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Intellectual property protection for AI algorithms

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Abstract: In the 21st century, artificial intelligence technology is developing rapidly. Artificial intelligence technology combines multiple disciplines, involves multiple industries, and absorbs multiple talents, which is an extremely complex and huge technology. As the core technology of artificial intelligence, artificial intelligence algorithms have the ability to train and learn human-like self-training, and have become one of the most concerned fields. In recent years, there has also been an increasing discussion of artificial intelligence algorithms. How AI algorithms are protected has also become a matter of great concern for many companies and creators. In this context, this paper will take artificial intelligence algorithms as the research object to carry out the paper. This paper will introduce the legal nature of algorithms, reveal the introduction and ethical dilemma of the existing artificial intelligence algorithm rights ownership dilemma of artificial intelligence algorithm intellectual property protection, and put forward feasible suggestions for the construction of China's artificial intelligence algorithm intellectual property system. It should be made clear that China's existing patent protection path cannot fully respond to all the needs that artificial intelligence algorithms want to be protected, so some adjustments need to be made to the patent law. First of all, it should be clarified which artificial intelligence algorithms can and cannot become the object of patent authorization. As a new thing, artificial intelligence algorithms are different from patents that are obviously novel, practical and inventive in the traditional sense. In order to better protect artificial intelligence algorithms and promote the better development of artificial intelligence algorithm technology, in view of these special differences, certain adjustments have been made to the examination standards of China's patent substantive elements according to the characteristics of patentable artificial intelligence algorithm objects.

Keywords: Artificial intelligence algorithms; Intellectual Property Protection.

1. Introduction

The report of the 20th National Congress of the Communist Party of China pointed out that it is necessary to accelerate the development of the digital economy, promote the deep integration of the digital economy and the real economy, and create a digital industrial cluster with international competitiveness. The rapid development of the digital economy is inseparable from the development of artificial intelligence, and the development of algorithms plays a vital role. The term "algorithm" and specific applications are not out of reach, and it has gradually entered public life and become one of the areas of public concern. From product recommendations on the homepage of shopping platforms, face recognition authentication in mobile banking, to smart medical care that has been implemented in a small area, to the largest artificial intelligence algorithm model in history "Hulk GPT-3" with 175 billion parameters, it can attract public attention. However, artificial intelligence algorithms still have the problems of relatively general concepts and imperfect legislation on intellectual property protection. In the process of decision-making and operation, artificial intelligence algorithms are also very likely to have problems such as "algorithm discrimination" and "algorithm collusion" caused by "algorithm black box". This paper will study the above issues, clarify the legal nature of artificial intelligence algorithms, lead to regulatory approaches, show the dilemma faced by the protection of artificial intelligence algorithms, and finally put forward the path idea of the construction of China's artificial intelligence algorithm intellectual property system.

2. The legal nature of AI algorithms

As a new production relationship in the era of artificial intelligence, artificial intelligence algorithms will eventually be regulated by law. Different theories of the legal nature of algorithms determine different legal intervention and regulation methods. At present, there are four theories: speech, trade secret, due process and patent.

2.1. The rhetoric theory

According to the understanding of ordinary people, algorithms, as a running program with computers as external manifestations, have an inseparable relationship with "speech". The "reason" why algorithms are "speech" is that business giants refuse to regulate algorithms. If the algorithm belongs to speech, then any data, operation mode and output results about the algorithm will be the personal speech of the algorithm developer or the "internal affairs" of each company, and freedom of speech is protected. Any interference with algorithms is an infringement of free speech. The 2003 Search King, Inc. v. Google Tech. case, the 2006 Christopher Langdon v. Google Inc. case, and the 2014 Zhang v. Baidu case defeated attempts to regulate algorithms with free speech. Proponents see algorithms as mere tools, expressions of human thought and speech. However, once the algorithm belongs to speech, refusing the intervention of the law to regulate it means that the supervision of the algorithm is illegal.

