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# From Digitization to the AI Era: Digital Technology Trajectories in Fine-Art Creation

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**Abstract:** This article analyzes how digital technologies have reconfigured fine-art creation from early computer graphics to contemporary generative AI. It advances a practice-centered periodization that links changing tool affordances to shifts in authorship, originality, distribution, and the political economy of creative labor. Three phases are identified: medium translation (1980–2000), when images became file-based and procedural logics entered artistic craft; platformized networking (2000–2010), when Web 2.0 expanded participation while structuring visibility through interfaces, metrics, and attention regimes; and algorithmic autonomy (2010–present), when GANs and diffusion models made style and composition statistically learnable and widely replicable. The AI phase intensifies long-standing debates by redistributing artistic agency across prompts, model priors, datasets, and post-selection, while deepening dependence on data extraction and platform governance. In response, the article proposes technological humanism as a normative-analytic framework for AI-mediated art: it centers traceable delegation, situated cultural responsibility, and infrastructural transparency as conditions of accountable creation. The paper concludes with operational principles for artists, educators, and museums to evaluate and sustain agency and cultural integrity under algorithmic production.

**Keywords:** Digitization; Digital Art; Platformization; Generative AI; Authorship; Technological Humanism

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## 1.Introduction

Digital technologies have shaped fine-art creation for more than four decades, evolving from early experiments in computer graphics into an infrastructural condition that reorganizes how images are produced, circulated, and valued; in the Chinese context in particular, the early development of computer graphics helped establish technical and institutional pathways—education, industry transfer, and the normalization of computer-based image making—that later enabled digital art practices to consolidate and expand [1]. Yet the significance of this long trajectory cannot be reduced to a linear catalog of tools: each technological wave has re-specified the practical and conceptual grounds on which authorship, originality, and esthetic legitimacy are claimed, contested, and stabilized. The recent surge of generative AI brings these issues to a new intensity, not because it simply "adds another tool," but because it shifts the locus of artistic agency toward model-mediated

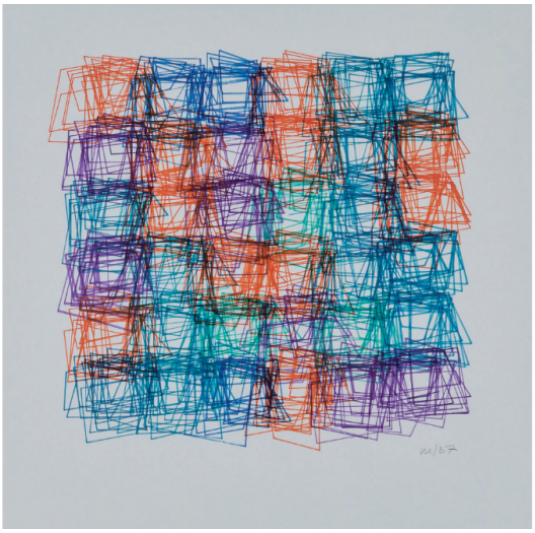
inference, large-scale data dependence, and platform-governed visibility, thereby altering what it means to intend, make, and take responsibility for an image. Against this backdrop, this study treats generative AI not as a radical rupture but as a historically continuous—yet qualitatively consequential—reconfiguration of mediation and agency in art making, and asks a single, cross-phase research question: how do technical systems reorganize artistic agency, value formation, and cultural interpretation across successive regimes of digital creation? To make this question analytically tractable, the paper proposes a three-phase periodization that links technical affordances to shifts in practice and evaluation: (i) medium translation (1980–2000), in which artistic media were increasingly rendered computable and production became more reversible, copyable, and procedural; (ii) networked collaboration and platformization (2000–2010), in which participation expanded through Web-based infrastructures while circulation and recognition were increasingly shaped by interfaces, metrics, and attention economies; and (iii) algorithmic autonomy (2010–present), in which machine learning systems—particularly GANs and diffusion models—made style and composition statistically learnable and widely reproducible, relocating a significant portion of creative work to prompting, iterative exploration, and post-selection. The study's research problem is thus not whether "technology replaces the artist," but how agency and responsibility are redistributed across human intention, operational procedures, datasets, model priors, and platform governance, and how such redistribution reshapes the criteria by which works are interpreted and legitimated within artistic communities and institutions. Methodologically, the paper adopts a critical historical synthesis grounded in a three-part analytical framework: (a) technology tools (hardware, software, platforms, and algorithms) are examined as operational infrastructures that enable and constrain artistic action; a key premise here is that software is not merely a carrier of content but an active layer that shapes representational possibilities and stabilizes specific forms of visual knowledge [2]; (b) creative practice (workflow, collaboration, and distribution) is analyzed as the site where agency is enacted, delegated, and negotiated through choices of procedures, constraints, iteration, and institutional embedding; and (c) theoretical reflection is used to clarify how evaluative vocabularies e.g.(originality, aura, authenticity, participation, autonomy) are mobilized to justify or contest emerging forms of creation and circulation. Concretely, the study proceeds by selecting representative technologies and debates within each phase and tracing how they structure recurring reconfigurations of artistic labor and cultural economy, rather than attempting an exhaustive technical history; This allows the analysis to compare phases in terms of (1) the locus of decision-making (who decides what, when, and through which operations), (2) the legibility of process (how traceable the causal chain is from intention to output), and (3) the governance of visibility and value (how institutions, platforms, and markets shape what becomes recognizable as art). By combining periodization with mediation-oriented analysis, the paper aims to produce a framework that is critical yet actionable: it explains why generative AI reopens foundational debates about authorship and originality as practical problems structured by contemporary infrastructures of data and platforms, and it positions these debates within a broader, historically grounded account of how digital systems continually redefine the conditions under which artistic meaning and legitimacy are negotiated.

