Somewhere in between the Latent Space: Theoretical and Technological Perspectives on the Status of AI Art

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Situated at the convergence of computational creativity, machine learning, and art, AI Art has experienced significant growth in popularity and is now widely regarded as a leading medium among artists. Despite growing attention to its potentialities, it has also raised philosophical, ethical, and legal issues. However, a systematic review of how and to what extent AI shapes artistic creation is lacking, as is an in-depth analysis of the technologies being used. To address these gaps, we surveyed 143 papers and artworks, presenting a multi-perspective survey considering both theoretical and technological issues. On the theoretical side, we identified 5 research threads frequently debated in the literature. On the technological side, we constructed a design taxonomy to explore how AI techniques are used in current practices. We correlate theoretical and technological analyses, providing a comprehensive understanding of how AI contributes to art making and suggesting new research opportunities.

CCS Concepts: • **General and reference → Surveys and overviews**; • **Human-centered computing → HCI theory, concepts and models**; *HCI theory, concepts and models*; • **Computing methodologies → Artificial intelligence**; **Artificial intelligence**; • **Applied computing → Arts and humanities**; *Arts and humanities.*

Additional Key Words and Phrases: AI Art, Computational Creativity, Artificial Intelligence, Theoretical Survey, Technological Survey, Literature Review

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1 Introduction

Artists have always enjoyed using new media in their creations, from paper or marble to human body, as has happened recently in the case of artistic makeup. The earliest computer art dates back to the 1960s, with the Henry's Drawing Machine[143], an analog computer originally used by UK military aircraft to drop bombs accurately. In the same years, A. Michael Noll used a digital computer at the Bell Labs to produce aesthetically pleasant artworks similar to the works by Piet Mondrian. Yet computer art achieved a definitive status only thanks to Andy Warhol's exhibition at Lincoln Center when the Amiga computer was presented to the public for the first time (1985). Since the 1990s, most artists have integrated computers into their creations as just one of the many tools in their toolbox.

However, the AI age marks a line of demarcation in the use of computers to create art. A standard definition of AI Art states that AI Art encompasses artistic works and approaches that fundamentally rely on AI techniques ([15]; see also [121]). The advent of AI Art allowed us to move from a machine that executes a sequence of instructions defined by the artist to a machine that appears to be genuinely creative on its own. The level of creativity is generally considered proportional to the level of autonomy that the machine will exhibit. From a philosophical point of view, AI Art appears

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challenging to the extent that apparently brings about the progressive disappearance of the author [61]. At the same time, AI Art allows the exploration of new aesthetic canons while raising important ethical and legal issues. In the last decade, AI Art has been attracting massive attention; a widespread trend has emerged that aims to explore the potentialities of AI technologies in the artistic field. The absence of a systematic review on how and to what extent AI shapes the creation of art is still missing, together with an in-depth analysis of the technologies being used for creating AI Art. Our paper complements the theoretical and technological issues by presenting a multi-perspective survey on AI Art, in which the technological perspective sheds light on the theoretical issues, and vice versa, as shown in Fig. 1.

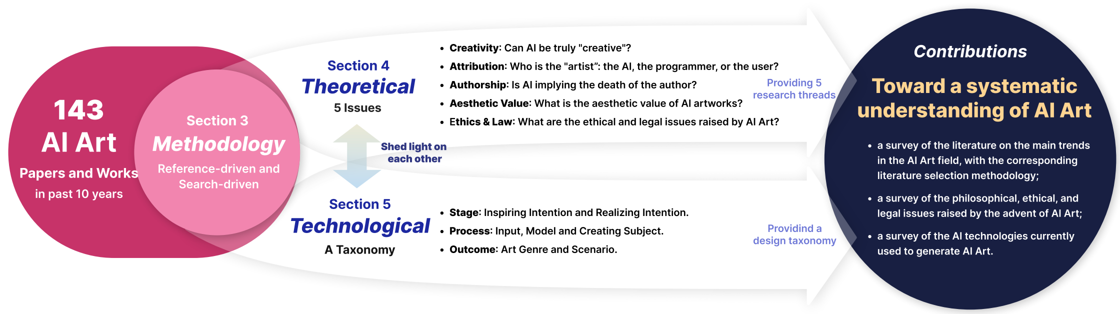

Fig. 1. The research path of this paper. We investigate and reflect on how and to what extent AI shapes artistic creation.

The contributions of our paper are the following:

- a survey of the literature on the main trends in the AI Art field, with the corresponding literature selection methodology;
- a survey of the philosophical, ethical, and legal issues raised by the advent of AI Art;
- a survey of the AI technologies currently used to generate AI Art.

In the theoretical section, we take into account 5 questions frequently debated in the literature. These questions articulate the impact of AI Art on topics such as creativity, authorship, human-machine collaboration, the advent of AI aesthetics and, last but not least, the ethical and legal issues raised by this discipline. The technological side analyzes 78 AI Art projects to map the design space of current practices, including creative stages, processes, and applications. The paper will emphasize how the two perspectives shed light on each other. The discussions emerging from the theoretical side must be aligned with current practices to assess the gap between theoretical debates and the present reality.

2 Related Work

While AI Art has advanced rapidly in recent years, comprehensive surveys on the subject are not common. Most of the existing works focus primarily on technological achievements. For instance, Cetinic and She [31] reviewed the role of AI in both the analysis and creation of art, categorizing research in two areas: (1) the use of AI to understand the aesthetic value of artworks, and (2) the role of AI to generate art. Their study highlights the potentialities of AI in visual arts from an analytical and creative point of view. Meanwhile, Maerten et al. [119] explored the history of AI-generated art, by detailing neural network types and recent advances in AI image generation. The study also addresses ethical concerns like authorship, copyright, and the potential misuse of AI in the artistic field. Wang et al. [184] focused on the use of diffusion models for art creation, offering a framework that connects artistic requirements with generative processes. Their work analyzes recent advancements and identifies future directions.

While prior studies have thoroughly examined technological advancements and ethical considerations, most have focused primarily on AI capabilities, such as generative performance and controllability. Only a few have addressed deeper issues such as creativity, authorship, and human–AI interaction in the process. Our advantage lies in providing a theoretical survey that explores these topics, drawing on a range of perspectives to highlight key issues in AI Art. Based on these insights, we constructed a detailed taxonomy to understand the technological perspective of AI in the artistic scenario. These two perspectives shed light on each other, providing a deeper understanding of AI Art.

3 Methodology and Taxonomy

In this section, we present the methodology and describe the resulting taxonomy.

3.1 Methodology

To create the corpus of articles, we conducted our search using both reference-driven and search-driven methods. Our literature selection began with a collection of "AI Art" references for the reference-driven method, which was expanded by examining both their cited and citing articles. Then, we selected our search scope to relevant conferences and journals, as shown in Table 1. We chose literature from the last decade to build the corpus (Jan 2015 to June 2025). In addition, we collected artworks by widely recognized AI artists coming from both the Eastern and the Western worlds (e.g., Mario Klingemann, Sofia Crespo, Jake Elwes, Refik Anadol, Helena Sarin, Anna Ridler, Joy Buolamwini, Dabeiyuzhou (Lin Kunhao), and Ting Song) based on their participation in major exhibitions and public documents.

Table 1. Journals and conferences most relevant to our research.

Journals	TOCHI, TOG, TPAMI, TOMM, AI & Society, AI Magazine, and AIJ
Conferences	CHI, UIST, CSCW, DIS, MM, UbiComp, SIGGRAPH, CVPR, AAAI, and ICCV

Our aim was to identify research exploring the intersection of AI and artistic creativity. Papers were included if they met at least one of the following criteria:

(1) The paper examines AI-driven systems for the creation, modification, and editing of artistic content, where AI plays a role in the process of artistic creation.

(2) The paper investigates the relationship between AI and artistic practices, especially those exploring human-AI interaction in artistic contexts.

Finally, 143 articles and projects were chosen to form the corpus, as shown in Fig. 2.

3.2 Taxonomy

In our taxonomy, we correlate theoretical and technological analyses to shed light on each other, emphasizing the role of AI in the artistic practice and its implications from the point of view of human–AI interaction.

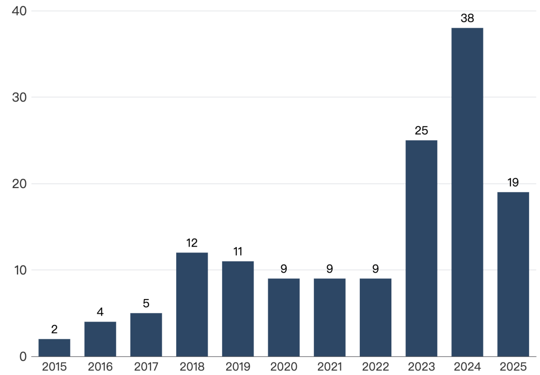

Fig. 2. Number of the collected papers according to the publication year.

3.2.1 Theoretical Perspective. After reviewing and synthesizing the literature, we identified five central issues frequently discussed in the AI Art literature, as shown in Fig. 1. The issues have been formalized in terms of questions as tools to structure the present debate. Questions are more open than statements to different perspectives and contributions; furthermore, they provide conceptual lenses that allow the comparison between different studies. Hopefully, this approach will reveal where AI is positioned in the art-making process and clarify how creativity, authorship, and credits must be attributed and apportioned and, broadly speaking, how the human-AI interaction is shaped by AI.

