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Title	The Voice of the Artist in the Age of the Algorithm: Ethically Aligned Design for Artists
Authors	Clancy, Martin;Çetin, Buse;Kg, Rachana;Lima, Eleonora;Osipov, Artur;Pedigo, Emileena;Roddy, Stephen;Treusch, Pat;Tweed, Rebekah
Publication date	2022
Original Citation	Clancy, M, Çetin, B, Kg, R, Lima, E, Osipov, A, Pedigo, E, Roddy, S, Treusch, P & Tweed, R 2022, The Voice of the Artist in the Age of the Algorithm: Ethically Aligned Design for Artists. IEEE SA Ethically Aligned Design for Autonomous and Intelligent Systems (AIS), IEEE.
Type of publication	Report
Rights	© 2022, IEEE. This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 United States License. - https://creativecommons.org/licenses/by-nc/4.0/
Download date	2026-10-23 02:58:24
Item downloaded from	https://hdl.handle.net/10468/18587

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In collaboration
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THE VOICE OF THE ARTIST IN THE AGE OF THE ALGORITHM

Dr. Martin Clancy and Rebekah Tweed

Ethically Aligned Design for Artists

IEEE

TABLE OF CONTENTS

INTRODUCTION **3**

Purpose 4

BUILDING A BRIDGE BETWEEN SOCIETY AND TECHNOLOGY **5**

Technology, Society, Art 5

Making Sense of AI: Art as a Public Forum 5

The Black Box Problem 7

HAVE ARTISTS LOST THEIR HALO? CHANGES TO THE CONCEPT OF AUTHORSHIP **8**

Intellectual Property and AI: Music as a Case Study 8

Beyond Human 9

Collective Intelligence and Distributed Authorship 10

ETHICS & ECONOMICS: CAN WE HAVE IT ALL? **11**

AR/VR: Artists' and Commercial Actors' Roles and Responsibilities 11

Opportunities for Inclusiveness 12

CONCLUSION **13**

Contributors 14

Works Cited **15**

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INTRODUCTION

On Wednesday, 30 October 2019, an inconspicuous notice was published in the U.S. Federal Register. Placed between announcements for The Commodity Futures Trading Commission and The Mid-Atlantic Fishery Council, The United States Patent and Trademark Office invited public comment on thirteen questions regarding the possible impact of Artificial Intelligence on the creation of Intellectual Property. Subjects ranged from "should it be legal to feed an AI on training sets of human authorship?" to whether anything other than natural persons might have the right to copyright protection.

While the regular and mundane placement of the communication indicates how routine such enigmatic puzzles had become by the autumn of 2019, many of the thirteen questions have perplexing implications for artists operating throughout the creative industries and elicit a considerable amount of thought and deliberation. Such legal entanglements require the immediate engagement of the global creative community and allied stakeholders, as the economic activity generated directly or indirectly by the commercial exploitation of a range of expressions of Intellectual Property (IP) (including copyright, trademarks, design) is a significant contributor to employment worldwide in the arts and creative industries.

The economic significance of these entanglements becomes evident once one considers the variety of jobs produced by an Ariana Grande tour, for instance (Frankenberg). The range of professions involved in this, the original gig economy, from songwriter to stage manager, is a straightforward commercial expression of the various trademarks, copyrights, and trade dress attached to the artist.

Many in the music ecosystem recall that, though Napster was a liberating force for the accessibility and availability of recorded music content, the same technology that contributed to establishing the world's first trillion-dollar company—Apple, Inc.—would inadvertently also decimate the middle classes of the music industry (Taplin).

When reviewing the apparent destabilizing possibilities of AI and IP in the creative arts, the old reliable Hollywood truism that "nobody knows anything" remains prescient despite the myriad benefits of algorithmic prediction (Debruge).

