

Challenges and responses to legal protection of intellectual property in the era of artificial intelligence

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Abstract

Artificial intelligence technology reshapes the knowledge production model, but poses challenges to the traditional intellectual property legal system: generative AI blurs the boundaries of creative subjects, training data capture triggers copyright disputes, patent examination standards are difficult to adapt to AI assisted inventions, and data rights ownership and circulation rules need to be clarified. This article analyzes the legal challenges of AI in the fields of copyright, patents, and data rights, based on real cases such as OpenAI copyright litigation and copyright disputes over AI cultural and creative images in China, as well as legislative and judicial practices in various countries. The study proposes that it is necessary to adhere to the principle of "people-oriented, technology for good", and to construct an intellectual property protection ecosystem that is suitable for the development of AI through multiple paths such as legislative refinement, precise judicial policies, technology enabled governance, industry self-discipline and coordination, and international rule docking. This will provide practical references for solving legal application problems and promote the coordinated development of intellectual property systems and new technologies.

Keywords

Artificial intelligence, intellectual property, copyright protection, patent examination, data rights, legal response.

1. Introduction

The rapid iterative application of technologies such as generative AI and embodied intelligence has promoted the upgrading of artificial intelligence from an auxiliary tool to an innovative core participant, profoundly changing the practical forms of intellectual property fields such as literary and artistic creation, technology research and development, and data utilization. In judicial practice, disputes involving AI intellectual property have continued to grow in recent years, covering dimensions such as copyright infringement, patent authorization, and data competition, highlighting the contradiction between the existing legal system and technological development.

The traditional intellectual property system is built around the core of "natural person creation" and "human invention", but the rise of artificial intelligence has broken this basic premise: can AI generated content constitute works in the sense of copyright law? Does large-scale model training constitute infringement on the "memory" and "restoration" of copyrighted works? How to define the patent authorization standards for AI assisted inventions? These issues pose new challenges to the intellectual property legal system [1].

The judgment of the Munich court in Germany that OpenAI's unauthorized use of music lyrics to train models constitutes infringement, as well as multiple AI cultural and creative copyright disputes heard by Chinese courts, and legislative documents such as the EU's Artificial Intelligence Law and relevant guidelines from the US Copyright Office, all reflect the urgent global response to this issue [2]. In this context, it is of great practical significance to

systematically sort out the legal challenges brought by AI, explore response paths based on real cases and existing legal frameworks, balance technological innovation and rights protection, and promote the healthy development of the AI industry. This article is based on real judicial cases and legislative practices, analyzing the core challenges and response strategies, and providing feasible solutions for intellectual property protection in the AI era.

2. The copyright ownership and originality determination dilemma of AI generated products

The core controversy over copyright protection of artificial intelligence generated products revolves around two main points: whether they constitute works and who owns the rights. According to Article 3 of the Copyright Law of the People's Republic of China (2020), works must be "intellectual achievements with originality in the fields of literature, art, and science that can be expressed in a certain form." However, the "human-machine collaboration" creative characteristics of AI generated products make it difficult to directly apply traditional originality standards [3].

In judicial practice, vastly different verdicts have emerged. In the copyright dispute between Zhou and a technology company in Beijing over AI generated images, the plaintiff failed to submit original records of the generation process and could not prove their creative intellectual input. The court rejected their claims in the final judgment, clarifying the principle of "whoever claims, who provides evidence". In the first copyright case of AI Wenshengtu in China heard by the Beijing Internet Court, because the plaintiff can provide complete creation traces such as prompt word design, parameter adjustment, content screening, etc., reflecting the personalized aesthetic choice, the court identified the pictures involved in the case as works and supported the plaintiff's appeal. These two effective judgments indicate that the court has taken "human intellectual investment" as the core criterion for judgment, but in practice, the difficulty of the creator's "process imprint" operation and the scale of evidence identification have not been fully unified [4].

Under the existing legal framework, there is a consensus that AI itself cannot become the subject of rights, but there is still controversy over the ownership of rights: some views believe that it should belong to AI tool developers, as they provide core algorithm support; Another viewpoint advocates belonging to the user, if the user has engaged in creative labor such as refined prompt word design and content modification; Some argue that purely AI generated content should enter the public domain [5]. This divergence leads to uncertainty in the application of laws for market entities, which is not conducive to protecting the rights and interests of creators, but also increases the compliance costs of the AI industry and affects innovation enthusiasm. The definition of "creation" in the Copyright Law is "the intellectual activity that directly produces a work". The indirectness and algorithmic dominance of the AI generation process make it difficult for existing legal provisions to be directly adapted, and there is an urgent need to clarify the recognition criteria through legislative interpretation or revision.

3. Copyright infringement and fair use boundary dispute of AI training data

Training data is the core 'fuel' for the development of artificial intelligence, but generative AI models' ability to capture, copy, and utilize massive amounts of copyrighted works has sparked a global wave of copyright infringement lawsuits, with core controversies focusing on whether AI training behavior constitutes 'fair use' [6].

