

Rise of AI-generated content (AIGC) in gaming and its legal challenges

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Abstract:

The application of AI-generated content (AIGC) is changing the entire gaming industry. AIGC has expanded the application of AI from the elements that constitute the game to the design and production of the game itself. To protect the original creators in gaming industry, the regulation of AIGC is more important than ever. This article discusses the copyrightability of games to determine the scope of regulation of AIGC and proposes a regulatory plan. After analysis, the focus of copyright infringement review and protection of AIGC should be on the output stage. After analysis, the focus of copyright infringement review and protection for AIGC should be on the output stage. When determining infringement, the Abstraction-Filtration-Comparison Test should first be applied to abstract out components that are not protected by copyright law, such as those in the public domain and those influenced by external circumstances. This filtered result should then be compared with the allegedly infringing program for substantial similarity. This identification method allows developers to benefit from the improvements in game quality and player experience brought about by AIGC technology, while maximizing the protection of the legitimate rights and interests of original creators. Thereby promoting the development of the gaming industry.

Keywords: AI-generated content, copyrightability, output stage, Five-layer theory

Introduction

Gaming industry, as an indispensable means of electronic entertainment, has seen its market share and audience increase in recent years greatly. According to *Mobidictum Game Industry Report*¹ (Shchur, 2024) and *Reuters*², the market size of the gaming industry

was \$183.9 billion in 2023. In 2024, the market size reached \$187.7 billion, a year-on-year increase of 2.1%. Based on current data forecasts for 2025, it is expected to increase by 3%-4% year-on-year, and the market size may reach \$189 billion. These data not only reveal the important position of the gaming industry in the global market but also reflect the rapid

upward trend of it.

In the global game revenue, mobile games account for 50%, while PC, console games and other games account for the other 50%. As a country where mobile game accounts over 70% of the domestic game market, China plays an important role in the global game industry. Game market in China share in the world has remained stable at around 30%³ (China Audio-Video and Digital Publishing Association, 2024), combined with the large player base in China, making it the world largest single game market. Recently, the impact of AI on the gaming industry has received much attention. On January 10, 2024, Valve, the owner of Steam, the largest gaming platform on the PC, announced that it would provide a new review process for AI-generated games to help them be listed on the Steam platform. Prior to this, Valve banned any games that use AI-generated content (AIGC) from being listed on the Steam platform unless developers can prove that they own all IP intellectual property used in the data sets used to train AI to generate these resources. The changes made by the gaming platform demonstrate the huge impact of AIGC on the gaming industry. Before the emergence of AI-generated content, some traditional AI technologies such as AI NPCs and AI image models have already been widely used in the gaming field. However, the emergence of AIGC has expanded the application of AI from the elements that constitute the game to the design and production of the game itself. This phenomenon has put AIGC and original creators in a competitive relationship, thus triggering the need for AIGC regulation, especially in the field of copyright law.

As an additional explanation, games can be protected as computer software. Direct comparison of the code can clearly show whether infringement has occurred. However, the parties involved are often unwilling to provide game codes, and it is difficult to prove the possibility of access to the code⁴(Yin & Liu, 2009). Therefore, this article mainly discusses other protection paths in copyright besides computer software.

1. AI Violations in Gaming

To better regulate the application of AIGC in the gaming industry, first need to understand what kind of violation AIGC may lead to. But before that, it is important to know what AIGC is and how it works.

1.1 What AIGC is and how it works.

AI-generated content means that after AI receives task instructions from humans, it can process natural language of human and therefore automatically generate pictures, videos, audio, or any forms of production, including

game. ChatGPT is a type of AIGC mainly used for language conversations. The reason why AIGC can influence the gaming industry in real life is the support of three important technologies: deep learning, neural networks, and generative adversarial networks⁵ (He & Zhang, 2025). These technologies make it difficult to distinguish between AI-generated works and human-generated works in AI regulation.

The application of AIGC in game production can be divided into two modes. (1) Pre-generated content, which refers to the generation of content with the help of AI tools during the game development process. For example, in role-playing games, AIGC can help developers create various types of characters and define the attributes or appearance of these characters. (2) Real-time content generation, that is, generating different content through interaction with players during the game. For example, generating dynamic character dialogues and game plots based on the choices of player.

1.2 Where copyright violations can occur

During the data training and application phase of AIGC, there are two key stages that may lead to AI violation. First, in the data training stage, if AIGC collects and uses copyrighted content for AI training without authorization, it may constitute copyright infringement. Second, in the generated output stage, if the AI generated output contains works protected by intellectual property or is substantially similar to the works of others, it may also constitute infringement.

