ISSN: 1813-4890

Algorithm Patent Eligibility Standards: A Comparative Study between China, the USA, and Europe

Chuyun Wang [1,2], Ziyun Zhao[3,*]

[1]School of Economics, Shenzhen Polytechnic University, Shenzhen 518000, Guangdong, China

[2]Research Center for the Legalization of Finance, Fiscal and Taxation in Guangdong-Hong Kong-Macao Greater Bay Area

[3]Institute for Sustainable Industries & Liveable Cities, Victoria University, Melbourne VIC 3000, Australia

Abstract

This paper compares the differences in algorithm patent eligibility standards among China, the USA, and Europe, noting that Chinese patent examination requires algorithm patents to integrate technical features, while the USA employs a two-step process, and Europe focuses on technical means. The paper suggests that China should relax its standards for algorithm patents, clarify the eligibility of fundamental algorithms, update requirements for data training algorithms, and strictly review creativity. Case analysis indicates that China needs to adjust its examination standards to adapt to technological advancements, while also considering the impact of data protection laws on algorithm patents.

Keywords

Algorithm, Patent, Eligibility.

1. Chinese Algorithm Patents Face Challenges in Eligibility Criteria

There are significant differences in the eligibility criteria for algorithm patents across various countries. Both the United States and Europe emphasize that technical means must support each other, but if the technical means are not a necessary prerequisite, they do not constitute eligible subjects. During patent examination, the focus is on the role and support of the functionality and technical features. The 2018 edition of the European Patent Office's examination guidelines provided an example of a "control technical system," arguing that the technical purpose must be specific, such as predicting the strength of a particular structure through data analysis of car collisions. Merely combining the algorithm with the application scenario in form is not sufficient to support the eligibility requirements of the scheme, as it does not prove the relationship between the algorithm and the technical effects.

In China, the patent examination authorities base their eligibility review of algorithm patents on Articles 2 and 25 of the Patent Law. That is, if an algorithm patent combines a technical problem, means, and effect, it meets the requirements for patent eligibility. Furthermore, if the technical effect does not conform to the laws of nature, it does not comply with the provisions of Article 2, Paragraph 2, of the Patent Law regarding a "technical solution." However, the Chinese patent examination authority sets excessively high standards for the patent eligibility of algorithms. The "three technical elements" and "two natural laws" are the necessary conditions for determining whether the claims are technical solutions. Compared to the US and Europe, there is a problem of a one-size-fits-all examination standard that hinders technological innovation, and the narrow scope of patent authorization leads to low value.

ISSN: 1813-4890

For instance, the patent application with the number CN201580024703.0 seeks to protect a method for parallelizing the training of convolutional neural networks, with the applicant being Google LLC. The technical solution claimed in the claims is "a system, method, and storage medium for training convolutional neural networks on multiple batches of training examples, which adopts a scheme for training convolutional neural networks that reduces the training time of the neural network." This patent has corresponding applications in the United States and Europe, and it did not face challenges regarding patent eligibility during the examination by the US and European patent authorities. However, in China, it was rejected due to patent ineligibility because the scheme is an improvement to an algorithm, the means used are not technical means, it does not combine with a specific technical field, and it does not solve a practical technical problem. It is not considered a technically meaningful technical solution as stipulated by the Patent Law, and therefore was rejected.

In 2020 and 2021, the Chinese patent administrative authorities made two revisions to the examination rules for algorithm-related patents, adding examples that relax the patent eligibility involving improvements to the algorithms themselves, such as "a training method for a deep neural network model." It is clarified that if an algorithm patent meets certain domain-specific and technical effectiveness requirements and can produce improvements in the internal performance of a computer, it complies with the requirements of a technical solution. This revision further relaxes the scope of eligible subjects for algorithm patents, and as long as the algorithmic solutions belong to a few specific technical fields, they can be recognized as meeting the requirements for patent eligibility. In the examination of the inventiveness of the patent scheme, there is also a greater emphasis on the overall inventive concept of the technical scheme. However, the progress in adjusting the criteria for the eligibility of algorithm patents by the Chinese patent examination authorities has been slow, and the aforementioned patent (number CN201580024703.0) was still determined in the re-examination in February 2021 not to have demonstrated the resolution of specific technical issues in the application field: the effect obtained is an optimization of the performance of the abstract convolutional neural network training, and it still does not meet the eligibility requirements.

