

**THE CREATION OF ARTISTIC MEDIA BY ARTIFICIAL INTELLIGENCE AND ITS
EFFECTS ON HOW HUMANS PERCEIVE CREATIVITY**

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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THE BEGINNING OF THE ARTIFICIAL INTELLIGENCE TAKEOVER

In March of 2023, the World Photography Organization announced the winners of their annual competition. Shortly after the announcement, the winner of the creative category turned down the award, as his submission had been generated by an artificial intelligence (AI) (O’Kane, 2023). Such an occurrence is the second time an AI-generated piece won a competition, the first being in September 2022 (Metz, 2022). Both pieces can be found below in Figure 1.



Figure 1: [Left] "Théâtre D'opéra", an award-winning AI-generated piece created for the Colorado State Fair's art competition (Metz, 2022); [Right] "Pseudomnesia | The Electrician", an award-winning AI-generated piece created for the World Photography Organization's annual photography competition (O’Kane, 2023)

Artificial intelligence is a double-edged sword because it both makes our lives easier while it replaces our independence. Technology can be described as a human means of interfacing with nature, while AI can be described as interfacing human learning with machine learning technology (Grba, 2022). Technology is meant to assist humans with everyday living, whether it makes life more convenient, more luxurious, or simply allows us to survive.

Technology has provided many advantages in the development of creativity. Artists and consumers can much more easily access, use, and create media today than ever before. Currently, the analog world is digitizing, allowing computers and devices to perform tasks humans once did. Traditional artists are able to create works using digital tablets and monetize through services such as Patreon (Conte & Yam, 2013) or non-fungible tokens (NFTs). Humans have become more connected through the metamorphosis from analog to digital media.

The introduction of highly advanced AI systems such as the generative pre-trained transformer (GPT) chat bot (OpenAI, 2022), has led humanity to a crossroad. Such an AI has been used both as a malicious weapon for scammers (Eliot, 2023) and a powerful educational tool in the classroom (Rid, 2023). Other AI, such as generative adversarial networks (GANs), can generate art indistinguishable from man-made works. Traditional artists are beginning to struggle when in competition with the vast processing speed of current technology and are therefore losing the spotlight. Software engineers have become prominent artists through machine learning and neural networks, thriving in the current environment of automated creativity.

The technical project, titled Whiplash, after the movie of the same name (Chazelle, 2014), is a device that automatically plays a drum to the beat of a song. The device uses a beat-detecting algorithm to take an audio input, parse out the beat of the input song, and output a beat signal. The beat signal is then fed into two servos that play a physical drum to the calculated beat. The project aims to assist musicians in their practice when a human drummer is not available. Further development on this device would involve individual drum tracking algorithms, providing the device the ability to replicate a drummer on a full-scale drum set. While the project currently does not contain any form of AI, it is a bridge technology with the

capability of replacing a human aspect of music. Such a piece of technology has major implications for the future of our ability as humans to practice creativity. The final iteration of the Whiplash drum device can be found below in Figure 2.



Figure 2: Whiplash Drum Device, this device is able to take in a piece of musical audio, parse out the beat, and play a physical drum to the beat of the song (Anselmo, 2022)

The primary concern of AI is the replacement of human beings by technology. Such an occurrence has already taken place in industries such as manufacturing, automotive, and sales (Flynn, 2022), with sights now trained on the creative realm. The endless expansion of AI is leading humanity to several futures. By placing such a situation into the theory of Actor-Network theory (ANT) (Latour, 1988), navigating the complexities of AI may become more manageable. The Actor-Network Framework is a theoretical approach to studying how people and non-human entities interact to shape social processes. The framework was developed by sociologist Bruno Latour in the 1980s as a way to study science and technology, but has since been applied to a

wide range of fields, including business, politics, and the arts (Latour, 1988). Actors can be people, objects, or technologies, and are viewed as active agents that have the power to influence each other. Relationships between actors are dynamic, and power is not fixed but negotiated. ANT emphasizes the importance of non-human entities as active actors, such as computer algorithms used in art. By studying these interactions, we can gain insight into the complex dynamics that shape social outcomes in various fields.

This paper will ask the following: How has artificial intelligence affected the way we perceive creativity? For most of human history, art was created solely by humans; however, AI-generated art has challenged the definition of “art” itself. New evolutions of creativity are always happening, such as with digital art and 3D animation. What makes AI different is that while someone programmed the AI to generate art, they are not directly interacting with the art itself. We must consider whether the AI or the programmer should be considered the “artist”. As the inventors of technology that threatens to replace our creativity, we must assess the level of this threat. By gathering human perspectives about AI-generated media, we can learn more about the position in which humans are situating themselves in preparation for the future of AI.

