

Exploring Copyright Protection for Artificial Intelligence Outputs Based on the Interaction Between Technology and Law

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Abstract

In response to the issues of whether artificial intelligence (AI) outputs can be protected by copyright, to whom the rights should belong, and how infringement should be determined, this study adopts a method combining normative analysis and historical analysis. Starting from the historical logic of copyright law's response to technological change, it sorts out and analyzes institutional responses under the impact of printing, photography, audio and video recording, and Internet technologies, and identifies three patterns: human beings as the creative subject, a balance between empowerment and limitation of rights, and judicial action taking the lead. The study shows that generative artificial intelligence (generative AI) has the attribute of a tool, and the copyrightability of its outputs depends on the substantial intellectual control exercised by humans in prompts, parameters, selection, and revision. The degree of human contribution should be used as the standard for distinguishing weak protection from strong protection; fair use should be moderately relaxed at the training input end, substantial similarity should be strictly regulated at the output end, the burden of proof on developers should be strengthened, and judicial adjudication should comprehensively consider the responsibilities of all parties.

Keywords

generative artificial intelligence, copyright protection, interaction between technology and law, principles of generative AI

1. Introduction

In November 2023, the Beijing Internet Court rendered the first-instance judgment in China's first copyright case involving an AI text-to-image work [1]. The court held that the AI-generated image involved in the case satisfied the requirement of originality, should be recognized as a work, and should be protected by copyright law. This judgment triggered extensive debate: Can AI outputs constitute "works" in the sense of copyright law? To whom should copyright belong? How should the alleged infringement be analyzed under the existing infringement determination framework? With the explosive growth of generative AI technology, fields of creation that traditionally required the participation of natural persons, such as literature, fine arts, and music, can now all be generated by AI. The current copyright law, however, lacks clear provisions for such emerging objects, and there are significant academic disagreements.

There have already been many academic discussions on copyright protection for AI outputs. Some scholars argue that the degree of human creative contribution should be used as the key standard [2]. Some scholars believe that apparent originality is sufficient and that excessive examination of the creative subject and process is unnecessary [3]. Other scholars deny the copyrightability of AI-generated content [4]. These discussions focus on whether AI outputs can be protected and to whom the rights should belong. Their positions differ, but they rarely examine the issue in the historical context of copyright law's response to technological change.

In fact, the development history of copyright law itself is a history of interaction and co-evolution with technological change. From printing technology giving rise to the world's first copyright law, to photography technology and audio and video recording technology promoting the continuous expansion of the protected objects of copyright, and then to network technology triggering the creation of new systems such as the right of communication through information networks, every major technological change has brought similar challenges to law. Wall pointed out that "from the day copyright law came into being, it has continuously responded to innovations in recording, photography, cinematography, and broadcasting" [5]. Copyright law needs constant adjustment because each leap in communication technology breaks the existing balance of interests between right holders and users, and law has to intervene to redraw boundaries. Existing studies, however, have not sufficiently sorted out the system and refined the rules of how copyright law faces new technologies, making it difficult to provide a theoretical reference with historical depth for the current protection of AI outputs.

Based on this understanding, the following text will sort out the basic logic of legal responses made by domestic and foreign copyright law when facing successive technological impacts such as printing, photography, audio and video recording, computer software, and Internet technology. It adopts a method combining normative analysis and historical analysis, refines the regular understandings contained in them, and uses them as theoretical reference to explore practical solutions for current copyright protection of AI outputs.

2. Historical Logic and Rule Refinement of Copyright Law's Response to Technological Change

Law is the institutionalized expression of human social experience, but social reality always changes before law. Science and technology progress, society develops, and law evolves accordingly. Looking across the development of copyright law, from printing and photography to audio and video recording, the Internet, and digital technology, every major technological change has had a profound impact on the existing legal order. Of course, law cannot change from morning to evening. Its requirement of stability determines that it must respond to new problems within the existing framework. Rules formulated with a specific technology as the blueprint often find it difficult to foresee subsequent technological iterations. For this reason, the analogical thinking in legal methodology has a role to play. By identifying the similarity between new things and existing norms, the spirit of existing rules can be extended to emerging issues, thereby connecting law and reality [6]. This methodology provides a theoretical premise for this study to refine regular understandings from the historical experience of copyright law's response to successive technological changes.