However, if the arts community fully engages with this emerging technology, the potential to transform the creative industries toward a positive human-centered outcome is possible and workable. As such, as part of the mission laid out by IEEE's *Ethically Aligned Design, First Edition (EAD1e)*, this committee of The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems is also contemplating "what we—the techno-scientific community and every group involved with and/or affected by these technologies—could do for society to advance in positive directions" (EAD1e, p. 5) through the use of AI in the creative arts.

Artists have always pushed the boundaries of what technology can be used for, creating opportunities for society at large. AI can be regarded as a potentially powerful resource for artists in terms of creative and economic opportunity. Therefore, this paper wishes to consider new ways of making art with AI and explore new ways of understanding and engaging with AI through the arts.

Before delving into such issues, a clarification regarding what we mean by the term "arts" is necessary. As it is not our purpose to explore unfathomable philosophical questions about what may constitute art, we wish instead to follow the inclusive definition provided in the IEEE EADv2 report, which defines art in this way: "Throughout history, the arts have been a means for human expression and often healthy escapism, as well as for social and political commentary." Therefore, the issue discussed in this paper pertains to the impact of AI on and the use of AI to generate any form of artistic creation, from fine arts to literature, visual arts, video games, film, and music.

Finally, a note on citations: This committee chose to use MLA citation to use the artists' full names.

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Purpose

Artificial Intelligence Systems (AIS) are now capable of generating work that is indistinguishable from that made by humans. In 2018, when Christie's auctioned a painting created with generative adversarial networks (GANs) for the first time for $432,500, it gathered international headlines (Cohn). However, by March 2021, the Hanson Robotics' android, Sophia, would auction NFT artworks for €688,000 and its programmed curiosity would be contained within the context of the Non-Fungible Token debate as opposed to issues related to non-human creativity (Fung).

AI-generated art with demonstrable social and commercial value may not just challenge the artistic business model as the aforementioned IP destabilizer, but could entirely replace human artists.

There is a general preoccupation with, and growing lively debate around, AI art precisely because people think of art as a quintessentially human product, a manifestation of the human core that art embodies—creativity, expression, identity, and sympathy; therefore, the prospect of AI usurping human artists concerns not just artists but the entirety of society.

The consequences of an AI capable of producing a painting, a song, or a novel—all things already achieved—are both ethical and legal. Indeed, what can be the cultural implications of entrusting the work of imagination to an AI system? What ethical values should guide such artistic creations, given that corporations almost universally control software and platforms? The advancements in AI systems and their application to artistic creation have sparked a critical debate around the concept of authorship. From a legal and economic perspective, who owns the rights of an AI-generated creative product? Who is/are the author(s)—the artist, the software engineer, the AI system, and/or the corporation behind it?

This paper identifies several significant ethical, social, political, and economic challenges presented by AI for the creative and technical communities and policymakers and standard-setting organizations; these challenges arise around these spheres:

The Social

The Legal

The Economic

The authors of this paper are at the intersection of these various identities that shape and are impacted by this transformation of the artistic ecosystem as a consequence of AI. Building on the authors' experiences and standpoints, this paper attempts to sketch an initial landscape of AI's high-level questions and challenges to the creative arts.

At this stage, rather than providing principles or guidelines, the paper seeks to initiate a meaningful discussion around these issues to collectively design technologies, processes, and ecosystems that protect and prioritize artists globally and to subsequently propose a few relevant recommendations.

This committee considers diving deeply into these questions through artwork and other participatory methods in the later stages of this committee's ambition. However, in the meantime, we borrow the arts' core attitudes and apply them to this reflection: curiosity and critical thinking. We believe these driving forces of artistic practice are all the more needed to deal with the complexity of our collective present and future creatively.

The acceleration of movement toward increasingly digital environments as a result of the global COVID-19 crisis has made extremely clear that digital tools and platforms can be crucial to keeping artists in business; indeed, when the majority of musicians have been forced, by the decimation of the music ownership model and the rise of the streaming model, to rely on touring for their livelihoods, the abrupt removal of this income stream has been devastating for many. The IEEE *Ethically Aligned Design, Version 2* (EADv2) states that, "A/IS has the potential to dramatically impact and permanently alter the methods and tools by which artists earn their living." For better or for worse, the same belief guides this paper.

