

ARTIFICIAL INTELLIGENCE AND CREATIVITY IN THE VISUAL ARTS

Nwombu, Ugochukwu Kingsley PhD

Department of Fine and Applied Arts
Ignatius Ajuru University of Education
Rumuoloumeni, Port Harcourt
Ugochukwu.nwombu@iaue.edu.ng

Abstract

Artificial intelligence is another milestone recorded by man in this technological era and has come to stay just like the computer that is used today. Artificial intelligence is the intelligence of machine that surpasses human intelligence by enhancing creative process of man. From generating unique artistic style to creative interactive and dynamic art pieces, AI serve as a powerful tool for artist to explore new possibilities and break traditional barriers. The aim of this study was to examine the impact of artificial intelligence on creativity in the visual arts. The design of the study relied essentially on qualitative analysis of data generated from Generative Adversary Networks (GANs). Theory of creativity was adopted to underscore AI algorithms and human artist collaboration to generate novel and innovative art forms. The result of the study revealed that AI art generates unique and innovative artistic expressions that blend human creativity with machine intelligence. A fusion of traditional artistry with computational power leading to the creation of art that challenges conventions, inspire new perspectives and extends the boundaries of creativity. It is recommended that artists should leverage on Generative Adversary Networks techniques (AI) to produce a wide range of visually stunning and thought provoking artworks.

Keywords: Artificial Intelligence, Creativity, Generative Adversary Networks, Visual Arts

Introduction

Artificial Intelligence is a field of science concerned with building computers and machines that can reason, learn, and act in such a way that would normally require human intelligence or that involves data whose scale exceeds what human can analyze. AI is a broad field that encompasses diverse disciplines such as computer science, data analytics and statistics. Others are hardware and software engineering, linguistics, neuroscience, and even philosophy and psychology. The ability for a machine to sense, think, and act just like human has made AI to be adopted in any activity undertaking by humans. For instance AI art is an artificial intelligent software design tool used to create art works known as AI artworks. The evolution of AI art can be traced back to 1973 when a computer scientist and artist named Harold Cohen created the first known AI art creation program, AARON (Droitcour, 2024).

Forty years later, in 2014, Generative Adversarial Networks (GANs) were developed. While it was not developed solely for creating artwork, GANs play a huge role in its creation today. In 2015 researchers/scholars began training a computer to use a text prompt to generate images. They did this by reversing the process of image to text, which the knowledge is wide spread. If you have ever noticed how i-phone can identify objects in pictures and categorize them? That is a good example of image-to-text. In 2021, the first major text-to-image software DALL-E was launched/released. Created by open AI (makers of ChatGPT) and named after the painter Salvador Dali, and Pixar's WALL-E, it was the first program to be trained on millions of images and concepts. Thanks to the release of DALL-E, the AI text-to-image boom was born. In 2022, a group known as open-source developers started building AI art generators, using every technology they could reach out their hands on. Some of those developers eventually moved ahead to work on developing Midjourney. AI art or generative AI, refers to creating art using artificial intelligence to automate image creation, aid with creative writing, create music, build websites, and more. AI art is different from digital art, which people with creative skills create. Instead AI art allows those with little or no creative ability to create art forms effortlessly with a text prompt.

However, creativity in the visual arts refers to the ability to generate new ideas, concepts, or solutions that are original, valuable and meaningful. It

involves thinking outside the box, making connections between seemingly unrelated things; and coming up with novel approaches to problems. Creativity can manifest in various forms, such as art, music, writing, design, innovation, and so on. It is a crucial skill that can lead to innovation, personal growth and the development of unique and valuable creations. This study applies theory of creativity to underscore AI algorithms and human artist's collaboration to generate novel and innovative art forms. The theory explores the sources of creativity, including imagination, originality and problem-solving, shedding light on the processes through which AI assists artists in developing new artistic ideas and style. Incorporating this theory into the study of AI art creation, artists and researchers can gain insights into the intersection of technology and creativity as well as the impact of AI on the evolution of art forms and artistic practices. These and much more were explored in this study.