2.1 Institutional Evolution of Copyright Law in Response to Technological Impacts

2.1.1 Printing Technology: From Publishing Control to Author's Rights

The birth of printing technology was the technological premise for the emergence of the copyright system. In the mid-fifteenth century, Gutenberg's printing technology enabled the large-scale reproduction of books and also triggered the evolution of regulatory systems surrounding the contents of printed media.

At the beginning of printing technology, European countries mainly adopted a management model combining licensing and censorship for printed media [7]. In the mid-seventeenth century, the number of printing houses and printing presses in England increased significantly. The Crown controlled printing and publishing activities by granting patent privileges and implemented a registration system through the Stationers' Company. The Stationers' Company controlled more and more printing ownership through the English Stock [8]. During this period, the printing and publishing system was essentially an administrative governance tool, aimed at controlling thought and speech rather than protecting creators' interests.

However, the logic of institutional evolution has its own internal driving force. In order to stabilize their commercial interests, booksellers turned to legislative support. Together with the continuous development of European intellectual movements, the public began to re-examine the pattern of interests among authors, publishers, and distributors. The Statute of Anne was born in this context [9]. It was the first law to recognize that the source of rights in works was no longer the grace of the Crown but the fact of the author's creation itself.

2.1.2 Photography Technology: From “Product of a Machine” to “Work of an Author”

In 1839, the French artist Daguerre first invented photography technology on the basis of the work of his predecessors. The emergence of this technology brought the first real challenge to the works and authors protected by copyright law.

Photography technology enables people to accurately reproduce images of the objective world with the help of mechanical devices. This feature caused people to think: Is a photograph a mechanical product of light and chemical action, or is it the result of the photographer's intellectual labor? During most of the nineteenth century, courts and legislatures in various countries conducted prolonged debates on this issue. Early judicial precedents tended to deny the copyright nature of photographic works. In early cases, U.S. courts held that photographs were products of light and machines and did not embody any original conception by the author. For example, in the 1874 *Udderzook* case in Pennsylvania, the court held that the lines of a photograph were not drawn by the hand of an artist but were only chemical impressions left by sunlight through a camera on a sensitive plate [10]. This understanding regarded photography as a purely scientific recording process rather than an artistic creative activity.

However, the judicial position did not remain unchanged. In the second half of the nineteenth century, Britain and the United States successively brought photography within the scope of protection through legislation. In 1884, the U.S. Supreme Court held in *Burrow-Giles Lithographic Co. v. Sarony* that the photographer reflected the author's creativity in selecting the subject, designing the pose, arranging the composition, and arranging the lighting, and that the photograph should be protected by copyright [11]. The judgment recognized the photographer as the “creator” of intellectual property. Photography technology, once born, placed the copyright system in a fundamental dilemma [12], and the resolution of this dilemma ultimately depended on judicial confirmation of the creative contribution of the “human.”

Although China's copyright law started relatively late, it follows the above rule in institutional design. The Copyright Law of 1990 expressly listed photographic works as protected objects. In judicial practice, the originality of photographic works is understood as the author's personalized choices of scene, angle, light, and shooting timing in the process of shooting, rather than simple mechanical recording [13].

2.1.3 Audio and Video Recording Technology: The Birth of the Neighboring Rights System

In the late nineteenth and early twentieth centuries, the development of audio and video recording and radio communication technology gave rise to the neighboring rights system. Before this, copyright law mainly protected the rights of creators. However, the emergence of recording technology made it possible for performers' live performances to be copied and disseminated. Records and films largely replaced actors' live performances, seriously harming the interests of artistic performers [14]. At the same time, phonogram producers invested large amounts of capital and organizational labor to make sound recordings, and their investment also needed legal recognition and protection. Therefore, should performers' performing activities and phonogram producers' organizational labor receive the same copyright protection as authors?