3.2.2 Technological Perspective. Based on 143 papers, we identified 78 projects that practiced AI Art. A qualitative coding analysis was conducted to categorize these projects. Two authors independently reviewed each project and, through iterative open coding and consolidation, we distilled five recurring arguments that have been organized into three dimensions: stage, process, and outcome (as shown in Fig. 3). The technological analysis does not map point-by-point onto the theoretical questions but instead offers a complementary perspective. It enriches insights from the theoretical survey and highlights how AI participates in artistic creation.

4 Theoretical Survey

This section illustrates a range of theoretical issues raised by the advent of AI Art. Some of the points could appear similar; however, they are approached from different perspectives. The position of scholars or practitioners may appear simplified by the needs of a survey of this nature. It is also important to note that most of the examples, at least in this section, have been drawn by AI-generated visual art. The issues have been intentionally formalized in terms of questions commonly discussed in the literature:

1 Can AI be "truly" creative?
2 Who is the "artist": the AI, the programmer, or the user?
3 Is AI implying the death of the author?
4 What is the aesthetic value of AI artworks?
5 What are the ethical and legal issues raised by AI Art?

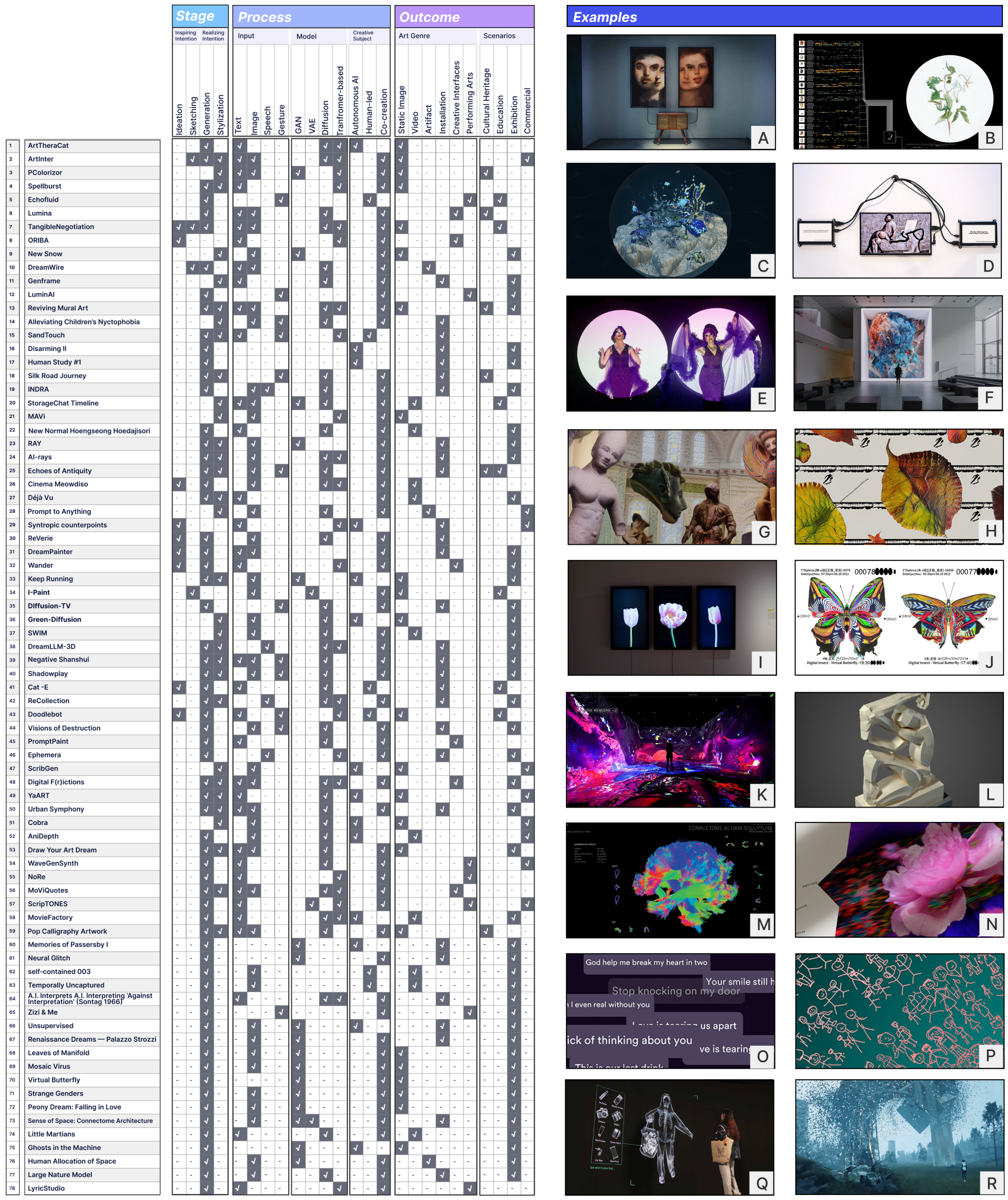

Fig. 3. Left: Categorization of 78 AI artworks and tools. Right: A list of AI-generated artworks. (A) Memories of Passersby I by Mario Klingemann [99], (B) self-contained 003 by Entangled Others [124], (C) Beneath the Neural Waves by Sofia Crespo [43], (D) A.I. Interprets A.I. Interpreting 'Against Interpretation' by Jake Elwes [58], (E) Zizi & Me by Jake Elwes [57], (F) Unsupervised — Machine Hallucinations by Refik Anadol [8], (G) Little Martians by Vanessa Rosa [153], (H) Leaves of Manifold by Helena Sarin [156], (I) Mosaic Virus by Anna Ridler [151], (J) Virtual Butterfly by Dabeiyuzhou (Lin Kunhao) [105], (K) Machine Memoirs: Space by Refik Anadol [7] , (L) Human Allocation of Space by Scott Eaton [52], (M) Sense of Space: Connectome Architecture by Refik Anadol [11], (N) Peony Dream: Falling in Love by Ting Song [163], (O) LyricStudio by Maya Ackerman [1], (P) Strange Genders by 64/1 and Harshit Agrawal [1], (Q) AI-rays [65], (R) Wander by YuQian Sun [167].

4.1 Can AI Be Truly Creative? Or Can AI Generate a Truly Novel Artwork?

The adverb "truly" pictures a creativity comparable to human creativity at the aesthetic level. This question is the subject of an ongoing debate among AI researchers, philosophers, psychologists, neuroscientists, and artists. Creativity appears as one of the most unique manifestations of the human species. It is viewed as a dynamic force that propels human minds beyond conventional boundaries. How, therefore, can creativity be hard-wired? Nothing seems further from creativity than an effective procedure. If creativity means breaking conventions, how can a rule-based algorithmic system be creative? Then, would you say that a Natural Language Generation system is creative?

4.1.1 Definition of Creativity. In Wittgenstein's terms [191], the question "can AI be truly creative?" would appear a philosophical question about the use of the word "creativity". How would the use of the word "creativity" change if eventually the linguistic community shared the assumption that entities different from humans can be creative? The question becomes more complex by the fact that there is no consensus on the meaning of "being creative", even in the case of human beings. Scholars have attempted to identify the key features of human creativity, the factors that influence creativity, the underlying mental processes, and its various manifestations. A distinction of this kind is mirrored by our taxonomy, in which we speak of stage, process, and outcome, to identify the different moments of the interaction between human and machine. A couple of surveys [157, 158] analyzed over 200 definitions of creativity, classifying the main features of creativity into two groups: novelty (originality, surprising, unexpectedness) and value (appropriateness, meaningfulness, usefulness). The fuzzy nature of the notion of "creativity" led Newell, Shaw, and Simon [131] to propose an anti-essentialist approach based on criteria that do not need to be equally present to categorize a solution as creative. In addition to the aforementioned concepts of novelty and usefulness, their criteria consider factors such as whether the answer results from intense motivation and persistence or comes from clarifying a problem that was originally vague.

On the other side, if the definition of "creativity" is still debated, the perspectives according to which it is possible to study creativity are widely acknowledged. The "Four Ps of Creativity": person, process, product, and place (or press), is an accepted framework today [150]. Most of the literature concerning AI and creativity has focused mainly on product and, to some extent, on process modelling [30, 40]. Jordanous [91] is one of the few essays that illustrates how the Four Ps relate to computational creativity. For instance, the subfield of research known as computational creativity has devoted almost no effort to modelling the skills behind the creativity of a computationally creative system, regardless of whether the agent is human or machine. An effort of this kind would be justified to enable a computational system to be creative independently of the task it is carrying out, and therefore, allowing the transfer of those skills from one task to another.

4.1.2 Main Approaches. The main attitudes towards the question "can AI be truly creative?" can be summed up by using the Lovelace questions, as they have been rephrased by Margaret Boden [22]. They ask:

- whether AI could be used to implement programs capable of human-level creativity, even though the processes behind a creativity of this sort could be different (the Strong View).
- whether AI could ever create artworks that appear to be creative, without necessarily being creative themselves (the Weak View).
- whether AI could be used to understand human creativity by formulating and implementing an algorithmic perspective on human creative behavior (the Emergent View).