In the AI training stage, there are two main views on whether AI training data constitutes copyright infringement, one supporting it and the other not. According to the view that AI training data constitutes copyright infringement, system learning is essentially a process of copying, adapting and disseminating. AI platforms copy and transfer a large number of copyrighted works to computer memory or storage devices, convert the original works into other forms of expression or generate substantially similar new content, and transmit or share them on different devices and network platforms. This constitutes an infringement of the right to copy, the right to adapt and the right to disseminate information on the Internet⁶ (Ropes & Gray, 2025).

According to the view that it does not constitute infringement, the behavior of AI training data should be considered as a *fair use*. This view holds that AI, as an inclusive technology, the training data used in its model belongs to the exploration of technical resources, which has public attributes. From the perspective of results, the training behavior that only serves as the input end neither make com-

mercial profits, nor affect the normal use of copyrighted works or infringe on the legitimate rights and interests of others, therefore should be included in the scope of fair use⁷ (Jiang & Lin, 2025).

At the output stage, opinions on AI infringement are basically unified. If the work produced by AIGC is substantially similar to an existing copyrighted work, it can be considered that AI infringement exists. However, there is still controversy over whether the user or the platform is responsible for the infringement⁸ (Goodyear, 2024).

Although there have been few infringements related to AIGC in the gaming field so far, players have already had heated discussions on the application of AIGC in other fields. In early February 2025, Steam player *AyeforScotland* initiated a discussion on the official forum about *whether AI-generated content should be labeled or filtered*, and the topic quickly spread to platforms such as Reddit, YouTube, and Pinterest. *AyeforScotland* suggested on official forum that Steam should follow the way it handles adult/NSFW content and add filtering options for players to block such games. This topic has triggered a wider discussion later, which has received 23,000 likes and more than 1,700 comments. The focus of the discussion also expanded to deeper issues, such as how to define the degree of AI involvement and how to avoid AI violations towards original producers.

2. Copyrightability of Games

2.1 Games as protectable works in China and the U.S.

According to current laws, regulations, and judicial interpretations in China, there is no clear definition of what type of work a game constitutes under copyright law. However, it is recognized that the continuous dynamic game screens generated when the game is running can be protected as audiovisual works⁹ (Deng Danyun, 2021). The concept of audiovisual works was added to China Copyright Law in 2020, replacing the *cinematographic works and works created by a process analogous to cinematography* and expanding the scope of protection. The original scope refers to works which are recorded on some material, consisting of a series of images, with or without accompanying sound, and which can be projected with the aid of suitable devices or communicated by other means. Game is driven by computer programs, it combines multiple copyrightable elements such as text, music, pictures, audio and video. When the game is running, these elements form a continuous and dynamic combination under the purpose of reflecting and serving the rules of game play. This kind of continuous dynamic image meets the

definition of audiovisual works.

This view has also been supported in many jurisprudences. In *Zhuangyou v. Shuoxing* case, Shanghai Intellectual Property Court recognized that the continuous images of the game *Miracle MU* constituted a film-like work.¹⁰ From the perspective of the creation process of online games, the functions of game planners, material designers and other creators are similar to those of directors, screenwriters, artists, music, and costume designers in the film creation process, and the programming process is equivalent to the filming of a movie. From the perspective of expression, the game screen is composed of a series of screens with or without sound, which has a similar expression to film works. Although the continuous screens presented by different players operating online games may be slightly different, their main parts are the same, and the different screens are all pre-set by the developer. It is impossible for players to add or modify the screen beyond the preset of the game developer. The Supreme People's Court¹¹ and Guangzhou Intellectual Property Court¹² also has similar precedents.

The United States has a more flexible protection for games. Games can be protected as computer software works or literary works; if pictures or images are dominant, they can be protected as visual art works; if continuous dynamic images are dominant, they can be protected as film works or audio-visual works. Protect games as audiovisual works is a common situation.¹³

One notable case is *Stern Electronics v. Kaufman*,¹⁴ heard by the U.S. District Court for the Eastern District of New York. The court held that video game *Scramble* developed by Plaintiff Stern falls within the definition of the United States Code Title 17—Copyrights (17 U.S.C.) Article 102(a)(6). The reasoning as following: *Scramble* presents on a screen a series of images projected by a cathode ray tube which depicts a spaceship simultaneously trying to navigate a mountainous airspace, destroy enemy fuel depots, evade deadly ground fire, and prevail in an aerial dog-fight, while at the same time watching carefully over a diminishing fuel supply. In essence, the work is a movie in which the viewer participates in the action as the fearless pilot controlling the spaceship.

Although both countries have tried to protect the copyright of game works, the methods are different. The United States flexibly protects the entire game as different works, depending on the focus of the game¹⁵. However, China currently only supports games as audiovisual works, and believes that other types of works can only exist as part of the game. It is true that copyright law can protect the originality of creators, whether it is protecting the game as a whole or protecting the components of the game. However, since game is a complex collection of works,

if it is only protected as a whole, some original parts may be omitted. For example, if the entire game is identified as an audiovisual work, the original text and art in it will be difficult to be protected. At the same time, if only the components are identified, it is difficult to cover the overall experience and worldview of the game. Therefore, the two ways of protection should be combined at this stage. When filing a lawsuit, the parties should also advocate the protection methods of both paths at the same time.