THE ENDLESS EXPANSION OF AI TECHNOLOGY

AI DEVELOPMENT AND COMPETITION

One of the first instances of automated visual art was Pask and McKinnon-Wood's 1953 "MusiColour" machine (Haque, 2007). The device included a digital interface that would produce a system of colored lights to play in unison with a live musician. Below in Figure 3 is an image of the MusiColour machine.

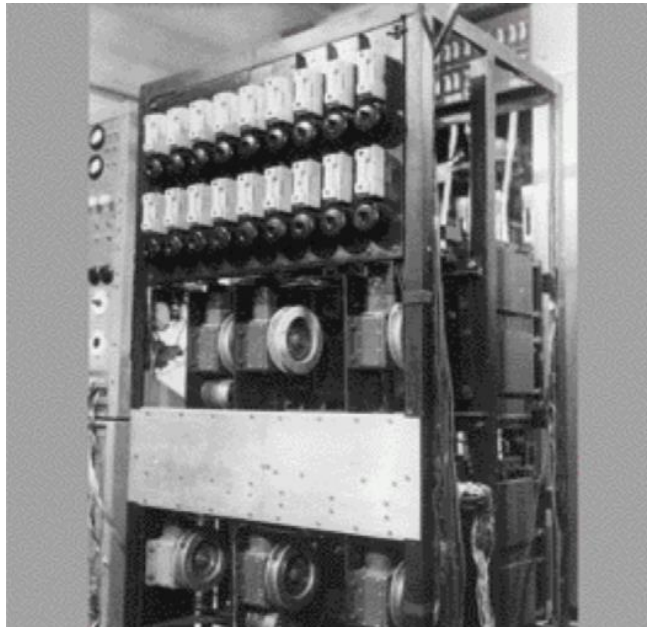


Figure 3: Pask's "MusiColour" Machine, this machine had the capability of displaying digital colors in unison with live music (Haque, 2007)

Continuing to 1957, the first machine learning algorithm was invented to play the game of checkers, known as the "Perceptron" (Foote, 2021). The algorithm was of the first to utilize artificial neural networks, designed to improve prediction accuracy of computers. Over years of research and development, automated visualization and machine learning were combined to create GANs in 2014 (Poltronieri, 2019). GANs are the AIs responsible for creating art, built from the infrastructure of algorithms that once served an entirely different purpose.

The primary idea behind the creation of GANs was to increase the robustness of machine learning techniques. Training an AI involves “...teaching it to properly interpret data and learn from it in order to perform a task with accuracy...” (AI DATA, 2021). While other AI train on datasets or text, GANs are trained on images. Since GAN models were being trained on sets of tens to hundreds of thousands of images, developers realized such models could also be used to generate new images. Researchers in NVIDIA used the opportunity to train a GAN model with human faces, producing some of the first AI-generated human-like portraits, as shown in Figure 4 below.



Figure 4: AI Generated Portraits, displayed are two portraits generated by NVIDIA Researchers during development of a machine learning model trained on human faces (Synced, 2019)

The generative models we see today were created soon after NVIDIA’s revelation. The DALL-E model was created as a submission for a coding competition and developed further afterward (McNamee, 2022). Other models such as MidJourney and DreamStudio were created to advance the competition between previous models. While the creation of each model stemmed

from NVIDIA's initial research, the use-cases today have shifted significantly. AI-generated art provides people without artistic capabilities the ability to express themselves and their feelings through art.

The continued strive to innovate can be explained in part by technological entrepreneurship. For example, Spotify commercialized streaming technology by paying artists to host their discography on their own servers. In 2019, streaming accounted for 83% of all recorded music revenue, as shown in Figure 5 to the right (Friedlander, 2022). Thomas Hughes also explains that the growth of technology is a result of a drive for high diversity and competition in a field (Hughes, 1987). Such an idea is reinforced by a framework on technological

