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FROM ALGORITHM TO AESTHETICS: ARTIFICIAL INTELLIGENCE'S PLACE IN CREATIVE SECTOR

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Abstract: *Traditional ideas of authorship, creativity, and artistic originality have been challenged by the nexus of artificial intelligence (AI) and art, which has ushered in a revolutionary era for creative practices. Both professional and amateur artists can now create images, music, poetry, and movies using AI-driven tools and algorithms like GANs, CANs, and machine learning models. In addition to increasing productivity and creativity, these technologies raise moral questions about authorship, copyright, and the possible replacement of human artists. While platforms like DALL·E and Stable Diffusion push the limits of visual expression, projects like DeepBach and Beethoven X show how AI can mimic classical composition. AI's wider societal utility is also demonstrated by its application in cultural heritage and restoration, including the analysis of historical paintings and the reconstruction of lost artwork. AI has also changed marketing strategies through content automation, emotional targeting, and data-driven personalization. AI lacks contextual sensitivity and emotional depth, which are traits derived from human experience, despite these advancements. Therefore, it is crucial to strike a balance as AI develops so that it enhances rather than replaces the fundamental human characteristics that characterize true artistic creation.*

Keywords: *Artificial Intelligence (AI), Art, Creativity, Algorithms, Marketing*

JEL classification: *O33, Z11, M31, D83, L86*

INTRODUCTION

Technology shares the progress made by science in the form of new machines, products and processes and in past ten to fifteen AI. Art, on the other hand, conveys ideas and emotions, which sustain our society and our conversations. Art and technology have always been linked. As Marshall McLuhan said, "The medium is the mes-

sage" (McLuhan & Lapham, 1994). The technical framework we live in informs our creativity. Yet this framework is changing, as ideas expressed by using technology are becoming increasingly common. The ongoing digitalization of our societies is creating a new playground for art, through virtual worlds, extended reality an AI. This transformation is also rewriting the rules of the game, fundamentally altering the very notion of what it means to be an artist in the age of networks (Hello Future, Artistic creation and hybridization in the age of the Internet, 2022). The rise of the internet and web technologies has profoundly impacted artistic creation, fostering a shift toward greater collaboration, appropriation, and audience participation. Artists are no longer isolated creators but active participants in a decentralized and often collective creative process, where boundaries between creator and viewer continue to blur.

The rise of the internet and web technologies has had a deep impact on artistic creation, which includes much more collaboration, appropriation, and participation. This new revolution is far more delicate than previous revolutions (Manovich & Arielli, 2024). Yet despite certain similarities, the scale of digital affects is fundamentally unique. This distinction is crucial, as it supports two key arguments: one concerning the comparative nature of digital versus analogue affects, and another regarding the vastly different levels of impact they produce(Langdon, 2014).

In the 1990s, the development of the internet gave rise to what became known as Net art refers to a category of artistic practice specifically conceptualized in relation to the Internet—created *by, for*, and *through* the online medium. Artists working within this genre engage with the Internet not merely as a channel for distributing their work, but also as a central instrument for artistic creation. Moreover, the Internet functions as an evolving, interactive environment in which the artwork exists and develops, highlighting its dynamic and participatory nature. Drawing inspiration from the internet's unique characteristics, its interactivity, decentralization, and immediacy, they create original works while simultaneously experimenting with new modes of creative process and audience engagement. Also, artists and collectives like *This is Not Art* and *Jodi.org* adopted earlier avant-garde strategies, including parody and mimicry, while also integrating the mundane and often problematic aspects of digital technology into their works such as system crashes, pop-up ads, frozen screens, visual glitches, and hacker interventions. Conversely, groups such as ®™ark and *The Yes Men* utilized digital tools to create satirical corporate-style websites that mimicked and critiqued global institutions and high-profile figures (Langdon, 2014).

The influence of the internet on contemporary art extends well beyond the confines of the Net art movement. Ongoing technological advancements are reshaping the practices of emerging generations of artists, while the foundational culture and values embedded in the internet's early development continue to redefine modes of artistic production and disrupt conventional relationships among artists, their creations, and audiences. Broadly speaking, the arrival of artificial intelligence and machine learning onto the creative tool scene to help amateurs (generally with no previous training or education in art) to produce images, sounds, and texts from the analysis of huge data pools. While artificial intelligence has made it increasingly feasible for amateur creators to replicate established artistic styles and even produce complex compositions, an essential question arises: can these individuals genuinely compete with professional artists? Despite the technical sophistication of AI-generated outputs, critical aspects of

artistic creation such as originality, emotional depth, and the nuanced vision that stems from lived experience remain inherently human. These attributes, cultivated over time through personal and cultural contexts, continue to distinguish professional artistry from algorithmically generated imitations. Therefore, while AI can emulate form, it arguably falls short in replicating the profound intentionality and creative intuition embedded in human artistic expression.

