

Research on Legal Issues of Artificial Intelligence Intellectual Property Rights

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Abstract: *With the rapid development of AI technology, the field of intellectual property rights faces increasing challenges and complexities. This paper first introduces the basic principles and application areas of artificial intelligence technology, then analyzes the challenges of AI technology in intellectual property law, including patents, copyrights, trademarks, and trade secrets. Furthermore, this paper discusses whether the current legal framework is sufficient to address the new challenges brought by artificial intelligence technology and how to protect the innovation and development of AI technology at the legal level. Finally, this paper proposes some strategies and suggestions to address legal issues related to artificial intelligence intellectual property rights, promote the healthy development and innovation of AI technology.*

Keywords: *artificial intelligence, intellectual property rights, legal issues, patents, copyrights, trademarks, trade secrets, innovation, development*

1. Introduction

With the rapid development of artificial intelligence technology, its applications in various fields such as social life, economic development, and scientific research continue to expand and deepen. Artificial intelligence technology has become an important engine driving economic growth and social progress. However, at the same time, the rapid development of artificial intelligence technology has also brought a series of legal issues, especially in the field of intellectual property rights. Intellectual property rights, as an important legal system for protecting innovation and knowledge, face many challenges in the era of artificial intelligence[1]. Traditional intellectual property frameworks may not fully adapt to the development needs of artificial intelligence technology, leading to difficulties and uncertainties in the application and enforcement of intellectual property law. For example, in works generated by artificial intelligence, issues such as determining copyright ownership and the degree of protection for generated works are among the challenges facing current intellectual property law[2]. In addition, the commercial application of artificial intelligence technology involves a large amount of data and algorithms, and protecting these trade secrets has become an important issue. Traditional measures for protecting trade secrets may not prevent new types of infringement brought by artificial intelligence technology, requiring the legal community to reconsider the scope and standards of trade secret protection. Therefore, in-depth research on the legal issues of artificial intelligence technology in intellectual property law and exploring corresponding solutions are of great significance for protecting the legitimate rights and interests of innovation and knowledge, and promoting the healthy development and innovation of artificial intelligence technology[3].

2. Overview of Artificial Intelligence Technology

Artificial Intelligence (AI) is a technology that simulates human intelligence, with the core goal of enabling computer systems to perform various tasks that humans possess intelligence for. These tasks include but are not limited to understanding natural language, perceiving the environment, learning and reasoning, problem-solving, planning, and executing actions. Artificial intelligence technology encompasses multiple fields, including but not limited to machine learning, deep learning, natural language processing, computer vision, and robotics[4]. Machine Learning is an important branch of artificial intelligence, with the primary task of improving the performance of computer systems by learning from data and discovering patterns. Through machine learning, computer systems can continuously optimize their algorithms and models to better accomplish specific tasks[5]. Deep Learning is a sub field of machine learning that simulates the neural networks of the human brain with

multi-layered structures to efficiently process and analyze complex data. Natural Language Processing (NLP) is another crucial field of artificial intelligence, aiming to enable computer systems to understand, process, and generate natural language text. NLP technology has been widely applied in machine translation, text classification, sentiment analysis, question-answering systems, and more[6].

Furthermore, artificial intelligence technology also includes computer vision, speech recognition, intelligent driving, recommendation systems, among other aspects. These technologies have been extensively applied in various fields such as healthcare, finance, transportation, manufacturing, bringing significant benefits to social and economic development. In summary, the rapid development of artificial intelligence technology is changing our lives and working methods, bringing unprecedented opportunities and challenges to various industries[7]. With the continuous advancement and application of artificial intelligence technology, it will continue to play an important role in driving the progress and development of human society in the future.

3. Intellectual Property Challenges of Artificial Intelligence Technology

3.1 Patents

The rapid development of artificial intelligence (AI) technology poses new challenges to the patent system, with one major issue revolving around whether inventions developed by AI should be granted patents. Under traditional patent systems, patent rights typically belong to the inventor, either an individual or a company. However, in AI technology, due to the complexity of algorithms and models, it is difficult to clearly define who the "inventor" is. Some AI systems can autonomously generate new inventions or solve problems without direct human intervention[8]. This raises a controversy: should these inventions generated by AI be considered eligible for patentable innovation?

