“NEURAL ART” AS THE SUBJECT OF COPYRIGHT (Review)

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Abstract. *In recent years, specialized media have increasingly focused on the so–called «neural creativity» – works created by special algorithms. Digital art is becoming widespread and objects created by neural networks are not only popular but even sought after by such well-known auction houses*

as Christie's. However, the legal status and authorship of such «works» has not yet been determined. This survey examines Russian and foreign legislation as well as the doctrine on how copyright law should resolve the issues raised.

Keywords: *digitalization; digital culture; neural art; Artificial Intelligence.*

For citation: Ishutin A.V., Kosarimov S.V., Chikirca E.V. "Neural art" as the subject of copyright / English transl. by Nikulichev M.Y. // Social Novelties and Social Sciences. – Moscow : INION RAN, 2021. – № 1. – P. 110–119.

URL: https://sns-journal.ru/en/archive/ DOI: 10.31249/snss/2021.02.09

Introduction

In recent years, digital technologies have been developing at an unprecedented rate and penetrating into various areas of public life. Digital technologies in medicine, transportation, agriculture, retail, security etc., subtly affect our everyday lives, and might even radically change our future. In this regard, we are witnessing the digital transformation of society, the formation of a new social environment with modern methods of communication and infrastructure of the virtual world – the so-called Internet of People (IoP). This process includes the digitization of scientific and cultural heritage (creation of electronic libraries, museums and publications); conducting online social events (online broadcasts, web conferences, etc.); the spread of social networks, even, the formation of an electronic state [Polozhihina, 2020].

Digitalization affects even the sphere of creativity, where artificial intelligence is no longer just a tool. More and more often AI is becoming a co-author in activities that until now have been the prerogative of humans. In the past few years, algorithms have been created for parametric architecture, generative clothing design, and procedural video games that have allowed designers to expand their creativity.

Artists around the world are using deep neural networks to create artefacts that are commonly referred to as "neural art" or "artificial intelligence art". The interest of the art market in this trend is an important indicator that the relationship between art, technology and society is changing, that it is time to rethink the role of art and technology in our lives and how autonomous systems can change the modern development paradigm.

However, we believe that one more issue, no less important, should be resolved in the near future – who is the creator of digital art? And who should hold the rights to digitally created works?

Neural art: history and modernity

Human brain can no longer process and absorb huge volumes of data that are extracted from modern systems. This is where artificial intelligence (AI) and machine learning come to the rescue, performing tasks impossible for humans, such as correlation, prediction, modeling, and knowledge gathering on a massive scale.

AI carries out many mundane and everyday functions that we don't even notice. For example, chatbots analyze customer requests and generate quick responses instead of real people; "smart assistants" use artificial intelligence to extract information from large datasets in arbitrary form and optimize

planning; recommendation systems on Twitch or YouTube match similar videos based on previously viewed clips. But manufacturing and trade are not the only areas where neural networks are widely and actively used. As was noted above, recently the "era of creative neural networks" began in art.

The history of this technology is very interesting and dynamic. For instance, specialists agree that AI was born in the 50s of the XX century. In 1956, a scientific conference was held at Dartmouth College on the modeling of the human mind. At the Conference a new scientific discipline dealing with the development of AI was established. Among other things, questions were raised about the ability of algorithms to create art objects, make inventions and various scientific discoveries. At the turn of the XXI century, the scientific community of the developed countries eagerly held disputes about AI and creativity. Most eminent scientists agreed that a computer will never become a creator, arguing that no matter how powerful a computer (even close in power to the human mind), its functioning will still be based on a program written by a human. Therefore, proponents of this point of view consider any research in this area to be a waste of time [Boden, 2009].

But time has proved the majority to be wrong. Scientists have achieved incredible success in this field. In early 2000ies, they made attempts to put into practice their ideas about creating artworks by neural networks, then in the mid-2010ies, first such artefacts were publicly presented. The French did it first using an AI system called Flow Machines. This system takes as a basis some musical genre or some artistic style and creates a variation. Yes, it was only an instrumental version, since the system was unable to write the text at that time, but the music itself is very similar to the basis that is used for creativity [Ihalainen, 2018]. Today, it is possible to create a work of art, be it an image, a melody or a poem, literally at a click. However, this requires knowledge and skills in programming: what ready-made algorithm to apply, how to collect a list of references for the machine's creativity and how to set a task based on the knowledge gained.

For example, as it was recently reported that AI replaced a full-time designer at the "A. Lebedev Studio" for a year with excellent results [Bondarev, 2020].

Digital technology helps artists become famous or helps become artists for those who only dreamed about it.

