

GENERATIVE ART: CAN MACHINES BE CREATIVE?

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Jane Shin was selected as the winner of the 2023 *Broad Street Scientific* Essay Contest. Her award included the opportunity to interview Dr. Victoria Miller, Assistant Professor of Materials Science & Engineering at the University of Florida.

Since the beginning of industrialization, when machines began to integrate into our lives and replace manual work in factories, people have believed that machines will take over the physical labor while we, human beings, will handle all the creative ventures. Of course, technology has improved many parts of our lives and made performing primitive tasks easier, but not every facet of our lives has been mechanized. Today, these machines are starting to intervene in the field of creativity through artificial intelligence and generative art.

Generative art is “made entirely or partially using an autonomous system...[that] may take different forms, including music, literature” (Hencz). The autonomous system usually uses artificial intelligence (AI) trained with extensive system of machine algorithms. The AI movement began after the modern art era, which included styles that valued unpredictability and chaos (such as the Dada movement and Surrealism). However, the modern art world has evolved more since the 1970s with the increased use of computers, leading to the current generative art movement.

Currently, controversy surrounds generative art. Namely, people question whether AI art is true art. Machines can be creative because of the autonomy of the process of generative art, randomness, and its generative power.

Creativity is the ability to generate something new and valuable, such as a poem, visual artwork, music composition, or simply any idea. Today, there is software that has this same ability to generate artwork. However, it remains unclear whether the credit for this artwork should be given to the programmers or the machine itself. Granted, programmers are the ones who code the basic algorithms but the machines still have a lot of autonomy in the generative art process. A well-known example of generative art is DALL-E, an open source AI tool that generates images based on the text input that the user gives to the machine. This AI is trained through deep learning and diffusion models to classify images and understand the extensive relationship between text and images (O'Connor). The work behind this deep learning process is credited to machines because the unsupervised machine learns without human intervention. The autonomy and independence in the generative art

process prove that machines can also be creative.

Randomness, if used in generative art, becomes another point of evidence for proving this computational creativity. This randomness has been identified as one of the key questions in need of future research in the article ‘Ten Questions Concerning Generative Art’. The author writes, “Randomness is often used to ‘humanize’ or introduce variation and imperfections to an underlying rigid deterministic process” (McCormack). To the same question, the open source AI ChatGPT answered, “Randomness plays an important role in generative art as it can be used to create unique and unpredictable variations in the output. It can also be used to create a sense of randomness and chaos in the art, simulating the unpredictability of nature or other real-world phenomena.” Both of the responses show that randomness allows the machine to resemble human nature in contrast to other codes, which produce outputs as a result that is intended by the programmer. The unexpectedness formulated through randomness diminishes the contribution of the programmer and gives more autonomy towards the machine for the creation of the piece. Moreover, through the characteristics of randomness, slight variations will create a new and unique art piece every time it is generated. The unpredictability is hard to repeat or be a replica of something else.

One may argue that randomness is not the same thing as art. Art, they may say, is intentional and can deviate from the foundations of the past. AI can replicate existing pieces, but it may not create something new by intentional design, not at least in the moment. A second major point of controversy lies in the fact that the databases for AI art are “stolen art.” Some may argue that machines can not actually create new things, because these algorithms require preliminary inputs and data. However, if we define creativity in this way, then one may argue that humans are not creative as well. In the book *Steal Like an Artist*, author Austin Kleon states, “All creative work builds on what came before. Nothing is completely original” and defines originality as “undetected plagiarism” (Kleon, 2022, pg.7-8). The originality of generative art is exactly what Kleon described. Many AIs trained for generative art use existing images, audio files, and algorithms to create a unique output that programmers can not precisely

predict.

Despite the controversy surrounding the machine's creativity and originality, generative art itself is very important in the field of art as it gives a new perspective towards creativity. The generative power that machines have is a creative catalyst that we may utilize to enhance our creativity. The procreative ability of machines is trained through enormously large amounts of data that a human cannot process or remember. This ability will be an amazing tool and resource by incorporating it in our creative process to concoct an innovative idea. First, generative art shows that rules and algorithms, which seem restrictive and passive at the surface level, can generate creative pieces. Second, experimentation and randomness allow the machine to achieve creativity. Small variations and changes that are entered as parameters of the program create original and different pieces every time. Third, generative art is an incredible medium. Artists may use this extensive and inventive medium to present their imagination in the most creative and effective way. As the technology improves and the influence of technology in art increases, generative art will become the mainstream, and machines' creativity will be welcomed.

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