Another challenge is determining patent ownership. In traditional patent applications, patent rights belong to the inventor or the inventor's employer. However, in AI technology, there may be multiple participants, including data providers, algorithm designers, model trainers, etc., all of whom may contribute to the final invention. Therefore, determining patent ownership becomes a complex issue that needs to consider the interests and contributions of all parties involved.

The key to addressing these challenges lies in establishing clear and unambiguous legal standards and regulations to ensure that innovation in AI technology receives adequate protection while balancing the interests of all parties involved. This may involve amending patent laws to clearly specify whether inventions generated by AI are eligible for patents and how to determine the ownership of patent rights. Additionally, there is a need to strengthen international cooperation and coordination to jointly address the intellectual property challenges brought by AI technology.

3.2 Copyright

Determining copyright ownership and the level of protection for works generated by artificial intelligence (AI) is one of the challenges faced by intellectual property law. Traditional copyright laws typically attribute copyright to the author or creator of the work, but in works generated by AI, the lack of a clear creator complicates this issue. Works generated by AI may involve multiple participants, including data providers, algorithm designers, developers training the models, etc., and the contributions and rights of these participants may vary. Additionally, the level of protection for works generated by artificial intelligence also faces challenges. Traditional copyright laws are primarily based on the creative labor of human authors, protecting their works from unauthorized copying and distribution. However, whether works generated by artificial intelligence have sufficient creativity and originality, and whether they should receive an equal level of copyright protection, are issues that need to be reexamined and discussed.

Therefore, the key to addressing these challenges lies in improving the existing copyright legal framework and establishing new rules and standards applicable to the AI era. This may involve clarifying rules for copyright ownership of works generated by AI and refining the definition of their level of protection. Additionally, there is a need to strengthen international cooperation and coordination to jointly address the intellectual property challenges brought by AI technology.

3.3 Trademarks

The widespread application of artificial intelligence technology may lead to issues such as trademark infringement and confusion. This is due to the highly intelligent and automated nature of artificial intelligence technology, which enables it to generate and process large amounts of data, images, text, etc., and engage in commercial activities. In this context, artificial intelligence technology may inadvertently or intentionally use existing trademarks, resulting in situations of trademark infringement or confusion. Trademark infringement refers to the unauthorized use of another person's registered trademark, leading the public to mistakenly believe that the products or services originate from the trademark owner. Trademark confusion, on the other hand, refers to the use of marks or trademarks similar to those of others, leading consumers to be confused and unable to accurately identify the source of products or services. These issues pose challenges to the legality and fairness of commercial activities, thus requiring the legal community to reexamine the scope and standards of trademark protection.

The key to addressing these issues lies in reevaluating and improving the existing trademark legal framework to meet the development needs of artificial intelligence technology. This may include strengthening trademark registration and examination systems to ensure that new trademarks can be distinguished from existing trademarks, thereby preventing trademark infringement and confusion. At the same time, it is also necessary to enhance trademark enforcement and protection efforts, promptly handling cases of trademark infringement and confusion to protect the legitimate rights and interests of trademark owners. Additionally, there is a need to strengthen international cooperation and coordination on trademark protection to jointly address the trademark protection challenges brought by artificial intelligence technology.

3.4 Trade Secrets

The commercial applications of artificial intelligence technology often involve handling large amounts of sensitive data and complex algorithms, which are often the core competitive advantage and trade secrets of companies. Therefore, protecting these trade secrets becomes one of the significant challenges faced by enterprises. To ensure the security of data and algorithms, companies need to take a series of measures, including but not limited to encrypting data, implementing access controls, adopting secure algorithms and protocols, establishing secure data transmission channels, and monitoring and auditing data access. Additionally, companies need to strengthen employees' awareness of security through training to ensure that employees can properly handle and protect sensitive information. By comprehensively employing technological means and management measures, companies can effectively protect the large amounts of data and algorithms involved in the commercial applications of artificial intelligence technology, thereby safeguarding their business interests and competitive advantages from harm.