In October 2018, the Christie's auction house in New York for the first time exhibited a painting that was created, according to the brochure, by AI. The artefact was an unfinished portrait of a man seemingly from the XVIII–XIX centuries. The auction house estimated the printed painting "Portrait of Edmond Belamy" at 7-10 thousand dollars. The selling price at an auction reached 432.5 thousand dollars [Bondarev, 2020].

Fig. 1. AI-generated painting "Portrait of Edmond Bellamy"

The authors of such artefacts are neural networks, one of the varieties of machine learning algorithms. A neural network is a combination of many simple, interconnected elements that add up to a simplified semblance of a brain. The neural network analyzes artworks uploaded to the database, recognizes images, techniques, style parameters, and then, according to the prescribed task, uses the knowledge gained to create paintings.

The machine learning algorithm is able to find similarities, typical features and rules in any set of uploaded objects, be it painting, music or poetry. When processing a large amount of data, the neural network generalizes them and draws conclusions in different ways.

The most successful algorithm that underlies most modern AI-based creative programs is Ian Goodfellow's Generative Adversarial Network (GAN). It is built on a combination of two neural networks. The first acts as a generator-artist; it uses acquired techniques to create images. The second, the discriminator, acts as a critic; it compares the generated results with the original artworks. If the discriminator cannot distinguish the generated image from the original picture painted by a human, the

result is considered accepted. If the discriminator decides that the proposed picture is a fake, then the generator starts anew.

The discriminator can be configured to indicate what exactly seemed doubtful when evaluating the AI-generated artefact. The generator will take note of this and will not repeat the error again. That is, it will continue to train, learn and improve.

Fig. 2. The AI-generated image with Google's DeepDream effect based on the works of Van Gogh

Source: https://news.artnet.com/app/news-upload/2016/03/google-dream-starry-night-1024x811.jpg

Legal status of digital artefacts : main approaches in Russia and abroad

The main approaches in the Russian legal doctrine. Today, AI in the vast majority of cases is a tool controlled by humans: it prepares the foundation for training a neural network, sets the creativity parameters and selects the results. There are unique rare experiments when the algorithm is given the maximum freedom. This practice of using AI is accepted by legislators, refusing to recognize AI in civil law as an independent subject of copyright.

However, recently, a discussion about the legal status of copyright objects and the results of intellectual activity in general, created by neural networks, has become extremely relevant. In our opinion, the active use of AI in this area can significantly change the current copyright system due to the legal uncertainty in qualifying the subject of such artefact of art or literature.

It should also be noted that the legal status of AI in general depends on resolving numerous problems, such as determining the legal nature of AI in terms of attributing it to an object or subject of law, taking responsibility for actions committed by AI, including the issue of determining the legal status of intellectual results, generated by neural networks.

In accordance with paragraph "E" clause 24 of the "National Strategy for the Development of Artificial Intelligence for the Period up to 2030", approved by Decree of the President of the Russian Federation N 490 dated 10.10.2019, the development of a comprehensive system for regulating social relations in AI-era is one of the main tasks for Russia. However, given that today only the Development Strategy in this area has been adopted, the issue of legal regulation, undoubtedly, remains very relevant and causes much scientific dispute.

To date, the Russian doctrine is developing around two opposite points of view. One group supports the need to recognize the legal status of AI, which would accept AI as the author of the computer-generated artefacts, for example, a painting or musical composition. For example, R.R. Safin (Р.Р. Сафин) and K.A. Maskin (К.А. Маскин) maintain that the user cannot be recognized as the author of an AI-created piece, just because the question of his personal contribution is dubious. The creative process is always associated with choice, and in the case of AI, the choice is made by the properly trained neural network [Safin, Maskin, 2018].

Undoubtedly, AI, when creating an object of intellectual property, is guided by the already existing skills uploaded by the software developer, and the artefact created by this algorithm appears as a result of machine self-learning. At the same time, the programmer does not have the skills necessary to create a work. However, this point of view seems to be ambiguous. Regardless of the presence or absence of skills in an AI and a person at the start of a project, in both cases the choice is made on the basis of the available experience. In addition, in accordance with Article 1228 of the Civil Code of the Russian Federation, only an individual is recognized as the author of the result of intellectual activity, which, today, excludes the possibility of recognizing AI as such.

Another group supports the opposite view: AI is denied the legal status, while AI developers or its users are recognized as authors of the result of the intellectual activity in the event that they make a significant contribution to the creation of a copyright object.

For instance, V.N. Sinel'nikova (В.Н. Синельникова) and O.V. Revinsky (О.В. Ревинский) maintain that the development of a program capable of creating new copyrighted objects gives rise to the right of authorship to such objects from the developer of the original software, if only because AI creativity is the result of the intellectual activity of the "human creator" [Sinel'nikova, Revinskij, 2017]. It may also be noted that many scientists adhere to the same point of view and consider AI developer to be the author of the copyrighted object created using such an algorithm.

