Legal Regulation of Intellectual Property Rights in the Digital Age: A Perspective from AIGC Infringement

Wangrui Yang[*]

Guangdong University of Finance, 527 Yingfu Road, Longdong, Tianhe District, Guangzhou City, Guangdong Province, China
[*]Corresponding author: 3142723484@qq.com

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Abstract: The emergence of Artificial Intelligence has changed the traditional way of creating works dominated by human beings, which has triggered many copyright-related issues. Globally, there are relatively few AIGC copyrightable cases in the judicial practice related to AI technology, which, taken together, leaves many issues to be discussed at the legislative and judicial levels, such as the determination of copyrightability, the ownership of works, the protection of data ingested by AI, the balance of interests, and so on. Determining copyrightability of AIGC can, on the one hand, help to "settle disputes" in technical disputes related to AIGC, and, on the other hand, guide the development of copyright in literature, art, and science. Therefore, it is necessary to respond to a series of copyright issues caused by AIGC. Based on the current development of AI technology, guided by the essence of copyright law, and considering the protection practice of AI-generated objects, this paper intends to study the focus of copyright disputes involved in the AIGC. It will participate in the legal regulation of intellectual property rights as a matter of course, and offer suggestions for balancing the legal interests of creators and the public.

1. Introduction

With the breakthroughs in data, algorithms, arithmetic, and other related core technologies, AIGC has come into real life from the concept of becoming a new type of content creation, presentation, and interaction. AIGC: AIGC is known as Artificial Intelligence Generated Content, or "Artificial Intelligence Generated Content", is an artificial intelligence technology based on generative adversarial network GAN, large-scale pre-training models, and other artificial intelligence technologies. AIGC: AIGC, known as Artificial Intelligence Generated Content, or "Artificial Intelligence Generated Content", is an artificial intelligence technology based on Generative Adversarial Networks (GANs), large-scale pre-training models, and so on.Various types of AIGC models essentially utilize existing works for model training and generating final results. However, there are similarities and differences among them. The works in the database undergo a certain degree of formal conversion into the AIGC model. The AIGC model utilizes autonomous learning capabilities to extract valuable content, and then generates and matches results based on input commands to produce the learning output.

However, the risk of infringement of AIGC model works cannot be ignored by all sectors.A joint team of researchers from the University of Maryland and New York University noted that the likelihood of content generated using the Stable Diffusion model being more than 50% similar to the works in the dataset was 1.88%, making it impossible to ignore the existence of copyright infringement issues given the huge volume of user usage.[1]

In a recent experiment using AI diffusion generation models such as Stable Diffusion, researchers said that because the search for copyrighted works in the experiment covered only 12 million images in the training dataset (a very small portion of the training dataset as a whole), and because there is a high probability that there is copied content that cannot be recognized by the search method, the results of this experiment would underestimate the amount of infringing copying in Stable Diffusion.

2. Technical Principles of AI Painting - Using Stable Diffusion as an Example

In Stable Diffusion, the plaintiffs' allegations revolved around Stability AI's acquisition and use of copyrighted works as "training images" for Stable Diffusion without the rights holder's permission.[2] Plaintiffs characterized the Stable Diffusion model as "a complex collage tool" - "storing and combining countless copyrighted images into training images and then stores and merges numerous copyrighted images into training images and then ...... generates 'new' images based entirely on the training images." Defendants "commercially benefit and profit handsomely from the use of copyrighted images," while millions of rightsholders suffer losses as the resulting "new" images crowd the market for the original work.

Stable Diffusion model painting is a process of "from something to nothing", i.e., from the base plate covered with messy noise (similar to the "snowy screen" of the TV in the 1990s), the irrelevant noise is continuously removed until the final target image is retained. In the model training stage, the Stable Diffusion model takes the works downloaded from the database as input objects, adds noise to them and encodes (compresses) them so that the works enter the "image information space". The copyrighted work that enters this space will "interact" with the descriptive text encoded by the "Clip Text Encoder" to obtain the result of the fusion of the two pieces of information - the "potential representation". "Potential Representations". As a source of training data, it uses LAION-5B, a database of hundreds of millions of images, which contains the infringing works claimed by the plaintiffs.