2.2 Game components

Works protected by copyright law in games can be divided into several categories. The most intuitive copyrightable works in game should be text works, music works, and art works. The plot design, character dialogue, and narration in the game can constitute text works. The game soundtrack can constitute music works. Game maps, scene pictures, character modeling can constitute art works. In recent years, the most controversial discussion is about the copyrightability of game rules.

The rules of different games vary greatly from one another. For ARPG games, the game rules are the core competitiveness of the game. Rules of such games are so complex and original that make it more likely to constitute works recognized by copyright law. But for card games such as *Texas Hold'em*, the rule of it is already a part of the public domain, which makes it difficult to constitute works. Among the game rules that have the possibility of being recognized as a work, China and the United States have different views on their copyrightability. Overall, both China and the United States have gone through a process from not protecting the rules of the game to protecting some of the game rules.

Under 17 U.S.C. Article 102(b), copyright law does not protect any idea, procedure, process, system, method of operation, concept, principle, or discovery.¹⁶ In early cases in the United States, although there were different definitions of game rules, none of them met the conditions for protection under copyright law. One of the representative cases is *Incredible Technologies v. Virtual Technologies* with the game *PGA Tour Golf* and *Golden Tee* (2005). Circuit Judge TERENCE T. EVANS pointed out the trackball system used for game rule is a method of operation. The judge also suggest game rules may seek protection from patent law.¹⁷ As a member of the Berne Convention, China also had many similar judgments in the early days. In the 2014 *Hearthstone v. Crouching Dragon* case, the court held that the combination of cards and decks was an abstract idea and could not be protected by copyright law¹⁸. Considering that the game rules are the core competitiveness of online games, the court could grant them

protection under the Anti-Unfair Competition Law.

With the development of the game industry, gameplay rules become extremely important. It takes a certain amount of intellectual and financial resources to design, implement, and test gameplay¹⁹(Ang, 2006). Therefore, if a *free rider* copies the game rules and further commercializes them, the original developers will not only be deprived of their intellectual achievements but also will lose the incentive to produce innovative video game gameplay in the future. This is not conducive to creating a fair and reasonable competition environment for the game industry²⁰ (Kim et al., 2018). In this context, the initial denial of copyright protection for game rules has gradually changed to a hierarchical sorting and detailed protection of game rules, distinguishing between *game rules* and *expression of game rules*. After excluding content that belongs to ideas, limited expressions, and expressions in the public domain, the remaining specific presentation of specific game rules should be protected. Ideological content may include growth, battle, equipment, and mall systems. Necessary expression and public domain may include the interface layout of general gameplay such as recharge and battle. In China, this view was supported by the top ten intellectual property cases in Chinese courts in 2019 released by the Supreme People's Court²¹. The court held that game designers design continuous and dynamic game interfaces to express the specific gameplay rules of a single game system in a straightforward text form or through continuous game operation interfaces. This allows players to clearly perceive the game rules during operation and conduct interactive operations accordingly, which is expressive. In the *Chamberlin v. Uris Sales Corporation* case in United states, the judge rejected the request of plaintiff on the grounds that the game rules lacked originality, rather than that the game rules were not protectable in copyright law²².

2.3 What makes one game distinct from another.

Firstly, the degree of abstract. The most representative method to identify the degree of abstraction of a game is *idea-expression divide* principle from the TRIPS agreement²³ (1994, Art. 9[2]). This principal divide works into two aspects: ideas and expressions. Copyright law only protects the original expression of ideas, not the ideas themselves²⁴ (Gervais, 2020, pp. 44–45). To distinguish between ideas and expressions, the most famous one is the abstraction test established by Judge HAND in *Nichols v. Universal Pictures Corp*²⁵. Applied in games, the way to distinguish between game ideas and game expressions is the degree of abstraction. In Chinese judicial practice,

five-layer theory has been established to test the degree of abstraction of games.

In Shanghai Feihu copyright dispute case²⁶, the court divided the development of game *KunlunXu* into five layers. The first layer is game planning and game type positioning. The second layer is ruling design around the game theme. The third layer is the core part of setting game resources, which mainly includes three components: one is the game map that conforms to the game positioning, one is the initial numerical planning of the game characters, giving each character different parameter values and unique skill designs with weapon effects, and finally the overall layout of the game interface. The fourth layer is game resource connection and function debugging. The purpose of this link is to integrate the game rules and game resource, matching settings and logical relationships, to finally form a smooth overall game screen. The fifth layer is to further refine and integrate game resources, with the art and audio departments mainly involved. The work of this link may include the specific layout of the scene map, the detailed setting of the game appearance, the presentation of character images, weapon appearances and skill effects, and the enrichment and integration of the user interface.