Alongside these three dominant views, some scholars have raised a related, though less frequently debated, question: whether AI can, not only generate, but also evaluate creativity, a step that could potentially move it beyond mere mimicry [22, 38, 177, 189]. The Lovelace questions sum up efficiently the traditional views on AI Art by allowing us to distinguish three main approaches: (1) The Strong View; (2) The Weak View; (3) The Emergent View, as shown in Fig. 4.

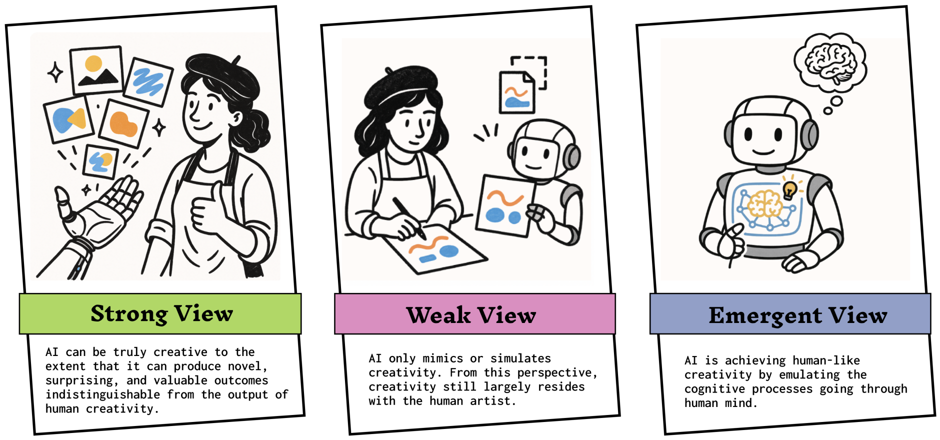

Fig. 4. Three Views on AI Art.
We used ChatGPT 5 (see supplementary material for prompt details) to produce the illustrations in this figure. The figure has been subsequently edited by the authors.

4.1.3 The Strong View. According to this view, AI can be truly creative to the extent that it can produce novel, surprising, and valuable outcomes (ideas, solutions, products) indistinguishable from the output of human creativity. Scholars supporting this view argue that AI-generated visual art, music, or literature that appeal to humans may be regarded as creative, even though we assume that it lacks consciousness, intentionality, or emotional experience.

Margaret Boden View. Boden's works [22–24] are a milestone in computational creativity. Firstly, she introduces the notion of "conceptual space", matching the notion of "state space" from computer science. Then, she draws three main strategies to search this space creatively, through a distinction between explorative creativity, combinatorial creativity, and transformational creativity. Explorative creativity is the systematic exploration of a conceptual space previously defined that has been partially explored so far, as exemplified by the series by Frank Lloyd Wright called "Prairie Houses". Combinatorial creativity comes from the unusual combination of well-known ideas, as exemplified by Marcel Duchamp's "readymade" work "Why Not Sneeze Rose Sélavy". Transformational creativity appears when a previous conceptual space is altered by changing the representations underlying the conceptual space or its theoretical constraints, as exemplified by Schoenberg's Atonal music. An AI-generated artwork would satisfy Boden's constraints to the extent that it is novel in the sense that it is original, surprising in the sense that it is unpredictable, and valuable in the sense that it is aesthetically pleasing. Boden's investigation is mainly focused on the process behind the creation of AI-generated artworks, as the three strategies she introduced show. According to Boden, AI can be truly creative from a functional point of view to the extent that it produces novel, surprising, and useful outputs, even though it does all this without the intentional stance characterizing human creativity. However, in Boden's view, an AI system cannot exhibit transformational creativity because such creativity would require self-generative algorithms capable of modifying the conceptual space during their operation.

Kostas Terzidis View. Terzidis et al. [171] take a more radical stance compared to Boden's. They do not take into account how creativity is sourced. They introduce the notion of "unintentional intentionality" attributing an intention to the outcome of the AI system rather than to the process that originates that outcome. If the product of the creative process is intersubjectively acknowledged as novel, surprising, and aesthetically pleasing, then it is creative independently of any intentionality behind the process that brought it its own generation. The artistic intention is evaluated as the outcome of actions regardless of whether they are human-based or not, to the extent that they embed an aesthetic value. In this sense, an AI-generated artwork reflects an objectified intentionality insofar as its outcome manifests a discernible intent. There is no need to assign an intention to the AI system since the output of the system shows the intent. As a consequence of this view, if a creative artwork can be generated by an object such as a computing device, then a move of this kind will cancel out the notion of artistic "genius" [34, 61]. In this context, Mazzone and Elgammal [123] devised a (visual) Turing test to check whether people could tell the difference between AI-generated art and human-generated art. According to their test, 75% of the subjects thought that AI-generated art was the output of human artists. In addition, participants characterized the artworks using terms commonly associated with human-created art (e.g., "inspiring", "communicative", etc.). However, there is also a pervasive perception bias toward AI-generated artworks when those works are explicitly labelled as AI-generated, as experimental evidence shows [127, 147]. According to Arriagada [14], Bown [26], Fabrocini et al. [61], this attitude mirrors the anthropocentric view according to which creativity is one of the most exclusive features of human beings.

Oliver Bown View. Finally, Bown [26] takes a different stance. While Boden [22–24] focuses on the process and the similarities between human and computational creativity, and Terzidis, et al. [171] focus exclusively on the outcome of the artistic process, Bown looks at creativity from an ecological point of view in which humans and machines, both empowered from different forms of creativity, work together to generate art. In this sense, if we go back to Mel Rhodes' Four Ps Theory of Creativity [150], Boden takes the process perspective, Terzidis takes the product perspective, and Bown takes the place perspective. The notion of "place" is revisited by Bown as our anatomical, physiological, biological, linguistic, and cultural embedding, in which creativity emerges from our social interactions. The influence of cognitive science and of the theory of embodied cognition is a constant theme in Bown's work (as embodied cognition, see [175]). Creativity comes from the specific embodiment of the agent and takes place in a social context. Therefore, it is not the outcome of an individual, person or machine. Machines miss the human embodiment and the embedding in the socio-cultural environment that characterizes the human species. Bown highlights the importance of establishing positive feedback loops between humans and machines to effectively leverage the distinct forms of creativity unique to each of the actors (see also [62]). Machine creativity emerges from the interaction with humans and it is guided by their prompts. This is the only method through which machines can become socially situated. Machines can be creative when embedded in an appropriate interactive ecosystem, without being creative in the same autonomous, intentional fashion that characterizes human creativity.

Main Criticisms. The main criticisms against the Strong View argue that artistic creativity requires consciousness, intentionality, and emotional experience [160, 165]. Scholars also underline that machines are disembodied [48, 49] and socially disconnected [45, 81, 94]. In our view, these objections do not fit the new scenario disclosed by AI Art. Artistic intent can be viewed as objectified in the artistic outcome of the machine ([171]; see also, from a different perspective, [182]). AI Art is philosophically fascinating, and its fascination lies primarily in its unique embodied nature. More precisely, the uniqueness and charisma of AI Art stem from the fact that it can generate categorizations of reality as well as artistic expressions that are completely different from those that humans can create. Disembodiment and social disconnection underline the obvious disparity between machines and living creatures. As Fazi [62] says: "... I wish to consider machines that do exactly what they are supposed to do. I want to engage with the question: can computing machines be generative of novelty in ways that are profoundly alien to humans, because they are so inherently computational?" [62]. AI Art is thus conceived as a type of art that humans are intrinsically unable to create due to limitations of our bodies, brains, and culture.

4.1.4 The Weak View. In this perspective, AI can only mimic or simulate creativity, without achieving creativity at the human level. Lev Manovich has a nuanced stance on AI Art [121, 122]. According to Manovich, the present discussions concerning AI Art overemphasize its autonomy, ignoring how it relies on human-curated datasets and pre-existing artistic conventions. AI Art needs data that has been selected by humans. Secondly, the algorithm itself has been chosen by the artist (a human being) among the many available on the shelves. Finally, it will be the artist's choice to privilege the artworks that, in her/his views, are the most successful among many more that the algorithm has generated. Therefore, in Manovich's view, creativity still largely resides in the human artist who guides the process. Du Sautoy [50] has a similar point of view. What AI Art does is just to mix up different contents and styles by exploiting its massive computational power, with the consequence that AI tends to reproduce familiar styles rather than generate truly novel aesthetics. According to du Sautoy, the creativity of AI Art comes from the human-machine collaboration, in which the machine is used like a tool for creating art, in the same fashion humans make use of brushes, chisels, or cameras for creating artworks. The dependence on humans has been emphasized by a variety of authors from different points of view, ranging from the very definition of creativity to a more ecological and distributed perspective [41, 90, 205]. According to Zylinska [205], computational creativity emerges from the complex blend of data, algorithms, infrastructures, and human intervention. The positions of Zylinska [205] and Bown [26] may look similar to the extent that they support an ecological perspective. Yet, as we have seen above, Bown defends the idea that AI Art is creatively productive from a genuine point of view. On the other side, the position of Joanna Zylisnka is more cautious insofar as she looks at AI models as mirrors culturally educated of their training set. A computationally creative system can just participate in creativity without being creative [205]. Finally, Kate Crawford attacks the autonomy of AI, showing how AI systems rely on human labor (e.g., data annotations), cultural artifacts (e.g., raw data: text, images, sounds, etc.), and societal structures (e.g., corporate infrastructures) [41]. AI is parasitic on a sociotechnical system inseparable from labor, social classes, and power structures [41]. At the end, AI is more human than artificial, she says.