Different arts and design connected with AI

Over the past fifty years, whenever a human ability or skill, traditionally considered uniquely human, was automated through computer technology, it was typically labeled as "artificial intelligence" (AI). However, once this automation became seamlessly successful and fully operational, it was no longer referred to as AI. In other words, "AI" refers to technologies and methodologies that aim to automate human cognitive functions and are in the early or developing stages of functionality. AI has been embedded even in the earliest tools for computer-based media production. For instance, the first interactive drawing and design system, Ivan Sutherland's *Sketchpad* (1961-1962), featured a function that automatically completed the shapes of rectangles or circles initiated by the user. In essence, the system could predict the user's intention. Within the broad conceptual framework outlined here, this functionality can be unequivocally considered an early form of artificial intelligence (Manovich, 2023). "In addition to recommendations and automatic editing, AI is now widely used to generate new synthetic artifacts, including artworks, music, designs, and texts" (Manovich & Arielli, 2024).

In 2016. Sony Computer Science Laboratories in Paris developed a neural network, called DeepBach, that produces choral cantatas in the style of J. S. Bach. The resemblance is extraordinary. In 2019, Deutsche Telekom put together a team of international experts in music and AI to complete Beethoven's unfinished 10th symphony, thus celebrating the 250th anniversary of his birth. The completed symphony, Beethoven X - The AI Project, premiered on October 2021 in Bonn (Fulde, 2021). There are YouTube videos that invite listeners to participate in a sort of a musical Turing test, challenging them to distinguish AI-penned compositions from human ones. For people with some musical training, the task still seems straightforward, but for inexperienced listeners, this is not the case.

One interesting project that combines arts (in particular music) and AI is The MUSICA (MUSical Interactive Collaborative Agent) project seeks to develop an artificial intelligence (AI) system capable of playing jazz and improvising in real time alongside human musicians. The system is trained using a large database comprising thousands of transcriptions of performances by renowned jazz artists, employing machine learning techniques to analyze and extract underlying musical patterns. By identifying these models, the AI gains the capacity to generate original musical responses, enabling it to compose and perform live music collaboratively with human players. One could say that this sounds very cool and on a first view definetely it is. But, I have to say that the project is financed by the US Defense Advanced Research Projects Agency, in the scope of a wider program called Communicating with Computers. Brian A. Miller, a music scholar at Yale University, suggests that jazz improvisation serves as a paradigmatic model of broader human interactive behaviors. Consequently, its

technological simulation could possess strategic military significance that transcends its intellectual or artistic dimensions (Miller, 2020).

In May 2023, Google introduced MusicLM, an innovative application capable of generating music based on textual prompts such as "rock-inspired meditation music", which garnered considerable public attention. Shortly thereafter, the launch of Voice-Swap by DJ Fresh marked a significant shift in music production practices by enabling the legal use of cloned voices of real artists. This controversial platform permits users to utilize AI-generated vocal replicas in exchange for licensing fees when the content is monetized. In addition, platforms such as AIVA.ai offer tools for generating original, copyright-free compositions that emulate the stylistic features of existing musical works, thereby expanding the creative possibilities available to composers and producers while raising complex questions regarding authorship and intellectual property.

Numerous start-ups are producing computer programmes with the capacity to generate music and include it in multimedia projects. For example MatchTune, formally known as Muzeek, has created an AI-based musical marketplace that allows users to create soundtracks for their videos using royalty free music. For its part, Sony's Computer Science Laboratory has developed the algorithm (named Flow Machines), which notably crunched 1,300 scores of songs by the Beatles and other bands of the 1960s to create music in the style of the Fab Four. Last but not least, we should also mention Taryn Southern's 2018 album, *I am AI*, which was entirely composed using artificial intelligence (Hello Future, Creation, restoration, music: artificial intelligence tools in the arts, 2023).

In poetry, AI has been making waves ever since Google researchers fed a neural network with 11,000 unpublished books and created a machine capable of generating transitions between suggested opening and closing sentences back in 2016. In the same year, 20th Century Fox called on IBM's supercomputer Watson to come up with a trailer for its film Morgan using an algorithm that had been fed with 100 horror film trailers cut into separate moments and scenes. However, the machine did not do all the work: it simply recommended extracts of the film to be included in the trailer, while a human editor was still needed to patch the scenes together to tell a coherent story. In a further example, the Benjamin algorithm developed by film director Oscar Sharp and researcher Ross Goodwin, which was fed with dozens of science fiction film and television scripts, created the screenplay for the short film Sunspring.