This issue gave rise to the new legal concept of “neighboring rights.” The neighboring rights system includes performances, sound recordings, and broadcast signals within the scope of protection, but its protection level differs from copyright. The Rome Convention of 1961 marked the entry of neighboring rights protection into the international stage. China's Copyright Law also adopts a protection model that separates copyright from neighboring rights. Producers of audio and video recordings, as neighboring right holders, enjoy rights such as reproduction, distribution, rental, and communication to the public through information networks. Compared with copyright owners, neighboring right holders have a lower degree of creativity and therefore receive a lower level of protection. This is a prudent balance made by legislators between empowerment and limitation of rights.

2.1.4 The Internet and Digital Technology: From the Reproduction Right to the Right of Communication Through Information Networks

The impact of digital technology on copyright law is first reflected in the change in reproduction methods. In the traditional environment, reproduction depended on physical carriers, and each reproduction involved quantifiable marginal costs. In cyberspace, however, digital works can be copied perfectly and infinitely, almost without additional cost [14]. Low-cost and high-precision digital reproduction fundamentally challenges the institutional logic that originally protected copyright by controlling reproduction. At the same time, the global interconnection of the Internet puts the territorial protection principle of copyright in difficulty, and new technologies such as peer-to-peer (P2P) file sharing disperse infringing subjects from centralized publishers to countless individual users [15]. The traditional model of “authorization before use” is difficult to operate effectively.

Facing these challenges, legislatures and courts in various countries have responded actively. In 1998, the United States enacted the Digital Millennium Copyright Act (DMCA), establishing the safe harbor principle and providing institutional space for liability exemptions for network service providers. China promulgated and implemented the Regulations on the Protection of the Right of Communication Through Information Networks in 2006, which also clearly provided for the safe harbor principle in cyberspace [16]. At the same time, the Copyright Law added the right of communication through information networks, giving copyright owners a new type of right to control the dissemination of works on networks.

2.2 Rules in the Interaction Between Technology and Copyright Law

2.2.1 Insisting on Humans as the Creative Subject

Looking over more than three hundred years of evolution in copyright law, law has always taken the creative contribution of “human beings” as the core basis for copyright protection. In the printing era, the Statute of Anne shifted the source of rights from the grace of the Crown to the author’s creation. In the photography era, the Burrow-Giles case recognized the photographer’s creative contribution. In the audio and video recording era, neighboring rights still protected human performances and organizational labor. In the Internet era, the right of communication through information networks protected authors and their right holders. It can be seen that copyright law has always taken human creative contribution as the core basis.

This rule faces the most serious challenge in the AI context. Unlike previous technologies, which were merely tools extending human creative capacity, the generation process of AI has relative autonomy, and humans no longer directly control every creative link. Whether this indirect control can be regarded as human creation will be discussed below.

2.2.2 Dynamic Balance Between Empowerment and Limitation of Rights

Another significant rule in copyright law’s response to technological change is that empowerment and limitation of rights always accompany each other. In the printing era, the Statute of Anne granted authors copyright while expressly setting a term of protection. In the audio and video recording era, although the creation of the neighboring rights system expanded protected objects, the protection level of neighboring right holders was clearly lower than that of copyright owners. In the Internet and digital era, the addition of the right of communication through information networks was accompanied by the introduction of the safe harbor principle.

The tension between empowerment and limitation of rights is especially sharp in the AI field. AI training requires massive amounts of data, and most of these data are protected by copyright. If traditional rules are strictly applied, almost no model can lawfully complete training. If AI is completely allowed to freely scrape works without any restrictions, copyright owners’ interests will be harmed. Therefore, how to reserve space for technology at the training stage and hold the bottom line for right holders at the output stage is the second issue to be discussed below.