2.2. Trade secret theory

I believe that it makes sense to use "trade secrets" as one of the protection options available to developers for AI algorithms. In the 2016 Wisconsin v. Loomis, a judge treated

certain algorithms regarding sentencing as trade secrets. However, if all artificial intelligence algorithms are characterized as "trade secrets", there is a suspicion of trying to evade regulation. Once the legal attributes of AI algorithms are characterized as trade secrets, it means that all data, decision-making and operation processes are not disclosed. In essence, it has played an absolute protective effect consistent with speech. When civil rights are violated, it becomes difficult to obtain evidence.

2.3. Due process theory

Scholar Chen Jinghui put forward the view that "algorithms are a matter related to due process". He believes that the "algorithm black box" does not automatically lead to unfairness, and the reason behind it is the algorithmic manipulation caused by algorithmic power. Algorithmic society, like any social form, contains elements of "power" and may be in danger of "abuse of power". Power, and the social system itself that gives it requires moral justification; These moral justification requirements necessarily include "due process." It prevents abuses of power primarily through a review of the decision-making practices of power holders. However, due process cannot respond to the problem of arithmetic regulation in the period from the early stage of algorithm development to the formation of algorithmic power.

2.4. Patent theory

I agree with the legal nature of the algorithm, that is, the patent law is used to regulate artificial intelligence algorithms. "Exchange of disclosure for protection" is the main idea of algorithmic patents. Patent protection is obtained by appropriately disclosing the algorithm data set and the purpose of the algorithm application. Overall, this helps protect AI algorithms, promote enthusiasm among algorithm developers, promote positive social development, and reduce the likelihood that algorithm developers or companies will use algorithmic power to cover up illegal purposes.

3. The protection dilemma of artificial intelligence algorithms

The scientific and technological level of artificial intelligence algorithms has developed rapidly, but the legislative level of various countries has not been raised to the corresponding level, which makes the protection of artificial intelligence algorithms lack legal basis. In addition, the complexity of artificial intelligence algorithms themselves and unclear rights ownership, and the human concerns about the development of science and technology to a super high level caused by the ethical problems of artificial intelligence algorithms have all caused the protection dilemma to a certain extent.

3.1. AI algorithm rights ownership dilemma

At present, there are several different views in the academic community on the issue of the ownership of rights to artificial intelligence algorithms. The first view is that rights belong to the developers of AI algorithms. AI algorithms are only generated if developers start programming them. The second view is that rights are attributed to the users of AI algorithms. This stems from the "patent addition" theory. Proponents argue that much of the identification and selection work, the drafting of claims, and the delivery of claims are done by users in order to obtain patent rights. The labor behavior of the user of the artificial intelligence algorithm is the processing line. The third view is that rights belong to the AI algorithms themselves. This view believes that the human-like self-learning ability of artificial intelligence algorithms determines the possibility of their existence as legitimate civil subjects. Opponents believe that although artificial intelligence algorithms have self-learning capabilities, they are learning and development directions determined by writing code, and they do not have independent will, nor do they have the original need for protection.

3.2. The ethical dilemma of AI algorithms

While artificial intelligence algorithms bring convenience to humans, they also bring ethical dilemmas. The decision-making and operation process of artificial intelligence algorithms are unknown, and thus form an "algorithm black box". In the "algorithmic black box", one can observe the inputs and outputs of the system, but the input-to-output conversion mechanism is not clear. Even if the AI algorithm code text is made public, the public will not understand how it works. AI algorithms can also evade regulation more covertly through other methods. Such power may infringe on human rights and dominate human behavior; Human labor is gradually replaced by intelligent machines, and the meaning of human beings will no longer exist; In continuous training and self-learning, algorithms are constantly optimized, and human thinking ability may also be possessed by artificial intelligence algorithms in the future, once artificial intelligence algorithms produce self-awareness, this will be a devastating blow to human beings.

4. Chinese the construction of intellectual property system for intelligent algorithms

4.1. Construct a protection path focusing on patent protection

The successful application of a patent needs to meet both formal and substantive requirements. The examination of the formal elements is to examine whether the content of the application is patentable, and the examination of the substantive elements is to examine whether the content of the application complies with the novelty, practicality and inventive step of the patent. The following will expand on these two aspects:

4.1.1. Identify patentable AI algorithm objects

In order for AI algorithms to be effectively protected by the Patent Law, it is first necessary to clarify what kind of AI algorithms are patentable subject matter.