Theoretical Framework

In the context of AI art creation, various theories can be applied to understand and analyze the process and outcomes. One prominent theory that can be relevant is the theory of aesthetics which delves into the principles of beauty, art appreciation and artistic expression. By applying aesthetics, AI artists can explore concepts such as visual harmony, balance, contrast and emotional impact in their artworks.

Another theory that is relevant to this study is the theory of creativity to understand how AI algorithms and human artists collaborate to generate novel and innovative art forms. This theory explores the sources of creativity, including imagination, originality and problem-solving, shedding light on the processes through which AI assists artist in developing new artistic ideas and styles. Incorporating these theories into the study of AI art creation, artists and researchers can gain deeper insights into the intersection of technology and creativity, as well as the impact of AI on the creation of art pieces and artistic processes.

The Root of Artificial Intelligence

If one explores the source of artificial intelligence, you would trace to the root of AI. Artificial is an adjective of the verb artifice which stands for crafty but underhanded deception. It refers to a trick or a strategic maneuver that uses some clever means to avoid dictation. Artificial

therefore, expresses man-made artifice, false and misleading or unnatural. While intelligence is the capacity of the mind especially to understand principles, truths, facts, or meanings, acquired knowledge and application to practice; the ability to learn and comprehend. It can also be an entity that has such capacity. For instance, capacity of mind, wit, intellect, brightness <http://wiktionary.org>. The exposition above presents a pretense of an entity other than man in demonstrating same capacity of mind in handling tasks even in a greater dimension. This reflects artificial intelligence.

Artificial Intelligence and its Meaning

Artificial intelligence is a field of computer science that is associated with the concept of machines thinking like humans to perform tasks such as learning, problem-solving, planning, reasoning and identifying patterns. AI textbook defined artificial intelligence as the study and design of intelligent agents, where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success, http://en.wikipedia.org/wiki/artificial_intelligence.

Techopedia describes AI as a branch of computer science that uses computational models to perform tasks that previously required human intelligence. While Investopedia asserts that Artificial Intelligence is an evolving technology that tries to simulate human intelligence using machines. AI encompasses various subfields including Machine Learning, and deep learning which allow systems to learn and adapt in novel ways from training data, <https://www.investopedia.com>ai...>

Types of Artificial Intelligence

Artificial intelligence can be organized in several ways, depending on stages of development or actions being performed. For instance, four stages of AI development are commonly recognized.

1. Reactive machines: limited AI that only reacts to different kinds of stimuli based on preprogrammed rules. Does not use memory and thus cannot learn with new data. IBM's Deep Blue that beat chess champion Garry Kasparov in 1997 was an example of a reactive machine.
2. Limited memory: most modern AI is considered to be limited memory. It can use memory to improve over time by being trained with new data, typically through artificial neural network or other

training model. Deep learning is a subset of machine learning, is considered limited memory artificial intelligence.

3. Theory of mind: theory of mind AI does not currently exist, but research is ongoing into its possibilities. It describes AI that can emulate the human mind and has decision-making capabilities equal to that of a human, including recognizing and remembering emotions and reacting in social situations as a human would.
4. Self-aware: a step above theory of mind AI, self-aware AI describes a mythical machine that is aware of its own existence and has the intellectual and emotional capabilities of a human. Like theory of mind AI, self-aware AI does not currently exist.

A more useful way of broadly categorizing types of artificial intelligence is by what the machine can do. All of what we currently call artificial intelligence is considered artificial “narrow” intelligence, in that it can perform only narrow sets of actions based on its programming and training. For instance, an AI algorithm that is used for object classification would not be able to perform natural language processing. Google search is a form of narrow AI, as predictive analytics, or virtual assistants.

Artificial General Intelligence (AGI) would be the ability for a machine to “sense, think, and act” just like a human. AGI does not currently exist. The next level would be Artificial Super Intelligence (ASI), in which the machine would be able to function in all ways superior to a human. In the same vein, ASI does not currently exist.