Furthermore, due to the introduction of data protection laws such as the "Data Security Law," "Personal Information Protection Law of the People's Republic of China," and the "Provisions of the Supreme People's Court on Several Issues Concerning the Application of Law in the Trial of Civil Cases Related to the Processing of Personal Information by Means of Facial Recognition Technology" last year, the existing "Patent Law" and "Patent Examination Guidelines" have not yet proposed a solution for the protection of algorithmic schemes based on foundational data training. This could lead to a large number of algorithmic innovations that require data from specific application scenarios for algorithm model training to be potentially excluded from patent eligibility due to non-compliance with data protection laws.

In summary, the difficulty in the eligibility examination of smart algorithm patents lies in the lack of a clear standard for eligibility in China at present. Considering eligibility from the overall perspective of technical problems, technical means, and technical effects is actually a compromise product of unclear examination standards. Confusing the "means + problem + effect" trio is merely a mechanical application of existing examination rules, leading to a large number of basic algorithm product technical schemes being excluded from the subject of patent eligibility.

ISSN: 1813-4890

2. Comparative Study of Algorithm Patent Eligibility Standards

2.1. United States: Two-Step Test for Patent Eligibility Judgment

Section 101 of the United States Patent Law outlines two criteria for patent subject eligibility: First, any new and useful technical improvements that are sought to be protected; second, the invention sought to be protected must meet the criteria of being a patent-eligible subject, for example, the claims cannot pertain to judicially excluded subjects unless the claims as a whole include additional elements that significantly exceed the excluded phenomena. In the early examination practices of the United States Patent and Trademark Office, computer software was typically considered an ineligible subject for patents. During the 1970s to 1980s, the United States Supreme Court summarized and clarified the "holistic review principle" from three algorithm patent eligibility cases. After the establishment of the United States Court of Appeals for the Federal Circuit, the requirements for the eligibility of algorithm and software patents were relaxed. The court held the view that the combination of abstract concepts with a technical field meets the requirements for patent eligibility. However, this standard of eligibility was later questioned as being too lenient. In the "Bilski case," the Federal Circuit Court overturned the evaluation standard of combining "technical fields" with abstract concepts, establishing a return to the "machine or transformation" standard. However, the United States Supreme Court opposed this standard, arguing that the requirements for patent eligibility in the information age should be different from those in the industrial age, and that a more diverse set of criteria should be introduced. In the "Alice" and "Mayo" cases, the United States Supreme Court established a framework for determining whether the applicant is seeking patent protection for the judicially excluded subject matter itself or a patent-eligible technical solution that includes judicially excluded subject matter. This framework is known as the "Alice/Mayo test." The first step is to determine whether the claims are directed to natural laws, phenomena, or abstract ideas. If they are directed to such concepts, the second step is to assess whether the combination of elements mentioned in the patent provides a certain level of innovation and improvement that goes beyond the "patent eligibility exclusions" themselves. Following this, the United States Patent and Trademark Office further refined the evaluation criteria. First, abstract concepts are categorized and listed based on judicial precedents; second, it is determined whether the claims relate to a process, machine, manufacture, or composition of matter, and further consider whether the claims, when taken as a whole with other features, combine the abstract concepts of judicial exceptions into a technical solution for practical application. The second step is to determine whether the claims fall within abstract ideas or natural laws and phenomena, and whether the additional elements recorded in the claims significantly exceed the scope of patent eligibility exclusions. If they do, the claims meet the requirements for patent eligibility. In the current U.S. patent law regarding the subject matter of patent protection under Section 101, algorithms themselves are considered "abstract ideas" as opposed to "practical applications." The U.S. Supreme Court's interpretation of judicial exceptions reflects the court's view that abstract ideas, natural laws, and phenomena are "basic tools of scientific and technological work," and therefore are excluded from the scope of patent eligibility, as granting patent monopolies would instead hinder innovation. The court's concern about this preemption has driven the establishment of the "exclusion principle," which holds that claims cannot preempt abstract ideas, natural laws, or natural phenomena. Claims related to judicial exceptions require further careful examination because they risk preempting excluded subjects, thereby preventing others from using natural laws, phenomena, or abstract ideas. However, the court has cautiously explained: "The exclusion principle must prevent it from devouring the entire patent law," because "all inventions implement, use, reflect, rely on, or apply natural laws or abstract ideas to some extent. But not all claims relate to abstract ideas." If a claim is based on or includes an abstract idea but does not recite the abstract idea,