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Technology, Society, Art

Art is an ideal intercessor between society and technology: translating concepts and ideas, warning about risks, thinking creatively, and pushing for innovation. Art can operate as a de facto space for reflection since it makes us see what usually goes unnoticed: the frame around a painting, the silence before a concert, the opening titles before a movie. These carve a particular space and ask for our undivided attention toward what we are about to experience. Art can likewise render visible to the public, and thus understandable and subsequently subjected to possible criticism, what is often invisible through any other critical lens—what algorithms normally do without anyone noticing.

AI systems do not exist in a vacuum. They reflect their creators' dominant societal norms and practices; so when an AI system produces art, the social and technological are necessarily entangled. Technological and artistic objects share the shared nature of artifacts created by human ingenuity, at the same time tangible and loaded with signs and meanings, which in turn shape and influence the sensitivity and perception of the communities of people interacting with them.

Art can offer people a chance to connect interactively and engagingly with AI's problems and practices. The ever-present dialogue between arts and technology must be recontextualized for AI. This poses new challenges and opportunities for artists and requires reconsidering art practice to engage with society and with technology in the age of the algorithm.

Art can offer a chance to connect

interactively and engagingly with AI's problems and practices.

Making Sense of AI: Art as a Public Forum

NFTs, or non-fungible tokens, have emerged, generating excitement around a new blockchain-enabled method of buying and selling digital artwork (Clark). Holly Herndon teamed up with Mat Dryhurst for an NFT series entitled "DAO" (decentralized autonomous organization). Herndon told the NFT platform Foundation about DAO, "to make it more layered, we've also been training a bunch of neural networks on the (series' central text by Reza Negarestani called 'Crossing the Interface') to animate different scenes" (Howard).

An earlier example of art creating a public forum for explorations on AI came on 28 December 2018, when Charlie Brooker, creator of the British television series Black Mirror, released an interactive film, *Black Mirror: Bandersnatch*, in "choose your own adventure" style, letting viewers personalize their own path among over a trillion possible permutations. Bandersnatch, released on an online platform relying on a content recommendation engine, likely did more for viewers' algorithm awareness than any scientific or educational source could (Damiani).

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These and other innovative ways that artists explore and engage with AI can foster social debate and offer a space for critical reflection aimed at widening people's perspectives on artificial and human intelligence.

Artists can fully utilize this newly afforded attention granted by a momentarily invested public and turn their work into a virtual public space where discussions and negotiations around AI are hosted.

For Oglala Lakota performance artist Suzanne Kite, AI enables her to make sense of an increasingly virtual existence by examining its significance for her indigenous identity, which is rooted in connectedness to the land in direct tension with the disembodied nature of a persistently digital daily life (Shaw).

Kite explores contemporary Lakota epistemologies through research-creation, computational media, and performance practice by developing a body interface for movement performances, carbon fiber sculptures, and immersive video and sound installations. Kite's work involves, as noted in the Independent Curators International website, "a hair-braid interface which changes a synthesizer, which sends sound to machine-learning software, which manipulates the video, affecting each shape as it forms and forms and forms."

More to the point, an arts perspective integrating and interacting with AI can help us question the underlying social meaning and power structures anchored in AI, and mainly to **deal with the questions of representation and politics of classification inherent to AI**, like Joy Buolamwini's spoken-word piece "AI, Ain't I a Woman?" (Reynolds).

This art installation on bias in image training, "Training Humans" (2019) by Kate Crawford and Trevor Paglen sought to unveil and criticize AI gender and racial prejudices, while Stephanie Dinkins' AI-powered art projects and installations evoke the complex intersection of AI and race in ways that are intended to provoke discussion about bias and AI, as well as topics like data sovereignty and social equity.