In the world of graphic design there is an open-source LAION-5B dataset, used by DDG's Text 2 Dream. Kaloyan Chernev, founder of DDG, says that the dataset comprises "largely public domain images sourced from the internet", but many artists and illustrators say that databases will often also include a lot of copyrighted images (Shaffi, 2023). This raises an additional ethical concern: although prompts used in image-generating models can be broad and nonspecific, they may also explicitly request outputs that emulate the work of specific artists. Such practices risk further obscuring the boundaries of authorship and originality, as they can result in images deliberately designed to replicate another artist's distinctive style or technique. Today neural networks are progressively used to assign semantic labels ("meanings") and to automatically extract aesthetically relevant features through the analysis of large databases of liked images to mimic something or what AI has analyzed that consumers

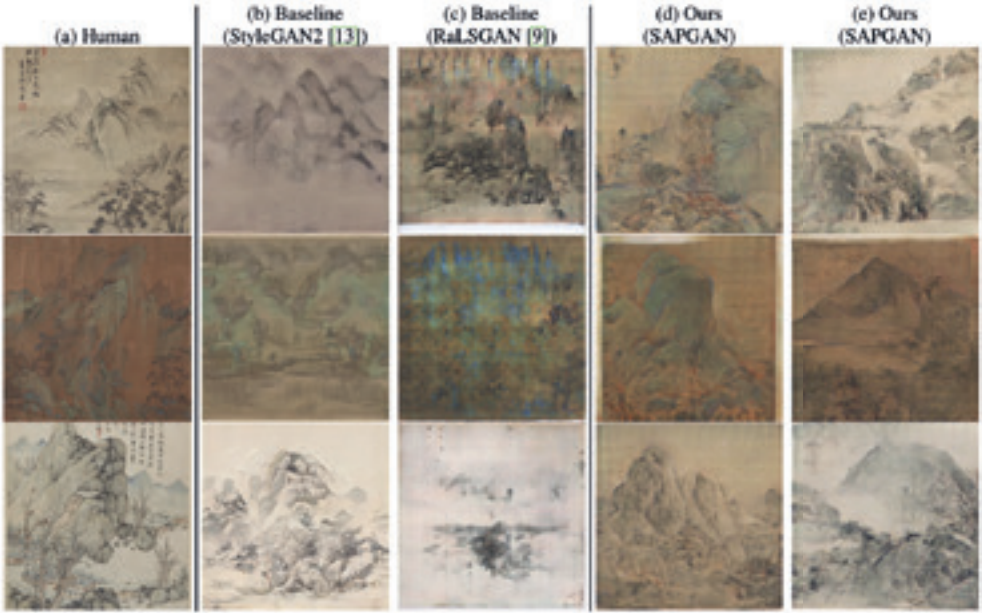
prefer (Wilde, 2023). Based on the research conducted by the authors of this paper, the launch of DALL·E in January 2021 marked a significant milestone in the evolution of artificial intelligence in the creative industries, enabling computers to generate highly detailed images based solely on textual descriptions. This development has since been complemented by the emergence of advanced multimodal models capable of converting text into animations, 3D visualizations, and even musical compositions. Tools such as DALL·E, Midjourney, and Stable Diffusion have become central to this transformative wave, prompting considerable debate within artistic and design communities. Key concerns include questions of intellectual property ownership, the potential for copyright infringement and plagiarism, and the broader ethical implications of automating creative labor.

Particularly within the animation industry, the integration of AI technologies is accelerating rapidly. Leading studios have begun to acknowledge the disruptive potential of these innovations, with some projections indicating that up to 70% of jobs traditionally associated with animated film production could be replaced or significantly altered by AI-driven systems. This anticipated shift raises urgent discussions not only about employment but also about the future role.

For instance, Figure 1 illustrates the work of Princeton undergraduate student Alice Xue, who, in 2021, developed a novel Generative Adversarial Network (GAN) framework for generating Chinese landscape paintings. The figure presents a comparative visualization of paintings produced using various artificial intelligence model configurations. The layout is organized into multiple columns, with each column representing outputs from a different generative model. Columns b and c display paintings generated by baseline models, which serve as reference systems commonly used in previous generative art research. These models typically rely on conventional GAN architectures and have limitations in stylistic fidelity and structural coherence. Columns d and e, on the other hand, show the results produced by the Sketch-and-Paint Generative Adversarial Network (SAPGAN) framework proposed by the authors. SAPGAN is a novel dual-stage model consisting of two separate GANs: one for sketch generation (SketchGAN) and another for translating sketches into fully rendered paintings (PaintGAN). Column d presents outputs from a configuration combining StyleGAN2 and Pix2Pix. StyleGAN2 is utilized to generate detailed sketch structures, while Pix-2Pix converts these sketches into color-rich, stylistically consistent paintings.

Column e illustrates results from the RaLSGAN configuration (Relativistic Average Least Squares GAN), which offers an alternative adversarial training approach to improve realism and reduce artifacts. The overall comparison clearly demonstrates that the SAPGAN models (d and e) outperform the baseline models (b and c) in terms of aesthetic coherence, brushstroke emulation, and adherence to the traditional elements of Chinese landscape painting. This qualitative enhancement supports the authors' claim that SAPGAN provides a more authentic and human-like artistic output. of human creativity in an increasingly automated cultural economy (Xue, 2021).

Figure 1. Comparisons between Chinese landscape paintings generated by baseline models (columns b and c) versus models in our proposed Sketch-and-Paint framework (columns d and e). Specifically, the SAPGAN configurations shown are StyleGAN2+Pix2Pix (d) and RaLSG (Xue, 2021)



Source: Proceedings of IEEE WACV, 2021, pp. 3863–3871. arXiv, https://arxiv.org/abs/2011.05552.