The Stable Diffusion model utilizes copyrighted works in two phases. First, in the AI model training stage, Stable Diffusion utilizes copyrighted works to train its internal component "Image Encoder" (U-Net model), which is complemented by "Clip Text Encoder" (Text Encoder model), to generate image content by simply inputting a piece of descriptive text. The final result is that only a descriptive text can be input to generate the corresponding image content. Second, the AI model application stage: Stable Diffusion can output the final image based on the text given by the user after sufficient training. However, these generated image contents have a high probability to contain and show the elements and features of the copyrighted works as training data.

It is included in the training phase of the model. The main utilization behaviors of the Stable Diffusion model for copyrighted works are "copying" and "adapting". The relevant behaviors are mainly reflected in two steps.

First, it is the copying during the preparation of training data. Since the LAION-5B database itself does not provide copies of copyrighted works but only indexes the list of online URLs of copyrighted works, before training the Stable Diffusion model, the works used as training data need to be downloaded and stored from the corresponding web addresses to form copies of copyrighted works.

Secondly, it is an adaptation of a work that has been encoded and then imported into the "image information space". Compared with the direct download and storage of the work, the process of adding noise and encoding (compression) to the work does not "restore" the original copyrighted work "without any difference" in the "image information space", but it still retains the most crucial and essential features of the work's content, and should be recognized as an adaptation in the sense of the copyright law. The work should be recognized as an adaptation within the meaning of copyright law.

In the content output stage, the final image is generated by the Stable Diffusion model, which first needs to correspond the user-input text to the "potential representation" in the "image information space" through the "Clip text encoder". "Potential Representation".the U-Net module, trained on the noise output, predicts the noise added to the potential representation. Again, the potential expression of the text is subtracted from the noise predicted by the "U-Net module", and "denoising" is carried out several times according to the user's settings, and the new image content is finally obtained.

At this stage, the exploitation of the original copyrighted work has to be judged on the final generated content. If the content generated after denoising and decoding constitutes "substantial similarity" in expression to the original work, it falls within the scope of regulation of the "reproduction right"; if it does not constitute "substantial similarity", it may constitute an infringement of the "adaptation right" of the original work, but forms a new expression while retaining the basic expression of the work. If it does not constitute "substantial similarity", but forms a new expression on the premise of retaining the basic expression of the work, it may constitute an infringement of the "right of adaptation" of the original work.

In broadening the discussion to AIGC models in general, Kevin P. Murphy, a researcher at Google, notes that machine learning models sometimes reconstruct the characteristics of the input data rather than reflecting the underlying trends in those data. Such models can be viewed as probabilistic models for generating works that fall under the broad definitions of "copy" or "derivative work" of original work, and infringe on "reproduction rights" and "adaptation rights". There is a risk of infringement of the "reproduction right" and the "adaptation right". In addition, according to the official website of Stable Diffusion, the new content generated by Stable Diffusion is presented in the Internet environment as "CC0 1.0 Generic" and is "completely open source". From the perspective of copyright law, whether the distribution of the generated content is interactive or non-interactive, i.e., whether it can be accessed by the public at a time and place of their choosing, may also fall under the scope of the "right to disseminate information networks" and the "right to broadcast", respectively. At the same time, there is also the risk of damaging the package user's right to information, privacy, and copyright.

3. National positions on the copyrightability of AIGC

United States of America;

The U.S. Copyright Office has adopted "originality" as the basis for its judgment: AIGC may be protected under the copyright law if, and only if, it has "the author's creative idea given expression by the author."[3] At the same time, copyrights are registered for the part of the text, coordination of visual elements, and arrangement that is done by human authors themselves, but not for the part that is done by artificial intelligence. In addition to this, the department has issued the "Guidelines for Copyright Registration:[4] Works Containing Material Generated by Artificial Intelligence", which describes its approach to examining and registering works containing material generated by AI technology.

EU

In 2020, the European Commission published another report [5] , which concluded as a whole that the current level of technological development of AI does not require immediate and substantial changes in European copyright and patent law, that the existing concepts and rules of copyright and patent law are sufficiently abstract and flexible to deal with the current challenges of AI, and that the neighboring rights regime may be extended to all areas of "unauthorized" AI generation. Meanwhile, the report proposes a "four-step test", i.e., four interrelated criteria to determine whether an AIGC qualifies as a "work": According to the "four-step test" issued by the European Union [6] , whether an AIGC qualifies as a "work" depends mainly on the fulfillment of Steps 2 and 3, i.e. whether the AIGC expresses human intellectual activity and is original.