Of course, illegal AI algorithms cannot be patentable subject matter. But the illegality of AI algorithms is extremely hidden. For example, the formation of artificial intelligence algorithms depends on the transmission of a large amount of data, and the code text strings of many artificial intelligence algorithms may have no problem, but if the input data selected at the beginning has an illegal bias, it will eventually lead to illegal operation results. In addition, there are the actions of creators of artificial intelligence algorithms that use legal forms to carry out illegal purposes. For example, the AI algorithm is used as "commodity pricing", "racial discrimination", "employment discrimination", "commercial monopoly and unfair competition", "infringement of personal information", and "seemingly legitimate" AI algorithms with

illegal purposes should also be excluded.

AI algorithms that violate public order and ethics also cannot become patentable subject matter. Chinese Patent Law also clearly stipulates that no patent right shall be granted to invention-creations that violate the law, social morality or harm the public interest. If artificial intelligence algorithms want to obtain patent protection, they should also comply with this provision. With the continuous development of artificial intelligence, algorithmic robots applied to artificial intelligence writing, medical consultation, simple teaching, etc. have begun to enter the public eye, and whether they meet artificial intelligence ethics should also be included in the scope of patentability of artificial intelligence algorithms.

4.1.2. Adjust the examination criteria for substantive patent requirements

AI algorithms can be patentable subject matter protected by patent law. As a new thing, artificial intelligence algorithms are different from patents that are obviously novel, practical and inventive in the traditional sense. In order to better protect AI algorithms, certain adjustments can be made when examining the substantive elements of AI algorithm patents according to their characteristics.

(1) Practicality review

According to Paragraph 4 of Article 22 of the Patent Law of China and the definition and interpretation of practicality in the Patent Examination Guidelines of China, the practicality of a process invention should be reflected in its positive effect, and the application for a process invention shall only be subject to the technical content disclosed by the inventor in the claims, and at the same time should reach a level where the invention can be reproduced by ordinary technical personnel in the industry that can solve specific technical problems, can be applied in the industry, and can be reproduced by ordinary technical personnel in the industry field. In the patent utility examination of artificial intelligence algorithms, the requirement of "positive effect" should promote economic and social development, and reverse minimum to ensure that the algorithm will not have a negative impact on society. Specifically, how to judge whether the algorithm can produce "positive effects" and ensure that it will not have a negative impact on society in the future operation process, some scholars have proposed whether humans intervene in the operation of the algorithm as one of the judging criteria. Human intervention can "control" the artificial intelligence algorithm to a certain extent, ensure the legitimacy of the data used by the algorithm to learn and train, and timely rewrite the algorithm code or terminate the algorithm learning process when the algorithm operation may have adverse effects; As for the requirement of "subject to the technical content disclosed by the inventor in the claims", in the actual patent examination process, the developer will appropriately select the technical content disclosed in the claims out of confidentiality considerations for the operation mode of the artificial intelligence algorithm, which may cause the technical examiner to be unable to reproduce the algorithm based on the submitted technical content. In this regard, developers can prompt before submitting and give suggestions that can supplement the submission of relevant cases.

(2) Inventive step examination

The inventive step criterion for an invention requires that the invention has outstanding substantive characteristics and significant progress. Part II, Chapter IV of the Patent Examination Guidelines gives a "three-step judgment method". By combing through the cited cases, it can be clarified that the closest prior art is not of course the technology with the most disclosed technical characteristics at present, but also needs to be specifically selected according to the claimed invention; In order to adapt to the technical characteristics of artificial intelligence algorithms themselves combined with multiple fields and strong inventive power, some scholars proposed to make "general artificial intelligence standards" to the level of "general technical personnel". But scholar Li enjoys the opposite view. He believes that the existence of the "general technical person" judgment standard only provides objective criteria for creativity, but in fact this "hypothetical person" is not really involved in the review work, and this "person" is more like a "supercomputer" that stores knowledge in the field of technology, only to provide objective standards. Creative review will eventually return to the "three-step method", fictionalizing "general AI standards" to the level of "general technical personnel", and in actual operation, it will encounter the problem of how to determine "general artificial intelligence standards", so it is not feasible to simply change the definition of "general technical personnel". The author agrees more with the second view, in order to better solve the problem of identifying "general technical personnel", what patent examiners should do is to draw a probative basis for judgment after conducting a large number of visits and investigations in the field where the claimed invention is located, and using professional methods to conduct data analysis.