The work of such artists can create space for dialogue and identify ethical blind spots in AI while emphatically illustrating just how essential the human artist is in providing the discourse and applied insights into these critical nuances between humans and AI.

As we are claiming the role of artists in fostering a social debate around AI, we acknowledge that these debates are not identical around the world and that there are disparities in global access to technology. While smartphones are increasingly ubiquitous (though still, only 45% of the world population has a smartphone in 2020), there is a growing movement to expand access to the high-speed technology (O'Dea).

To generalize what is currently happening in the Global North—especially in the wealthiest communities—and assume equal/mass access to digital technologies everywhere would be a mistake. Indeed, marginalized communities are often absent in AI system development and discussions, which IEEE is attempting to address with a couple of standards: IEEE P2985™ (Draft Standard Taxonomy for Responsible Trading of Human-Generated Data) and IEEE P2980™ (Draft Recommended Practice for Provenance of Indigenous Peoples' Data), as we seek a more thorough global understanding of AI: who the standard user is, what her needs and values are, and what the context is in which the technology will be used.

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The Black Box Problem

In the entertainment, arts, and cultural sectors, the artist's ability to take ownership of, interact with, and wield a piece of technology is paramount to the creative process. Hence the question becomes, is it possible to develop systems for the entertainment, arts, and cultural industries that allow artists to understand better and operate the AI systems with which they work?

One pertinent example is video games featuring non-player characters (NPCs) with whom the human player is supposed to interact. A research team of computer scientists has studied the problems that have arisen from NPCs created by a Black Box AI: Their behavior is incomprehensible for the human player, making for a frustrating gaming experience. They then propose to adopt explainable AI to make the interaction more accessible and more fun (Cfr. Ehsan, Upol, Tambwekar, Chan, Harrison, and Riedl).

Much of the current AI boom is driven by advances in modern deep learning technologies that also have the potential to revolutionize the entertainment, cultural, and arts industries by letting anyone create deep fake avatars, fully orchestrated songs impossible to distinguish from original recordings, or other ways that threaten to sideline or render obsolete human artists.

However, deep learning algorithms are complex and not well understood, even by those who build them. As a result, in many cases, end users cannot fully grasp how deep learning applications operate or why they are so effective.

This is called the Black Box problem.

The Black Box problem in machine learning calls for a renewed commitment to Human-Computer Interaction (HCI) to ensure transparency and accountability. We learn about the world around us, our environments, both natural and human-made, and the organisms and artifacts that populate those environments through interaction processes. We also learn about technologies, what they can be used for, and how they operate through interaction. To tackle the Black Box problem, many are now calling for what is referred to as Explainable AI (XAI), meaning a set of methods and techniques ensuring that human agents always have a workable understanding of what that system is doing, how it works, and how they can interrupt the process in case of immediate danger.

There are multiple reasons why XAI is essential. Where AI systems cannot be explained, they may cause harm relating to psychological, data, or property, beyond and including physical damages. Manufacturers, too, have an interest in increasing the explainability of AI systems. If a system's algorithm is unknowable even to its own manufacturer, then Research & Development takes on a lack of clarity that can harm profits and consumer trust. Specific to an artistic context, solving the Black Box problem will increase artists' ability both to wield technology in the creation of artistic works satisfactorily and demystify and critique AI for society at large.

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Intellectual Property and AI: Music as a Case Study

The thirteen questions as mentioned earlier posed by the United States Patent and Trademark Office regarding AI and Intellectual Property reveal a potentially gnarly regulatory landscape for the arts. Though IP law varies around the world, one concept unites all IP traditions. IP is a reward, deemed to be in the public good, used to reward human creators' skill and efforts ("sweat of the brow"), defined by territory, limited through time, after which the work enters the public domain and is available to be used by anyone without charge or limitation.

There is little dispute that IP laws need to be overhauled. As the 2020 Berlin Copyright conference presented, there is thankfully no shortage of ideas to attend to the shortfalls of existing copyright for the creative arts (Vogler). Such remedies, however, require research testing to ensure that any new development successfully harnesses the stated good intention.

