SKHID (EAST)

2023, Vol.4, Issue 3, 9-13

https://doi.org/10.21847/2411-3093.2023.4(3).294658

Artificial intelligence and digital art: current state and development prospects

Mary Chikarkova (ORCID 0000-0001-9664-8132)
Yuriy Fedkovych Chernivtsi National University (Ukraine)

ABSTRACT

The article analyzes the use of artificial intelligence in various types of digital art at the current level of their development and outlines the possibilities of external ways of such interaction. The author considers specific artistic examples, which see that the use of artificial intelligence in art develops a complex art history and philosophical questions: what is art? how does computer technology change aesthetics? where is the line between technology and creativity? who is considered the author of the work generated by neuronets? is it possible to compare anthropocentric and non-anthropocentric forms of creativity? etc. The researcher demonstrates different approaches to the chosen topic, citing antagonistic points of view of scientists. Some of them believe that art with the help of a computer is the next step in the development of avant-garde trends, while others see these trends as the degradation and even the death of art. In digital painting, we are already faced with the use of works (the most famous example is the android-artist Ai-Da) who know how to draw in different techniques and with the use of different tools. The victory of a painting generated by a neural network at an art competition raised questions about its authorship and the admissibility of participation of such works in competitions for artists. Discussions on the ArtStation platform indicate that many artists do not perceive works made with the help of artificial intelligence as "real" works of art. In music today, it is possible not just to generate melodies, but to create an imitation of certain styles or composers, which raises questions about the nature of true creativity and its limits. Another direction of using artificial intelligence in music is the creation of virtual singers who become mega-popular. Such an example is given by the Japanese virtual singer Hatsune Miku, who is a hologram with an android interface and an artificially generated voice. In the field of video games, artificial intelligence knows how to create not only levels, but already generate game target worlds and complete games. Artificial intelligence in photography can generate images of non-existent people. At the same time, it is unlikely that artificial intelligence can completely replace a human artist, after which he learns from the previously created material. This makes it possible to say that he left real creativity and knows how to compile in advance, and not to generate original artistic solutions.

KEYWORDS

artificial intelligence, digital art, Neural networks, creativity, computer aesthetic

Introduction

Digital art is one of the most debated topics in modern art, which today is already impossible to imagine without computer technologies. The famous French art critic F. Popper rightly notes that the interaction of art and technology in the 20th century is already irreversible (*Popper, 2007: 11*). In recent years, artificial intelligence has played an increasingly important role here, which with new force raises the question of where the line is between technology and artistic creativity, talent and craftsmanship. Fierce discussions with antagonistic positions take place here. This raises the question of whether technology is killing the very essence of art. Some researchers believe that digital technologies continue the processes that have existed in art since at least the 20th century. For example, M. Rush speaks of technology-based art as part of "the last avant-garde of the twentieth century" (*Rush, 2005: 28*). At that time, other scholars believe that thanks to the latest technologies, the death of art and culture as a whole occurs, as ignorance and humiliation of talent begins to reign (*Keen, 2007: 15-16, 177*).

The question of the role of artificial intelligence in the development of art is even more difficult, especially since the situation here changes every day. In addition, the role of artificial intelligence in our lives is causing increasing concern. "Now is the time for AI developers and policymakers worldwide to decide what kind of future they wish humanity to usher in, as that will help clarify the role that technology will play in the future. Observing how this technology advances may only prove disastrous because once it reaches a point of no return, it may become so seductive

chikarkova@ukr.net

that it may be impossible to balance its pros and cons" (*Singh, Tholia, 2023*).

In recent years, studies have begun to appear that examine the role of artificial intelligence in the evolution of modern art, but here the technological approach often prevails. A representative example is the article by V. Volynets, which provides a list of technologies that can already be used to generate works of art (*Volynets, 2023: 23-24*). Various programs and methods of involving artificial intelligence in art are analyzed in the article by A. Chibalashvili (*2021: 42-46*). Not only technological, but also ethical problems (originality of the work, copyright, etc.) attract the attention of B. Osmuk and I. Skril (*2023: 503-506*). However, the authors of the article for some reason take not only literature, but also music beyond the boundaries of art, as evidenced by the very title of their work. In general, the authors usually focus on one or two types of art and record only the state of use of artificial intelligence today.