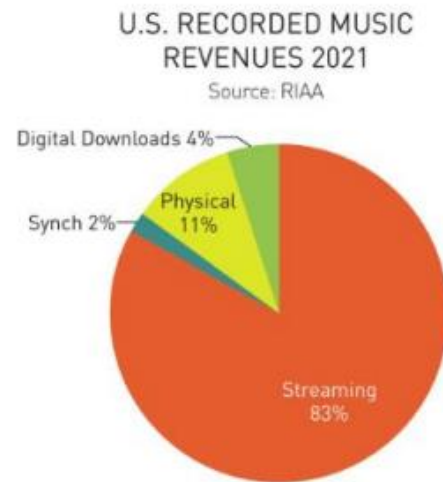


Figure 5: U.S. Recorded Revenues 2021, this pie chart shows the distribution of revenues in the music industry in 2021 (Friedlander, 2022)

entrepreneurship, stating, “Technological entrepreneurship...can be defined as the setting up of new enterprises by individuals...to exploit technological innovation” (Siyanbola et al., 2011).

Spotify, YouTube, Amazon, and many others compete today to dominate the media streaming market by exploiting algorithms to provide humans with recommended content. The AI-generated art market is expanding as well with competitors such as: DreamStudio AI, Dall-E Mini, MidJourney, and several others. AI such as DreamStudio have utilized a paid system, but others stay entirely free due to advertisements. To display the differences in several GANs, I input the prompt “A Vision of a Parallel Dimension” into DreamStudio (DreamStudio, 2022), Dall-E Mini (Dayma, 2021), and MidJourney (Holz, 2022), as shown below in Figure 6.

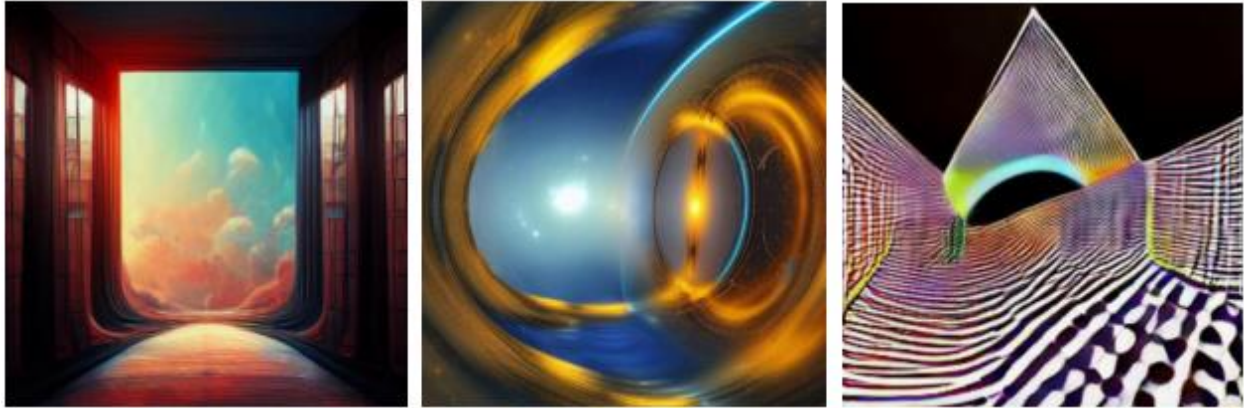


Figure 6: "A Vision of a Parallel Dimension", the same prompt was input into three separate GANs to display different versions of AI creativity, [from left to right] MidJourney (Holz, 2022), DreamStudio (DreamStudio, 2022), and Dall-E Mini (Dayma, 2021)

MidJourney has the capability of producing high-resolutions images, with the ability to upscale them even further (Yadav, 2022). DreamStudio uses a process called “Stable Diffusion” that trades some quality for more speed (Andrew, 2023). Lastly, Dall-E Mini utilizes fewer hardware resources and produces several images rapidly while sacrificing quality (Roth, 2022).

BUILDING A NETWORK INVOLVING CREATIVE AI

Understanding the development of creative AI is crucial when building the related network of actors. Each actor’s input into the creation of generative AI-technology has affected and is predicted to affect its use-cases and development process. The integration of artificial intelligence into the creative fields has sparked a debate on the role of machines in the creative process and the definition of creativity itself. The actor-network framework, developed by Bruno Latour, is a useful theoretical lens to explore the complex interactions between humans, machines, and other actors in the creative process. This paper will use the actor-network framework to examine the impact of AI on our perceptions of creativity and the roles of corporations, AI, artists, and developers in shaping these perceptions.

Corporations play a crucial role in the development and implementation of AI in the creative fields. Large tech companies such as Google, Facebook, and Amazon have invested heavily in AI research and development, and their algorithms have been used in various creative applications such as music composition, visual art generation, and film production. These corporations shape our perceptions of creativity by influencing which AI technologies are available for use in the creative industries.