ISSN: 1813-4890

then the claim is unrelated to the abstract idea; if a claim recites an abstract idea, but as a whole, the claim is about an improvement or other significant improvement that does not seek to preempt the abstract idea, then the claim is unrelated to the abstract idea, and the technical improvement or additional elements of such a claim will shift the focus of the invention being claimed away from the abstract idea. Judicial decisions on such claims include the McRO case, where the claims related to the automatic configuration of synchronized lip movements and facial expressions in animation were improvements in computer-related technology rather than abstract concepts. Instances that have been recognized by the courts as abstract concepts include: the "idea itself," a phrase used by the courts to describe a standalone idea, such as a concept, plan, or scheme that has not been instantiated, as well as an intellectual scheme that "can be performed in one's mind or with pen and paper": concepts related to data comparison that can be manipulated in the human mind or are akin to human mental labor; concepts related to organizing or analyzing information through intellectual operations or in a manner similar to human intellectual work; concepts described as having no specific or tangible form; and concepts related to mathematical relationships/formulas and the execution of mathematical calculations, etc. In the Electric Power Group case, the Federal Circuit Court explained that the concept of collecting and analyzing information falls within the "abstract idea domain" because information is intangible. Thus, processing the collection of information belongs to the domain of abstract ideas, including information targeted at specific content. Similarly, the court regards the processing and analysis of information through steps that people perform in their minds or through mathematical algorithms, without any other processing means, as methods of intellectual activity within the abstract concept. The Alice Corp. case provides an example of how the court analyzes "significantly more," where the court identified additional elements in the claims and considered the additional elements individually, stating that all additional elements "as an intentionally arranged combination," these claims did not reach the degree of "significantly more" than a mere instruction, thus deeming these claims ineligible. When assessing whether additional elements meaningfully limit the judicially excluded subject matter, it is particularly important to consider the additional elements both individually and in combination, even if the individually considered elements do not "significantly more," when viewed in combination, they may still achieve a significant degree of limitation of the excluded subject matter by meaningfully limiting the excluded object.

In summary, the current principles for determining the eligibility of patent subjects in the United States are as follows:

Step 1: First, determine whether the subject matter of the claims is directed to one of the four patent-eligible categories: processes, machines, manufactures, or compositions of matter.

Step 2: Further determine whether the claims as a whole contain statutory exceptions, which include natural phenomena and abstract ideas. When claims involving abstract ideas or natural laws are ineligible, using methods and products of abstract ideas, natural phenomena, and natural laws to achieve real-world functions is acceptable. If the claims are directed to statutory exceptions, an analysis must be conducted to determine whether the elements of the claims, considered individually and as an ordered combination, are sufficient to ensure that the claims as a whole significantly exceed the exceptions themselves.

2.2. Europe: Technical Requirements for Algorithm Patents

Whether it has technical character is the focus of the European Patent Office's examination of the eligibility of patent schemes. The European Patent Office grants patent rights to any technically feasible and industrially applicable inventive scheme. Excluded subjects of patents include: rules of mental activity, natural laws, and aesthetic creations, etc.

ISSN: 1813-4890

For example, a purely mathematical method of quick division would be excluded from patentable subjects, but a computer that performs quick division calculations would not be excluded. A filter that uses a particular mathematical theory would not be excluded. Only when a technical objective of the method is sufficiently defined can mathematical methods and other process steps contribute to the existing technology. Computer simulation methods for specific technical applications are considered to meet the requirements of patent eligibility. In the case of mathematical methods for processing data, even though the source of the data is defined, that is, what the data represents, it may imply a technical appearance, but it does not necessarily give the method its technical nature.

The 2018 edition of the European Patent Office (EPO) Examination Guidelines, when examining algorithm-related patents, states that in terms of subject-matter eligibility, as long as the patent technical scheme employs technical means, it is not excluded from patent eligibility under EPC52(2) and (3). Technical means can include computers, networks, and devices, among other technical means. The guidelines have supplemented the examination of technical requirements: whether algorithms and models can contribute to the existing technology is subject to the same criteria as those for intellectual activity rules. For technical applications, there must be technical effects and contributions of mathematical methods. For technical implementations, if the patent scheme utilizes the application of mathematical methods in a specific technical field and produces technical effects, then the mathematical method also contributes to the technical nature of the patent scheme.