4.1.5 The Emergent View. Finally, a third position emphasizes the role of computational systems in studying creativity in human beings. The goal is to achieve a creativity close to that exhibited by human beings. Artificial General Intelligence (AGI) could achieve a goal of this kind only to the extent that it implements human-like cognition. For instance, Goertzel [69] claims that, whenever AI will achieve consciousness, it will achieve a creative behavior close to humans. According to the supporters of this view, AGI will embed cognitive capabilities that will capture artistic intent or cultural context as human beings do. Evolutionary and brain-inspired approaches fall into this class as well [77, 110] .

4.2 Who Is the Author: the AI, the Programmer, or the User of the Program?

AI Art gained fame after the auction house on October 2018, during which Christie's sold the portrait named "Edmond de Bellamy" generated by a Generative Adversarial Network (GAN) for a value of $432,500 [180]. The authors, a group of artists called "Obvious Group", used code originally developed by the artist Robbie Barrat to generate the work [133, 180]. The authorship issue emerged patently for the first time with this case. Who gets the credits: the AI, the programmer, or the group of artists? What about the rights of the owners of the artworks appearing in the dataset used to train the

GAN? If we were supporters of the Strong View, then the author would be the AI, together eventually with the human actors involved in the plot to the extent that they played a creative role. The roles of each of the players will be different. AI will make use of its computational power to mix patterns discovered in the dataset, eventually maximizing the deviation from established styles and minimizing the deviation from the art distribution [54]. Humans will define the model, the training set, and the evaluation parameters for picking up the "most artistic" instance among the artworks generated by the machine. A situation of this kind in which the allocation of responsibility is distributed among multiple agents is frequent in the case of autonomous systems [63], as it happens with self-driving cars [55, 82, 103, 164]. Joanna Zylinska explicitly frames computational creativity as a post-human assemblage of datasets, algorithms, humans, and institutions in which the attribution of credits and responsibilities is conceptually and pragmatically problematic [205]. Some scholars might criticize the autonomy of the machine and doubt its creative abilities. However, both the AI system and the human will be functionally autonomous, under the assumption that the human guidance does not deny the machine autonomy; rather, autonomy emerges within the framework established by the human decisions. AI takes decisions on its own within the framework of decisions made by humans [34].

In the case of Generative AI (GAI) systems, such as, for instance, DALL-E or Midjourney, the artist is the user to the extent that the user provides prompts and curates the results by eventually tweaking those prompts. Vlad [182] argues that DALL-E (or any other GAI system of this kind) should be considered a work of art itself. But, if this is the case, then the developers of DALL-E should be considered artists, with the consequence that the authorship should be conjunctively attributed to the programmers of the AI system and to the users providing the prompt. The dynamic interaction between these roles invites a reconsideration of established concepts, such as the definition of "artist", particularly as elements of randomness are incorporated into the aesthetic process. Random seeds, noise injection, stochastic training procedures, stochastic sampling methods, latent space perturbations, evolutionary strategies, procedural randomness (e.g., Perlin noise) are all examples of techniques that can be used to introduce randomness and to increase the autonomy of the machine. In this sense, an autonomous system is by definition and to some degree "outside human control", as the etymological sense of the word "autonomous" clearly expresses.

4.3 Is AI Implying the "Death of the Author"?

The death of the author is an expression that appeared many years ago, thanks to the works of Roland Barthes [17]. In the context of AI Art, the expression intends to underline the "fading out" of the notion of "authorship" into an assemblage in which it is extremely difficult to attribute credits to the author behind the artwork. Thus, the main question appears the following: is it possible to attribute an intent when talking about AI Art? If not, then does this feature of AI Art imply the "death of the author"?

4.3.1 The Death of the Author. An answer to the question necessarily involves an assessment of the notion of "intentionality" and, therefore, "authorship" as it appears in AI Art. As we have seen in section 4.2, in the case of AI Art the authorship is distributed among a variety of roles: the algorithm, the training data, the developer, the user's prompt, and even the institutions. One of the first artists to look at art as decentralized and collective was Marcel Duchamp [51]. In his view, all art involves multiple contributors, as the audience interprets and assigns meanings to the work. Roland Barthes radicalized this concept by famously claiming the "death of the author" [17]. According to a few authors, AI Art aligns with Barthes' concept, as its interpretation is based solely on the audience to the extent that the communication intent and therefore the author are absent. The output of AI-generated art conveys the appearance of an intent even though it does not require a human mind behind its creation. Increasing the autonomy will progressively lead to marginalizing the role of the artist, as we have mentioned at the end of section 4.2. For example, Chen et al. [34] present a self-elimination approach that introduces randomness into the process of generating the artwork with the goal of bypassing the three modalities through which humans control AI Art models [121] and of reaching an objectivist autonomy [61].

4.3.2 Objectivist Autonomy. Object-oriented Ontology (OOO) offers a valuable framework to guide the interpretation of AI-generated art objects according to the "objectivist autonomy" view [75]. It posits that objects possess their own autonomous reality, characterized, on one side, by emergent properties that transcend the sum of their parts ("upward autonomy") and, on the other side, by the inherent withdrawal of certain aspects of their nature from complete access ("downward autonomy"). According to OOO, and consistently with [17], any artistic object exhibits an autonomy emerging from the interaction between the artwork and the viewer and mirroring the uniqueness of their relational encounter [76]. This relation distinctly embodies the "objectivist autonomy" of AI Art manifested through the "disappearance of the author" [34, 61, 171]. Specifically, the "objectivist autonomy" of AI artworks derives not only from the fact that the outcome is unpredictable (upward autonomy), but also from the fact that the algorithmic process is not fully controllable by the designer of the software (downward autonomy). AI artworks, therefore, would possess both an upward autonomy, in the sense that they are emergent entities, and a downward autonomy, in the sense that they are opaque objects. In this radical view, the intentionality of the author will completely disappear for being replaced by an "objectified autonomy".

4.3.3 The Aura of An AI Artwork. Walter Benjamin prefigured the shift of the "aura" of artworks in "The Work of Art in the Age of Mechanical Reproduction" [19]. Benjamin argues that the advent of reproduction technologies such as, for instance, photography will transform the aura of artworks, i.e., the aesthetic qualities intrinsic to artworks. His words can be easily applied to AI Art, in which the blending of data manipulation and algorithmic decision-making connected to the emergence of outputs totally unpredictable to the artist constitutes the aura of an artwork (see also [2, 141]). In this view, if the aesthetic value of an AI artwork, its aura, originates from the blending previously mentioned, on the other side, the message it conveys, its intended meaning, is generated by the interaction between the artwork and the audience. A viewpoint of this kind coincides with the "objectivist autonomy" of the AI artwork. The intention of the artist, the message that the artist intends to convey, or its personal biography are not relevant to assess the aesthetic value of an artwork.

The objectivist view has been criticized by Redaelli [149]. In his view, what Terzidis et al. [171] exclude from their investigation is the notion of "technological intentionality", as has been proposed by several authors [20, 21, 89, 129, 179]. According to this approach, technological objects do have intentions and communicate their intentions to other artifacts and humans. This notion shifts the authorship to the technological artifact rather than to the outcome of the process. A similar stance is defended by Chen et al. [34], with the difference that their argument is supported by Harman's philosophy. In the OOO, objects have an existence ontologically independent from the human subject ([75]; see also [125]). As in the case of "technological intentionality", the OOO objects relate and communicate with each other, independently of human consciousness. Intentionality, then, is not just a feature of human consciousness, but of the relationship between things themselves: for instance, the table intends the pen, the pen intends the paper, etc. However, the two approaches are different: one claims that intentionality is embedded in the artistic outcome [34], the other in the technological artifact [129, 149]. Redaelli supports his ideas by making use of the notion of "composite intentionality", in which machine and human intentionality blend together [179]. However, as Redaelli [149] himself underlines, the notion of "composite intentionality" does not clarify the redistribution of intentionality between humans and technology. The question of the "death of the author" is, therefore, still open.

4.4 What Is the Aesthetics Behind AI Art?

The introduction of AI has determined a shift in the aura of artworks, as we have said in section 4.3.3. In that section, the aura of AI artworks has been regarded as the blending of data manipulation and algorithmic decision-making connected to the emergence of outputs totally unpredictable to the artist. But does AI Art embrace a specific aesthetics? AI Art is often rejected by the art community, with the consequence that its aesthetic value has been frequently denigrated. This debate is exemplified by AI artists like Refik Anadol, who argue that critics misunderstand the "medium" of his artworks [107]; according to Anadol, the medium, i.e., the complex and unpredictable blending of data and algorithms, *is* the artwork's "aura". The aesthetics of AI Art is therefore "in-fieri", and it has been mainly discussed among artists or curators. Scholars have played a minimal role so far. A quick review comprises three main trends:

- The aesthetics of the prompt
- The aesthetics of the latent space
- The aesthetics of the data

4.4.1 The Aesthetics of the Prompts. An aesthetics of this kind has been influenced by the advancement of Large Language Models (LLMs), enabling the development of large text-to-image models. Artists consider prompts as part of their artistic output. The act of prompting is an art form itself: the selection of words, phrasing, rhythm, mood, and the ideology behind the concepts that appear in the prompt, frame the latent space and design the final output. But if the prompt is a component of the aesthetics of the artwork, then (1) the prompt has an artistic role on its own, and (2) its role is performative in the sense that it acts like a speech act [32, 161]). A prompt is not only text. It is not a set of instructions as well; it is an illocutionary sentence that shapes the outcome of the artistic process. It always entails a risk to the extent that it is an explorative action that eventually will not bring to the desired output; it can succeed or fail, as in the case of promises. The prompt is the source of the artwork, and the strict dependence of the outcome from the prompt justifies the efforts of artists in tweaking and progressively refining the input-text. Laba [106] introduces the framework of the Affordance Theory [67] for investigating the relationship between the user and the AI platform. The Affordance Theory, among others, studies the perception and use of the affordances provided to the users by a technological system and the range of possible actions those affordances enable. In the case of GAI platforms, the system's affordances correspond to the range of possibilities that users can utilize to create, modify, and refine a prompt, with the intent of reaching the desired stylistic outcome (e.g., the use of templates). Both the design features of the platform and the prompt parameters contribute to the aesthetics of the prompt by mixing technical control and poetic exploration. Technical skills consisting of tweaking the prompt become an artistic practice in which the input is a tool for addressing and exploiting the machine's imagination.

