Relevance of Cybernetics," *Architectural Design*, 39, 9, 1969, pp. 494–496.

that anticipated generative and computational art. For LeWitt, it was the idea—not the artist’s hand—that defined the artwork. In *Paragraphs on Conceptual Art* (1967), he famously stated that “the idea becomes a machine that makes the art.”<sup>5</sup>

In Italy, the artistic avant-garde and an emerging technological industry created a fertile cultural climate. In 1962, Adriano Olivetti sponsored the exhibition *Arte programmata: arte cinetica, opere moltiplicate, opera aperta* in Milan. As Umberto Eco observed, art and beauty were no longer “something immobile, waiting to be looked at, but something in progress.”<sup>6</sup> Programmed mechanisms celebrated movement and produced unpredictable patterns—open works in the fullest sense.

Movement and temporality were joined by geometry. The Hungarian artist Vera Molnar, a pioneer of generative art, experimented with geometric abstraction in which algorithms and randomness defined “the rules of the game.” By parametrizing simple figures—often letters of the alphabet—Molnar generated permutations that were always different yet always referable to the same underlying matrix. Language, understood as a system of signs, became a container of meaning subject to continuous manipulation.

Through procedural randomness, Molnar sought to remove human choice from artistic practice. Paradoxically, by focusing on freedom through its absence, her work foregrounded a condition central to human creativity. Deterministic rigor was counterbalanced by moments of formal surprise. Similarly, in the 1970s, the British artist Harold Cohen developed *AARON*, a software designed to simulate drawing and generate unpredictable results. Through feedback and archival memory, the system learned from past actions, recalling them to inform future ones according to predefined instructions.

## TOWARDS A DIGITAL MANNERISM

The machine thus becomes a database capable of capturing gestures and reproducing styles—what Renaissance theory would have called *maniera*. Generative AI systems merely automate stylistic imitation, reminding us of a fundamental truth of creativity: nothing is created from nothing; everything is generated from what already exists. There is no generative process without a dataset, and therefore no creation without imitation.

<sup>5</sup> S. LeWitt, “Paragraphs on Conceptual Art”, *Artforum*, 5, 10, 1967, p. 79.

<sup>6</sup> U. Eco, *Arte programmata*, exh. cat., ed. B. Munari, G. Soavi, Olivetti, Milano, 1962, s. p.

In fifteenth-century literature, Renaissance scholars used *maniera* as a synonym for style, emphasizing that artistic creation depends on precedents. Vasari refined this idea by framing Renaissance art as the emulation of the ancients, whose aesthetic, technical, and moral principles were considered exemplary. For classical and artisanal traditions alike, creativity developed through imitation: selecting, assimilating, transforming, and occasionally contesting inherited forms.

Art as *mimesis* entered a crisis with modernity. For ideological and practical reasons, imitation was banished from art and architecture schools in favour of originality as an absolute value. Today, this supremacy of the “new for the sake of newness” is so deeply ingrained that, as Mario Carpo observes, “no one today knows what imitation is, what it does, or how it works.”<sup>7</sup> Ironically, it is precisely generative machines that are reactivating imitation after a century of repression.

Jean Baudrillard’s concept of the *simulacrum* further complicates this return. In postmodernity, images no longer refer to an external reality but circulate within a closed system of signs—*hyperreality*. Generative AI aligns with this logic. Its outputs are not copies of originals but syntheses of prior images, producing what Baudrillard would call “copies without originals.”<sup>8</sup>

Refik Anadol’s recent work exemplifies this condition. By training a large language model on the metadata of MoMA’s collection, Anadol generated constantly transforming visual fields oscillating between recognition and estrangement. Rather than classifying or representing the world, his AI explores dreams, hallucinations, and speculative memory—an archaeology of possible pasts.

## FROM TACIT KNOWLEDGE TO THE BLACK BOX

In *Introduction to Mathematics*, Alfred North Whitehead writes: “Civilization advances by extending the number of important operations which we can perform without thinking about them.”<sup>9</sup> This provocation captures a paradox at the heart of technical culture: progress coincides not with heightened awareness but with the delegation of cognition.

<sup>7</sup> M. Carpo, “Generative AI, Imitation Learning, and the Automation of Tacit Knowledge,” *A+U*, 646, 2024, p. 104–109.

<sup>8</sup> J. Baudrillard, *Simulacra and Simulation*, trans. University of Michigan Press, Ann Arbor, 1994.