4. Shortcomings of the Legal Framework and Improvements

The current intellectual property legal framework may have some shortcomings when faced with the rapid development of artificial intelligence (AI) technology, requiring corresponding improvements and enhancements. Due to the innovative and complex nature of AI technology, existing patent laws may not fully cover all inventions and innovations in related fields. Therefore, revisions to patent laws are necessary to ensure effective protection of the innovative achievements of AI technology. Additionally, as the creative process of AI technology often involves collaboration among multiple parties or is generated by algorithms, copyright laws may be ambiguous and inadequate in determining rights ownership, scope, and protection periods. Hence, corresponding modifications to copyright laws are needed to adapt to the development needs of AI technology. Furthermore, with the widespread application of AI technology, legal issues involving data privacy, algorithm transparency, liability attribution, etc., are becoming increasingly prominent, necessitating the establishment of corresponding legal mechanisms and norms to protect individual rights, maintain social fairness, and promote the healthy development of AI technology. Taking into account technological advancements and societal needs, improvements and enhancements to the intellectual property legal framework will facilitate the innovation and application of AI technology, thereby driving sustained economic and social development.

5. Strategies and Recommendations for Addressing Artificial Intelligence Intellectual Property Legal Issues

5.1 Enhance the Legal Framework and Timely Revise Relevant Laws and Regulations to Adapt to the Development Needs of Artificial Intelligence Technology

With the rapid development of artificial intelligence technology, the existing intellectual property legal framework may not fully cover the innovation and application of new technologies. Therefore, it is necessary to promptly revise relevant laws and regulations to fill legal loopholes and ensure the effective protection of intellectual property rights. This includes amending relevant laws such as patent law and copyright law to ensure the effective protection of the innovation achievements of artificial intelligence technology, and to clarify the rights and responsibilities regarding data generation, usage, and protection. Additionally, specialized legal systems for artificial intelligence technology should be established, such as regulations concerning data privacy, algorithm transparency, and liability determination, to safeguard public interests and social stability. By comprehensively applying legal means and refining the legal framework, robust legal protection can be provided for the innovation and application of artificial intelligence technology, thereby promoting its healthy development.

5.2 Strengthen Awareness of Intellectual Property Protection and Encourage Enterprises to Enhance Their Own Intellectual Property Protection Measures to Prevent Infringement

In addition to legal protection, strengthening awareness of intellectual property protection is also crucial. Enterprises should realize the importance of intellectual property to their business success and establish a culture of protecting intellectual property. This can be achieved by enhancing internal training to increase employees' awareness and importance of intellectual property protection, ensuring they understand what intellectual property is and how to protect the company's intellectual property. Additionally, enterprises should establish sound intellectual property management systems, including establishing intellectual property records, enhancing internal confidentiality measures, and standardizing contract management, to ensure that the company's core technologies and trade secrets are not leaked or infringed upon. Through these measures, enterprises can more effectively protect their intellectual property, enhance their competitive advantage, and avoid unnecessary legal disputes and economic losses.

5.3 Enhance International Cooperation and Establish a More Comprehensive International Intellectual Property Protection Mechanism to Promote International Exchange and Collaboration in Artificial Intelligence Technology

With the proliferation and application of artificial intelligence technology, international cooperation has become one of the key means to drive innovation and development in this field. Against this backdrop, countries should strengthen communication and cooperation to jointly establish a more comprehensive international intellectual property protection mechanism. This includes enhancing coordination and alignment of cross-border intellectual property laws, promoting international recognition and protection of intellectual property rights, and providing broader international market and cooperation opportunities for innovative enterprises and research institutions. Additionally, it is important to establish a cross-border intellectual property enforcement mechanism, strengthen international law enforcement cooperation, combat cross-border intellectual property infringement, and uphold the global intellectual property order and fair competition environment. Through enhanced international cooperation and exchange, not only can innovation and application of artificial intelligence technology be promoted, but sustainable development of the global economy can also be facilitated, achieving a win-win situation for all countries.

6. Conclusion

The development of artificial intelligence technology has brought new challenges and opportunities to intellectual property law. Faced with the intellectual property legal issues of the AI era, joint efforts from the legal community, academic community, and industry are required. Only through continuous improvement and innovation of the law, enhancing awareness of intellectual property protection, and promoting international cooperation and exchange, can innovation and the legitimate rights of knowledge be effectively protected, thus fostering the healthy development and innovation of artificial

intelligence technology. All parties should actively explore solutions and collectively address the intellectual property challenges of the AI era, contributing to the construction of a new system for the legal protection of intellectual property rights.

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