AI Art and the Stuff it is Made

AI art is simply artwork made with the assistance of generative AI – a technology that finds patterns in big datasets and uses it to create new content. All it takes is an AI art generator, like Adobe Firefly and an idea. The artist types a detailed prompt, which the tool then uses to generate image options based on the description. There is more than one kind of generative artificial intelligence. For writing anything from poetry to an email, there are large language models, which are trained on text and help people generate copy. To create illustrations, painterly creations logos and more, diffusion models trained on images help people make artwork of all kinds. Many of the popular generative AI tools use one of these models. Artists use generative AI to make a variety of artworks, from poems and

stories to creations that look like analogue paintings or photographs and more. The speed and flexibility of generative AI enables creators to jumpstart and finish projects more quickly and opens up all kinds of exciting new avenues for creative expression.

AI Algorithm and Human Artist Collaboration

People create art from the things that surround them, which can be trees in the forest, cityscapes and their own reflection in a mirror. Generative artificial intelligence also takes in lots of information in the form of words and images and uses those to create artwork from a prompt. The technology that powers this ability is called a neural network. A neural network is a mathematical system which is an algorithm that finds patterns in big sets of data. When you prompt the AI generator to depict a tree. It uses the information it has learnt about what trees look like to create a new image. And it is your guidance as the artist that refines those images even further – telling it to generate a pink fine tree, for instance or a tree blooming with tropical flowers. Those tools are packed with information, but it takes the imagination of the user to create artificial intelligence art.

Generative AI in the Art World

Artists have been experimenting with forms of artificial intelligence in their work for decades, pondering on the implications and applications of such technology long before the general public was. Artist Vera Molnar began experimenting with early programming languages to produce randomly generated art work in 1968. Considered a pioneer in generative art, her geometric creations are included in major museum collections. Flash forward a few decades and you can find AI generated art within the Museum of Modern Art in New York. In 2023, the museum displayed the exuberant, ever-changing artwork of Refik Anadol on an enormous screen. The abstract creation was made with artificial intelligence trained on artworks held within the museum's collection. AI artworks have been auctioned by Sotheby's and exhibited at the Venice Biennale. Artificial intelligence has been folded into art course curriculum at institutions like Columbia University and the Rhode Island School of Design. These are just a few examples of how artificial intelligence has affected creative work. AI has inspired artists to explore both how art is created and what is defined as art.

The Technology Behind AI Generated Art.

Just like there are many tools in an artist's physical toolbox such as paints, pencils, inks etc. Multiple kinds of technology contribute to making AI artwork. The generative AI models to explore are:

1. **Generative Adversarial Networks (GANs):** GANs has a set of two neural networks, trained on the same data that work together. One generates a photorealistic image and the other figures out if the image is real or created. For instance, the first may generate an image of a horse and the second would try to determine if the image was a photograph or digitally created. This helps the system to make more realistic images.
2. **Variational Auto-Encoders (VAEs):** a variational auto-encoder is made up of two neural networks working in tandem, each with a different job. One is an encoder, which takes in information and the other is a decoder, which is able to reinterpret that information into all new content. Like GANs, they produce photorealistic images.

Generative AI Techniques

Image synthesis: image synthesis describes the act of creating new images from large datasets of other images. **Creative coding:** Artists who create the programmes that generate their artwork are described as creative coders. The intent of creative coding is not to produce a functional result, but an expressive one.

Creativity for All

Generative AI gives you access to more types of artistic expression. A skilled graphic designer using AI can try their hands at making dramatic edits to a photograph or a total beginner can experiment with multiple kinds of art-making using Text to Image.

What is Creativity?

Creativity is the ability to generate new ideas, concepts or solutions that are original, valuable and meaningful. It involves thinking outside the box, making connections between seemingly unrelated things and coming up with novel approaches to problems. According to Linked-in, there are over fifty thousand different professional skills people can master. At the top of it is creativity. Creativity is the literal birth place of innovation. A creative mind is one designed to look at complex problems and come up with non-

linear solutions, solutions that others more linear thinkers or AI would not necessarily have the mental dexterity to imagine.