<sup>9</sup> A. N. Whitehead, *An Introduction to Mathematics*, Williams and Norgate, London, 1911, p. 61.

Architecture exemplifies this logic. Architectural design is a problem-solving methodology grounded in what Michael Polanyi described as tacit knowledge.<sup>10</sup> For centuries, this knowledge was transmitted through apprenticeship and imitation. Yona Friedman described architecture as a vocation learned through practice rather than instruction.<sup>11</sup>

References—projects, typologies, strategies—have always guided architectural thinking, yet their relevance remains implicit and difficult to formalize. Architectural problems cannot be fully specified in advance, nor can their solutions be conclusively validated. This reliance on tacit judgment long shielded architecture from automation.

Digitization altered this balance. Quantification migrated from structure to geometry, topology, orientations, and networks.<sup>12</sup> Therefore, the adoption of an increasingly quantitative approach—modularity, proportional relationships, and environmental considerations—has led to a greater understanding of architectural design and, at the same time, a departure from that empiricism<sup>13</sup> which, in the absence of objective criteria, characterized architecture before computation. In fact, what computational tools did was to translate aspects of tacit knowledge into software. Expertise became transferable, but epistemic transparency was lost.

This shift culminates in the black box, “word (that) is used by cyberneticians whenever a machine or a set of commands is too complex. Instead, they draw a little box that they don’t need to know about other than its inputs and outputs.”<sup>14</sup> As Wiener and later Bruno Latour observed, black boxes function precisely because their inner workings are no longer interrogated. In AI-driven design, references are no longer cited; they are absorbed. Interpretation gives way to interpolation.

The distinction between automation and autonomy becomes critical. Kantian autonomy implies self-legislation; Luhmann’s autopoiesis describes self-reproducing but operationally closed systems. AI systems are neither autonomous agents nor simple machines. They are recursive,

<sup>10</sup> M. Polanyi, *The Tacit Dimension*, Doubleday & Company, Garden City, New York, 1966, p. 4.

<sup>11</sup> Y. Friedman, M. Orazi, *Yona Friedman. The Dilution of Architecture*, Park Books, Zürich, 2015, p. 29.

<sup>12</sup> C. Alexander *et al.*, *A Pattern Language: Towns, Buildings, Construction*, Oxford University Press, New York, 1977.

<sup>13</sup> B. Zevi, “Cervelli elettronici? No macchine calcolatrici,” *L’architettura: cronaca e storia*, 6, 62, 1960, pp. 508–509.

<sup>14</sup> B. Latour, *Science in Action: How to Follow Scientists and Engineers Through Society*, Harvard University Press, Cambridge Mass., 1987, p. 2.

adaptive, and opaque—quasi-autopoietic systems whose apparent autonomy is simulated rather than enacted. AI does not replace human autonomy by becoming autonomous. It displaces autonomy by making deliberation unnecessary.

#### TOWARD A SPECULATIVE AUTONOMY

If automation absorbs optimization and black boxes encapsulate tacit knowledge, human agency relocates: from execution to interruption, from control to play. Surrealist automatism sought to bypass rational intention; contemporary generative systems invite engagement with hallucination, error, and deviation. Machines become performative partners—unruly, opaque, generative. Creativity emerges through constraints, in the ludic space where rules are bent, subverted, or reimaged.

Generative and algorithmic art frees artists from idiosyncratic expression while introducing new choices. Recursive algorithms present halting problems: when to stop the process, when conditions are satisfied. Authorship remains an act of conscious and rational decision—extreme self-determination. Art and computation chase each other, intersecting to produce new rules, exceptions, and transgressions. From Turing’s Imitation Game to Baudrillard’s simulacra, AI simulates, deceives, and allows us to act *as if*. In this interplay, meaning is evoked, not merely created. Cohen reminds us: “The real power, the real magic [...] lies not in the creation of images, but in the evocation of meaning.”<sup>15</sup>

In the age of *αὐτόματα*—self-moving systems that simulate autonomy without possessing it—the challenge is to redefine human agency: not as authorship *ex nihilo*, but as the capacity to frame, select, and speculate within systems that perform, subvert, and dream. When machines no longer obey but dream, the task is to learn how to dream with them.

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<sup>15</sup> H. Cohen, “What is an Image,” <https://aaronshome.com/aaron/publications/whatis-animage.pdf#:~:text=The%20conclusions%20offered%20bear%20upon,intentionality.%20They%20propose%20also%20that>, (accessed 20 December 2025).

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