In addition to the first and second layers mentioned above, which should be included in the category of ideas, the third and fourth layers are no longer abstract ideas, but the specific expressions of specific game play rules in the interactive interface. The fifth layer belongs to the detailed expression of the game such as artistic image and audio effects.

Secondly, the degree of originality. Originality includes two aspects, independent completion and creativity. Independent completion means that the work originates from the author and is produced by the author through independent conception and creation, rather than imitating or plagiarizing the work of others. Creativity means that the work contains the personality of author, something that belongs to the author personally, or to say the work contains the personal choices, selections, arrangements, designs.

In the discussion of game originality, there are two principles that need special attention, namely Merger Doctrine²⁷ (Siegel, 1988) and *scènes à faire*²⁸ (Leo, 2024). The Merger Doctrine means that if the methods used to express a certain idea are so limited that expressions and ideas are merged, copyright law will not protect it. This principle was reflected in *Morrissey v. Procter & Gamble*²⁹. *Scènes à faire* means that to effectively express certain specific ideas, specific elements and backgrounds need to be used. In this situation, the specific elements and backgrounds are not protected. For example, the scenes

describing vampires in games generally involve crosses, onions, sunlight and pale skin. Therefore, the description and shooting of these scenes are generally not protected. This principle was first proposed in the *Roth Greeting Cards v. United Card judgment*³⁰.

Combining these two perspectives, what distinct a game from another is not the creativity or viewpoint of the author or production team, but how the expression of game reflects this viewpoint or creativity, that is, whether the expression contains the personal choice, selection, arrangement, and design. For example, some games are adapted from comics. What makes these games special is not the idea of the comics, but how the expression of game reflects the idea of the comics. For example, the skills of characters are related to the family environment in which the character grew up in the comics, or the strengths and weaknesses of different factions are consistent with their experiences written in the comics.

3. Methods of Protection

With the rapid development of AIGC application in gaming industry, its advantages continue to emerge. The improvement of AIGC in player gaming experience, game authenticity is unignorable. Most gaming platforms, including large platforms which attach great importance to copyright such as Steam, have begun to relax the review of AI training data and instead conduct real-time review of AI output content. This means that games using AIGC do not have to prove that all the data used for training is copyrighted before they can be listed on Steam or other platforms.

As mentioned above, there are two key stages that may lead to AI violation, one in the data training stage, the other in the generated output stage. The author believes that the focus of copyright infringement review and protection should be on the output stage for two reasons. First, in the production of traditional games, producers will refer to the game rules, interface design, plot development and other content of previous games, and create new games based on this, which has become an industry practice. If the entire game or most of its content is protected by copyright and prohibited from being used for training, the AI model will be completely unable to refer to previous games. Second, it is very difficult to find out what data was used to train the AI model. In previous cases, the common mode of proof was to prove that the AI-generated work was highly similar to the original work, which means by seeking help from the output stage. Therefore, as long as the infringement is identified as a situation when the work produced by AIGC is substantially similar to the original work, protection can be provided for infringement during

the training phase at the same time.

When identifying infringement at the generated output stage, one standard is Abstraction-Filtration-Comparison Test. This test was first proposed in a case involving computer software infringement³¹. The specific approach is as follows. Abstraction: Divide the computer program from the program code to the final function of the program into several levels from concrete to abstract. Filtering: All components that are not protected by copyright will be excluded, including: (1) components determined by program efficiency; (2) components determined by external factors; (3) components obtained from the public domain. Comparison: After the computer program is filtered according to the above principles, the remaining components are the components that can be protected by copyright and can be compared with the alleged infringing program for substantial similarity. If the alleged infringing program plagiarizes a substantial part of these protected components, it constitutes infringement. When applying in the field of games, we should first select the third, fourth, and fifth layers of content in the abstract stage of the two works, that is, exclude the parts that belong to the idea. Then filter out the content that belongs to the public domain and limited expression. Finally, compare the remaining parts and observe whether the degree of similarity should be considered as infringement.

4. Conclusion

The application of AIGC has a significant impact on the development of the gaming industry. This technology not only enhances the player experience but also significantly reduces the economic and time costs of game production, lowering the economic barrier to entry. By discussing the copyrightability of gaming works, the scope and potential methods for regulating AIGC are clarified. The methods discussed above, filtering abstract content and comparing substantial similarity, not only ensure that AIGC outputs do not infringe the copyright of the original creators but

also, to a certain extent, restrict the use of copyrighted works for AIGC model training. This approach ensures the application of AIGC while maximally protecting the copyright of original creators.

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