In gaming AI is making big changes. Machine learning has enabled independent developers working on new games to extensively explore their technical potential, notably by using ChatGPT to generate code for game mechanics, and to translate games more efficiently. And in in the world of mobile games, AI can simplify the generation of visual content. Designers use an AI model like Stable Diffusion to simplify the process of design of simple objects and operations. This has enabled artists to save time that used to be devoted repetitive tasks, because they no longer need to manually complete every stage of a process. However, it is also essential to point out that artists are not being fully replaced by AI, but that it helps to simplify their work (Hello Future, Video games: AI paves the way for a new generation of visual content, 2024).

Advancements in artificial intelligence (AI), particularly in the domains of environment, character, and scenario generation, have provided game designers and visual artists with powerful tools that not only streamline but also enhance the creative process. These tools allow for the rapid development of visually compelling content while preserving the artist's creative autonomy and vision. Although AI technologies have not yet reached a level where they can independently handle complex gameplay mechanics or perform sophisticated coding tasks, they are increasingly capable of automating and supporting various aspects of game development.

The integration of cutting-edge technologies, such as Light Detection and Ranging (LiDAR) and generative diffusion models, marks a significant milestone in the evolution of game design. These tools contribute to the production of hyper-realistic visual assets and dynamic in-game environments with minimal manual input. One notable example is Club Koala developed by Play for Fun, which demonstrates

the capabilities of generative AI in customizing virtual worlds. Using diffusion models, players are empowered to shape unique digital landscapes, compose original music, and personalize non-player characters (NPCs).

According to the game's publisher, these AI-driven NPCs exhibit a high degree of autonomy; they adapt their behaviors in response to player interactions, generate individualized quests, and contribute meaningfully to intricate, evolving narratives. This dynamic responsiveness fosters a more immersive and personalized gameplay experience. Furthermore, the game introduces groundbreaking innovations in narrative generation. By leveraging techniques such as prepossessing, pan-dialogue modeling, natural language parsing, and structured AI behavior trees for NPCs, Club Koala can produce one-of-a-kind storylines that mirror the creativity and choices of individual players. This fusion of AI with interactive storytelling represents a significant shift in how narratives are constructed and experienced in digital gaming. It not only enhances player engagement but also reflects the broader trend toward increasingly adaptive and co-creative virtual environments.

GANs and CANs

Algorithms are now capable of creating original works of art by taking inspiration from huge to enormous numbers of images and inventing new artistic styles. Here follows an overview of these "artist-algorithms" that are shaking up the art world and questioning the classical conception of creativity. Utilizing methodologies such as Generative Adversarial Networks (GANs), artists are now capable of producing artworks that autonomously adapt in response to audience engagement and feedback. This dynamic interaction reconfigures the traditional relationship between the artwork and its viewers, fostering a more participatory and responsive aesthetic experience. GAN consists of two competing neural sub-networks: a **generator** and a **discriminator.** The discriminator has access to a dataset of real images (the training set) and aims to distinguish between authentic images from this set and synthetic images generated by the generator. In contrast, the generator attempts to create images that mimic the distribution of the real data, despite not having direct access to the actual training samples. Initially, the generator produces random visual outputs and receives feedback from the discriminator indicating whether the generated images appear real or fake. Through this iterative feedback loop, the generator incrementally improves its outputs. At convergence, the discriminator is no longer able to reliably differentiate between the real and generated images. This outcome indicates that the generator has effectively learned to reproduce samples from the same underlying distribution as the training set (Elgammal, Liu, Elhoseiny, & Mazzone, 2017).

One of the first examples of algorithmic art (art generated by algorithms) dates to 1973, when English painter Harold Cohen wrote a computer program called AARON that could produce original drawings. American artist Jean-Pierre Hébert drew the outlines of this artistic movement twenty years later and invented the term "algorist". An artist is an algorist when they create a work of art from an algorithm that they have designed themselves. The act of creation is in the writing of the code, which becomes an integral part of the final work. Advances made in artificial intelligence (AI) are questioning this definition and bringing about a new generation of technologies, techniques and models. Thanks to machine learning, algorithms no longer simply follow

a set of pre-defined rules by the programmer-artist. Fed with a large amount of data, they assimilate the aesthetic characteristics of artistic styles or movements and become ever more autonomous in the production of content. Since the 2010s, many families of algorithms have been used to explore new practices and keep on pushing back the boundaries of "artificial creativity".