China

For AIGC to constitute a "work" protected by the Copyright Law[7] , it needs to fulfill the requirements of "belonging to the field of literature, art and science", "capable of being expressed in a certain form", "possessing a certain degree of originality" and "having a certain form of expression". To constitute a "work" protected by the Copyright Law, it needs to fulfill the four elements of "belonging to the field of literature, art and science", "capable of being expressed in a certain form", "possessing originality", and "belonging to the fruits of the human intellect" (the "Four Elements of a Work"). As to whether an AIGC "belongs to the field of literature, art and science", since AIGCs are mainly expressed in the form of text, pictures, video, audio, etc., they are often considered to have the constituent element of "belonging to the field of literature, art and science". (b) The AIGC is not a literary, artistic, or scientific work, but a work of art.

In terms of whether AIGC is "capable of expression", the main criteria include: (1) whether the content can be perceived by human beings and reproduced in a certain form; and (2) whether the content is distinguishable from "thought" and constitutes a figurative "expression". The difference between an "idea" and an "expression" in this context lies mainly in the size of the range of expressions available to the author at the time of creation, i.e., if there is only one or a limited number of forms of expression for a certain concept, these expressions should be regarded as "ideas", not "expressions". If there is only one or a limited number of forms of expression for a certain concept, these expressions should be regarded as "ideas" rather than "expressions" and cannot be protected by copyright. Since AIGC is often transmitted and reproduced in the form of data and is capable of generating content that is not dissimilar to the appearance of ordinary works created by human beings, it is often considered to fulfill the constitutive element of "capable of being expressed in a certain form". Based on this, whether it meets the elements of "originality" and "intellectual achievement" becomes the key to whether AIGC can constitute a "work". It is generally believed in China's theoretical and practical circles that, based on the purpose of encouraging creativity, the Copyright Law should only protect the intellectual achievements of human beings, and the originality of a "work" should reflect the intellectual choice and judgment of human beings. Since in some AIGC products, human beings only need to input simple prompts, and the AI can generate detailed content, the contribution of human beings to the final generated content seems to be minimal, and this is the biggest challenge facing the inclusion of AIGC in the protection of the Copyright Law.

3.1 If the AI drawing product constitutes a work of authorship, to which subject should the copyright belong?

As a kind of private right, copyright, without violating the mandatory provisions of laws and regulations, the parties concerned can agree on the attribution of rights to the content generated by creation utilizing agreement. However, copyright sharing inevitably leads to problems such as inconvenience in the distribution of rights and responsibilities and difficulty in exercising rights and

interests in the future, therefore, mainstream AIGC products have not adopted the model of copyright sharing.

From the current situation of domestic and foreign AIGC service providers, it seems that they believe that AIGC-generated content belongs to works, and most of them believe that its copyright should be owned by the user. Offshore AIGC service providers, such as Artbreeder, stipulate in the service agreement that Each Artbreeder image is owned by the user who created that image, i.e., the image generated by the service belongs to the user; NightCafe stipulates in its service agreement that Once your Artwork has been created and delivered to you, all Intellectual Property Rights subsisting in that specific Artwork is transferred to you and you may use your Artwork for personal or commercial purposes. i.e. Once your Artwork has been created by the User, all Intellectual Property Rights subsisting in that specific Artwork are transferred to you and you may use your Artwork for personal or commercial purposes.

Most of the AIGC service providers in the country hold similar views. Dream Thief is an AI painting platform jointly launched by Xihu Xinchen (Hangzhou) Technology Co. and the Deep Learning Lab of Xihu University. Through its service agreement, Dream Thief makes it clear that "the AI models used by Dream Thief are all open-sourced using the MIT protocol, based on which we carry out in-depth customization of various thematic styles, and the copyright of the images generated is fully authorized to the generator himself, which means that, images generated by the user, such as the absence of unforeseen circumstances, the copyrights are attributed to the user. " The same goes for 6pen, which is based on AI technology to turn your text descriptions into painting artwork. You can submit your generated works to prize exhibitions and display them in the community to create more value. 6pen service also makes it clear that "no copyright is retained. 6pen does not retain the copyright of the works generated by you, if there are no special circumstances, the copyright belongs to the generator or the CC0 agreement. Use it for yourself, for business, as an avatar, whatever you want. In 6pen, the copyright of all the works you generate with AI belongs to you, 6pen doesn't reserve the copyright.