2.2.3 Experience Accumulation Through Judicial Action Taking the Lead

From historical experience, courts often face legal problems brought by technological change earlier than legislatures. Legislation requires time, sufficient investigation, and interest bargaining, and therefore the

completion of legislation often lags behind technological change. In this situation, the judiciary responds to new problems in advance through individual cases and accumulates experience for the final improvement of the system. This has become the usual path for copyright law to respond to technological change.

In the process of solving a series of problems caused by AI technology, the tradition of judicial action taking the lead is continuing. In the world's first copyright dispute involving an AI text-to-image output heard by the Beijing Internet Court, in the absence of a clear legislative basis, the judgment established an adjudicative rule that AI-generated content can be protected by copyright under specific conditions and that the rights belong to the creator who uses AI. This provided practical material for subsequent legislative discussions.

3. Copyright Dilemmas of AI Outputs

3.1 Subject Eligibility

The protected subject of copyright law has always been the human being. Whether AI outputs can be protected by copyright and to whom the rights should belong depends on whether AI is a creative tool or a creative subject in creative activities. To answer this question, its technical principles and working methods must first be understood.

Generative AI is essentially based on large language models (LLMs). It can be understood as a “super learning brain” that collects massive amounts of text, images, and other data from the Internet and automatically explores language rules, knowledge associations, and logical patterns from them. It does not store original data, but only stores abstract rules extracted from the data. When a user inputs an instruction, the model recombines new content according to the rules it has learned. Whether generating text or images, its internal logic is to synthesize new content according to user instructions and the rules it has learned.

The technical features of generative AI determine its tool attribute in creative activities. Taking AI painting as an example, users can switch the base large model, load a Low-Rank Adaptation (LoRA) model to anchor specific characters, styles, or object features, use tools such as ControlNet to control character posture, composition, and image structure, and repeatedly conduct trial and error by adjusting parameters such as sampling steps, guidance scale, and random seed. Text generation is the same. Prompt design, parameter adjustment, and multiple rounds of revision directly determine the direction and quality of the output. Research on “meta-generation” also shows that different algorithmic strategies at the inference stage produce different generation results, and the choice and control of these strategies are precisely in the hands of users [17].

Therefore, generative AI is essentially only a creative tool that executes human will. The tool itself cannot become a creative subject. The real subject is the natural person who uses the tool and invests intellectual labor.

3.2 Infringement Issues Arising from Generative AI

3.2.1 Whether Data Use at the Training Stage Constitutes Fair Use

The generative ability of AI comes from training on massive amounts of data, and these training data contain a large number of copyright-protected works. As stated above, the model does not store original data but only stores rules extracted from them. In technical implementation, however, whether the act of copying others' works into training datasets itself infringes the reproduction right, and whether exemption can be defended on the basis of fair use or statutory exceptions, is the core controversy at the input end.

The party supporting fair use at the training stage argues that, in the training process, the model does not expressively reproduce works, but learns and summarizes rules from them, and this non-expressive use of works should be recognized as fair use. The Hamburg Regional Court in Germany took this position in the 2024 LAION case, holding that the nonprofit organization LAION's unauthorized copying of images to create an AI training dataset conformed to the exception in Article 60d of the German Copyright Act on text and data mining for scientific research purposes and did not constitute infringement [18]. However, a 2026 empirical study by Stanford University and Yale University showed that Google's Gemini 2.5 Pro model output 76.8% of the content of *Harry Potter and the Sorcerer's Stone* without the researchers using “jailbreak” techniques, that is, without constructing special prompts to bypass its safety restrictions [19]. This reversal indicates that

the argumentative basis of “non-expressive use” has been shaken, and the fair use defense at the training stage will face greater challenges.