AI algorithms themselves are also active actors in the creative process, as they are responsible for generating works of art alongside human artists. AI systems operate based on algorithms that can learn and improve through exposure to vast amounts of data, which allows them to create unique works that can surprise human artists. As such, AI machines challenge traditional notions of creativity as the sole product of human ingenuity.

Artists are essential actors in the creative process, both in their use of AI in their work and in their influence on public perceptions of AI-generated art. AI can serve as a tool for artists to generate new and innovative works, as well as an inspiration for new forms of expression. For example, the artist Memo Akten has created pieces that use AI algorithms to generate abstract visuals in real-time (Akten, 2017), challenging traditional definitions of what art is and can be.

Developers of AI algorithms also play a critical role in shaping our perceptions of creativity. The algorithms they develop can determine which creative applications of AI are possible, which creative fields are impacted by AI, and how AI-generated art is received. Developers are also responsible for ensuring the ethical and social implications of AI-generated art, including issues such as copyright and ownership. Below we find an ANT graph in Figure 7.

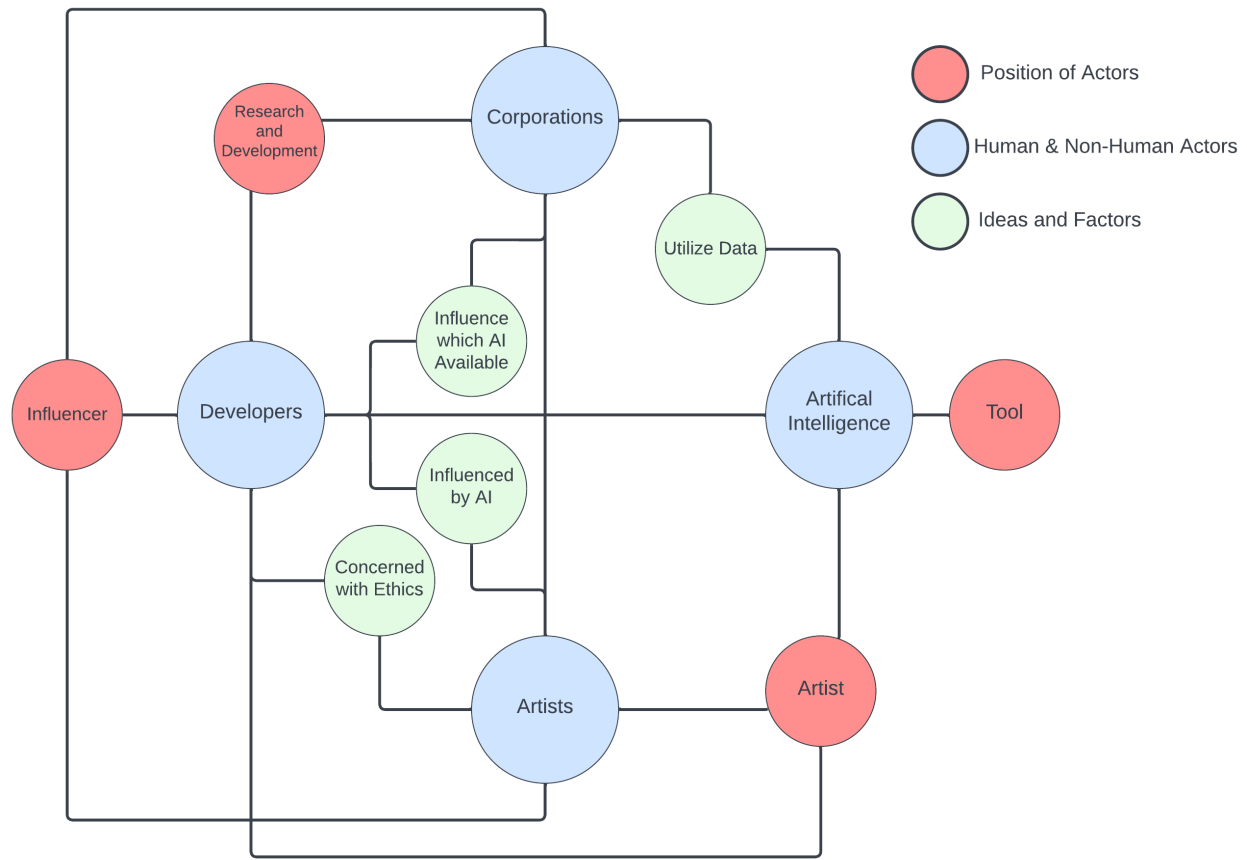


Figure 7: ANT Graph, a chart showing the connection between human and non-human actors, their positions, and their ideas (Anselmo, 2023)