The distribution of the creative process of AIGC lies in two segments, one of which is the segment in which the AI program is written, and the other is the segment in which the input information is supplemented, the latter of which is not mandatory. If the human choices in all segments are made by the same subject (natural or legal person), such as a company that develops the AI program, that subject shall be granted copyright over the corresponding AI-generated content.

The real problem may be that it is not so easy to make a clear distinction between the two parts of the AI generation process and human "input or intervention", i.e., the subject of conceptualization and execution of the AI generation process is divided into the two opposites, i.e., the "human" and the "machine". It does not seem to be that easy to make a clear distinction between the two parts of the AI generation process, i.e., the absolute division of the conceptualization and execution of the AI process into "human" and "machine". For example, in a model like ChatGPT, which shows the possibility of joint conceptualization, collaborative execution, and co-generation between humans and machines, the quality of human questions and the creative thinking behind the questions largely determines the quality of the answers in ChatGPT, and the scale of the model and the algorithmic structure behind ChatGPT determine the amount of information and accuracy of the answers. Therefore, if the modifications, instructions, and screening given by the AI user in the generation process of AIGC create the originality of the final answer, even if the final content is "one-click generated" by AIGC, it is worth discussing whether it should be recognized as a work and the authorship should be granted to the AI user.

However, in the current mainstream AIGC products, AI technology developers and users tend to focus more on building and optimizing the algorithms themselves, rather than considering the

creativity of the vast amount of specific content generated by the AI output during its use. Even though AI technology developers take into account algorithmic design to avoid sensitive topics like politics, religion, ethics, morality, and public order during content generation, they may also utilize manually identified data tags to train additional models for identifying offensive content. These models are integrated into the AIGC algorithms to filter out illegal, offensive, unethical, immoral, and disorderly content, thereby influencing the final content. However, such actions are primarily aimed at complying with universal laws and regulations. Public order, and can hardly be interpreted as the original intellectual activity of the AI technology developer for the AIGC. Therefore, it is relatively unlikely that the AI technology developer will become the author.

3.2 Dispute between "originality" and "fair use" in the context of constituent elements

Plaintiff argues that it created latent images of all 5.85 billion images on which the model was trained. These latent images were developed through a machine-learning process in which a training image was associated with a particular word. More and more noise is then gradually introduced over the training images until eventually the entire original training image is completely obscured by noise. A second machine learning process is then performed that reverses the process. Only this time the noise is gradually reduced, and the program tries to construct its image that visually reconstructs the original image it has just trained on, but it can never do a replica.

Plaintiffs argue that the latent images are copies of the training images, and while they do not refer to them as exact copies or replicas, they do refer to them as reconstructed copies and infer the argument that they are, for all intents and purposes, copies. The central issue in this case is that any image generated by stable diffusion is a derivative work of the training image on which the model is based. A derivative work is a work that is based on or derived from one or more pre-existing works, translations, movie adaptations, art reproductions, and new editions of books.

Once the program is trained, the lawsuit claims, its Data Mesh, the statistical grid of data that contains all the billions of potential images, can be manipulated through conditioning and interpolation. To illustrate this, the suit uses the example of a dog in a hat eating an ice cream cone. In this example, the textual cue "a dog wearing a hat is eating an ice cream cone" is the conditioning data that informs the model which potential images need to be called. Through a process of interpolation, the program combines the potential images into an image recognizable to the human eye. The argument is that this interpolation still relies entirely on the latent images, which are derived entirely from the training images, which are copyrighted, even though the resulting image of a dog wearing a hat and eating an ice-cream cone looks completely different from any of the original training images.

The plaintiffs make a good argument that every image generated by the model is a derivative work. This is important because the right to make and distribute derivative works is known as the right of adaptation. It is one of the exclusive rights of copyright, which means that a derivative work cannot be created without the authorization of the copyright owner.

However, if the work alters the original work with a new expression, meaning, or message, or increases the value of the original work by creating a new message, new aesthetics, new insights, or new understandings, then the work is recognized as an adaptive work rather than a derivative work. An alternative work changes the nature of the original copyrighted work to such an extent that its use no longer constitutes infringement because it serves an entirely new purpose. It is not merely a derivative work. The importance of this nuance between derivative works and transformative works cannot be overemphasized. Derivative works require permission from the copyright owner, whereas transformative works do not. From this perspective, we can accurately view the real issue in this case. The real issue is whether the use of the stability of the five-point eighty-five million training

images that make up the Lion 5 b dataset constitutes fair use.

