

**УДК: 004.8+75.059**

**К. Little-Tetteh, Н. Shchyhelska, Ph.D., Assoc. Prof.**

Ternopil Ivan Puluj National Technical University (Ukraine)

**ARTIFICIAL INTELLIGENCE PAINTING: IS IT ART, REALLY?**

**К. Літл-Теттех, Г. Щигельська, канд. іст. наук.**

**ЖИВОПИС СТВОРЕНИЙ ШТУЧНИМ ІНТЕЛЕКТОМ:  
ЧИ МОЖНА ЙОГО НАЗИВАТИ МИСТЕЦТВОМ?**

Nowadays, Artificial Intelligence (AI) demonstrates a stronger potential for art creation. With the active development of Artificial Intelligence, more and more researchers try to create a painting with AI technology automatically. AI creativity is a very lively subject area, with many issues still open to debate. Even though the process of AI art and the outputs of this process can be considered as somewhat creative, their quality of «artiness» requires another philosophical discussion. Therefore, the following question will be the core of our research: Can AI painting be considered as true art?

During the past 50 years, several artists have written computer programs to generate art. One of the earliest practitioners of this form is artist Harold Cohen, who wrote the program AARON in 1973 to produce drawings that followed a set of rules he had created. Cohen continued to develop and refine AARON for the rest of his career, but the program maintained its core design of performing tasks as directed by the artist. New developments incorporate AI and machine learning technologies to allow the computer more autonomy in producing images [1].

Most of the AI artworks that have emerged over the past few years have used a class of algorithms called generative adversarial networks (GANs). First introduced by computer scientist Ian Goodfellow in 2014, these algorithms are called «adversarial» because there are two sides to them: One generates random images; the other has been taught, via the input, how to judge these images and deem which best align with the input.

For example, an artist could feed portraits from the past 500 years into a generative AI algorithm. The algorithms then try to imitate these inputs, producing a range of output images. The artist must sift through the output images and select those he or she wishes to use [1]

However, in the last few years, the development of GANs has inspired a wave of algorithmic art that uses AI in new ways to make art. In contrast to traditional algorithmic art, in which the artist had to write detailed code that already specified the rules for the desired aesthetics, in this new wave, the algorithms are set up by the artists to «learn» the aesthetics by looking at many images using machine learning technology. The algorithm only then generates new images that follow the aesthetics it has learned [2].

Most AI systems use some form of a neural network, which is modeled on the neural complexity of the human brain. Therefore, AI and conceptual art coincide in locating the art activities in the system network of the brain, rather than in the physical output. The physical act of an artist, either applying paint or carving marble, becomes optional. This removes the necessity of a human body (the artist) to make things and allows us to imagine that there could be more than one kind of artist, including other than humans [2].

Simon Colton's Painting Fool is much more autonomous than AARON. Although the software does not physically apply paint to canvas, it simulates many styles digitally, from collage to painting strokes. In Colton's words: The Painting Fool only needs minimal direction and can come up with its concepts by going online for source material. The software runs its web searches and crawls through social media websites. The idea is that this approach will let it produce art that is meaningful to the audience because it is essentially drawing on the

### Секція 3. Науково-технічний прогрес: проблеми та перспективи

human experience as we act, feel and argue on the web. For instance, in 2009, the Painting Fool produced its interpretation of the war in Afghanistan, based on a news story. The result is a juxtaposition of Afghan citizens, explosions, and war graves [3].

Artificial neural networks have become far more experimental and unpredictable. The work springs from the machine itself without any human intervention. Ahmed Elgammal, director of the Art and Artificial Intelligence Lab at Rutgers University in New Jersey, is working with a system that he calls AICAN — a «creative» rather a «generative» network, which creates styles of art never seen before. AICAN stands for «Artificial Intelligence Creative Adversarial Network» and while it utilizes the same adversarial network architecture as GANs, it engages them differently. Adversarial networks operate with two sets of nodes: one set generates images based on the visual training data set that it was provided while the second set judges how closely the generated image resembles the actual images from the training data. Professor Elgammal underlines: «As a scientist, I created the algorithm, but I have no control over what the machine will generate. The machine chooses the style, the subject, the composition, the colors, and the texture. Yes, I set the framework, but the algorithm is fully at the helm when it comes to the elements and the principles of the art it generates». [4]

From the beginning of October 2017, AICAN's work has been exhibiting at venues in Frankfurt, Los Angeles, New York City, and San Francisco, with a different set of images for each show. Recently, in December 2018, AICAN was exhibited in the SCOPE Miami Beach Art Fair. At these exhibitions, the reception of works was overwhelmingly positive on the part of viewers who had no prior knowledge that the art shown was generated using AI [2].