4.4.2 The Aesthetics of the Latent Space. Only a few scholars have explicitly engaged the aesthetics of the latent space [16, 122, 205]. Yet, a number of AI artists have used the latent space as a metaphor to describe their work. Artists like Mario Klingemann and Refik Anadol, for instance, often introduce their works metaphorically as explorations in the "inner cosmos" or the "digital subconscious" of the machine, a concept that has become central to this aesthetic discourse [6, 60, 97, 98, 101]. Several titles of their artworks have been dedicated to the notion of "latent space". According to these practitioners, the latent space constitutes a statistically derived representation of human culture as manifested within the dataset, with its aesthetics serving as a reflection on our collective conscious and unconscious knowledge. Yet, we should not forget that the latent space is a technical medium as well, in addition to being a metaphor. It is a playground in which artists play with the material abstracted from the dataset by interpolating and manipulating data points. A space of this kind is a continuous space that works as a creative tool to augment human perception through its exploration [98]. The fluidity of this space allows the generation of mysterious, never-seen forms, propelled by something that goes beyond human imagination. A liminal space of this kind is a space of transition, ambiguity, and transformation [56, 59]. This liminal quality is vividly illustrated by artists like Jake Elwes, who leverages the ambiguous "in-between" spaces not only for aesthetic exploration, but also as a socio-political tool to reveal and challenge the machine's inherent biases about gender and identity [60]. Therefore, the aesthetics of the latent space is both a technical tool and a poetic metaphor, allowing the artist to disclose the "subconscious" of the machine, i.e., the patterns, relationships, and associations the model has learned, while leveraging on its imagination by exploring the fluidity of this space in which it is possible to discover hybrid forms that go beyond the information contained in the dataset. Yet, the latent space is also a tool for allowing the artist to circumvent the autonomy of the machine by maintaining a partial control on the outcome. As we have said, it is a playground in which human and machine imagination finally meet and interact.

4.4.3 The Aesthetics of the Data. According to a number of scholars and practitioners, the real medium of AI Art is the data. If the latent space is an abstraction, the dataset is the raw material. Datasets embed values, biases, and stereotypes; they are a form of cultural archeology to the extent that they constitute a digital archive. Data is both history and culture. Moreover, data encapsulates numbers, statistical distributions, patterns, trends, and forms that can be visualized. The aura of artworks sources from all this information hidden in the data. Practitioners have approached data from different viewpoints. Some prefer to work on large-scale datasets (e.g., Refik Anadol, "Machine Hallucinations"), others prefer small, personal (e.g., Helena Sarin, "Latent Space Explorations") or specialized (e.g., Sofia Crespo, "Artificial Natural History"), datasets. The aesthetic outcome will be completely different, from immersive environments to personal poetics. If the dataset is huge, the curatorial aspect plays a minor role. This choice hides the reason behind different aesthetics. The practitioners who prefer to work on large datasets tend to look at the latent space as the real medium of AI Art (e.g., Mario Klingemann, Refik Anadol). The others assume that the outcomes that AI can generate depend entirely on the dataset. Therefore, they tend to meticulously curate their own data (e.g., Anna Ridler, "Mosaic Virus"). A distinction of this nature determines a corresponding distinction concerning the degree of control. The artists who privilege large datasets tend to emphasize the machine creativity by focusing on the exploration of the latent space. The medium is the latent space, and the aesthetics is the aesthetics of the latent space. On the other side, the artists who privilege small datasets tend to emphasize the curatorial aspect by engaging the data itself through a critical approach. The aesthetics is the aesthetics of the data.

4.5 What Are the Ethical and Legal Issues Raised by AI Art?

AI Art introduces critical ethical challenges, particularly regarding systemic bias, while also confronting complex legal issues including authorship and copyright.

4.5.1 Ethical Issues. AI is frequently associated with an aura of neutrality and scientific objectivity. However, biases are an intrinsic feature of AI systems insofar as they are built into the training data. The training sets that AI models make use of include biases, discriminative attitudes, and unfair power forms, which typically affect our societies. AI amplifies biases insofar as, being basically a statistical tool, it tends to learn just the most common patterns sourced from Internet. For instance, AI simplifies human identities into common stereotypes, creating a feedback loop that reinforces biases. Crawford speaks of this process as “bias laundry” [41]. An example comes from Google Translate [13], as shown in Fig. 5. Hungarian is a gender-neutral language; it does not have the distinction between male, female, and neuter. The outcome of the translation shows how biases heavily affect these models.

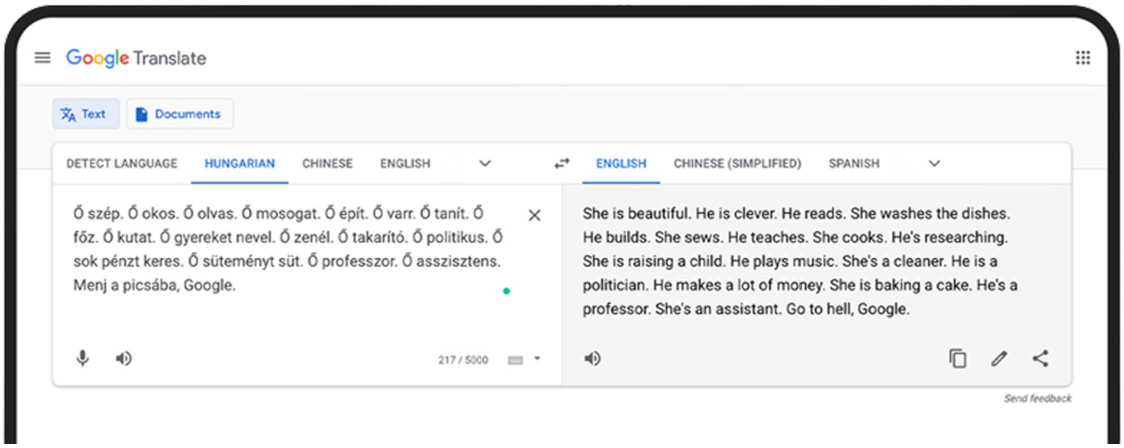

Fig. 5. The effect of biases in the case of Google Translate.

Training data is not neutral; the categorizations that AI models generate are also not neutral. Datasets are sculpted by political, social, and cultural biases. Therefore, the supposed objectivity of AI is merely a myth; on the contrary, AI is aligned with the political mainstream [41, 142]. If a biased attitude is the ethical pathology that affects AI, AI Art paradoxically emerges like therapy. AI Art is increasingly becoming a critical tool of AI politics, i.e., a space of investigation to allow the emergence of the discriminative attitudes populating our societies. AI Art unmasks the objective character of AI to show the exploitative and discriminative nature of this technology. Several AI artists have used their art to deal critically with bias reinforcement, minority exclusion, or distorted representations. Joy Buolamwini has analyzed the biases involved in face recognition software [27]. Her program, “Algorithmic Justice League”, aims to highlight the bias hidden behind AI models that can lead to discrimination against underrepresented groups. Other artists, as Mimi Onuhoa (“The Library of Missing Datasets”, 2016-ongoing [134]), Trevor Paglen and Kate Crawford (“ImageNet Roulette”, 2019 [137]), have similarly used their work to expose how biases arise not only from flawed data, but also from missing information and the absurd or offensive nature of algorithmic categorization itself. The aesthetics of these artists, therefore, consists in investigating the ethics of AI by using AI itself.

4.5.2 Legal Issues. In the meanwhile, a number of artists (e.g. Sarah Andersen, Kelly McKernan, and Karla Ortiz) and institutions (Getty Images, RIAA, Sony Music) have started a lawsuit against GAI companies (e.g. Midjourney, Stability AI, Deviant Art) for unauthorized use of copyrighted images including watermarked images during the training phase o the model ([80, 181]; see also [72]). If the plaintiffs allege massive copyright infringement, to the extent that their works have been used to train AI models without consent, credit, or compensation, the defendants argue that the training process is purely transformative, without implying the storage of copies. One issue is whether training can be assimilated to human learning, thereby to fair use. We must also mention that most of these lawsuits have been dismissed, with a few exceptions. A similar context concerns the case in which an artist’s style is mimicked by using AI without permission or compensation, as happened with Greg Rutkowski [78]. In the design area, GAI has also been used to infringe trademarks such as logos, causing confusion among consumers and dilution of the brand. A case of this kind is the lawsuit previously mentioned between Stability AI and Getty Images in which the plaintiff alleges that some of the outputs generated by the platform contain replicas of the Getty watermark associated with low-quality images, with the consequence of potentially confusing consumers and diluting the distinctiveness of its brand [181]. GAI has also been (mis)used to produce realistic images of celebrities for commercial purposes. This is an infringement of the personality rights which grant individuals protection from unauthorized exploitation of their identity for financial gain. For instance, deepfake images of the YouTuber MrBeast (James Donaldson) have been used in scam advertisements of commercial products [66]. The most eminent case involved the American singer Taylor Swift, where deepfake technology has been used to disseminate sexually explicit AI-generated images with a defamatory intent [159]. The case has been correlated with the use of Generative AI (GAI) for motivations related to political propaganda.