One of the most compelling models in the intersection of algorithms and creativity is the Generative Adversarial Network (GAN), which has become emblematic of algorithmic innovation in the visual arts. This prominence was cemented by the highly publicized 2018 auction of *Portrait of Edmond de Belamy* at Christie's, an artwork created by the artist collective Obvious using a GAN. Originally introduced in 2014 by machine learning researcher Ian J. Goodfellow, GANs are a class of unsupervised machine learning algorithms composed of two competing neural networks: the generator and the discriminator. The system is trained on a dataset, such as thousands of early twentieth-century Cubist paintings allowing the generator to produce new images that mimic the style. The discriminator's role is to distinguish between authentic artworks and those generated by the algorithm. Through continuous feedback, the generator iteratively improves its outputs until the discriminator can no longer reliably tell the difference, effectively creating convincing, machine-generated art.

The artist plays a more or less active role in this process. Failing building the generative algorithm (this was not the case of the members of Obvious who borrowed the code from another programmer-artist), they select it, change it to obtain the desired result, and they run it. The artist gathers entry data (with the help of a "scraping" tool, a technique for automatically extracting data from websites), selects it (pre-curation), then sorts the content generated by the machine (post-curation). In Fall of the House of Usher II (2017), English artist Anna Ridler chose to create her own dataset by producing over 200 drawings. One could say that artist and machine work together to cocreate a piece of art and this is an interesting collaboration, but it could lead us to the moment of opening a Pandora's box.

A similar project same year, but with an upgrade option, a very important option is CANs invent new artistic styles. Researchers from the Art and Artificial Intelligence laboratory of Rutgers University in the United States suggested a new method for generating original art, inventing creative GANs, Creative Adversarial Networks (CANs).

On the assumption that GANs are limited in their creativity due to the way in which they have been designed (their aim being to imitate existing works of art from a specific style as well as possible), they changed the process to make them capable of generating creative art by maximizing deviation of the system from established styles.

CANs pursue three goals. They must generate works that are new (1), but without being too much so, i.e. swaying too far from the entry data, to avoid creating dislike (2). The work generated must also increase stylistic ambiguity, meaning it is difficult to classify in a particular style (3). Just like GANs, CANs are made up of two adversarial networks. The discriminator uses a large set of labelled works of art to learn the difference between artistic styles (baroque, impressionism, expressionism, etc.). The generator produces the work from a random entry. However, unlike GANs, it receives two signals. The first tells it if the discriminator thinks the work presented is art or not, and the second whether the discriminator has been able to classify this work into an established style. These two signals act as opposing forces as the first pushes the generator to

emulate art whereas the second penalizes it if the discriminator manages to classify its style. This pushes the generator to explore creative space and to create works that, not only misled humans but were also better ranked than the original works Generative art, powered by AI and machine learning, enhances virtual reality by enabling dynamic, responsive artworks. These pieces evolve based on audience interaction and real-time data, creating personalized experiences without direct artist intervention, showcasing the fusion of technology and creativity (Anantrasirichai & Bull, 2022).

Evolutionary algorithms imitate creative thought

Less widely publicized, evolutionary algorithms are also used to generate credible works of art. Inspired by Charles Darwin's theory of the evolution of species, they are based on the three fundamental principles of natural selection. According to these principles, there are differences between individuals of a same species (principle of variation). Some traits are more advantageous than others and enable the individuals that have them to survive and reproduce better than their counterparts (principle of adaptation). These traits are passed on from one generation to the next (principle of heredity). The idea behind creative evolutionary algorithms is to reproduce the intellectual approach of the artist, who imagines, tests, and selects new ideas. This means modifying entry data randomly and in a variety of ways, selecting the best-adapted variant or variants, and repeating the process until a satisfactory idea emerges. During this interactive process, the artist intervenes to choose the most aesthetic variations of a generation, but it is also possible to automate this step.

Although descried examples are more machine learning oriented and the AI is still based on this, the evolution of creative algorithms may have gone in the direction of increased autonomy in the production of works of art, but has this made them more creative? Are they destined to replace artists, or will they stay confined to the role of tools at the service of augmented creativity? These questions are the topics of debates. One thing is certain, the transmission of creativity, a notion intrinsically linked to human nature, to machines, is a huge challenge for machine learning!

Art and science are often pitted against each other. Yet, art seeks also to describe the world, and science contains a creative and imaginative part. Art in all its forms injects new ideas, which inspire researchers and engineers. Film, literature, music, etc. show us new possibilities both from the point of view of the technologies themselves as well as from that of their uses and impacts on society, they often harbor solutions to solve very real engineering problems.

In the end, every technology begins in the imagination and imagination is the foundation of art and creativity, therefore AI and Art have the same foundation, but let's hope that in the future Art will not merge to much with AI, because Art, especually good art is one of the highest achievements of mankind and human spirit.

AI and cultural heritage

In this section we will present some fine examples of AI usage and interventions in cultural heritage. The European RePaIR (Reconstructing the Past: Artificial Intelligence and Robotics) project aims to develop a robotics system boosted by AI that is capable of recreating shattered artefacts, such as amphora or frescos. The idea is to build a robot equipped with mechanical arms, which scans fragments, recognizes

them, and assembles them, handling them with care thanks to advanced sensors. The first to benefit from this new method is none other than the archeological site of Pompeii in the south of Italy. Two world-renowned frescos, thousands of pieces of which are currently in storage, are being restored.