To answer what makes work and artwork and present another perspective on the discussion of authenticity (or legitimization) of computational art, there is a very important key point to consider: the feedback of the human audience. This approach would suggest a paradigm shift in terms of evaluation (or quality) of artwork, and therefore the authenticity of AI artifacts. Using this approach, researcher Deniz E. Kurt suggests that the attribution of 'art' as an approval or evaluation of output is ultimately defined by the audience [5]. For instance, when someone creates a painting, can he or she decide whether it is a piece of art or not? Even if the art-maker claims that it is art for him/her due to his/her intentions of expressing an aesthetical and emotional phenomenon, ultimately the quality of artwork depends on the perception of the audience. Therefore, even though the art-maker is a computational program that does not have any intentions to express a certain feeling, the artworks can create emotional or aesthetical feedback by the human audience.

To register how people would react to the generated images and whether they could tell the difference between AICAN - or human-created art, a visual Turing test was used. To make the test timely and of high quality, images from AICAN with works from Art Basel 2016 (the flagship art fair in contemporary art) were mixed. Researchers also used a set of images from abstract expressionist masters as a baseline. The study showed that human subjects could not tell whether the art was made by a human artist or by the machine. Seventy-five percent of the time, people in the study thought the AICAN generated images were created by a human artist. In the case of the baseline abstract expressionist set, 85% of the time subjects thought the art was by human artists. The subjects even described the AICAN-generated images using words such as "intentional", "having the visual structure", "inspiring", and "communicative" at the same levels as the human-created art [2].

AI paintings not only have been exhibited worldwide, few of them even recently sold auctions. The first work offered for sale from the AICAN collection, which AICAN titled “St. George Killing the Dragon,” was the one that sold for \$16,000 at an auction in New York in November 2017 [2]. Another painting made by an artificial intelligence program sold at a Christie's auction for \$432,500, nearly 45 times its high estimate, in October 2018. This

### Секція 3. Науково-технічний прогрес: проблеми та перспективи

painting, called Portrait of Edmond Belamy, was created by a Paris-based art collective Obvious. It was produced using an algorithm and a data set of 15,000 portraits painted between the 14th and 20th centuries.

The most intriguing recent computational creativity is the latest AI innovation - the first ultra-realistic drawing robot artist Ai-Da. Thanks to British art dealer Aidan Meller, in collaboration with a robotics company, Engineered Arts, Ai-Da came to life. The combination of her mechanical abilities and AI-based algorithms allows her to draw, paint and sculpt. She has a robotic arm system and human-like features are equipped with facial recognition technology and are powered with artificial intelligence. She can analyze an image in front of her, which feeds into an algorithm to dictate the movement of her arm, enabling her to produce sketches. Her goal is creativity. Between 12th June and July 6th, 2019 at Oxford University, Ai-Da presented herself for the first time physically and with her artworks spanning from drawings to videos within a solo exhibition titled Unsecured Futures.

The possible counter-arguments on the authenticity of the AI-art could suggest that computers do not produce art to express their emotions as humans do. Or that computers do not have the intention to express an aesthetical or socio-political stance because they do not have emotions or aesthetical taste. These counter-arguments are true in a perspective which evaluates the authenticity of artwork in terms of art-maker. Foreseen as the last step of AI technology, it is considered as the milestone of the technological singularity in the future. [5].

In conclusion, we believe AI is now part of art and it's not art itself! No doubt it is now doing the major works in art and other fields, it is just a tool to help ease the tedious analytic thinking painters/artist go through to produce the finest arts and paintings. Just like the camera is needed to capture an image at an accurate angle, just like a brush and paint are also needed to produce the finest pictures. It is the same way an AI will also be playing a role in modern art as a tool and not as the brain behind a final art. Because without the control and guidelines and a mastermind (artist/painter) the AI will not be able to work on it or produce the works needed.

#### References:

1. Elgammal A. AI Is Blurring the Definition of Artist. Available at: <<https://www.americanscientist.org/article/ai-is-blurring-the-definition-of-artist>> [Accessed 12 November 2019].
2. Mazzone M., Elgammal A. Art, Creativity, and the Potential of Artificial Intelligence. Available at: <<https://www.mdpi.com/2076-0752/8/1/26>> [Accessed 10 November 2019].
3. Mantras R. Artificial Intelligence and the Arts: Toward Computational Creativity. Available at: <<https://www.bbvaopenmind.com/en/articles/artificial-intelligence-and-the-arts-toward-computational-creativity/>> [Accessed 12 November 2019].
4. Elgammal A. Meet AICAN, a machine that operates as an autonomous artist. Available at: <<https://theconversation.com/meet-aican-a-machine-that-operates-as-an-autonomous-artist-104381>> [Accessed 20 November 2019].
5. Kurt D. Artistic Creativity in Artificial Intelligence. Available at: <[https://theses.ubn.ru.nl/bitstream/handle/123456789/5631/Kurt%2C\\_D.E.\\_1.pdf?sequence=166](https://theses.ubn.ru.nl/bitstream/handle/123456789/5631/Kurt%2C_D.E._1.pdf?sequence=166)> [Accessed 12 November 2019].