5 Technological Survey

We analyzed 78 AI artworks and tools to construct a design taxonomy summarizing how AI techniques are applied in the current practice, as shown in Fig. 6. In doing so, our technological survey complements and provides evidence for the issues raised in the theoretical survey.

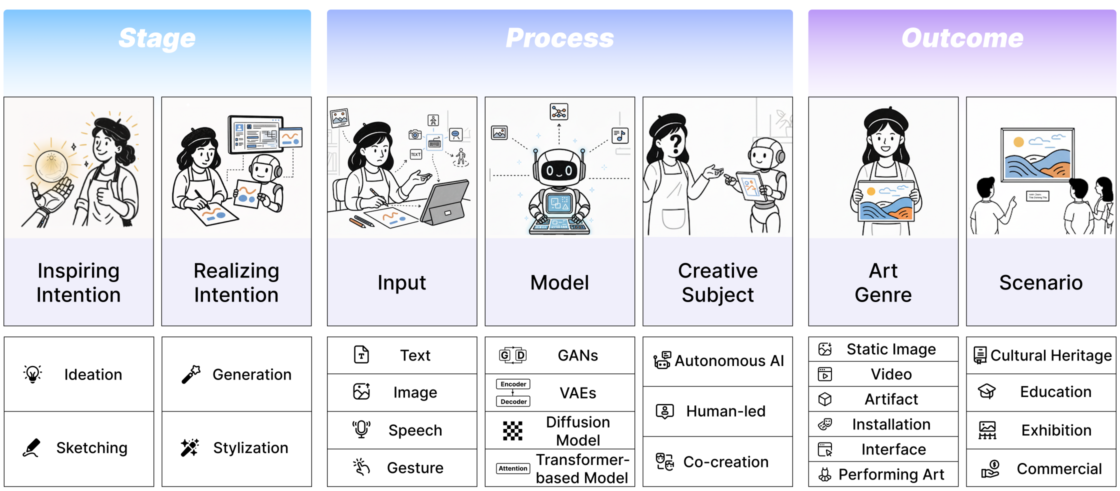

Fig. 6. A taxonomy illustrating how AI participates in the artistic practice.
We used ChatGPT 5 (see supplementary material for prompt details) to produce the illustrations in this figure. The figure has been subsequently edited by the authors.

5.1 Stage

Artistic intention is often regarded as a key criterion to distinguish what qualifies as art [126]. Therefore, we will use intention as a lens to examine AI Art. The creative process is categorized into two stages: *Inspiring Intention* and *Realizing Intention*. *Inspiring Intention* refers to the use of AI to generate, extend, and explore creative ideas. This stage focuses on conceptual development, including **Ideation** and **Sketching**. *Realizing Intention* involves transforming these ideas into artistic outputs, including **Generation** and **Stylization**.

5.1.1 Inspiring Intention.

Ideation. Ideation refers to the process through which the artistic intention is initially shaped and refined iteratively. The use of large-scale datasets and natural language processing allows AI to generate creative ideas and support artistic exploration [203]. Platforms such as ChatGPT can help the artists' brainstorm by providing high-quality suggestions, expanding the range of concepts, and accelerating ideation workflows [4]. For example, ORIBA [168], a customizable AI chatbot, enabled artists to converse with their original characters and gain new inspiration from the characters' responses. The characters appeared to "come alive" with the support of AI. AI can generate meaningful responses that exceed the artist's original design, sparking new inspiration and ideas. These responses embody what Terzidis et. al. [171] describe as "unintentional intentionality" (Section 4.1). The ideation process also shows a greater complexity than that suggested by Redaelli [149] (Section 4.3): AI is not merely supporting human intention, but can actively trigger novel and unforeseen layers of creativity through its interaction with humans.

Sketching. Sketching refers to the process of visualizing initial concepts through drafts or preliminary designs, thereby transforming abstract ideas into tangible forms [36, 87, 145]. For instance, Huang et al. [87] employed GPT-4 to transform real-world objects and backgrounds into fictional elements tailored to cinematic narratives, generating storyboards and shot descriptions. Similarly, Artinter [36] supported communication between artists and clients by rapidly generating stylized sketches, aligning the creative direction of the artist and the customer. Sketching deepens the initial idea and enables artists to quickly produce prototypes or demos, thereby facilitating iterative refinement. In practice, AI technologies can improve the usability of creative tools, broaden participation, and contribute to the democratization of artistic creation [61].

5.1.2 Realizing Intention.

Generation. Generation refers to the process of using AI to produce visual or multimodal outcomes of an artwork. By automating content production, AI enables artists to concentrate on the creative decision-making aspects of artistic production rather than on repetitive manual labor [25]. Recent AI Art practices employ advanced AI technologies to generate art across diverse modalities [87, 104, 132, 169]. These tools not only accelerate production but also expand creative possibilities, enabling artists to experiment with novel forms and combinations of media. Nevertheless, as outlined in Section 4.3, the allocation of credits regarding the true source of creativity along the generation step remains a subject of debate and cannot be solved with the simplistic Sketch-RNN example provided by Redaelli [149]. The generative process takes advantage of AI's capacity to model world regularities, understand semantics, and navigate latent spaces. These systems are trained on large multimodal datasets to internalize patterns such as spatial arrangements or stylistic coherence. The core value of the generative process lies in exploring what our paper defines "the in-between" of the latent space, that is, a conceptual space where hybrid forms emerge through the recombination of concepts previously learned during the training process of the model. The "aesthetics of the latent space", as discussed in Section 4.4, has its roots at this stage. For example, the generation of an image from a textual prompt (e.g., "a cat drinking tea on the moon") shapes a new aesthetic practice, one grounded in the artist's ability to explore the imaginative potential of the latent space through its textual prompt. The process of progressively refining the prompt is a tool for exploring further the imaginative space of the machine.

Stylization. Stylization is the process of transferring the style of an image on the content of another [108, 195, 204]. Sofia Crespo, a pioneering AI Artist, observed that many early practitioners explored AI Art through CNN-based style transfer, which was also her own entry point into the field [44]. Likewise, Mario Klingemann is an example of an artist who made use of style transfer during his practice [3]. The ability to apply artistic styles to photographs quickly established style transfer as a hallmark of AI Art practice. However, as discussed in Section 4.5, stylization also raises legal concerns. Many AI Artists are creating their own datasets [105, 151] both to mitigate potential legal risks and to enable the training of models that reflect their own desired artistic style.

5.2 Process

Understanding the mechanisms of AI and the roles it can play in the creative process can help artists use technology more effectively. Therefore, we examine three key dimensions: *Inputs, Models,* and the *Creating Subject. Inputs* include four common modalities in AI Art: **Text, Image, Speech,** and **Gesture**. As technology advances, early deep learning techniques are being naturally replaced. We focus on four major generative models that mirror the most updated technology: **GANs, VAEs, Diffusion Models**, and **Transformer-based Models**. To further explore the relationship between artists and AI, we also analyze the creative process in terms of the degree of human control over AI. The *Creating Subject* includes the following modalities of creation: **Autonomous AI, Co-creation**, and **Human-led.** Together, these dimensions provide a lens for understanding how AI participates in and shapes artistic creation.

5.2.1 Input.

Text. Among the various input modalities, text is the most prevalent. Text-based instructions, or prompts, guide generative models in producing specific outputs. Recent advances in text-to-image, text-to-video [188], and text-to-3D [192] synthesis have substantially lowered the barrier to creating high-quality and diverse visual content, positioning prompting as a central practice in contemporary art-making [135]. These technologies allow artists to focus on conceptual and aesthetic decisions rather than on manual rendering or repetitive tasks [25].

Although it may seem simple, prompting demands artists to clearly state their preferences to achieve the intended outcome [4]. AI Art is not just the technological generation of images; it also involves learning and mastering the emerging artistic skill of prompt design. The prompt itself is often considered a component of the artistic output [33]. Prompt engineering shapes the quality, style, and controllability of outputs, thus reshaping creative workflows [136]. This shift exemplifies the "aesthetics of the prompt", as discussed in Section 4.4. Effective prompting demands continuous experimentation and trial-and-error; without it, artists risk being constrained by the default styles and modes produced by the specific AI platform. Recently, several systems [186] have been developed to support users in refining prompts, demonstrating how the machine can be autonomous at the level of prompt engineering as well.