(3) Novelty examination

Novelty requires that the applied technical solution is not a prior art. Prior art refers to technology that was known to the public at home or abroad before the filing date. "Publicly known technology" only requires that the technology be in a state known to the public, and does not require the public to understand and learn it. In practice, the examination of novelty is actually carried out by relying on the search work of the patent substantive examiners of the State Intellectual Property Office. Patent substantive examiners mainly conduct a large number of searches in patent databases in China and other countries in the world, combine existing literature, the Internet, textbooks and other channels, screen out the comparative documents related to the claimed technical solution, and then carry out detailed comparison work to finally determine whether the applied technical solution is novel. From the above novelty judgment process, we can understand that this work is greatly affected by subjectivity, and the review period is long and the efficiency is low. In contrast, AI algorithms store hundreds of billions of pieces of data, making it difficult for substantive patent examiners to continue their searches. In addition, AI algorithms have self-learning and self-creation capabilities, which makes it easier for AI algorithms to meet the "novelty" standard. In view of the characteristics of the artificial intelligence algorithm itself, it is recommended to make adaptability adjustments in the examination of the "novelty" of China's patents. For example, it stipulates that patent applicants for AI algorithms can disclose the initial data used by the algorithm to learn and train to the greatest extent, and even ask patent applicants for AI algorithms to choose whether to disclose relevant trade secrets based on the job duties and professional ethics of patent substantive examiners. The general principle is that applicants should disclose the information and data of their AI algorithms as comprehensively as possible; The

examination standard for patent "novelty" can also be improved to cope with the phenomenon that artificial intelligence algorithms are more likely to reach the patent "novelty" examination line.

4.2. Administrative supervision protection path

Build a well-functioning and orderly administrative supervision and protection system, advocate to the whole society from the national level, promote the rapid and positive development of algorithms with national strength, and help the development of national science and technology. First of all, the government can formulate administrative regulations and departmental rules, issue guiding opinions on promoting the orderly development of artificial intelligence algorithms in the digital era, and determine the overall principles for the development of artificial intelligence algorithms in China. Secondly, the government should determine the specific responsible departments for artificial intelligence algorithms as soon as possible, scientifically and prudently supervise, and the specific responsible departments should be responsible for increasing the specific implementation of policy preferences and cost inputs, accelerate the formulation of artificial intelligence industry management methods, accelerate the pace of improving the construction of supporting facilities for the development of artificial intelligence algorithms, and form a social atmosphere that vigorously promotes development. Third, establish AI algorithm security review bodies at the central and local levels. Achieve the whole process review of artificial intelligence algorithms, achieve illegal review before algorithm formation, real-time supervision during algorithm operation, and investigation and punishment after the application of illegal algorithms. Fourth, improve the filing system for artificial intelligence algorithms. Achieve hierarchical and categorical management. While developing artificial intelligence algorithms, always keep in mind the bottom line of national security. It is clear what kind of data volume AI algorithms can be reported to the basic level people's government for the record, but AI algorithms that reach a large data volume and what specific matters are involved should be reported to the provincial people's government or the central people's government for the record. For example, artificial intelligence algorithms that involve national security, collect specific geographic information, and collect China's citizenship on a large scale should be reported to higher-level people's governments for the record. Fifth, build integrated channels for users and infringed parties to complain, appeal, and litigate. In the face of the difficulty of proving evidence for users and infringed parties, the burden of proof is more on the developers and holders of artificial intelligence algorithms.

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