As reported by *The Verge* in December 2019,

> **"The USPTO only gets a few responses from the public when it makes these types of inquiries, with the bulk coming from law firms, companies and various interest groups" (Deahl).**

It is, therefore, essential that the broader arts community is represented as a vocal interest group and that recommendations such as the IEEE EAD1e report's call for resisting AI's legal personhood be heeded (p. 214).

Additionally, the IEEE EAD1e chapter on Law provides a recommendation regarding legal personhood that is instructive for the arts: "Manufacturers and operators should learn how each jurisdiction would categorize a given autonomous and/or intelligent system and how each jurisdiction would treat harm caused by the system" (p. 256).

Artists organizations, unions for various artistic disciplines, and other interested entities or "jurisdictions" should define the relevant harms such as threats to revenue and livelihood and threats to the artist's ability to pursue one's own creative passion. Creative artists and multi-partner stakeholders need to engage in this discussion in a sector-specific consideration that actively seeks to shape the global debate on IP; otherwise, "the horse will have flown the coop," in the words of this author's machine learning poet AI.

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Beyond Human

The IEEE EADv2 report warns against the possibility that AI can realistically "copy/emulate/hijack creative authorship and intellectual and creative property concerning both human and/or AI-created works." Some recently published articles have indeed expressed concern for a world in which human artists are rendered obsolete by the advent of AI (Wilkinson). However, the most pressing questions have to do with economic and ethical issues rather than the threat to creativity.

The datasets used in the development of modern AI systems raise many ethical questions. Software and algorithms of technologies like Deepfake and Speech2Face were created to inspect possibilities of generative models where the target human participation is skipped. Innocent desire to explore the options created an environment where a future artist or a company can create art without the consent of the subjects portrayed. Free access tools like Faceswap, DeepFaceLab, or DeepFake-tf are indeed open source software and can be used by anyone.

By creating a highly versatile and exciting tool for an artist, this technology risks amplifying problems concerning authorship and hijacking intellectual property.

Several concerns arise:

How do we ensure artists receive the income and recognition they deserve for their work?

Should there be any supervising tools to monitor the ethical aspect of the technology created and the dataset in use?

Another facet to consider when dealing with human/machine authorship is that AI systems are currently primarily conceived in anthropomorphic terms: They are designed and generally understood to mimic human behavior and display human-like capabilities and attributes, as well as "being designed to simulate emotions in their interactions with humans in ways that will alter our societies" (EAD1e, p. 92). This human-centric perspective offers opportunities for artists but also raises some problematic issues.

When it comes to the ethical aspects, to think of AI as human-like can be misleading because it imposes anthropomorphic expectations on the technology. The human user—in this case, the human artist—needs to take full accountability for her work. This is why solving the Black Box problem is crucial, as it is also paramount to ensure that artists, computer engineers, and companies are equally involved in designing and implementing software. Taking agency away from the AI technology and re-distributing equally among the human actors involved can help guarantee transparency, fairness, and responsibility.

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Collective Intelligence and Distributed Authorship

Generally, the analyses of the role of the human artist are shaped around the tension between the fear that AI systems can equate to human creativity and thus eventually make it redundant on the one hand and the conviction, instead, that AI art cannot exist without a conscious mind behind it.

While this puzzle is impossible to solve outside personal convictions and specific artistic practices that apply this procedure, there is another way in which AI is changing our understanding of the role of artists beyond the opposition of the human vs. the artificial. Precisely, there is a shift from the author's concept as an individual, voicing their own feelings and ideas, to a more inclusive, collaborative, and dispersed definition of authorship as the expression of collective intelligence. This change is spelled out in the IEEE EADv2 report, which states that "A/IS frameworks used to generate artworks are becoming more accessible, which raises questions of the role of the human artist and ethical issues of authorship and creative rights."