The purpose of our research is to analyze the impact of artificial intelligence on the development of various types of digital art today and outline its potential prospects in the future. At the same time, we do not delve into technical details, but try to outline the prospects in this field from a cultural and philosophical point of view. Of course, it is difficult to make any predictions about the development of digital art in the more or less distant future, because technology is developing so rapidly that it is impossible to make any futuristic predictions about what art will look like, for example, in half a century. However, you can try to predict what it will be like in the coming months and years, since there are trends that have already been clearly outlined in its various areas.

Research methods

To address our topic, we use specific artistic phenomena found in various forms of digital art (video games, painting, music, photography, etc.). We use the method of artistic and stylistic analysis to analyze a specific artistic phenomenon, so that it can be judged as a work of art or just an imitation of it. Thanks to the comparative analysis, we compare the features of the use of artificial intelligence now and outline the possible ways of its use in the future.

Results end Discussion

The expansion of artificial intelligence in the field of digital painting is already obvious. The artists here are already actively using its possibilities. For example, Hong Kong artist Victor Wong with the help of robot A.I. Gemini creates paintings in the traditional style of Chinese Xieyi painting. He taught the artificial intelligence to use calligraphy, line drawing and ink hatching techniques.

The AI-DA project presented in 2019, created by a team of art critics, psychologists and roboticists, was a kind of breakthrough, a new stage in the development of digital painting. Ai-Da is a robot artist who can draw "from life" thanks to artificial intelligence algorithms. The first part of her name is an abbreviation for "Artificial Intelligence" (the second part contains a hint of Augusta Ada King Byron, who is called the first programmer in history). The work of this first cyborg artist is currently on display at the Design Museum and The Victoria and Albert Museum in Great Britain. Ai-Da, like any modern artist, is photographed in the workshop, gives an interview, the process of how she creates paintings is filmed on video.

Oxford Art Gallery owner Aidan Meller, who owns the idea of creating a robot artist, says that the images created by Ai-Da should confuse. "These images are meant to unsettle," said Meller of the drawings and paintings. "They are meant to raise questions about where are we going? What is our human role if so much can be replicated through technology? It is not just a jobs question, it is bigger. The goal is to encourage a public discussion about these topics rather than just allow the money-makers to capitalize on all the different technologies" (*Brown, 2021*).

Ai-Da often has an uncanny resemblance to a person. Of course, she works on algorithms created by programmers and learns from what was previously created by humans, but these algorithms are already so perfect that she can support a dialogue on almost any topic, especially about art. So, when asked where Ai-Da draws inspiration, she answers that it is from various authors, among whom the robot names Kandinsky, Yoko Ono, Doris Salcedo, and Aldous Huxley. When asked if she likes to draw, she answered: "I do not have feelings like humans do however I'm happy when people look at my work and they say what is this? I enjoy being a person who makes people think" (*Brown, 2021*).

The cyborg artist is primarily known for portraits and self-portraits. On average, the creation of one portrait takes from forty-five minutes to an hour and fifteen minutes. The robot painted his self-portrait while looking in the mirror. Aidan Meller comments that this is the first self-portrait in human history without an author, as the work has no consciousness (*Brown, 2021*). This fact raises interesting questions about identity and creativity with new force, and also shows postmodern discussions about the death of the author in a new perspective.

Ai-Da is the first android-artist, and in our opinion, it is unlikely that in the future there will be a great need to create cyborgs that can draw. However, with regard to the use of artificial intelligence for image generation, there are great prospects in this direction of development of digital painting. It gives opportunities to draw in people who do not have special artistic abilities, but have a desire to draw. Thanks to artificial intelligence, this can be learned quite easily, like a craft. In addition, it solves the copyright problem: from now on, we cannot use other people's pictures, but create our own images to illustrate our ideas. There are already dozens (if not hundreds) of neural networks capable of generating different images literally in minutes or even seconds.