3.2.2 Infringement Caused by Outputs at the Output Stage

The root cause of infringement problems often lies in the input stage, but infringement at the output stage is more direct. Traditional copyright infringement takes “reproduction-distribution” as its typical chain, while infringement by generative AI presents a new structure of “learning-output.” This is also the structural change that generative AI brings to copyright law. When an output is substantially similar to a prior work, whether the output originates from the model’s “memory” of training data or from other reasons, it may fall within the regulatory scope of the reproduction right and the adaptation right.

The empirical study by Stanford and Yale has proved that, through iterative extraction, a model can output 76.8% of the original text of *Harry Potter and the Sorcerer’s Stone*. This high-precision verbatim reproduction is almost no different from piracy in the traditional sense. Even if this reproduction requires specific extraction techniques, once the generation act occurs, the original data complete a qualitative change from “implicit storage” to “explicit dissemination.” Of course, not all infringing outputs appear in the form of verbatim reproduction. After understanding the plot structure, character relationships, and unique scene sequence of the original work, the model may generate a rewritten version at the user’s request. Although this version differs in wording, it is highly similar to the original work at the substantive level of expression. Under the basic principle of the idea-expression dichotomy, if the “expression” part of the model output is substantially similar to the original work, it may still constitute infringement of the adaptation right even without verbatim copying.

3.3 Whether AI Outputs Should be Protected by Copyright

The substance of copyright law protection is the human original expression contained in creative results. On the question of whether AI outputs should be protected by copyright, the key is to examine whether the user has played a dominant and original intellectual role in the creative process. In light of the above analysis of the tool attribute of generative AI, precise human control over the AI generation process requires a dominant and original intellectual role.

In 2023, in the first AI text-to-image copyright case, the Beijing Internet Court held that, in the process of using Stable Diffusion to generate the image, the plaintiff entered more than one hundred prompts, adjusted parameters many times, continuously conducted three to four rounds of revision, and finally selected the image involved in the case. This series of acts “reflected personalized expression and creative choices” and constituted substantial intellectual investment, so the image involved should be protected by copyright and the plaintiff was the copyright owner. The judgment expressly stated that “artificial intelligence is only a tool for creation, and the human being remains the creative subject” [1]. By contrast, in the 2025 “cat crystal pendant case,” because the plaintiff failed to submit records of the creative process and could not prove the specific instructions and operations in the original generation process, the court held that the evidence was insufficient to prove that the image involved had originality and therefore refused protection [20]. The comparison of the two cases shows that the key to judicial protection is not whether AI was used, but whether the human invested intellectual control sufficient to reflect originality in the generation process and whether this can be proved through original process records. As the presiding judge in that case stated, copyright law has always focused on “the protection of human creativity.” The U.S. Copyright Office also expressed its position in its 2023 guidance: content generated entirely by AI without human creative input will not be registered, but if a human selects, arranges, or modifies AI-generated material in a sufficiently creative way, the overall work may obtain protection [21].

4. Purpose, Position, and Methods for Solving the Problem

4.1 Purpose

The copyright issue of AI outputs involves not only whether the outputs themselves can be protected, but also the boundaries of infringement in the use of training data and output results. Therefore, an institutional response must be found between encouraging creation and balancing interests. If copyright protection for AI outputs is denied across the board, the results obtained by users through intellectual labor cannot be controlled

by themselves, others may use them at will, and users will be unwilling to spend further energy on creation. If the scope of protection is too broad, content that originally belongs to the public domain may be occupied by a small number of people, affecting the creative space of others. At the same time, AI technology is still iterating rapidly, and whether legal rules are clear directly affects whether enterprises and individuals are willing to continue investment.

At least four parties are involved in AI outputs: users, existing copyright owners, technology developers, and the social public. Users care about whether the intellectual labor they invest through prompt design, parameter adjustment, and output selection can be legally recognized and whether the generated content can be controlled by themselves. Existing copyright owners worry that their works will be used to train AI and then replace their market. Technology developers care about whether training data are compliant and whether liability boundaries are clear. The social public cares about whether freedom of expression and access to knowledge will be affected. Different subjects have different needs. The institutional response should neither let users' creative contributions fall through, nor hollow out the interests of existing right holders, nor block technological development because the rules are too strict. Therefore, a reasonable institutional goal is to find a balance among protecting existing right holders, encouraging new creators, allowing technological development, and safeguarding public use.