The democratizing effect of questioning the traditional idea of the author as a lonely creator possessing a particular sensitivity and a unique creative spirit has been advocated well before the advent of AI arts (Foucault). However, collective authorship has become increasingly likely with the growing ubiquity of AI-driven tools and modes of artistic creations.

The emergence of *collective intelligence*, meaning a collaborative effort between dispersed subjects who all contribute to problem solving and decision making, has been recognized in connection with the spread of IT and online networks (Jenkins). Collective creative intelligence is usually evoked concerning socio-political issues; however, it is evident how every artistic creation has more often been the product of collective consciousness as much as a single author's effort—from homage to borrowing to cultural appropriation.

The need to challenge the artist's idea as the sole author of their work and finally recognize the creative input of larger communities is an ethical claim increasingly pressing in our transnational and hyper-connected society. AI systems in arts could offer a tool to tackle this lack of recognition and help support a more democratic, collective idea of authorship. The usage of AI in the arts tends to draw together a diverse range of experts (from software developers to curators to more classically trained artists) into interdisciplinary creative teams, therefore questioning the artist's idea as a lonely maker. While such new tools provide artists access to and the opportunity to draw from collective knowledge and experience, it remains the case that, AI arts, relying on machine learning and data gathering, can be considered the product of a hive mind which inescapably will amplify existing bias and stereotypes.

Acknowledging this would not simply be fair but instrumental in creating a more inclusive and interactive artistic landscape. What has always been the case for any creative object—that it would not exist without the community in which the artist operates—becomes evident when using AI. The use of AI to serve collective intelligence has been advocated for tackling social issues, and the same can be said for the arts. AI in arts can support a more democratic and inclusive concept of authorship, recognizing the collective cultural capital behind any artistic object and fostering participatory creativity and community involvement.[1]

[1] A good example of this is Project IAQOS, an AI built with data provided by people living in the Rome multicultural neighborhood of Torpignattara with the intent to educate people on how to use AI, to foster community building, and develop artistic and educational projects.

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AR/VR: Artists' and Commercial Actors' Roles and Responsibilities

Virtual, non-human artists, such as the U.S. AI performer Lil Miquela or the Japanese vocaloid singing hologram and avatar Hatsune Mikco are now established parts of a new emergent music ecosystem. However, in July 2021 the Chinese social influencer Ha Jiang was noted as being the first virtual artist to be signed to a major recording label (Whet Records/ Warner Music Group) by UK's *Music Week* (Ingham).

Indeed, VRchat, a massive multiplayer online VR social platform released in 2014 in which players create 3D virtual avatars with which to interact, is today one of the most significant online communities where trends and challenges are controlled by the applications' algorithms, not the content creators. Thousands of people are communicating using their avatars. Artists, too, have taken advantage of the opportunity presented by these online communities. One of the first major artists to ever try the experiment was Duran Duran in 2006, when the band created an avatar presence in Second Life, allowing it to perform for its fans and interact with them. More recently, artists using the artificial environment of the computer game Fortnite to perform concerts include Marshmello in 2019, virtually attended by more than 10 million people (Marshmello), and Travis Scott in 2020, with more than 12 million viewers (TravisScottXX). Later the same year, The Weeknd partnered with WAVE XR to debut an augmented reality TikTok performance to a virtual audience of two million fans (Spangler).

These online communities and social network services are not simply tools for people to communicate or entertain themselves. They are also platforms used by companies to advertise their products and services. This situation creates the opportunity for commercial actors to administer and modify such platforms to their needs. The control exercised by companies, while it can bring economic advantages for artists using the same media and communities, can also conflict with their creative freedom and introduce a dangerous element of remote and often undisclosed control.

It is worth considering these scenarios and questioning which tools and strategies could guarantee artists' independence from commercial actors' interests. Two aspects need to be considered: creativity and freedom of expression, and artists' responsibility and duty of care toward their audience.