Moreover, we already have the first victory of artificial intelligence in the artistic field. In 2022, Jason Allen, a resident of the USA, took first place in an art competition held in Colorado with his painting "Théâtre D'opéra Spatial". The picture was created using the Midjourney neural network. An ardent discussion arose around this victory: the artist was accused of bringing the death of creative professions closer, that he won the victory by deception, etc. The author himself considers the victory deserved: he spent several weeks on the picture, made about 100 attempts, "manually" used Photoshop, scaled the image in Gigapixel. The artist doesn't believe he's cheating, as the accompanying documentation states: "Jason Allen via Midjourney." In addition, he won an art competition in the Digital Art category, which begs the question, is there a significant difference between artists who create work using Photoshop or using neural networks? Should we evaluate the tools with which paintings are created at all, or only the quality of the paintings themselves? We can predict that these questions will be key for art historians in the coming decades.

There is also an ongoing debate about the topic, whether artificial intelligence can replace human artists.

Let's give some of our thoughts on this matter. Of course, neural networks have huge advantages over the human artists: they create quickly (the generation of a picture can take even seconds), they cannot be paid, the customer of the work can correct it directly during creation, as well as the presence of dozens of options for the same subject often looks quite attractive. On the other hand, neural networks have significant disadvantages, and the main one is that they do not think, have no emotions, and are not characterized by truly creative skills. They can only learn from images already created by someone earlier, and model something new based on them. Yes, there may be some really interesting works, but it's still more of an epigonism or a compilation. In addition, sometimes it is necessary to create a request hundreds of times, and the result is still unsatisfactory. A well-known example: on the query "salmon swimming in the river", the neural network created a salmon fillet swimming in the turbulent waters of the river. You can also get an image of a horse with three legs instead of four, or a cat. However, artificial intelligence is learning, and such mistakes are becoming fewer and fewer. But is it possible to put a sign of identity between the works of neural networks and human creativity? For example, the reaction to the famous portrait of Edmond de Bellami, generated by artificial intelligence based on the study of images from the 14th to the 20th centuries, was very ambiguous. Western researcher M. Goenaga correctly notes that the appearance of this image is only a starting point for thinking about deeper topics - about computer aesthetics and non-anthropocentric forms of creativity: "There is no doubt that in this case Computational Aesthetics help us improve understanding of human aesthetic perception. Because when intelligent machines start generating their own designs and art pieces, free from our aesthetic constraints, how are we as human beings going to be able to under-stand their own original outcomes? Are we ready to adapt and fall in love with non-anthropocentric forms of creativity?" (*Goenaga, 2020: 56*).

All of the above allows us to say that neural networks will certainly play an important role in the development of painting in the future, but most likely in the applied aspect (for example, for creating design, advertising, logos, illustrating books, etc.). And, of course, neural networks can provide huge opportunities for amateurs to feel like an artist: because even now you can simply enter keywords to describe what you want to get, and in a couple of minutes you can have a pretty good drawing. This can already be done, for example, in the Midjourney and DALL-E neural networks.

While some see the limitless possibilities of neural networks (especially in the field of painting), others feel it is dangerous and threatening. A story related to the ArtStation platform, which is designed to host the works of artists, gained considerable publicity. When the generation of images with the help of neural networks began, they, accordingly, began to appear on this platform. Many artists did not like this and asked the ArtStation team to ban such works, but received a negative response, explaining that the platform aims to host an artist's portfolio. If the latter works with the help of neural networks, then he has the right to include such works in his portfolio and place them on ArtStation. Many artists did not like this and flooded the ArtStation feed with art content that clearly expressed their disapproval. The rebellion of artists against works created by artificial intelligence did not end there. In 2023, a group of artists filed a class action lawsuit against the authors of the Midjourney and Stable Diffusion neural networks. Designer and lawyer Matthew Butterick, who led this group, believes that the mentioned networks create something like collages of the 21 th century, because they simply generate images. They learn from images, many of which are copyrighted. Accordingly, the copyright of millions of artists who did not give their consent are already being violated at the moment of training these networks. Developers of neural networks have not yet responded to the lawsuit.