The image content generated by AI has a high probability of containing and displaying the elements and features of the copyrighted work used as training data. In the development stage of AI drawing tools, developers need to provide hundreds of millions of images for building AI deep learning datasets, most of which are automatically captured from the Internet by algorithms without obtaining authorization from copyright holders or paying the corresponding fees, so does this kind of copying constitute infringement? Can developers invoke the "fair use" clause as a defense to infringement?

The outcome of the decision in favor of fair use will be far-reaching, and it will effectively allow AI image generator cart Blanche to create trained models on any type of work, no matter how large, and without the permission, consent, or authorization of any copyright owner, all of whom contribute valuable original works to the image generator models, whose primary value lies in these underlying images. All they do is take some images and generate more images from them. This technology will forever impact audiovisual entertainment as we know it.

Fair use is an affirmative defense, meaning that the plaintiff cannot bring a lawsuit. A defendant can only raise a defense if the plaintiff raises a claim of copyright infringement.

Instead, the court will analyze to determine whether their use of the Lion 5 b dataset constitutes transformative fair use. At its core, fair use prevents a rigid application of copyright law that would otherwise stifle the creativity that copyright law is designed to foster. To find fair use, U.S. courts consider four factors.

First, courts consider whether the purpose and character of the new use alters the original use. A transformative use must change the nature of the original copyrighted work to such a significant degree that the use is no longer considered infringing, nevertheless, the fact that the new use is found to be transformative does not guarantee that the new use is justified. This is because the court also has to consider the nature of the original work, the amount and substance of the original work used in the new work, and finally, whether the new use impairs the market value of the original work. The commercial value of the new use cannot impair or replace the value of the original work. Rather, fair use requires a high degree of novelty, originality, and a new purpose for the new use.

Finally, courts will always consider prior precedents in determining fair use. Artificially intelligent image generators have never existed before, and there are many cases to consider. Two cases in particular stand out. The first is Perfect 10 v. Google.The case was brought by Perfect 10, a publisher of adult magazines, [8] against Google, which had made thumbnails of Perfect 10's images available through its search function. Perfect 10 then sued Google for copyright infringement. However, the court held that Google's use of the thumbnails was fair, primarily because the use was highly transformative. The court ruled that Google had transformed the images from entertaining to information-seeking, noting that the search engine technology provided an astoundingly valuable public benefit that should not be harmed by the possibility of affecting someone's sales. This is a very strong precedent.

The second case is Authors Guild versus Google.[9] The case, brought against Google by a diverse group of publishers, centered on whether Google infringed copyright by scanning and digitizing copies of printed books into an online searchable database. The court affirmed the definition of fair use, stating that digitizing books, creating a search function, and displaying only snippets of them in search results was fair use. The court also held that despite Google's commercial nature and profit motive in the new use, the copywriting was highly transformative and did not destroy the market for the original. The fact that Google had a commercial nature and profit motive in the new use was immaterial. The fact that Google is using thumbnail images, which have amazing public interest value, is irrelevant. So what does this mean for the art of artificial intelligence? As you can see, the Court relied heavily on the transformative nature of the new use.

This is because their use of the training images in the "Lion 5 b" dataset is highly transformative, thus creating new uses for the original images. Moreover, this new use of "Stability" does not appear to deprive copyright owners of their right to control and benefit from their original works.

In the case of copyright disputes involving the determination of the originality of works of art, the Supreme People's Court of China has clearly pointed out that the requirement of originality for different kinds of works is not the same. The originality of a work of art requires that it reflects the author's unique creativity and concepts in the field of aesthetics; for objects with both appreciation and practical value, whether they can be protected as a work of art depends on the unique personality and creativity embodied in the author's intellectual labor in the field of aesthetics, and intellectual labor that does not belong to the field of aesthetics has nothing to do with originality.

4. Exploration of the Path of Copyright Regulation in the Age of AIGC

4.1. Legislative level

The copyright infringement dispute (2024) Guangdong 0192 Minchu 113 decided by Guangzhou Internet Court is known as the first case of infringement on the global AIGC platform in many commentaries[10] , the plaintiff in this case is Xinhua Tron, which has obtained the exclusive license of the copyright of the image of the Ultraman series from Yuanyu Productions Co. since 2019, and the defendant is an AI company whose name has not been disclosed to the public. The defendant in this case provided AI image generation services for a fee through the Ta tool, and the plaintiff, Xinhua Chuang, generated images substantially similar to Ultraman through the defendant's Tab by inputting Ultraman and related keywords as indicator words. The Plaintiff changed the claim and finally set the cause of this case as an infringement of the reproduction right, adaptation right, and information network transmission right.