Regarding the latter, consider the hybrid nature of online platforms and communities. People participating in a virtual performance online could be at the same time gamers, potential customers, and users whose data could be harvested. This has always been true to a certain extent: Going to a movie theater often involves buying snacks, watching pre-movie ads, maybe even answering some customer satisfaction surveys. However, the convergence of plans is exponentially more subtle and omnipresent.

It should be of artists' concern about what kind of environment hosts their work and what type of experience they offer to their audience. Naturally, this has to be a shared responsibility among the commercial actors who need to be transparent, the users who need to stay informed, and the artists who need to be aware of the context within which they are working. Nobody would agree to perform in a theater without any security measures and putting the audience's well-being at risk. The same accountability should exist for digital spaces.

Consider, too, new technologies enabling a situation in which artists without the economic means or technological skills to update their presence are increasingly unable to compete, resulting in being pushed out of the market. Furthermore, even when able to comply with meeting their audience's expectations, this situation risks limiting their creative freedom.

As this situation continues to develop, there is a high risk that the privileged few will have increasing opportunities to gain economically from creating technologically advanced art. This might also lead to a loss of employment for those who cannot access or afford the necessary technology for their artistic creations to remain commercially competitive. Historically, of course, artistic expression has always been interwoven with technological developments. What makes the most recent examples of unsupervised machine learning content unique is that it is capable of autonomously producing creative content. If technology backed art is what gains (or is made to gain) a higher momentum among the masses, this will gravely disadvantage some artists.

Given that art is an integral part of human expression and experience, one must carefully consider how to create economic opportunities in this area while making these opportunities available to and inclusive of all, not just for the privileged few.

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Education systems could play a pivotal role in this, as it is in school that many people first experiment with creativity and have the chance to learn the necessary skills to engage with the new technology.[2]

Granting access to artists previously excluded from or not particularly favored by the system will mean a more diverse and inclusive art world. It has also been proven that inclusiveness and diversity is the most effective strategy against algorithmic bias. However, this will be possible only when AI inclusive design and global access to AI creative tools and outlets are ensured.

Finally, the current trend in advancements and applications of AR/VR will also force us to consider a scenario where people might prefer to live in virtual reality or a mixed reality world rather than in a purely physical world. The EADv2 report warns against the "possibility of commercial actors to create pervasive AR/VR environments that will be prioritized in the user's eyes/vision/experience." Indeed, since the advent of the World Wide Web, and especially since the creation of online environments capable of simulating everyday life situations, people have enthusiastically—sometimes *overenthusiastically*—taken part in these virtual communities.

Different artistic disciplines and forms are slowly embracing these changes in how art is created or experienced. The gaming industry has been an early adopter, and the fields of music, fine arts, dance, fashion, movies, and others are also quickly incorporating it into their creations. Some of these applications include: AR-enabled guided tours in museums; AR/VR enabled experience in/of concerts, music, dance; AR/ VR helped create music, dance, fine arts, fashion, sculptures, literature, and so on. AI is also being used in AR/VR to assist in the creation of art. These new areas of application open up a lot of new economic opportunities and the concerns mentioned earlier, and it is crucial to address the possible downsides of creating an increasingly mixed-reality world backed by AI.

Opportunities for Inclusiveness

Pairing AI with extended reality can provide artists with opportunities for better accessibility and inclusiveness regarding art's creation and fruition. It is again the EADv2 report that highlights this potential impact for people working in the creative industry by stating that, "Mixed reality presents unique opportunities for developers, artists, and story-tellers to both build upon and challenge existing modes of content creation, while helping to forge original tools and methodologies in the realization of new artistic media."

Indeed, improvements in AI and extended reality have the potential to reduce the need to master physical skills needed to create art. This is the case, for example, of Jeff Lewis, a VR and multimedia artist who was born with congenital amputation and who creates 3-D landscapes, objects, and characters using software that allows him to paint in 3-D space with VR. Similarly, VR headsets, as well as tactile and visual controllers, help musicians with disabilities to play and perform (Meireles and Schroeder).