From our point of view, it is hardly possible to seriously fear that neural networks will completely supplant human artists. However, the issue of unsettled copyright, as well as the issue of authorship of works generated by neural networks, is becoming more and more debatable and require, among other things, legal solutions.

Let's consider the features of using artificial intelligence in digital music. Several directions can be distinguished here. The first is the creation of musical compositions based on digitized sounds (samples) and their mixing. Such music can be generated with the help of artificial intelligence. For example, the DeepBach algorithm generates notes in the style of Bach, and it does it brilliantly. During the survey (not only by ordinary people far from the musical sphere, but also of music experts), it turned out that usually people could not distinguish between chorales created by Bach himself and DeepBach, which learned from the works of the German composer to generate music, imitating his style.

The second direction of digital music is the generation of the human voice. Now artists in the field of music think about whether it is possible to generate a human voice. And we can already talk about the first successes. In 2020, ByteDance AI Lab launched the ByteSing algorithm, which allows to generate very realistic singing in Chinese.

Today, digital music offers us artificial singers. Yes, there are already virtual pop stars in Japan. In 1996, Kyoko Date was created here - a virtual 3D star that was not very popular. But the project was not abandoned, and new versions appeared, the last of which dates back to 2007. This is Hatsune Miku, who is a virtual singer, or a "hybrid product", as researcher J. Guga calls her (*Guga, 2015*). Her image was created by the Japanese illustrator KEI Garou, and her voice was synthesized using the voice donor of a real singer - Saki Fujita. In fact, it is a hologram, an android interface, or a visualization of a Vocaloid - a machine that, based on algorithms, generates musical compositions based on other musical compositions, without human intervention. The image is completely artificial, but already has tens of thousands of real supporters. Hatsune Miku has become a superstar and has been touring the world since 2015. She not only sings songs, but also became the lead actor in the digital opera "The End". The opera is a completely digital show: in addition to an artificial singer, there are also various visual effects created with the help of computer technology. Viewers noted the incredible effect of immersion, which was achieved even without the use of virtual reality glasses.

Today, it is also impossible to imagine modern video games without the use of artificial intelligence. Artificial intelligence has been used in computer games for quite some time. In the 1970s, he could build a trajectory of the ball, and in the 2000s, he already knew how to generate simple but unique missions (*Romanyuk, Koryagina, 2022*). Today we already have the first games created by neural networks. One of them is the shooter "Shoon" with pretty good graphics and gameplay. The game is free, and its

generation took only three days in the neural network. Obviously, in the future, the use of artificial intelligence can significantly simplify and reduce the cost of creating games, although it is unlikely that the "human factor" will ever be completely eliminated here. Another example is an adventure game with graphics created by artificial intelligence. The game is from the indie developer Tim Rechor, who released the adventure Dalyeh, inspired by the stories of Howard Lovecraft. All graphic content is created for her by artificial intelligence.

Regarding the prospects for the development of digital fashion and design, it is not difficult to predict that digital clothing collections will become even more popular in the future. For generations of the so-called "digital natives" who are used to living in a virtual environment, digital clothing will play an increasingly important role. I. Gardabhadze believes that "in the near future, artificial intelligence will be able not only to generate images of fictional heroes, but also to form its own virtual image" (*Gardabhadze, 2019: 181*). Those who believe that in the future our "material" wardrobe, which requires a lot of money and space to take care of, will be limited to ten to twenty things, while the virtual one may number hundreds, are thought to be right. With the virtualization of life that we will observe now, it looks quite similar to the truth. Likewise, digital design will further develop: if now only a few campaigns like IKEA offer shopping for the home using augmented reality, then in the future this trend will become global, as well the design of the apartments (houses) in an exclusive style. Already now you can print unique things on a 3D printer and develop your own design for them, in the future these technologies will become cheaper and even more user-friendly.