V.A. Laptev (В.А. Лаптев) believes that within the framework of legal regulation, in the near future, AI robots will receive the status of an autonomous legal personality. In the medium term, AI will acquire an official standing of a full-fledged participant in legal relations, acting on the basis of the principles of autonomy of will within the framework of the goal of its creation – serving for the benefit of humanity. In the long term, AI legal personality will extend to the virtual (digital) space that is disconnected from the material world [Laptev, 2019].

There are some non-standard approaches to the legal regime of the AI intellectual activity and generated results.

For instance, Ju.S. Haritonova (Ю.С. Харитонова), supports the idea to establish a legally recognized register for the output of intellectual activity generated by neural networks. The registry should function on the basis of distributed ledger technology, combining and classifying the objects included in it. At the same time, the author deems possible to classify such artworks as allied rights objects, but considers this undesirable, since in this case the connection with copyright would be lost Haritonova, 2019].

P.M. Morhat (П.М. Морхат), in turn, proposes to introduce into legal circulation the term "concept of legal personality of an electronic person" for complex robotic systems with AI. He calls this concept "hybrid", since it includes elements of both physical and legal entities [Morhat, 2018].

In a comprehensive study G.N. Andreeva (Г.Н. Андреева) identifies several models of legal regulation [Andreeva, 2021]:

1) "machine-centric concept", in which AI is a full-fledged author of the created artwork;

2) "hybrid authorship concept", in which a human and AI act as co-authors in creating the result of intellectual activity;

3) "anthropocentric concept", in which a human physical entity is the author of the result of intellectual activity, created with the help of AI;

4) "contamination concept", dealing with especially difficult situations when the above concepts intersect.

Among doctrinal positions expressed by Russian scientists on the legal status of AI-created objects of copyright in literature and art there are numerous approaches and concepts, including quite innovative. However, the key principles underlying these approaches should be based on rational, objective and fair legal regulation.

Foreign approaches to the legal status of digital works

There is still no consolidated opinion of foreign scientists on the legal regulation of neural art. Lawyers are taking only the first steps in this area, doing mostly theoretical research. Indeed, this issue is very complex, and the very phenomenon of neural network creativity is very young, no more than ten

years old. Therefore, at the moment everything is limited to scientific articles in which the authors are considering the possibility of legal regulation of such works. Accordingly, there is no legislative regulation of this issue.

For example, J. Ihalainen believes that the legislature intentionally refrains from regulating this issue, because granting copyright protection to digital works will create a problem: those who plan to mass-produce AI-generated artefacts will become monopolists. The author writes that in the UK, for example, objects created by a computer with human assistance are protected by the copyright of the programmer who wrote the computer code. But if a similar approach is applied to works created without human participation, problems may arise, in particular, the era of author's trolling may begin [Ihalainen, 2018].

In Australia, copyright law explicitly requires a so-called "qualified person" to be the author. Consequently, works created by neural networks clearly do not fall into this category and remain outside the legal regulation. The situation is roughly the same in Canada. The copyright law clearly states that the author of a work must a Canadian citizen or a person residing in Canada [Ihalainen, 2018]. It turns out that the legal regulation covers cases where the computer acts exclusively as an auxiliary tool in creating a product, but in not the cases when a work is created by a neural network entirely.

Let us consider Asia, namely Japan. This is the only country in the world so far that discusses creativity of neural networks. The prevailing idea is to limit the protection of AI-assisted outputs, and to treat them as a trademark, diverting the legal regulation to the area of unfair competition. In this case, the rights to digital works will belong to the human creator of the corresponding algorithm. However, this approach leaves popular works practically unprotected, taking them out of the scope of copyright.

Conclusion

The analysis of Russian and foreign approaches to the issue of protecting rights to neural art demonstrates that so far this area is practically not regulated at the legislative level. The legislator does not keep pace with modern trends and rather attempts to catch-up. The variety of views and approaches is too great, ranging from proposals to recognize the legal personality of AI to the innovative approach proposed by Japanese lawyers. Thus, it is still difficult to predict how the industry will be regulated. Only one thing is obvious – the legislator must cooperate with software developers who create algorithms, because only they will be able to explain how neural networks operate. Legal scholars, in turn, must listen to the explanations and draw the right conclusions, implementing them in copyright law.

It should be emphasized that the legal status of products of neural networks capable of imitating human mental activity should be defined and legislatively regulated in order to form a clear position on this issue and to prevent legal uncertainty and gaps in law. Moreover, the normative legal regulation should be developed on the basis of an analysis of both domestic and foreign experience.

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