## 2.Phase I (1980–2000): Medium Translation and the Computerization of Image Making

The first phase can be understood as a process of medium translation, in which established artistic media were progressively re-encoded into computational representations and thereby entered a file-based regime of production. Raster and vector graphics, digital compositing, and early 3D rendering did not simply add "new tools" to existing practices; they changed what an image is in operational terms. When an artwork becomes a file, it is no longer bound to a singular, irreversible material procedure. Instead, it is constituted by manipulable data structures: pixels and layers, paths and nodes, meshes and textures, histories and versions. Under these conditions, copyability is not a derivative act but a default state; reversibility becomes a built-in logic of editing rather than a rare corrective; and versioning becomes an ordinary mode of authorship through iterative branching and refinement. These file properties shift artistic work from a one-way "making" process toward a continuous "modulating" process, where meaning and form can be repeatedly recomposed. As a result, categories such as originality, authenticity, and presence are forced to migrate: they can no longer be anchored solely in the uniqueness of a physical original, but must be rethought through the conditions of technical reproducibility and circulation. In this sense,

aura debates in modern media theory help clarify what is at stake, not by assuming that reproducibility destroys value, but by showing that the relations among distance, uniqueness, authority, and reception are reconfigured when images become technically reproducible objects and circulate within new regimes of display and access [3]. The "presence" of the work begins to depend on how it is rendered, projected, edited, and distributed, while "authenticity" becomes entangled with metadata, provenance, and the intelligibility of the work's production history.

*Figure 1. French artist Vera Molnar uses algorithms to generate the geometric pattern series "Désordres".*



At the level of craft and artistic labor, this period also marks the introduction of procedural thinking into visual creation. The rise of programming-oriented tools and communities created a bridge between visual design and code-based composition, enabling artists to describe form through rules, parameters, and computational operations rather than only through manual depiction. Processing played a pivotal role in this shift by providing a relatively accessible environment for artists and designers to generate visuals algorithmically, lowering the threshold for code-based experimentation and consolidating a pedagogical ecosystem around computational creativity [4]. The esthetic significance of this development is that it relocates where artistic decisions reside. Instead of treating the artwork only as a finalized visual artifact, one can increasingly treat it as a rule system: an operational description of how forms are produced, how variations emerge, and how constraints guide the space of possible outputs. Evaluation therefore expands from "what the image looks like" to "how the image is made possible"—including the elegance of the generative logic, the meaningfulness of parameters, the balance between constraint and variation, and the deliberate orchestration of randomness and repetition. This shift also subtly redefines authorship. The artist becomes a designer of procedures, not merely a maker of objects: authorship is expressed through constructing systems that can produce families of outcomes, and through curating the relationship between algorithmic possibility and esthetic intention. Even when digital tools in this phase functioned largely as translation and extension mechanisms—digitizing established media and enabling new modes of editing—they already prefigured later debates about agency and automation by embedding creativity in operational sequences and delegating portions of form-making to computational processes.