Advanced imaging technologies, such as X-ray radiography, infrared reflectography, and spectral scanning, when combined with artificial intelligence (AI), enable a comprehensive and non-invasive analysis of artworks, uncovering visual information imperceptible to the human eye. These techniques are particularly valuable in revealing compositional changes made by artists during the creative process, known as pentimenti, where elements may be added, removed, or modified. In other cases, entire sections or even complete works, may have been repainted by the same or another artist. Through the examination of these alterations, art historians and conservation experts gain critical insights into the materials, techniques, and working methods of the artist, refine authorship attributions, and, in some instances, uncover previously unknown masterpieces.

One notable example is the hidden painting The Lonesome Crouching Nude by Pablo Picasso, which lay concealed beneath another of his works. In 2021, researchers at University College London used X-ray imaging to reveal the obscured composition and subsequently reconstructed it with the aid of AI and 3D printing. A deep learning model, trained on a dataset of Picasso's Blue Period artworks, was employed to learn and emulate his distinctive stylistic features. Upon completion of the reconstruction process, the painting was physically printed onto canvas, demonstrating the capacity of AI not only to analyze but also to materially revive lost or hidden elements of art history.

Some examples of AI generated art that attracted attention of general public and experts

Artificial intelligence (AI) tools developed for artistic production, such as Stable Diffusion, Midjourney, DALL·E 2, and Adobe Firefly, are gaining substantial popularity within creative industries. Despite their growing accessibility, the process of generating compelling visual content through these platforms is often more complex than generally assumed. Achieving aesthetically impactful results that align with high artistic standards entails a creative process that may span several hours, even if it differs fundamentally from traditional artistic practices. As Nir Eisikovits, Professor of Philosophy and Director of the Applied Ethics Center at the University of Massachusetts, and Alec Stubbs, Ph.D. in Philosophy at UMass Boston, assert in their article published in The Conversation, "There's no separating ideas and execution," highlighting the inseparability of conceptual intent and its realization in AI-assisted artistic endeavors (Eisikovits & Stubbs, 2023). Nevertheless, technical innovation is offering artists more space to concentrate on concepts and the messages they wish to convey, rather than on technical difficulties and time constraints.

In 2018, three French students from an arts-collective named Obvious produced a painting entitled *The Portrait of Edmond de Belamy* using an algorithm that identified common features in 15,000 works from the 14th to the 20th centuries. The painting auctioned by Christie's in New York sold for a whopping $432,500 (Hitti, 2018).

In 2023, German artist Boris Eldagsen sent shockwaves through the world of

photography. The winner of the Creative category of the prestigious Sony World Photography Award refused to accept his prize for a surprising reason: his haunting 1940s style, black and white portrait of two women from different generations was not in fact a photograph, but an image generated by artificial intelligence. "I wanted to test to see if the world of photography was ready to manage the intrusion of AI in international competitions. Clearly, it is not," he explained (Hello Future, Creation, restoration, music: artificial intelligence tools in the arts, 2023).

The event which astonished the artistic community speaks volumes about the creative capacities of AI, definitively demonstrating that the world of art has not escaped the tidal wave of change ushered in by artificial intelligence. Today's algorithms have now shown that they can not only write poems, but also compose music and even produce paintings with help from robots.

Integration of AI into current marketing practices

Artificial intelligence's (AI) diverse character is demonstrated by the way it is revolutionizing several fields, such as marketing, cultural heritage, and the arts. By enabling generative art, interactive installations, and algorithmic composition, artificial intelligence (AI) tools have revolutionized traditional creative processes and opened new avenues for artistic creation and design. AI-driven tools help with style-based restoration, digital archiving, and artifact reconstruction, increasing the longevity and accessibility of historical works. This same technological infrastructure also extends to cultural heritage preservation. AI's potential to simultaneously spur innovation, democratize access, and reshape disciplinary boundaries is demonstrated by its convergence with these disparate but related fields. Together, these uses highlight AI's potential as a cultural force that shapes art production, cultural preservation, and consumer engagement, in addition to its potential as a technological tool.

Furthermore, AI is essential to the marketing industry because it makes data-driven decision-making, automated content creation, and hyper-personalization possible. With today's marketing environment marked by increasingly dynamic technological development, artificial intelligence (AI) has become a pivotal driver transforming the way business directly connects with its marketplace. Its usage is no longer an add-on but an intrinsic aspect of contemporary marketing strategy. Artificial intelligence allows marketers to recognize target groups with unprecedented accuracy by utilizing sophisticated analysis patterns, facilitating real-time, individualized communication design. Also, the pandemic has accelerated the development of the creative economy, at the same time putting megatrends such as digitization in the spotlight. In the era of crisis and rapid globalization, many leading countries have recognized the importance of the creative economy not only as a segment of business that increases value but also as a key field of the future where "young creative talents play" (Milovanović & Dušanić-Gačić, 2024).