4.2 Basic Position

4.2.1 Maintaining the Continuity and Scientific Nature of Law

Most of what legislators can observe is only the specific form of the current technology, and there is uncertainty about the path of technological evolution, which creates a time lag between rulemaking and technological development. Therefore, if law tailors rules for a new technology in a certain period, it is often difficult to foresee later technological iterations. The evolution of copyright law over more than three hundred years shows that the copyright system sometimes promotes and sometimes hinders technological progress, and one of the roots lies in the path dependence of institutional change [22]. When facing the issue of AI outputs, legislation should not use the specific technological form of "generative AI" as the blueprint. Instead, it should return to the basic institutional framework of copyright law to seek space for interpretation and application. The Opinions on the Lawful Trial of Cases Involving Artificial Intelligence Disputes issued by the Supreme People's Court in 2026 also expressly established the principle of "making full and proper use of existing legal provisions" [23], reflecting institutional rationality that gives priority to legal continuity. Gradual response through legal interpretation and judicial adjudication within the current framework not only maintains the scientific nature of copyright law as a general norm, but also reserves institutional flexibility for future technological iteration.

4.2.2 Combining with China's National Conditions

From the beginning, China's copyright legislation has taken "starting from China's national conditions" as its basic position. The Copyright Law of 1990 was the legislative result reached on the basis of fully considering China's economic development level, cultural traditions, values, and other actual conditions [24]. With the advancement of Chinese modernization, China's legislative orientation is continuously moving toward autonomy while coordinating domestic and foreign factors, shaping rules according to the actual needs of national technological innovation and industrial development [25].

At present, China's national conditions in the two major fields of AI and copyright have multiple features. In terms of industrial scale, the scale of China's core AI industry has exceeded RMB 1.2 trillion, and the penetration rate in key industries has exceeded 80% [26]. China has ranked second in the Global Artificial Intelligence Innovation Index for six consecutive years [27]. At the same time, the added value of China's copyright industry has reached RMB 10.06 trillion, accounting for 7.46% of gross domestic product (GDP), and the number of employees has exceeded 15.89 million [28]. This means that China is both a major country in AI technology research, development, and application and a country with a large content industry. The two identities create training needs for the AI industry and protection demands for the copyright industry, and a balance needs to be found at the institutional level.

Facing a new object, law needs to choose among multiple protection models such as patent, copyright, and special legislation, and different countries may take different paths. Compared with other countries, U.S.

copyright law is based on a case law tradition and strictly adheres to the bottom line of “human authorship.” Its 2025 report expressly states that “prompts alone are insufficient to claim copyright” [29]. The European Union, because of the strong lobbying power of its content industry, designed a complex text and data mining exception mechanism in the Directive on Copyright in the Digital Single Market. However, the 2026 official assessment of the United Kingdom shows that similar systems have been “almost unused” in practice, and the U.K. government even tends to abolish the provision protecting “computer-generated works” created in 1988 [30]. It can be seen that institutional design detached from the actual conditions of a country’s industries, no matter how refined in theory, may become empty text.

4.2.3 Basic Principles of Copyright Law

The basic principles of copyright law can provide stable and normative adjudicative and legislative guidance for copyright protection of AI outputs. The idea-expression dichotomy, the originality principle, and the interest balance principle are connected with each other. They respectively define the boundary of protection, establish the protection standard, and coordinate conflicts of interests.