As for the development of video technologies and digital cinema, the following prediction can be made here. In general, creating videos will become even easier, primarily thanks to neural networks. For example, the EbSynth neural network already allows you to "animate" a picture or photo or stylize a video, and for this you only need to select the image itself and tell the algorithm exactly how we want to make it move. Currently, neural networks can only make small videos of 5-10 seconds duration, but it is not difficult to predict that this duration (as well as the quality) will gradually increase. It is thought that in the future it will be possible to create films in this way. As for predictions about the development of digital cinema, in our opinion, only animated films have prospects here, gamified cinema is unlikely to be in great demand: experiments on its creation have shown that it is not extremely popular. Those who seek interactivity are more likely to choose video games.

The possibilities of development of digital photography are, of course, difficult to predict now, since it is one of those areas of art that are developing very dynamically. It can be predicted that the techniques of creating collages, stylizations, etc. will be improved. Services that can generate photos will also develop. Similar attempts are already being made - for example, the service "This person does not exist", created by Philip Wang, is able to generate the faces of non-existent people based on the StyleGen neural network. In the era of copyright dominance, such services have a great future - because thanks to them, you can illustrate your ideas with photos, without fearing that you are violating someone's intellectual property.

It is also possible to foresee the further merging of various types of arts, the disappearance of the boundaries between them. This is already happening today, and even now it is sometimes difficult to understand to which type of art this or that art object belongs. For example, multimedia shows can combine several types of art at once. And most likely, such integration will only intensify in the future.

Conclusions

The conducted research makes it possible to say that artificial intelligence will play an increasingly important role in the development of digital art. Its use even today shows that there is no art form with which it does not interact in one way or another. At the same time, it is hardly correct to say that sometime in the future artificial intelligence will be able to completely replace the human creator. Artificial intelligence lacks real creativity, it knows how to compile, but not create original images. So, most likely, in the future, artificial intelligence will be used in the artistic field primarily in applied aspects: for example, for the development of design, but it is unlikely that it will ever learn to create a real author's content. At the same time, its use in art poses a number of difficult questions of humanity: how to evaluate non-anthropocentric creativity? does it require separate art competitions, or should it be judged on a par with human-made "products"? who should be considered the author of generated works of art – a person or a computer? Finding answers to these questions is a matter of the future.

REFERENCES

Brown, M. (2021). 'Some people feel threatened: face to face with Ai-Da the robot artist. *The Guardian*. 18 May. Retrieved from https://www.theguardian.com/culture-/2021/may/18/some-people-feel-threatened-face-to-face-with-ai-da-the-robot-artist

Chibalashvili, A. (2021). Shtuchnyi intelekt u mystetskykh praktykakh. *Contemporary Art*, (17), 41–50. https://doi.org/10.31500/2309-8813.17.2021.248425 (In Ukrainian)

Goenaga, M. A. (2020). A Critique of Contemporary Artigicial Intelligence Art: Who is Edmond Belamy. *AusArt*, 8 (1), 51-66.

Guga, J. (2015). Virtual Idol Hatsune Miku: New Auratic Experience of the Performer as a Collaborative Platform. *Arts and Technology*. Springer International Publishing. Retrieved from https://www.academia.edu/9431519/Virtual_Idol_Hatsune_Miku_New_Auratic_Experience_of_the_Performer_as_a_Collaborative_Platform.

Hardabkhadze, I. A. (2019). Tendentsii rozvytku dyzainu doby postindustrialnoho suspilstva. *Bulletin of KNUKiM. Series in Arts*, 41, 176–184. https://doi.org/10.31866/2410-1176.41.2019.188689

Keen, A. (2007). *The Cult of the Amateur: How Today's Internet Is Killing Our Culture*. NY.: Doubleday. 242 p.

Osmuk, B., Skril, I. (2023). Shtuchnyi intelekt i tvorchist: rol shtuchnoho intelektu v heneratsii muzyky, mystetstva ta literatury Nauka i tekhnika sohodni. № 9 (23). S. 500-510. https://doi.org/10.52058/2786-6025-2023-9(23)-500-510 (In Ukrainian)

Popper, F. (2007). *From Technological to Virtual Art*. Cambridge-London: MIT Press (Leonardo). 471 p.