In 2019, the EPO Examination Guidelines considered that mathematical methods are not patent-eligible subjects, but their combination with applications and implementations in specific technical fields meets the requirements for patent protection subjects. The applications of artificial intelligence and machine learning in various fields are generally considered patentable. Therefore, artificial intelligence algorithms and/or models can only be patented in combination with different technical fields and scenarios. The technical features of the claims should be combined into an implementable technical scheme and define the scope of patent protection for that specific application. Appropriately excluding schemes containing artificial intelligence elements from patentable technical schemes can ensure that applications developed based on artificial intelligence are unrestricted.

2.3. China: Judgment of Intellectual Activity Rules and "Technical Schemes"

Article 2, Paragraph 2 of the Patent Law stipulates the "technical scheme" eligible for a patent, which must simultaneously possess the three elements of "technical problem, technical means, and technical effect." A technical scheme must be a collection of technical means that comply with the laws of nature.

Patent Law Article 25 excludes methods of human subjective thinking activities such as mathematical methods, game rules, management rules, etc. When determining whether a patent scheme is eligible, the following criteria should be followed:

Firstly, if the entirety of the patent technical scheme consists of rules and methods of intellectual activity, it does not meet the requirements for patent eligibility.

Secondly, if the patent technical scheme, apart from the subject name that defines the application field, consists entirely of rules of intellectual activity, it also does not meet the requirements for patent eligibility.

Thirdly, if the patent technical scheme includes both technical means and rules of intellectual activity, the scheme as a whole may be eligible for patent protection.

ISSN: 1813-4890

2.4. Comparison of Eligibility Judgment Standards in Various Countries

Firstly, the United States, Europe, and China all directly exclude algorithm patents involving rules of intellectual activity from being eligible for patents. Due to the foundational and abstract nature of algorithm patents, they are easily determined by patent examiners to be rules of intellectual activity.

Secondly, for the two main types of algorithm patents: basic research and specific applications, the United States uses a two-step test for patent eligibility judgment. If basic algorithm patents meet certain innovative requirements, they may be granted patent rights, such as Google's application for the Dropout algorithm model involving neural networks. In contrast, Europe and China both require that algorithm patents be combined with specific technical fields to meet patent eligibility requirements. The main concern is that if basic algorithm patents are granted with broad protection scopes, it may hinder continuous innovation in the field and be difficult to balance the patent monopoly and the public interest.

The United States Supreme Court first proposed a two-step test in the Mayo case to evaluate the eligibility of patent applications with algorithmic and methodological characteristics. Two years later, in the Alice case, the two-step test was refined. If a patent scheme belongs to a patent application for methods, machines, manufactures, compositions of matter, or combinations, and does not directly point to any natural phenomena or abstract concepts, it meets the requirements for patent eligibility. If the patent scheme points to natural phenomena or abstract concepts, it is necessary to examine whether additional elements that are sufficient to transform abstract concepts into inventive concepts can be integrated into practical applications. Only if the additional elements are sufficient to support the transformation of abstract concepts into inventive concepts and significantly exceed the level of "well-known, routine, and conventional activities," will the United States Patent and Trademark Office consider it patentable.

The European Patent Office mainly uses the adoption of technical means as the standard for judging the eligibility of algorithm patents. It determines whether the subject matter sought to be protected has a technical nature as a whole. If the patent scheme adopts technical means, it meets the requirements for patent eligibility, and further examines whether there is interaction or mutual support between the technical features.

China's National Intellectual Property Administration has modified the patent examination guidelines multiple times in recent five years, optimizing the evaluation standards for the eligibility of algorithm patents, and clarifying that the application of technical fields for basic algorithm patent schemes is no longer restricted in patent examination. The author believes that the relaxation of eligibility criteria for basic fields in several technical areas in this review guide complies with the demands of the industry and research institutions for patent protection of basic algorithm models.

Firstly, this is a response to the increasing commercial maturity of the field of basic algorithm research. Compared to the past few decades, the number of journal and conference articles in the field of basic algorithms and artificial intelligence has increased several times, and the ratio of the number of articles published to the number of patent applications has increased 2.7 times from 2010 to 2016. Secondly, relaxing the eligibility criteria for basic algorithms is conducive to the continuous innovation of innovators and the promotion of knowledge disclosure. Thirdly, more and more basic algorithm models have been used as mature commercial products to promote the development of various industries. The intellectual property protection of algorithm models is more capable of achieving the purpose of the patent system in the contemporary era compared to the protection of traditional technical fields in the industrial age. "Lifting the lighter to clarify the heavier," since traditional technical fields have already

ISSN: 1813-4890

been given intellectual property protection, it is naturally appropriate to provide intellectual property protection for basic algorithm patent schemes.