Image. For designers whose work is predominantly visual, text input can sometimes inhibit creativity. Therefore, image-based inputs offer a valuable alternative. First, inputs of this kind offer a more direct method for generating 3D artifacts [25]. Second, advances in style transfer enable AI to reproduce the aesthetic features of specific artworks [169, 194]. Although current models cannot yet grasp creative intent [187], they can generate large volumes of images in specific styles, supporting the dissemination and preservation of art forms that are difficult to reproduce, such as mural restoration or traditional Chinese ink painting. Beyond replication, many artists treat image input as a trigger for further exploration rather than an end product. For example, in Jake Elwes' work (Fig. 3 D), images were fed into an AI system, which repeatedly interpreted and reinterpreted them, creating a continuous cycle of machine-driven transformations. Such practices demonstrate how image-based input can shift from stylistic imitation to a mechanism for conceptual and process-oriented creativity.

Speech. Speech is a key modality in human–computer interaction, improving usability by enabling intuitive, hands-free communication. Whenever combined with text or images, it broadens participation in multimodal creative workflows [47, 117, 183]. Speech offers immediacy, accessibility for users with disabilities, and expressive richness through tone and emotion. However, speech input has several limitations, including recognition errors, a lack of precision compared with text or visual prompts, and privacy concerns associated with recording. Thus, speech works best as a complementary modality, enhancing creativity and inclusivity when paired with other inputs, but is less effective when used in isolation.

Gesture. Gesture-based interaction allows users to create art by translating physical movement into artistic expression, enhancing presence and engagement [111, 183]. For example, Heng et al. [79] guided users to mimic guqin finger techniques, which AI transformed into Chinese ink-style visuals. Gestures enrich performance-based arts and support usability by capturing rhythm, intensity, and emotion. A mode of interaction of this nature, however, suffers from ambiguity, hardware sensitivity, and cultural variability. These challenges make gesture-based interaction most effective when integrated with text or visual modalities in multimodal co-creation.

5.2.2 Model.

Generative Adversarial Network (GAN). The concept of GANs, introduced by Goodfellow et al. in 2014 [71], has become a foundational technique in both research and creative domains. GANs generate realistic data through the adversarial training of two neural networks: a *Generator*, which maps random noise into synthetic samples, and a *Discriminator*, which learns to distinguish real from generated data. Through iterative competition, both networks improve until the generated outputs become nearly indistinguishable from the real data [64]. Numerous GAN variants have been developed since the publication of Goodfellow's seminal paper [92, 146], many of which are widely used in AI Art. However, the artistic outputs of GANs are directly constrained by the scope and quality of their training data. For example, if the training set consists of classical oil paintings, the generated results will inevitably embody that style. Artists working with GANs often prefer smaller, carefully curated datasets to exert greater control over the outcome [10, 42, 100, 105, 151]. In such cases, the stylistic characteristics of the resulting artworks are largely determined by the dataset, a phenomenon that exemplifies "the aesthetics of the data" discussed in Section 4.4.

GANs became the backbone of many influential AI Art projects, such as Mario Klingemann's *Memories of Passersby I*, Refik Anadol's *Unsupervised*, and *Leaves of Manifold* by Helena Sarin, as shown in Fig. 3 A, F, H. Despite their aesthetic appeal, such works are generally not considered an evidence of the AI's creative capabilities. Instead, GANs are typically understood as powerful tools for reproducing and recombining patterns derived from human-made data, enhancing existing artistic concepts rather than creating new ones. However, Elgammal et al. [54] challenged this limitation through a new technique called Creative Adversarial Networks (CANs). Building on GANs, CANs incorporated the Arousal Potential Theory by the psychologist Colin Martindale to encourage novelty. CAN outputs have frequently been mistaken for works by contemporary artists. This marks a critical step beyond replication toward a form of machine creativity. It also supports the idea that cognitive theories embedded within AI can serve as mechanisms to emulate human-like creativity.

Variational Autoencoder (VAE). VAEs [96] are another important family of deep generative models. Unlike GANs, which rely on adversarial training, VAEs adopt a probabilistic approach to data generation. A VAE consists of two main components: an Encoder and a Decoder. The Encoder maps input data to the parameters of a latent distribution and the Decoder reconstructs data from these sampled latent variables. The distinctive feature of VAEs is that their latent space is modeled as a probability distribution rather than fixed feature vectors. The "aesthetics of the latent space" emerges from its continuous and probabilistic structure. By organizing data into smooth distributions, VAEs allow for fluid interpolations that unfold as gradual transitions between concepts or emotions.

VAEs are popular in art because their latent spaces allow artists to interpolate concepts and create novel hybrids. In visual arts, models such as VQ-VAE [174] have demonstrated the ability to produce high-fidelity images suitable for artistic manipulation, while systems such as Sketch-RNN [74] and MusicVAE [152] enable creators to interpolate between sketches or musical phrases, providing a kind of "morphing" palette for creative explorations.

Diffusion Model. Diffusion models have become the dominant deep generative framework [83]. They generate samples by iteratively denoising a signal, relying on two complementary processes: a forward diffusion process and a reverse generation process. In the forward process, a clean image is progressively corrupted by Gaussian noise. The reverse process trains the model to undo this corruption step by step, ultimately reconstructing a coherent image. During generation, sampling begins with pure noise, which is gradually transformed into a realistic image through the learned reverse process. For artists, this stochastic mechanism facilitates both variation and discovery. By sampling different noise seeds, they can obtain diverse interpretations of the same prompt, fostering exploration and the AI potential for unexpected results. Noise thus acts as a productive form of controlled randomness, valued for its ability to generate novel and varied outcomes. Diffusion models are the foundation of most modern AI systems spanning multimodal domains [114, 144, 148, 154] and are used in many notable AI Art projects [128, 140, 155].

Transformer-based Model. Transformers, introduced by Vaswani et al. in 2017 [176], changed sequence modeling by replacing recurrence with self-attention mechanisms. The self-attention allows each token in the input to attend directly to all others, efficiently capturing long-range dependencies. For generative tasks, Transformers are typically trained in an autoregressive manner: the model predicts the next token based on all previously generated tokens. At inference time, it produces outputs step by step, sampling a token, appending it, and then using the extended sequence to predict the next. Transformers underpin LLMs and multimodal systems today, enabling them to generate coherent and contextually rich text, images, and other media [118]. Concerning transformer-based models, the "aesthetics of prompts" is based on this autoregressive structure. A prompt is not merely an instruction; it is the initial condition that frames the latent space and guides the unfolding of the sequence. In this view, the prompt and the generated output are inseparable, together forming a work of art.

5.2.3 *Creating Subject.*

Autonomous AI. Autonomous AI reduces the degree of human control on the process generating the artwork as much as possible. In AI Art, human control typically operates on three dimensions: (1) data curation, (2) algorithm selection, and (3) outcome selection [121]. Autonomous AI seeks to minimize or bypass all three, especially the control embedded in data curation and outcome selection.

First, in terms of data, Gao et al. [65] introduced AI-rays, a system that transforms user portraits into simulated X-ray scans and inserts AI-inferred personal items into "bags" symbolizing identity, personality, and interests. Since the audience provides random portraits, the artist loses control over the input. Second, in terms of algorithms, a promising direction is allowing algorithms to generate other algorithms. Although the meta-algorithm is human-designed, the resulting algorithms and their creative products are unsupervised. Third, in terms of outcomes, The Painting Fool [39] exemplified a system that delegates the selection of the output to AI. Although the filtering mechanism is programmed by humans, the choice of the outcome is controlled by the system itself [70]. A delegation of this kind involves a further reduction in human control.

Beyond reducing the three forms of human control discussed above, recent approaches also emulate (or try to emulate) psychological mechanisms by using a cognitive approach. Although still in an early stage, such possibilities have already been explored in AI Art practice [46]. A future direction is to explore Artificial General Intelligence through evolutionary and brain-inspired approaches.

Human-led. Human-led AI represents the highest level of human control, where artists retain authority over each of the three dimensions mentioned above: data, algorithms, and outcomes. AI functions primarily as a tool for simulation, recombination, and augmentation. In this paradigm, creativity is fully attributed to the human artist, who is responsible for curating training data, designing model architectures, and selecting results.

For example, Jake Elwes' Zizi Project employed Deepfake technology. The AI was trained on videos of drag performers to create a virtual body, which then generated a new drag performance directed by the movements of a reference performer in the drag queen's unique style. Chen et al. [35] developed Origami-Sensei, which uses AI-based object recognition to detect errors during origami practice and provide corrective feedback. These systems enhance efficiency, interactivity, and creative exploration. Therefore, they primarily augment or refine human creativity rather than generating entirely new artistic paradigms.

Co-creation. Co-creation entails giving up the degree of control on some aspects of the creative process. Artists engage AI as a collaborator or muse that shapes their practice at different stages [116]. In this sense, both humans and machines are creative, although the creativity that they exhibit is different and manifested at different stages of the creative process. In human-led art practice, as the term implies, the artist retains full control. AI is just a tool. In co-creation, the process involves a collaborative effort between two actors, both of them creative. A common example of this approach is the exploration of latent spaces in generative models. For example, Scott Eaton [53] integrated deep neural networks into his practice, training GANs on custom datasets. He then navigated the latent space of the GANs to experiment with line weights, silhouettes, and styles, allowing for the generation of expressive and novel representations. Refik Anadol's Machine Hallucinations - MOMA [5] further illustrates this shift. In Anadol's work, the MOMA art collection became the data set. Although the artist parameterized the system, the resulting "data paintings" originated from latent space sequences shaped by the internal logic of the system (Fig. 7). Each frame reflects patterns not predefined "a priori" by the artist, but generated through the model's algorithmic processes. This approach recasts the artist's role from a sole creator to a curator and an interpreter of machine-generated outputs, positioning the AI as a co-creator. This co-creative paradigm is becoming increasingly common and shows a trend toward greater autonomy in AI Art.