## 3.Phase II (2000–2010): Networked Collaboration, Platformization, and Digital Labor

The second phase marks a shift from "digital production" to networked production, enabled by Web 2.0 infrastructures that made publishing and circulation continuous, low-threshold, and socially embedded. A consolidated set of operations—user-generated content, tagging, comment/reply systems, hyperlinking, RSS/feeds, and later timeline logics—turned the internet into a participatory cultural space in which artworks circulate as nodes within communicative circuits rather than as isolated objects later disseminated. For fine-art creation, this re-situates meaning-making: works become multimodal through titles, captions, links, and metadata, and participatory because interpretation extends beyond critics and institutions to distributed publics whose responses are visible and consequential [5]. As a result, artistic practice becomes more iterative and relational: "completion" is increasingly elastic, and making is shaped by ongoing negotiation with audiences, communities, and rapidly shifting formats.

At the same time, this phase is defined by platformization as a structural condition. Creative practice becomes embedded in commercial platforms whose interfaces, moderation regimes, and metrics function as infrastructural forces that organize visibility and attention. Interface defaults shape what can be easily posted and perceived; moderation sets boundaries of display and discourse; and metrics translate heterogeneous reception into comparable quantities, yielding a distributed curatorial regime in which circulation is steered by affordance-compatibility and engagement performance rather than by artistic merit alone. Even where artists resist these pressures, they must contend with them because platform governance shapes reach, audience composition, and the practical sustainability of practice.

*Figure 2. Blender Foundation's open-source animated film "Elephants Dream"*


Before Web 2.0 platformization, transnational outsourcing had already placed parts of animation and visual production within global labor chains, offering an important prehistory for later platform-mediated value capture [6]. In the Web 2.0 era, the political economy of creative work becomes explicit because platforms tie participation to extraction. Cognitive capitalism frames creativity and communication as central sources of accumulation [7], and network culture operationalizes this through "free labor," whereby creators provide content, attention, and behavioral data that increase platform value without commensurate control or compensation [8]. Exploitation here is not only financial but also governmental: algorithmic and interface changes can reconfigure visibility overnight, producing dependence on opaque ranking systems and volatile attention markets. These conditions also reorganize artistic identity and legitimacy, as self-branding, follower counts, and engagement indicators become partial proxies for credibility. Phase II is thus double-edged: networked infrastructures expand participation and collaboration, yet embed art making within metricized, governable systems of circulation and value—an ecology that forms the institutional and infrastructural substrate on which later generative AI practices emerge.

## 4.Phase III (2010–present): Algorithmic Autonomy and Generative AI

Phase III (2010–present) is defined by the rise of machine learning systems that can synthesize images and styles through statistical inference, shifting fine-art creation from direct pixel-level manipulation toward model-mediated generation and control. Technically, this transition is anchored in the maturation of generative paradigms: GANs demonstrated that plausible synthetic imagery could be produced via adversarial learning, establishing a widely influential baseline for computational image synthesis [9], while diffusion models have since become dominant because they support higher-fidelity generation and more flexible, controllable editing, effectively turning "generation" and "transformation" into continuous operations within the same pipeline [10]. For artistic practice, the crucial change is not only improved image quality but the relocation of creative labor: a visible portion of skill moves toward specifying constraints, iterating prompts, testing variations, and curating outputs—activities that resemble direction, selection, and orchestration more than manual construction. In this workflow, the artwork increasingly emerges as a negotiated outcome of interacting with a probabilistic system that can produce large-scale variation at low marginal cost, and the artist's competence is expressed as an ability to steer model behavior, consolidate coherence across iterations, and stabilize an esthetic identity through post-selection and compositing. Consequently,

generative AI redistributes artistic agency across multiple layers—prompting (intent specification), learned priors (what the model is predisposed to produce), training data (what visual cultures are represented and how), and post-selection (what is accepted, refined, and contextualized as the work). Compared with earlier digital tools that preserved a relatively legible causal chain from intention to operation (layers, parameters, filters), generative pipelines weaken causal transparency because outputs arise from probabilistic inference over learned representations; authorship is not removed but re-formed as the governance of delegation—authoring intentions, constraints, and selection criteria that shape a search space from which the final work is curated. The emergence of prompt engineering as a named creative skill makes this redistribution explicit by treating the formulation, refinement, and sequencing of prompts as craft and esthetic control [11].