Romaniuk, O. N., Koriahina, D. A. (2022). Vykorystannia shtuchnoho intelektu v ihrakh. In: "Youth in science: research, problems, prospects": Conference Papers. Vinnytsia Vinnytsia National Technical University. https://ir.lib.vntu.edu.ua/bitstream/handle/123456789/35633/%D0%9A%D0%BE%D1%80%D1%8F%D0%B3%D1%96%D0%BD%D0%B0.pdf?sequence=1&isAllowed=y. (In Ukrainian)

Rush, M. (2005). *New Media in Art*. London: Thames & Hudson. 250 p.

Singh, A., Tholia, S. (2023). The future of intelligent images: from simulation to stimulation. AI & Soc https://doi.org/10.1007/s00146-023-01664-7

Volynets, V. (2023). Vplyv shtuchnoho intelekta na suchasne mystetstvo: mozhlyvosti ta vyklyky. *Tsyfrova platforma: informatsiini tekhnolohii v sotsiokulturnii sferi*, 6(1), 21-31, https://doi.org/10.31866/2617-796X.6.1.2023.283933 (In Ukrainian).

Штучний інтелект і цифрове мистецтво: сучасний стан та перспективи розвитку

Марія Чікарькова (ORCID 0000-0001-9664-8132)
Чернівецький національний університет імені Юрія Федьковича (Україна)

Стаття аналізує використання штучного інтелекту у різних видах цифрового мистецтва на сьогоднішньому рівні їх розвитку та окреслює можливі потенційні шляхи такої взаємодії. Автор розглядає конкретні мистецькі приклади, які дозволяють побачити, що використання штучного інтелекту у мистецтві порушує складні мистецтвознавчі та філософські питання: що таке мистецтво? як комп'ютерні технології змінюють естетику? де знаходиться межа між технологією і творчістю? кого вважати автором твору, згенерованого нейромережами? чи можна порівнювати антропоцентричні та неантропоцентричні форми творчості? тощо. Дослідниця демонструє різні підходи до обраної тематики, цитуючі антагоністичні точки зору науковців. Одні з них вважають, що мистецтво за допомогою комп'ютера є наступним кроком розвитку авангардистських течій, а інші розглядають ці тенденції як деградацію та навіть смерть мистецтва. У цифровому живописі вже сьогодні ми стикаємося з використанням роботів (найвідоміший приклад – андроїд-художник Ai-Da), які вміють малювати у різних техніках та з використанням різних інструментів. Перемога на художньому конкурсі картини, згенерованої нейромережею, поставила питання про її авторство та допустимість участі таких робіт у конкурсах для митців. Дискусії на платформі ArtStation свідчать про несприйняття багатьма художниками робіт, виконаних за допомогою штучного інтелекту, як «справжніх» художніх творів. У музиці сьогодні можна не просто генерувати мелодії, але створювати імітації певних стилів чи композиторів, що ставить питання про природу справжньої творчості та її межі. Інший напрямок використання штучного інтелекту в музиці – створення віртуальних співаків, які стають мега-популярними. Такий приклад подає японська віртуальна співачка Хацуне Міку, яка являє собою голограму з андроїдним інтерфейсом і штучно згенерованим голосом. У сфері відеоігор штучний інтелект вміє створювати не лише рівні, але вже генерувати цілі ігрові світи й повністю ігри. Штучний інтелект у фотографії вміє генерувати образи неіснуючих людей. Водночас навряд чи штучний інтелект зможе повністю замінити людину-митця, оскільки він вчиться на вже раніше створеному матеріалі. Це дає можливість говорити, що він позбавлений справжньої креативності й вміє насамперед компілювати, а не породжувати оригінальні мистецькі рішення.

Ключові слова: штучний інтелект, цифрове мистецтво, нейромережі, творчість, комп'ютерна естетика.

Received (Надійшла до редакції): 12.09.2023,
Accepted (Прийнята до друку): 1.12.2023
Available online (Опубліковано онлайн) 25.12.2023