According to Milovanović and Novaković (2025) with predictive analytics, AI enables forecasting of customer behavior, thus enabling hyper-personalized marketing based on personal needs and interests (Milovanović & Novaković, 2025). Efficiency and speed of decision-making in marketing departments are greatly improved by automating activities like data analysis, content creation, and ad optimization. One of the most important aspects of AI marketing is its continuous ability to learn and adjust

according to changes in market conditions and customer behavior (Kotler, Kartajaya, & Setiawan, 2023). AI tools facilitate machine-based interaction with the customer through chatbots and virtual assistants, which provide personalized product suggestions, information, and assistance throughout customer journeys. All this greatly enhances customer experience as well as operational cost optimization.

Targeted ad algorithms enable ads to reach certain users at exactly the right moment, thus enhancing message relevance and campaign performance. Additionally, AI solutions are utilized to condition content for voice search, thus promoting brand discoverability in digital media. In contemporary customer relationship management (CRM) solutions, AI plays a role in creating advanced loyalty programs and optimizing customer relationship management by analyzing customer actions and behaviors in depth. AI also makes it possible to generate content across digital mediums, ranging from text to imagery and video content, to create uniform as well as contextual brand messaging. Besides this, marketing practitioners make use of AI to monitor the emotional impact of campaigns, understand users' sentiments, and adjust messaging based on emotional triggers. All this makes their emotional connection with consumers much more powerful. With voice-controlled devices becoming increasingly ubiquitous and real-time bidding algorithms becoming more common in digital marketing, there can be little doubt but that AI's role in marketing will only increase going forward. Its ability to analyze immense volumes of data and generate highly accurate insights constitutes a virtual business imperative in the digital economy(Milovanović, Dušanić-Gačić, & Novaković, 2024).

Finally, marketing AI integration does not come as a byproduct of future technological progress so much as a reflection of a larger shift toward more customer-centric, agile, data-driven business models. Business organizations embracing the potential of AI technologies and implementing them as an integral part of their business strategy will gain a compelling advantage in business in the decades ahead (Milovanović & Novaković, 2025).

CONCLUSION

Artificial intelligence is a vital and strategic technology that is changing the society and many industries. „However, the current regulation of modern technologies is already lagging behind worldwide" (Luknar, 2024).The very first law that deals AI by Europe Union at the end of 2023. This law preceded by numerous directives and (ethical) guidelines that have no legal binding. So, to regulate and harmonize AI there should be a sort of international law, that is updated every year, because the number of issues upon AI is growing and there are no clear answers.

The production, perception, and distribution of art have all changed significantly because of the convergence of artificial intelligence and the arts. By using machine learning, big data, and generative models, artificial intelligence (AI) has made it possible for both experts and amateurs to create music, images, texts, and designs. These tools expand creative possibilities and increase productivity, but they also bring up philosophical and ethical issues about originality, authorship, and the nature of creativity. Machine-assisted storytelling, algorithm-generated visual art, and AI-finished symphonies are a few examples that highlight the possibilities and difficulties of this technological revolution. The limits of artistic expression are being pushed by genera-

tive models like GANs and CANs, which now create works that are indistinguishable from human creations.

AI systems are capable, but they lack the contextual awareness and emotional nuance that come from human experience. AI has also shown promise in the preservation, restoration, and reconstruction of historical artifacts in domains like cultural heritage.

Simultaneously, the use of AI in marketing has made it possible to implement data-driven, hyper-personalized strategies, which has completely changed how customers interact with brands. AI is gradually but fundamentally transforming marketing by enabling hyper-personalization, real-time decision-making and more efficient allocation of resources. All this leads to stronger and deeper consumer engagement and increased brand loyalty. Using advanced data analytics, emotional intelligence tools and adaptive communication models, AI empowers marketers to go beyond traditional segmentation and develop interactive and responsive campaigns. It is an unavoidable conclusion that artificial intelligence is becoming an indispensable element of modern marketing systems, and its integration signifies not only technological progress, but also a paradigm shifts towards business strategies, which are based on data and focused on the customer. A balanced approach is necessary to guarantee that human creativity stays at the forefront as AI becomes more and more integrated into the arts, marketing, and culture. In the end, AI should be seen as a potent instrument to enhance creative and expressive expression rather than as a replacement for the human spirit that drives genuine innovation.

AI art tools, programs, algorithms and generators may provide for most amateur users, but the blurring of creative and ethical boundaries is leaving many artists and designers raging against the machine. Also, there is a concern that is gaining intensity: will AI replace some positions in creative sector and arts, in simple words: will AI replace artists and designers because machines could reach a point at which they are truly creative? And questions that follow: How could machines tackle the conceptual turn in contemporary art movements? What role could they have in helping us to understand "good taste" and "bad taste"?