The actor-network framework can help us understand how these actors interact and influence each other in the context of AI-generated art. Actors are not autonomous, but rather that they are constantly interacting and shaping each other. As such, the creative process is not solely the product of human artists or AI machines but rather the result of complex interactions between multiple actors. Moreover, the framework highlights the importance of non-human actors in shaping the creative process. For instance, AI machines are not passive tools but are active participants in the creative process, generating works of art alongside human artists. The framework can also reveal how social and cultural factors shape the adoption of new technologies, such as the desire for personalized and efficient art and the availability of large amounts of data for training algorithms.

ARTIFICIAL INTELLIGENCE AND PERCEPTIONS OF CREATIVITY

The use of AI in creative processes has opened debates about the nature of creativity, and whether AI-generated creations can be considered as genuine works of art. To gain an understanding on human perceptions of creativity, we examine the historical and philosophical perspectives of creativity and the implications of AI-generated art on the art world.

Creativity is a multi-dimensional concept that has been defined in various ways throughout history. It has been described as the ability to produce novel and valuable ideas, or as a process of combining existing ideas to generate something new and innovative (Runco & Jaeger, 2012). Creativity is a fundamental aspect of human intelligence and is considered a hallmark of human beings. Such a topic has been studied by various philosophers and thinkers throughout history. Aristotle, for instance, believed that creativity involved the combination of existing elements to produce something new. He argued that creativity was a skill that could be developed through practice and experience. Later, during the Renaissance period, the idea of the 'divine spark' emerged, which suggested that creativity was a gift from God that was bestowed upon select individuals. The Romantic period emphasized the idea of the 'genius,' a person with innate abilities that allowed them to produce exceptional works of art (Boden, 2003).

The emergence of AI has challenged traditional notions of creativity and its relationship with human beings. The philosophical perspective on AI and creativity can be divided into two categories: skepticism and optimism. The skeptics argue that AI cannot be truly creative because it lacks the emotional depth and subjective experience that humans bring to their creative endeavors. They argue that AI can only simulate creativity, but not truly create anything new or innovative. On the other hand, the optimists argue that AI-generated art is a new form of creativity that challenges traditional notions of creativity.

AI-generated art has significant implications for the art world. It raises questions about the role of the artist, the nature of creativity, and the value of art. One of the key concerns is the authenticity of AI-generated art. Can it be considered as genuine art if it lacks the emotional and aesthetic qualities that human artists imbue in their creations? Another concern is the role of the artist in the creative process. If AI can generate art without human intervention, what is the role of the artist in this process?

An article written by Ziv Epstein explores the issue surrounding authorship and ownership of art produced using artificial intelligence (Epstein et al., 2020). The author argues that while AI-generated art is becoming increasingly popular, there is a lack of clarity regarding who should be credited as the author of the artwork. Epstein explains that traditional copyright law does not account for AI-generated art, as it was designed to protect human creators' works. The article discusses several legal cases where AI-generated art was created, and the ownership and copyright of the artwork were contested. The issue of authorship is crucial to the art world, as it affects the commercial value of the artwork and its impact on the artist's reputation. Epstein suggests that there are several possible solutions to address the authorship issue, including revising copyright laws to account for AI-generated art and creating a new category of intellectual property rights. Blockchain is also discussed to track and verify ownership of AI-generated art. Beyond the legality of AI art, an experiment was also run in the same study to understand how people view AI as an artist. It was concluded that designation of responsibility for the AI was dependent on how anthropomorphized the AI was. By changing the language of how the functionality of the AI was explained, people would be more or less likely to grant the AI the title of “artist”.

WHERE CAN WE GO NEXT

AI has significantly impacted human perceptions of creativity, challenging traditional notions of creativity and the role of the artist in the creative process. The historical and philosophical perspectives of creativity demonstrate that it is a complex phenomenon that has been defined in various ways throughout history. The emergence of AI-generated art has raised questions about the authenticity of AI-generated art, the role of the artist in the creative process, the legality of ownership for AI art, and the value of art. As AI develops, further research will be necessary to explore these questions and determine the implications of AI-generated art on the art world.

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