The idea-expression dichotomy is a foundational institutional principle of copyright law. It means that copyright protects only original external forms of expression and does not protect abstract ideas, concepts, algorithms, operating methods, and other contents. This rule has been generally recognized by international treaties such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the WIPO Copyright Treaty (WCT), as well as copyright legislation in various countries. China’s 2012 Draft of the Third Amendment to the Copyright Law also expressly established the legal status of this principle. According to this principle, creative thoughts, logic, and other contents at the idea level are not protected by copyright, while concrete and personalized content expression is protected by law. In disputes over AI outputs, this principle can effectively distinguish protection boundaries. When adjudicating, courts need first to exclude unprotected algorithmic logic and creative ideas, and determine infringement only in relation to the final generated form of expression. It also provides lawful space for secondary creation and avoids excessive copyright monopoly hindering cultural innovation and technological development [31].

The originality principle is the criterion for determining whether a work obtains copyright protection. It means that the creative subject must invest independent intellectual labor so that the result has a minimum degree of creativity [32]. This is also the key to distinguishing ordinary mechanical output from protected works. Foreign legislation has long made clear that originality and fixation are the two core requirements for copyright protection [31], and China’s copyright system likewise takes originality as the core premise for recognizing a work. Under the traditional copyright framework, originality comes from the intellectual creation of natural persons, while the originality determination of AI outputs focuses on identifying the degree of human intellectual contribution. When users invest personalized intellectual labor through prompt design, parameter debugging, output selection, and other acts, and the final generated content has personalized expression, it satisfies the core requirement of originality and can be included in the scope of copyright protection.

“Interest balance is the basic spirit of modern copyright legislation, the theoretical cornerstone for constructing the system of copyright moral rights, and the basic criterion for copyright law amendment and copyright system design” [33]. The function of the interest balance principle can provide a coordination standard for conflicts of interests in the copyright dilemma of AI outputs. The copyright development plan issued by the National Copyright Administration in 2026 expressly proposed “formulating a fair use system for AI training data.” Its goal is precisely to establish an operable balance standard between innovation incentives and creator protection.

4.3 Methods for Copyright Protection of AI Outputs

4.3.1 Dividing Protection Levels

The traditional protection model of copyright law cannot adapt to differentiated human intellectual input in human-machine collaboration. It may cause problems such as excessive monopolization of public creative space and neglect of the value of users’ creative labor. When protecting the copyright of AI outputs, the user’s creative control over the generated content should be taken as the core standard, and protection levels should be divided. Where the user only inputs simple prompts and does not conduct parameter debugging, result selection, and post-processing optimization, the human intellectual contribution is limited and personalized

expression is insufficient. This should be classified as a low-intervention creation scenario. Only bottom-line protection should be given to prohibit malicious plagiarism and commercial use, and full copyright should not be granted. For creation involving only the provision of prompts, no protection should be given [6]. In a scenario of deep human-machine collaboration, the user, through continuous intellectual labor such as refined prompt design, multiple rounds of parameter adjustment, output selection, and later revision, leads the content's expressive style, structure, and core content, and forms an expressive result with personalization and originality. This fully meets the originality standard of copyright law, and full copyright protection should be granted to protect the user's exclusive rights according to law. This layered protection model continues the regulatory rule of "taking human intellectual contribution as the core" in successive technological changes of copyright law, and avoids the extreme positions of giving equal protection to all generated content or denying protection across the board.