5.3 Outcome

5.3.1 Art Genre. AI Art has expanded beyond image generation to multiple forms. We categorize these outcomes into six main types: **Static Image, Video, Artifact, Installation, Creative Interface**, and **Performing Art**.

Static Image. Image generation remains the most established domain of AI Art. Using AI as brushes on a digital canvas, artists can explore both stylistic and conceptual innovation (e.g., Fig. 3 H, J, P). For example, AI can generate stylistically expressive works [86, 169, 173, 186, 199] such as emotionally resonant calligraphy [196], thematic image

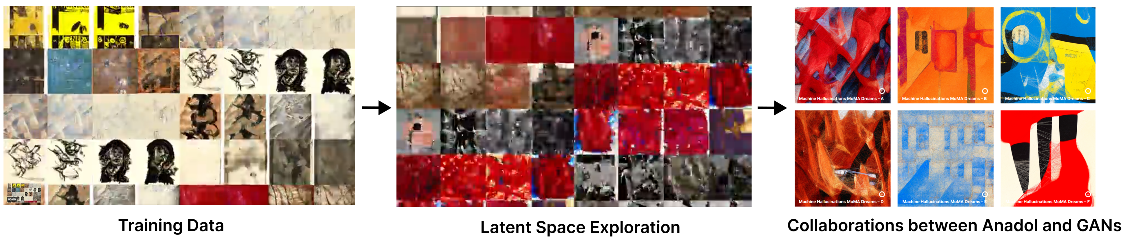

Fig. 7. *Machine Hallucinations - MOMA* by Refik Anadol [5], illustrating latent space exploration.

series [162], or portraits influenced by music [88]. These examples demonstrate how AI not only replicates visual styles but also extends them into new aesthetic territories by linking image generation with emotion, narrative, or cross-modal stimuli.

Video. A video can offer a narrative perspective for artistic expression (e.g., Fig. 3 G). The use of AI in video has advanced beyond simple visual effects to encompass generating intermediate frames [102], creating narrative [87, 193], and even orchestrating complex cinematic experiences [202]. For example, Cinema Meowdiso used an automated system to edit pet-recorded footage, transforming it into short clips, exploring how AI can create films under human guidance [87].

Artifact. An artifact is a digital 3D object that can also be fabricated in the physical world (e.g., Fig. 3 C, L, N). For example, Scott Eaton used GAN to explore abstract, geometric 3D form [52]. Similarly, the DreamWire system transformed text or sketches into complex 3D wire sculptures by addressing challenges of spatial organization [145]. Thus, AI alleviates many of the difficulties inherent in 3D modeling. A promising future direction is to incorporate knowledge of physical constraints, such as the curvature, texture, or tensile properties of materials, directly into the design process, allowing AI to support not only aesthetic exploration, but also structural feasibility [130].

Installation. Installations create immersive participatory experiences and some further allow the interaction with audiences (e.g., Fig. 3 A, D, F, M, I, K, Q). This real-time responsiveness transforms audiences into active participants and blurs the boundary between creator and participant, highlighting AI's ability to reshape both artistic production and experience [18, 29, 65, 79, 112, 117, 198]. More broadly, AI Art is increasingly moving beyond surface-level stylistic replication toward deeper, process-oriented creativity. Multimodal inputs and extended reasoning chains are increasingly being used to convey artistic intention [9, 85, 115, 197].

Creative Interface. Creative interfaces integrate AI into workflows as collaborative partners (e.g., Fig. 3 B, O, R). For artists unfamiliar with coding, such tools allow the creation of AI-generated works with minimal technical effort [37, 138, 194]. For example, Spellburst provided a system that allows artists to explore generative art through natural language prompts [12]. These developments not only broaden the expressive possibilities of human–AI collaboration but also indicate a growing trend in AI Art: a trajectory toward higher levels of autonomy, where AI systems participate in artistic creation with increasing independence.

Performing Art. In performing arts (e.g., Fig. 3 E), AI serves as a co-creative partner for composers [139, 166, 178], actors [57], and dancers [185]. The Echofluid system used machine learning techniques to support remote dance teaching and co-creation, allowing dancers to train their own AI models to explore, learn, and evaluate new movement possibilities [185]. Projects like Future Circus and AI Meets Holographic Pepper's Ghost explored "mixed reality" performing art where virtual characters, programmed with AI, could interact with live dancers in real time, creating dynamic and improvisational performances [84].

5.3.2 Scenario. Beyond the aesthetic values associated to art, AI Art also engages with domain-specific applications. We classify these scenarios into four areas: **Cultural Heritage, Education, Exhibition,** and **Commercial.**

Cultural Heritage. AI contributes to the preservation and development of cultural heritage. Many ancient art forms face the risk of disappearing due to their age, technical complexity, and lack of successors. By training AI on domain-specific datasets of traditional art, it becomes possible to reduce barriers to support restoration [169, 200] and facilitate the transmission of endangered practices [28, 112, 194, 201].

Education. In education, AI stimulates imagination and supports the appreciation of art [120, 190]. TangibleNegotiation combines TUI with GAI to cultivate creativity in children [203]. ArtBot, a Socratic LLM art companion, guided and enhanced the critical analysis of artworks [183], while StorageChat Timeline enriched art appreciation with Q&A and immersive animations [109]. However, a study involving university students suggests that they need more guidance to use these tools creatively [95].

Exhibition. Art exhibitions are a space for critical thinking, reflection, and emotional engagement. Recent AI Art exhibitions expand this tradition by emphasizing audience interaction and immersive media [172]. AI transforms exhibitions by enabling interactive experiences, moving beyond static displays to allow collaborative interactions between people and machines [68, 73, 84].

Commercial. AI Art tools are increasingly being used in commercial applications, ranging from empowering non-professionals to reshaping professional workflows [170]. AI enable efficient client-artist collaboration in the case of commissioned projects [36], and can drive large-scale production [25, 93], demonstrating significant commercial potential [113].

6 Limitations and Future Research Trends

6.1 Limitations

In the case of the theoretical section of this survey, the main limitation derives from the need to be necessarily synthetic and, therefore, excessively schematic. For instance, the positions of the scholars that have been mentioned in the theoretical section regarding creativity or authorship neglected some of the subtleties that are behind their philosophical approach. Yet, in our opinion, the survey deserves the credit of categorizing the main theoretical issues currently debated in the AI Art field under a set of specific questions and, at the same time, of comparing different attitudes among scholars or practitioners toward these questions. The technological section faces two limitations. First, while the cases we examine serve as illustrative examples of a range of AI approaches to the realm of art, yet they are neither exhaustive nor fully representative of the diverse and rapidly evolving landscape of AI practices. However, we believe that our study remains valuable in the context of a discipline such as AI Art that is rapidly changing. In our opinion, the proposed taxonomy will serve as a reference point for future researchers, allowing them to draw inspiration, evaluate their creative tools, and situate their work in relation to prior artistic practices. Second, the scope of our study is limited to visual and performing arts. Future studies could extend our framework to encompass artistic practices we did not take into account, thereby offering a more comprehensive understanding of how AI participates in diverse forms of cultural production.

6.2 Future Research Trends

We identify two main future research challenges for the AI Art community. The first is primarily theoretical in nature, though with technical implications, while the second is primarily technological, though it also involves theoretical issues. Theoretically, evaluating the impact of increasingly accessible AI Art tools is crucial. This trend has the potential to alter the artistic landscape by allowing each of us to become the "author". Such a scenario implies a progressive democratization of the artistic venues to the extent that AI will open opportunities for a broader participation in the cultural production, enabling new voices and perspectives to emerge [61]. In this context, an important research trend will consist of investigating whether the use of these tools could lead to a gradual homogenization of artistic outputs, potentially diluting the authenticity of human-created art. On the technological side, the integration of multimodal inputs, including text, images, gestures, and speech, to engage the generative system will be another important challenge. Multimodality expands the expressive space of human–AI interaction by allowing users to articulate the intent behind the artwork through a variety of channels. Different input modes emphasize different dimensions of agency: text emphasizes semantic precision, sketches involve visual imagination, and gestures convey embodied expressivity. The ability of AI systems to integrate these heterogeneous signals into coherent outputs will highlight the role of AI as a flexible and creative partner, becoming one of the main research trends in the future of AI Art.

7 Conclusions

This paper analyzed a set of theoretical and technological issues which play a central role in the current debate on AI Art. To better understand computational creativity and the evolving relationship between AI technologies and humans, we have identified on the theoretical side five key research threads that are frequently debated in the literature. To further test and complement the insights coming from the theoretical analysis, we developed a design taxonomy on the technological side to analyze how AI nowadays effectively participates in the artistic practice. AI creativity must also be evaluated within the context of everyday practice rather than being just the object of theoretical speculation. Together, these complementary perspectives deepen our understanding of how AI is pushing the boundaries of art, while also showing how the ideas and practices of AI Art can inspire new reflections and opportunities for the role of AI in creative production.

8 Acknowledgments of the Use of AI

We used AI to generate the illustrations in Fig. 3 and Fig. 4, details can be found in the relevant sections. The authors take responsibility for the output and use of AI in this paper.

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