Learning creative skills is not only for those pursuing artistic careers, but creative thinking ability acquired in art can sustain you in any other environment. It is a key skill you can rely on. Be able to communicate ideas and think on your own is fundamental to being a great individual as they are to make great personality (Stephen, 2022). The value of developing and honing creative skills will only increase as we move closer to an automated, data-driven future. While technology is not yet lurking at every vocational door, the reality is that in a relatively short space of time, its wave will likely engulf far more than simple menial, repetitive and labor intensive tasks.

In the art world, all tools like DALL-E2 can readily mimic and extend artwork previously created by other painters and visual artists. Entire advert campaigns for global brands like Kraft Heinz have being built around AI generated artwork. While this might cause panic, the reality is that the technology can only go so far. Almost inevitable, rather than being obliterated by it, many people will increasingly partner with technology both knowingly and unknowingly as it continues to evolve and add layers of all but invisible assistance, security and oversight within our daily work lives. However drastically, technology continues to redefine our roles and reshape our future, the need for creativity will remain. Whether to provide innovation or inspiration, our most human qualities will remain our most valuable asset in many years to come, so better make sure you stay creative. Creativity is the top skill you need for guaranteed career success.

The Process of Creating AI Artwork

1. Open the Firefly web app.

The simplest way to begin experimenting with generative AI is to use Adobe Firefly. Using the Firefly web application you can immediately begin creating artwork, recolor your existing artwork or edit photographs using generative AI. To get started go to [Firefly.adobe.com](https://firefly.adobe.com) and sign in. if you do not have an Adobe ID, you can create one. You can also explore features powered by Firefly like Generative Fill in Photoshop, Generative Recolor or Text to

Pattern (beta) in illustrator and Text to Image and Text Effects in Adobe Express.

2. Write a Prompt.

Writing a good descriptive prompt is one of the key components of creating generative AI art. Using adjectives, include the names of art movements or mediums and try including moods and emotions as well. Learn more about writing successful AI art prompts.

3. Explore Sample Prompts.

Mouseover the Text to Image artwork examples provided in the Firefly web app gallery to see what prompts produced those images and apply those techniques to your own experiments.

4. Refine your Settings.

Explore the options available within the Firefly web app to refine your output. You can choose from a selection of different Content Types, Styles, Color and Tone, Lighting and Composition options.

5. Keep Experimenting.

Once you have generated an image, see how much further you can take it. The creation of an artwork with generative AI can be a catalyst for exploration. Use it to inspire an analogue work or take it into another Adobe app for fine-tuning with precise editing tools. You can learn more by following step-by-step guide on how to make AI generated art.

Conclusion

Artificial intelligence (AI) is a branch of computer science that emphasizes the creation of intelligent machines; creating systems that understand, think, learn and behave like humans. The goal is to exhibit intelligent behavior and advice users. Artists have been experimenting with artificial intelligence for decades, exploring how it can change the way we make and view art. Right now this technology is readily available to all. You can start today and see where your imagination takes you.

AI can help artists develop new ideas by providing the following capabilities:

1. Idea Generation: using machine learning algorithms to create new concepts and inspire.
2. Visualization: using software to visualize ideas, create prototypes and experiment with design.

3. Automation: Automating repetitive tasks, such as creating templates or processing images, allows artists to focus on the creative process.
4. Feedback: Receiving feedback from artificial intelligence algorithms about the artist's work can help improve and develop their creations.
5. Exploration and Inspiration: Access to a vast database of art and culture that can be used to study history and find inspiration.
6. Personalization: Using machine learning algorithms to provide personalized tips and recommendation tailored to the artist's individual style and interests.

This study showed that AI art generates unique and innovative artistic expressions that blend human creativity with machine intelligence. Partnering traditional artistry with computational power leading to the creation of art that challenges conventions, inspire new perspectives and extends the boundaries of creativity.

Recommendation

It is recommended that artists should leverage on Generative Adversary Networks techniques (AI) to produce a wide range of visually stunning and thought provoking artworks.

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