The decision first cited Article 4 of the Interim Measures, which states that "Generative AI service providers shall comply with laws and administrative regulations, respect social morality and ethics, and respect intellectual property rights," emphasizing the duty of reasonable care in providing generative AI services, and used this as the basis for the analysis of the Defendant's failure to exercise reasonable care as an AI service provider. The analysis of the Defendant's failure to exercise reasonable care as an AI service provider was emphasized.

The decision cited the Interim Measures, but in the Spring Breeze case, the Interim Measures were not part of the copyright legislation in terms of style, and neither conflicted with the existing rules of the copyright law nor substantially filled the gaps in the copyright law. The Interim Measures are related to the regulation of copyright or perpendicular to the administrative supervision, such as the aforementioned Articles 12 and 15; the provisions related to the substantive rights of copyright are guideline legislation, i.e., they repeatedly lead back to the Copyright Law as the basis, such as the provisions in Article 4 that "the provision and use of generative AI services shall be...". ...(3) Respect intellectual property rights". The provisions of the Provisional Measures relating to the substantive rights of copyright are all adopted in the form of guideline legislation, indicating that the Provisional Measures cannot replace the copyright law, and the supplementary value is also focused on the regulation. At the same time, the Interim Measures belong to AI legislation of an experimental nature, and the global experience of AI legislation is not sufficient. In many cases the process of generative AI generating specific content is not completed independently by the big model but by the participation and joint decision of multiple subjects such as the big model, the training dataset, and the user.

Since China's copyright law has not yet provided for fair use in the form of text and data analysis, computer information analysis, etc., the evolving AI technology should be taken into account when improving the relevant legislation in the future.AI painting is an act of imitating the characteristics

of a work, so it should be the object of intellectual property law adjustment. Intellectual property law can even be defined as the legal norm that distinguishes between legal imitation and illegal imitation. Human civilization advances because of imitation, and imitation should be encouraged in principle, with intellectual property rights being the only exception. "The reality of the copyright system will always be to move between 'protecting creation' and 'prohibiting imitation'."

4.2 Judicial level

Optimizing the copyright protection mechanism of the AIGC model

Platforms are an important channel for the dissemination of works, and in addition to external means such as technical standards, judicial protection, and administrative supervision, platforms with a certain degree of copyright autonomy should also take the lead in transforming themselves from "governance receptors" to "governance subjects". In terms of the internal management of individual platforms, large platforms that disseminate chatbot-generated content can learn from the YouTube platform's technological means of content identification and copyright monitoring to increase the screening of infringing content and further handle it.

On the other hand, the content dissemination platform can also sign a usage agreement with the AIGC platform, committing itself to the source of copyright and the use of legalization from the source. The relationship between data mining, work generation, and the use of generated content should be handled well. The essence of copyright risk management in the data mining stage is to balance the interests of right holders and digger.The copyrightability and copyright attribution of judicial decision-making views present a good opportunity. The Supreme People's Court can promptly arraign representative cases and establish relatively consistent decision-making views on a national scale.

5. Conclusion

The author puts forward a few suggestions on the design of the current legal system: firstly, consideration can be given to formulating a special marking obligation for AI creations, for example, setting up a unique marking for AI-created works to distinguish between human and AI creations. This can help the public clarify the origin of the work while protecting the rights and interests of users. Second, the copyright of AI-created works should be reconfigured, including the establishment of a multi-party rights-sharing mechanism. For example, consideration could be given to allocating the copyright of AI-created works to AI developers, data providers, and users, and establishing a corresponding benefit-sharing mechanism. Finally, the "separation of attribution and copyright" can be used to clarify the attribution of rights and stop disputes, i.e., the attribution of the copyright of AI works can be given to investors, developers, or users through declarations, confirmation of copyright registration, labeling, and so on. This practice of separating signature and copyright breaks the rule of the current copyright law that "the person who signs his/her name on the work shall be regarded as the author, and shall be presumed to be the owner of the copyright".Facing the challenges of generative AI technology requires not only an in-depth analysis and adaptive reform of the current copyright law, but also the cooperation of many aspects of technology, society, and law to achieve reasonable regulation and protection of AI creations.

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