*Figure 3. "American Algorithm" by Mexican artist Rafael Lozano-Hemmer.*

*Figure 4. "Wiradjuri Code" by Australian Aboriginal artist Brook Andrew.*

At the same time, generative creation is inseparable from infrastructural power: critical work on large-scale AI emphasizes that model behavior cannot be treated as neutral because it is conditioned by dataset composition, institutional decisions, and the ecological and social externalities of computation, and harms follow when statistical generators are framed as universal

creative engines while their material and political conditions are obscured [12]. These concerns intensify within an extractive political economy in which "creative capability" depends on large-scale data capture, labor, energy-intensive computation, and uneven governance regimes [13]; for fine-art creation, ethical questions such as provenance, cultural representation, consent, attribution, and accountability are therefore not optional add-ons but part of the medium conditions of production and circulation. Postphenomenology helps clarify the stakes by treating technologies as mediators that amplify some forms of action while reducing others: prompting amplifies exploratory variation and rapid prototyping, but it can reduce tactile resistance and slow material feedback loops through which many artistic sensibilities are cultivated, implying that critique and education should assess not only outputs but also mediation, dependency, and the redistribution of agency [14]. Finally, because AI creation is typically embedded in platforms, recommender systems and metrized attention regimes participate in stabilizing what becomes visible and desirable; algorithmic taste-making operationalizes engagement logics that steer cultural consumption, and when creators optimize styles for visibility, esthetic diversity can narrow toward what is already rewarded [15]. In this sense, generative tools may expand the space of possible images while compressing the social space of recognizable and valued images, yielding a distributed form of esthetic governance in which metrics, ranking, and platform feedback co-produce taste and legitimacy.

## 5.Structural Shifts in the Creative Ecology: Identity, Value, and Power

Viewed across the three phases, the transformation of fine-art creation is best understood as a reconfiguration of the creative ecology—the coupled system of actors, tools, institutions, and infrastructures through which artistic identity is produced, value is assigned, and authority is exercised. Three structural axes clarify this reconfiguration. First, identity: digital tools and platforms lower entry thresholds and expand participation, but they also destabilize traditional markers of professional legitimacy by decoupling visibility from institutional accreditation and by shifting craft authority from material mastery toward procedural competence, platform fluency, and algorithmic literacy. As a result, artistic identity becomes increasingly performative and infrastructural: it is shaped not only by works but by profiles, metrics, formats, and the capacity to sustain attention under platform conditions. Second, process: digital workflows privilege search, remix, and optimization over singular inspiration, making creation more iterative, comparative, and data-driven. Across digitization, platformization, and generative AI, production tends to move from linear making to continuous variation management—testing alternatives, selecting among options, and consolidating coherence within an expanding space of possibilities. Third, value: platforms and models introduce evaluative regimes organized around metrics, rankings, and monetizable attention, thereby transforming evaluation into a socio-technical procedure rather than a purely critical or institutional judgment. Under these conditions, autonomy becomes an infrastructural question: artistic freedom is constrained not only by esthetic conventions but also by the governance of visibility (ranking systems, moderation, interface defaults), the ownership of computational means (models and platforms), and the dependencies created by data and compute access.

*Figure 5. "Miner Hash" by Congolese artist Sammy Baloji.*

These structural shifts also have pronounced cultural and geopolitical implications, because digital infrastructures translate cultural materials into formats that can be indexed, circulated, and monetized. Said's critique of representation helps explain how difference can be rendered into a consumable esthetic category—extracting "style" from historical and political context and re-presenting it as a neutral sign of exoticism or cultural variety [16]. Bhabha's account of hybridity further clarifies that cultural translation is never a symmetrical exchange: hybrid forms are produced within power relations that determine what is recognized as legitimate hybridity, who can speak for whom, and which translations become institutionally credible [17]. In contemporary AI debates, these concerns become operational rather than merely interpretive: global datasets can compress heterogeneous traditions into decontextualized style tokens, and models can reproduce such tokens at scale, thereby intensifying risks of cultural flattening, misattribution, and asymmetric appropriation. Against this backdrop, work on resistance to platform power emphasizes that users and creators can develop everyday tactics—counter-archiving, alternative distribution channels, and strategic refusal—to contest infrastructural capture and reclaim degrees of agency [18]. A closely related critique frames the broader condition as digital colonialism, arguing that AI systems can reproduce unequal power relations by extracting data, re-encoding cultural knowledge, and concentrating value and governance in a small set of institutions and markets [19].