LITERATURE

Anantrasirichai, N., & Bull, D. (2022). Artificial intelligence in the creative industries: a review. *Artif Intell Rev,55*, 589-656. https://doi.org/10.1007/s10462-021-10039-7

Eisikovits, N., & Stubbs, A. (2023, January 14). *ChatGPT, DALL-E 2 and the Collapse of the Creative Process*. Retrieved 28, March from LiveWire: https://livewire.thewire.in/livewire/chatgpt-dall-e-2-and-the-collapse-of-the-creative-process/

Elgammal, A., Liu, B., Elhoseiny, M., & Mazzone, M. (2017). CAN: Creative Adversarial Networks-Generating "Art" by Learning About Styles and Deviating from Style Norms. *International Conference on Computational Creativity (ICCC)* (1-22). Atlanta: Rutgers University.

Fulde, V. (2021, october 10). *Beethoven's 10th Symphony completed by AI. This is how it sounds*. Retrieved 29, March from telekom.com: https://www.telekom.com/en/media/media-information/archive/beethoven-s-10th-symphony-completed-by-ai-633060

Hello Future, O. r. (2022, June 3). *Artistic creation and hybridization in the age of the Internet*. Retrieved 05, April from hellofuture.orange.com: https://hellofuture.orange.com/en/interactive/new-technologies-pushing-the-boundaries-of-art#artistic-creation-and-hybridization-in-the-age-of-the-internet

Hello Future, O. r. (2023, November 14). *Creation, restoration, music: artificial intelligence tools in the arts*. Retrieved 03 April from hellofuture.orange: https://hellofuture.orange.com/en/artificial-intelligence-to-serve-art/

Hello Future, O. r. (2024, January 15). *Video games: AI paves the way for a new generation of visual content*. Retrieved 02, April from hellofuture.oragne.com: https://hellofuture.orange.com/en/video-games-ai-paves-the-way-for-a-new-generation-of-visual-content/

Hitti, N. (2018, october 29). *Christie's sells AI-created artwork painted using algorithm for $432,000*. Retrieved 28, March from dezeen.com: https://www.dezeen.com/2018/10/29/christies-ai-artwork-obvious-portrait-edmond-de-belamy-design/

Langdon, M. (2014). *The work of art in a digital age: Art, technology and globalisation (Illustrated ed.).* Springer.

Luknar, I. (2024). Artifical inteligence as a challenge. *Progress*, *5*(2),17-24. doi: https://doi.org/10.5937/napredak5-52577

Kotler, P., Kartajaya, H., & Setiawan, I. (2023). *Marketing 6.0: The Future is Immersive.* New Jersey: John Wiley & Sons.

Manovich, L. (2023). AI Image Media through the Lens of Art andMedia History. In: IMAGE. *Zeitschrift für interdisziplinäre Bildwissenschaft. Generative Imagery: Towards a 'New Paradigm' of Machine Learning-Based Image Production, 19* (1), 34-41. DOI: https://doi.org/10.25969/mediarep/22323

Manovich, L., & Arielli, E. (2024). *Artificial Aesthetics: A Critical Guide to AI, Media and Design.* Retrieved 30, March from manovich.net: https://manovich.net/index.php/projects/artificial-aesthetics

McLuhan, M., & Lapham, L. (1994). *Understanding Media: The Extensions of Man.* Massachusetts: The MIT Press.

Miller, B. (2020). All of the Rules of Jazz: Stylistic Models and Algorithmic Creativity in Human-Computer Improvisation. *MTO a Journal or te Society o Music Theory, 26*(3), 1-26.

Milovanović, M., Dušanić-Gačić, S., & Novaković, V. (2024, September 20). *Marketing Through the Prism of Time: Traditional, Digital and AI – What's Next?* In MES 2024: 10th International Scientific Conference Media and Economy. Bosnia and Herzegovina, Banja Luka (193-201). Higher Education Institution Banja Luka College, Banja Luka, Republic of Srpska, Bosnia and Herzegovina. UDK 339.138:004.8, https://doi.org/10.7251/BLCZR0723193M

Milovanović, M., & Novaković, V. (2025). *Upravljanje preduzetničkim poduhvatom: savremeni pristupi marketinga.* Banja Luka: Univerzitet Apeiron.

Milovanović, M., & Dušanić-Gačić, S. (2024). Research on Changes in the Creative Industry of Bosnia and Herzegovina with a Focus on Theaters and Cinemas. *SAR Journal - Science and Research*, *7*(2), 120-127. https://doi.org/10.18421/SAR72-08

Shaffi, S. (2023, January 23). *It's the opposite of art': why illustrators are furious about AI*. Retrieved 29, March from theguardian.com: https://www.theguardian.com/artanddesign/2023/jan/23/its-the-opposite-of-art-why-illustrators-are-furious-about-ai

Wilde, L. (2023). Generative imagery as media form and research field: Introduction to a new paradigm. *MAGE: The Interdisciplinary Journal of Image Sciences, 37*(1), 6-33. https://doi.org/10.1453/1614-0885-1-2023-15446

Xue, A. (2021). End-to-End Chinese Landscape Painting Creation Using Generative Adversarial Networks . *IEEE Winter Conference on Applications of Computer Vision (WACV)* (3863-3871). Viral conference: Curran Associates, Inc.