In the first European case of generative AI copyright infringement heard by the Munich First Regional Court in Germany, it was found that OpenAI's unauthorized use of music lyrics to train ChatGPT constitutes infringement, which is a landmark ruling. It breaks through the judicial tendency of considering AI training as "reasonable use" in the past, and clarifies that the "memory" of lyrics by large models constitutes replication - the lyrics involved are encoded as fixed parameters stored in the model, and can be restored through simple prompt words, which is in line with the core requirements of "tangible fixation+perceptible" in German copyright law. This ruling overturns the defense logic of AI companies' claim of "learning knowledge like students" and establishes the judicial standard of "memory=replication".

Across the ocean in the United States, the *New York Times v. OpenAI* case also revolves around training data infringement. The Southern District Federal Court of New York ordered OpenAI to submit relevant user logs in an attempt to penetrate the "big model black box" and restore the usage of training data [7]. The plaintiff claims that OpenAI used news works to train models without authorization and engaged in the behavior of bypassing paywalls to crawl content, while OpenAI defends itself on the grounds of "protecting user privacy". This case highlights the difficulty of proving infringement of AI training data: the training process occurred within the company, making it difficult for the plaintiff to directly prove that their work was used for training, and the key evidence is controlled by the AI company, leading to the application dilemma of the traditional "whoever claims, who provides evidence" principle.

Although China's current copyright law provides for a fair use system, it has not made special regulations for AI training behavior, resulting in vague legal application standards in practice. The "transformative use" advocated by AI companies is in stark contrast to the "gratuitous extraction of value" perceived by copyright owners, which not only damages the legitimate rights and interests of copyright owners, but also poses extremely high compliance risks to AI companies. How to draw a reasonable boundary between protecting the interests of copyright owners and promoting the development of the AI industry has become a core issue that urgently needs to be addressed in current legislation [8].

4. The adaptability challenge of patent examination standards for AI assisted inventions

The widespread application of artificial intelligence in technology research and development has made AI assisted invention the norm, but the examination standards of traditional patent systems face adaptability challenges, mainly reflected in the definition of authorization conditions, technical disclosure requirements, and other aspects.

The core benchmark for patent creativity judgment, the cognitive ability of technical personnel in this field, was originally set based on the knowledge level of natural person technical personnel. With the deep involvement of AI in research and development, it can quickly process massive technical literature and generate innovative solutions, making the boundary of this benchmark capability blurred [9]. National People's Congress representative Ma Yide pointed out that AI assisted inventions pose a need to adjust creative judgment standards, and whether to include AI capability level considerations has become an important issue in institutional updates. If traditional standards are used, truly innovative AI assisted inventions may be rejected, or solutions lacking substantial innovation may be authorized, affecting the core function of the patent system to incentivize innovation.

The issue of adaptability to technical disclosure requirements is equally prominent. The "black box" characteristics of AI algorithms and models, if the applicant only discloses the final technical solution without explaining key information such as algorithm logic, training data, model parameters, etc., may result in the public being unable to "implement" the invention based on it, violating the principle of "full disclosure" under the Patent Law [10]. The China

National Intellectual Property Administration has made it clear in the Revised Draft of the Patent Examination Guide (Exposure Draft) that AI related patent applications need to meet the requirements of full public writing and review the contents of the specification when necessary. This modification aims to address the issue of insufficient disclosure, but the specific scope and degree of definition still require detailed operational guidelines.

In addition, ethical review of AI assisted inventions has become an important consideration for patent authorization. The revised draft of the Patent Examination Guidelines (draft for soliciting opinions) adds a provision that AI technology that violates social ethics or harms public interests will not be granted patent rights, and provides an example of an "emergency decision-making model for autonomous vehicles". This regulation responds to ethical risks, but in practice, how to balance technological innovation and ethical safety still requires judicial and administrative agencies to accumulate cases and clarify standards [11].

5. Conflict between the protection of diverse rights and interests of data elements and circulation rules

The development of artificial intelligence relies on massive data support, and the ownership, usage boundaries, and circulation rules of data elements are not fully clear, leading to increasingly prominent conflicts between intellectual property protection and data utilization. The protection of data rights and interests has diverse complexities. Creative datasets can be protected by copyright law, but the existing legal protection path for a large amount of ordinary data that lacks originality but has economic value, such as platform user behavior data, commercial database information, etc., is still unclear. Professor Ma Yide pointed out that if the unique data resources formed by long-term accumulation of enterprises are crawled by others for AI training through technological means, it may constitute unfair competition. In this case, the Anti Unfair Competition Law has become an important supplement to the protection of data rights and interests, but the specific definition of "unfair competition" still needs further clarification in judicial practice [12].

The Guangdong High Court has released the first national document on judicial protection of AI intellectual property rights, titled "Opinions on Promoting Artificial Intelligence Technology Innovation and Industrial Development through High Quality Intellectual Property Trial Work," which establishes a full chain judicial guarantee mechanism for data elements and emphasizes balancing data rights and innovation needs in technology research and development, achievement transformation, market competition, and other links. The proposed "scenario based adaptive judicial protection mechanism" requires the implementation of refined dynamic protection based on technical features and application scenarios, avoiding a "one size fits all" judgment. This judicial practice provides useful reference for resolving data rights conflicts, but the scale of judgments nationwide still needs to be further unified.