*Figure 6. "Encrypted Sovereignty" by Mexican artist Minerva Cuevas.*


Finally, the AI era intensifies disputes about commodification and ownership by introducing new infrastructures for scarcity, provenance, and exchange. Blockchain-based systems and NFTs have been adopted by some creators and platforms to reintroduce scarcity signals into infinitely reproducible digital artifacts and to formalize provenance through tokenized ownership claims [20]. Yet sustainability-oriented analyzes caution that the long-term viability and legitimacy of such systems depend on technical design choices (e.g., energy use, security, permanence), institutional governance, and regulatory frameworks, rather than on speculative market narratives alone [21]. Regardless of one's normative position on NFTs, their emergence is theoretically symptomatic: it indicates that digital art value is increasingly negotiated through infrastructural arrangements—platform rules, model access, token markets, and verification mechanisms—rather than solely through traditional institutions of criticism, curation, and collecting. Taken together, these developments suggest that contemporary debates about digital art cannot be resolved at the level of esthetic judgment alone. They require an ecological analysis of how identity, process, and value are co-produced by socio-technical systems, and how power operates through infrastructures that shape representation, circulation, and the distribution of benefits in the digital and AI-mediated art world.

## 6.Toward Technological Humanism in Fine-Art Creation

Technological humanism, as advanced in this study, is neither a refusal of AI nor a technophilic celebration of novelty; it is a normative-analytic stance that seeks to keep human agency, situated knowledge, and cultural plurality visible while working within contemporary technical systems. Its central premise is that generative infrastructures do not simply "assist" creation but reorganize authorship, responsibility, and value; therefore, an adequate response must specify how artistic agency is exercised through delegation rather than imagined as standing outside mediation. Operationally, the stance can be articulated through three interlocking principles. (1) Agency and traceability: artists and institutions should render delegations legible—what is authored directly, what is generated through models, and what is curated or edited—so that accountability can be sustained for audiences, educators, and museums across production and reception. (2) Situated knowledge: datasets, prompts, and workflows should be treated as cultural commitments rather than merely technical inputs; this rejects the reduction of tradition to a detachable "style palette" and instead recognizes that cultural materials carry histories, power relations, and obligations that must be acknowledged and negotiated in practice. (3) Infrastructural critique: creators and institutions should attend to the extractive and governance conditions that make AI creation possible—platform dependence, data sourcing, and ecological costs—because these conditions shape what kinds of art can be produced and recognized. Stiegler's critique of political economy, and his later framing of the Neganthropocene, is instructive here in positioning technology as an organizational system that can either erode or support the conditions of collective meaning-making depending on how it is instituted and governed [22].

Conceptually, technological humanism treats the art–technology relation as an ongoing negotiation rather than a settled division between "human creativity" and "machine output." Actor-network theory is useful for clarifying that outcomes are co-produced by heterogeneous actors—artists, platforms, models, datasets, interfaces—and that responsibility cannot be collapsed into a single locus (either the artist alone or the system alone) [23]. Derrida's notion of différance further underscores that meaning is not fixed at the point of production but is continually deferred and reconstituted through context, circulation, and interpretation [24]. Together, these perspectives imply evaluative criteria suited to AI-mediated art: attention to (a) how agency is distributed and disclosed, (b) what cultural relations are mobilized, transformed, or erased, and (c) what infrastructures condition visibility and value [25]. Under this stance, AI-mediated works are assessed not only by formal novelty, but by the accountability of their process and the integrity of their cultural commitments [26].

## Conclusion

From early computer graphics to generative AI, digital technologies have repeatedly redefined what counts as artistic work by relocating creativity across tools, practices, and institutions. Across the three phases outlined in this study—medium translation, platformized collaboration, and algorithmic autonomy—each technological wave expands expressive possibility while simultaneously intensifying mediation, dependency, and the infrastructural conditions through which value is produced and recognized [27]. The current AI era crystallizes these tensions by making style and composition statistically learnable and reproducible at scale, thereby transforming authorship from an assumption of direct manual causality into a problem of delegated agency, process legibility, and responsibility for the sociotechnical conditions that enable production. Against both technological determinism and purely formalist accounts of "AI novelty," the paper argues that the central stakes are ecological and institutional: how agency is distributed among humans, models, datasets, platforms, and curatorial regimes; how cultural materials are translated, decontextualized, or responsibly situated; and how evaluation is shaped by metricized attention and platform governance. The proposed stance of technological humanism offers a constructive orientation under these conditions by insisting on traceable agency, situated cultural responsibility, and infrastructural awareness as practical requirements of contemporary creation. For artists, this entails treating prompts, datasets, and selection procedures as accountable components of authorship rather than neutral technical steps; for educators and museums, it requires developing transparent interpretive standards and ethical protocols that address provenance, delegation, and cultural representation in AI-mediated works. Ultimately, the future of digital art will not be determined by tools in isolation, but by how creative communities and institutions negotiate the relations among agency, value, and cultural meaning within—and sometimes

against—the algorithmic infrastructures that now condition artistic production and circulation.

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