4.3.2 Optimizing Fair Use for AI Companies

The fair use boundary for AI enterprises' training data should be optimized, and an input-end "broad entry, strict output" compliance system should be constructed. Article 7 of China's Interim Measures for the Management of Generative Artificial Intelligence Services establishes a regulatory orientation giving priority to authorization, requiring training data to have "lawful sources" and not infringe intellectual property rights. However, it does not clarify whether unauthorized data training constitutes fair use, creating a legislative gap. In combination with the interest balance principle and the needs of technological development, a compromise plan of relaxed recognition at the input end and strict regulation at the output end can be adopted to resolve the compliance dilemma of AI training data. At the input end, based on the needs of technological research and development and industrial innovation, non-commercial and public-interest data training acts for model iteration and algorithm optimization should be included in the scope of fair use, and the standard for recognizing fair use should be moderately relaxed. This can avoid strict authorization rules stifling AI technological iteration and conforms to the actual national conditions of the rapid development of China's AI industry. At the output end, infringement boundaries should be strictly controlled. AI platforms should be prohibited from directly transforming expressions and core ideas learned from training into commercial results, and from generating content that is substantially similar to prior works, thereby curbing at the source infringing acts of reproducing or adapting others' works. At the same time, with reference to the Supreme People's Court's rules for trying AI-related disputes, developers' burden of proof should be clarified. If they claim that the use of training data is lawful, they need to provide supporting materials such as complete data sources, training records, and model operation mechanisms. This will force platforms to regulate data use and balance the protection of creators' private rights with the public innovation interests of the AI industry.

4.3.3 Judicial Discretion

Rules on judicial discretion should be refined, and the adjudication adaptation mechanism in new technology scenarios should be improved. In light of the historical rule that copyright law is judicially led, and at a time when legislation has not yet been fully improved, the adjudication standards should be refined by relying on the Supreme People's Court's judicial guidance opinions, so that judicial discretion can play its gap-filling function. According to the relevant provisions of the Opinions on the Lawful Trial of Cases Involving Artificial Intelligence Disputes, when judicial organs hear AI copyright disputes, they may not mechanically apply traditional copyright rules, but need to make substantive judgments by comprehensively considering multiple factors [34]. At the level of infringement determination, core factors such as the type of AI service, industry attribute, compliance of training data, degree of human-machine participation, platform compliance measures, and profits obtained by subjects should be comprehensively considered. Different responsibilities of developers, platforms, and users should be distinguished, and appropriate liability exemptions should be given to open-source AI developers who have sound compliance and no subjective fault, so as to take account of both industrial tolerance and rights protection. At the level of originality and evidence determination, the originality of AI outputs and infringement facts should be comprehensively determined in light of dimensions such as the refinement degree of prompts, the similarity between generated content and prior works, the consistency of repeated generation, and the platform's content filtering mechanism, adapting to the technical features of AI opacity and generation randomness. Judicial experience should be accumulated through individual cases, adjudication standards for similar cases should be unified, and a copyright adjudication system suited to AI output scenarios should gradually be formed, providing practical support for subsequent legislative improvement and maintaining the continuity and scientific nature of legal norms.

5. Conclusion

The evolutionary history of copyright law is a history centered on human creative contribution and continuously responding to technological change. The successive impacts of printing, photography, audio and video recording, and the Internet ultimately crystallized three rules: humans as the creative subject, a balance between empowerment and limitation of rights, and judicial action taking the lead. Generative AI, however, gives machines relatively autonomous generative ability and challenges the rule of “humans as the creative subject.”

Although generative AI has relatively autonomous generative ability, its operating structure of “input-learning-output” shows that it is still essentially a creative tool that executes human will. The model learns rules from training data, user instructions determine the direction of generation, and human conception, selection, and judgment run through the whole generation process. Therefore, whether an output can be protected by copyright depends not on whether AI is used, but on whether the user invests substantial intellectual control in prompt design, parameter debugging, output selection, and later revision.

Based on the above understanding, copyright protection for AI outputs should proceed within the current legal framework. For outputs themselves, the strength of protection should be determined by the degree of human intellectual contribution. For training data and output links, the technical space at the input end and the rights bottom line at the output end should be maintained respectively. Through individual adjudication, the scale of judicial application should then be gradually unified. It should be noted that the above plan is a phased response when legislation remains unclear. AI technology is still iterating rapidly. Only by maintaining institutional flexibility on the premise of legal continuity can a dynamic balance be achieved among encouraging technological innovation, protecting existing right holders, and maintaining the public’s space for expression, so that copyright law can continue to play its institutional function of promoting cultural prosperity and knowledge dissemination in the AI era.

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Conflicts of Interest

The authors declare no conflict of interest.

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