The balance between data circulation and intellectual property protection is particularly prominent. The AI industry requires massive amounts of data for model training, and excessive protection may limit data circulation and hinder technological innovation; Lack of effective protection can dampen the enthusiasm of data collectors and organizers [13]. Professor Wan Yong suggested that the fair use system should be reformed, and a copyright law friendly to the artificial intelligence industry should be constructed to remove systemic barriers to data utilization; At the same time, establish a data licensing mechanism, standardize data circulation and transaction order, and achieve a win-win situation for data rights protection and AI industry development.

6. Multiple response paths for intellectual property protection in the era of artificial intelligence

In the face of the challenges of intellectual property protection brought by artificial intelligence, it is necessary to establish a diversified response system of "perfect legislation, precise judiciary, technological empowerment, industry self-discipline, and international collaboration", and seek a dynamic balance between original protection and technological innovation.

At the legislative level, it is necessary to accelerate the refinement and adaptation revision of rules. In the field of copyright, it is necessary to add an AI training "reasonable use exception" clause in the implementation regulations of the Copyright Law, which clearly allows algorithm training to internally replicate and analyze works without affecting their market value. At the same time, refine the copyright ownership rules for AI generated products, clarify that only content that involves substantial creative labor by humans is protected, and clarify the burden of proof and form of evidence for creators. In the field of patents, operational guidelines for AI related patent examination should be introduced, the standards for "technical personnel in this field" should be dynamically adjusted, technical disclosure requirements should be strengthened, and specific ethical examination standards should be clarified [14].

At the judicial level, it is necessary to establish a scenario based judgment mechanism and evidence rules. Drawing on the judicial practice of Guangdong High Court, establish a three chain linkage protection mechanism of "innovation chain industry chain rule of law chain", and formulate refined judgment standards for different technological scenarios and industrial needs. Improve the rules of evidence, moderately reduce the burden of proof for rights holders, and in cases of AI training data infringement, the burden of proof can be reversed or transferred, requiring companies to provide evidence of the source of training data. Strengthen the publication of typical cases and reasoning in judgments, and unify judicial standards through the demonstration effect of relevant cases.

Technological empowerment provides a new path for intellectual property protection. Promote the application of AI technology in intellectual property examination, monitoring, and rights protection, and use large models to improve the efficiency of intelligent classification, semantic retrieval, and infringement recognition of patents and trademarks. Require AI service platforms to deploy copyright filtering and piracy tracking technologies, conduct traceability screening of generated content, and achieve pre infringement prevention [15]. Implement the "Artificial Intelligence Generated Composite Content Identification Method", establish a unified identification mechanism, clarify the ownership and usage boundaries of rights, and reduce the difficulty of identifying infringement.

Industry self-discipline and international collaboration are indispensable. Guide AI companies to establish compliance management systems, implement the "authorization first, training later" path, and establish a reasonable licensing mechanism with copyright owners [16]. Encourage industry associations to develop self regulatory agreements to regulate the use of training data, authorization of generated materials, and other behaviors. Strengthen the coordination and integration of international rules, actively participate in global AI intellectual property governance, draw on the judicial practices of relevant countries, promote the formation of an inclusive, open, fair and reasonable international rule system, and solve the problem of fragmented global governance.

7. Conclusion

The rapid development of artificial intelligence technology not only brings unprecedented challenges to intellectual property protection, but also provides important opportunities for institutional innovation. At present, the core challenges of intellectual property protection in

the era of artificial intelligence are the copyright ownership disputes of AI generated products, the infringement dilemma of training data, the adaptability problem of patent examination standards, the conflict of data rights protection, and the fragmentation of global rules. These challenges are essentially a contradiction between the adaptability of new technologies and traditional legal systems, rather than a fundamental subversion of the existing intellectual property system.

To address these challenges, we need to adhere to the core principle of "people-oriented, technology for good", clarify the positioning of artificial intelligence as an innovative tool, and avoid misinterpreting technological effects as independent intelligence. The legislative level should be finely adjusted based on the existing legal framework, rather than rebuilding it by adding specialized provisions, refining review standards, and improving evidence rules to fill the gaps in legal application. At the judicial level, it is necessary to establish a scenario based and dynamic judgment mechanism, balance the protection of rights and innovation incentives, and unify the judgment scale through typical cases. At the governance level, a diversified governance pattern of "technology empowerment+industry self-discipline+international collaboration" should be formed, fully leveraging the positive role of AI technology in intellectual property protection, guiding market entities to regulate their behavior, and promoting global rule coordination.

The core of intellectual property protection in the era of artificial intelligence lies in achieving a dynamic balance between "protecting originality" and "stimulating innovation". We cannot weaken the legitimate protection of rights holders due to technological development, nor can we restrict technological innovation and industrial development due to excessive protection. In the future, with the improvement of legislation, accumulation of judicial practice, and empowerment of technological governance, China will build an intellectual property protection system that is compatible with the development of artificial intelligence, provide solid legal guarantees for the development of new quality productivity, and contribute Chinese solutions to global AI intellectual property governance.

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