Efforts made in this direction, combined with a potential increase in accessibility (along with the diversity of actors involved related to technology and its reduction), can substantially increase the number of people who can and will create art. This will create a virtuous cycle because a more significant and diverse pool of artists will demand better tools and software to serve their diversified needs. The availability of such technologies, in turn, will make it possible for human artists to gain monetarily from their AI and AR/VR-assisted art.

[2] On this subject, see Rick L.Garner (ed.), *Exploring Digital Technologies for Art-Based Special Education: Models and Methods for the Inclusive K-12 Classroom.* New York: Rutledge, 2019.

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CONCLUSION

Human artists of every discipline risk being replaced by AI systems.

Despite the promise and opportunity that AI offers creatively, artists face economic, legal, creative, and social pressures regarding authorship and copyrights, unequal access to new technologies and opportunities, misaligned goals from those of the corporate platforms delivering their artistic creations, and more.

Yet meaning—and its vital counterpart, criticism—originate from the human artist.

Therefore, the committee has three recommendations:

1. Artists should mobilize and collectively exert power to encourage and influence the development of human artist-centric AI systems.
2. The IP generated by artists should be respected by AI systems (for both commercial and non-commercial purposes).
3. AI systems in the creative arts should utilize human-centric principles and sustainable design whether commercially or non-commercially oriented.

First, the interconnected problems that arise around IP—from the legality of using works of human authorship in the training sets used to feed an AI to exactly how much human involvement should be required before a work qualifies for copyright protection, to the legal consequences for instances in which an AI system violates copyright, to questions of authorial contestations between the companies behind these artistic creations, the engineers who create the software, the artists whose works are included in the training sets, and the non-human AI systems that do the final works—are an illustrative example of the volume and knottiness of the legal issues that must be untangled regarding AI in the arts.

These and other questions are existential for professional artists. Since we all have a stake in the outcome of this and other processes and are organized, a multi-disciplinary approach is needed to ensure successful outcomes for human artists. Therefore, our second recommendation is that artists and arts-affiliated entities contain and collectively exert power to protect against the misaligned interests and priorities of other entities, including companies and organizations motivated by retaining revenue and harvesting data without meaningful consent. As an artistic community, we were not prepared when a governing body asked these questions of stakeholders. We must organize to be ready in the future.

Our second recommendation is that artists carefully consider the implications of extended reality on the arts, asking questions like: Does extended reality skew the professional playing field even further toward artists with the financial resources and access to explore these new technologies? Do artists have any responsibility to resist or determine the limits of a scenario in which people increasingly long to escape an ever more tenuous physical reality by seeking the sanctuary of extended reality? What kind of accountability do artists have to users of the platforms as the creators of the works on which these platforms are built? It is important to weigh these questions and risks against the rewards regarding inclusivity and how extended reality provides opportunities for disabled and socially disadvantaged people to more fully participate in the arts.

[3] Here an interview with Jeff Lewis about his work as an artist and disability-rights advocate: https://crosscut.com/2017/12/virtual-reality-jeff-lewis-disability-handicapable-art-seattle

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Finally, because meaning and criticism originate from the human artist, it is imperative to illuminate and critique AI systems themselves and make sense of AI's effects on society and critiquing the cultures in which any particular AI system arises.

Because art both mirrors and impacts society's values, art continues to be uniquely positioned to critique, challenge, and problematize society's binary conception of AI as utopic/dystopic. The arts have the opportunity to be instrumental in communicating alternate potentialities and issues with AI in readily understandable ways to society at large.

These recommendations are not intended to be exhaustive but are a means to initiate discussion and critical thinking around these issues, which is the stated intention of this paper. As such, we welcome feedback and input from the global arts community and appreciate your interest in engaging with these ideas.

This committee is excited to talk about the impact of AI on the arts and grow the community of people discussing these concepts. If you would like to join us and contribute to our ongoing work, reach out to the Executive Director of the IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, John C. Havens, at j.c.havens@ieee.org.

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