3. Suggestions for Improving the Eligibility Standards of Algorithm Patents in China

3.1. Clarify Basic Algorithms as Eligible Subjects for Patent Rights

The author believes that, firstly, the 2021 draft amendment to the Patent Examination Guidelines, which adds eligibility requirements for basic algorithms in specific fields, is in line with the trend of technological and economic development. Research in China's algorithm field has made significant progress, and there is a need for the intellectual property system to provide protection strength that matches the level of technological development. The time to gradually relax the eligibility of basic algorithm patents is ripe, and the relevant requirements for patent examination should be modified as soon as possible to meet the demands of innovators. Secondly, with the rapid development of artificial intelligence technology in recent years, there are no longer barriers between basic algorithm research and its application in specific scenarios. The gap between algorithm research innovation and industrial application is narrowing, and more and more algorithmic products operate in the form of "algorithm model + data." This has broken the absolute dichotomy between algorithmic products and application implementation on a technical level, providing a legitimate reason for basic algorithm patents to meet eligibility requirements.

Technological fields that involve using basic algorithms to solve technical problems also include frontier areas such as biotechnology and quantum computing. The draft amendment to the examination guidelines cannot list all technical fields, so it is also necessary to clarify the relaxation of restrictions on the application of technical fields for basic algorithm patent schemes. Currently, the "three technical elements" and "two natural laws" are still considered necessary conditions for determining whether a patent application is a technical scheme. The author believes that this review approach, which starts from technical effects, has strong rigid constraints and sets relatively high standards for the review of basic algorithm patents, with patent examiners having a strong subjectivity and inconsistent standards in determining patent eligibility. It is suggested to refer to the two-step test method of the United States Patent and Trademark Office in the judgment of the eligibility of algorithm patents, and to establish a patent eligibility judgment standard system that conforms to China's current development situation.

3.2. Update the Eligibility Requirements for Data-Training Algorithm Patents

In the current patent examination, when reviewing patent applications for big data applications that use classification, clustering, regression analysis, neural networks, and other methods to mine data, the author believes that as long as the applicant can add an explanation in the patent specification that the collection of user information is with the user's knowledge and consent, it can prove the legality of the data source for the big data algorithm patent scheme. That is, the algorithm patent scheme complies with the provisions of data protection laws such as the "Personal Information Protection Law," thereby meeting the requirements of Article 5 of the "Patent Law." It is suggested that examiners should be more cautious when applying this clause.

If the applicant's statement in the patent application documents that the collection of user information is with the user's knowledge and consent is false, it can refer to foreign practices. For example, in the United States, on the one hand, through its integrity system and credit punishment mechanism, the parties who make such improper acts or false statements will be fined or imprisoned, and the patent right will be invalid from the beginning.

ISSN: 1813-4890

Furthermore, the author believes that for the eligibility recognition standard of data training algorithm patents, if the use of the algorithm product violates the law, the method of training and constructing the algorithm does not violate the law. As long as the applicant declares in the algorithm patent that the source of its training data is legal, the patent scheme should be considered in compliance with the provisions of Article 5 of the Patent Law.

3.3. Stricten the Standard for Inventive Step Evaluation

With the relaxation of eligibility requirements for basic algorithm patents in the patent examination guidelines, an increasing number of basic algorithm patents will seek patent protection. When conducting an inventive step examination for such basic algorithm patent applications, adhere to the principle of "better to be without than to be overrun with substandard patents." It is recommended to establish stricter rules to prevent the abuse of rights. Whether it is a comparison with existing technology or during the process of infringement determination, the "sameness" of the patent technical scheme with other comparison documents should not be a formal sameness but a substantive sameness. When evaluating the inventive step of algorithm patents, consideration should also be given to whether they can solve technical problems and achieve technical effects. If the evaluation criteria for the inventive step of basic algorithm patents are too low, there will be a proliferation of "junk patents" with overly broad protection scopes and weak practicality, which will hinder technological development and increase the cost of social innovation. During the inventive step examination of algorithm patents, a rigorous theoretical difference comparison should be conducted to exclude a large number of abstract concepts, natural laws, and phenomena with insufficient inventiveness from patent protection, thereby enhancing patent quality.

In summary, although there is a strong demand for intellectual property protection of algorithm patents, given that China's relevant technical levels and supporting legal regulations are in the development stage, and considering the objective reality that the overall social judicial level and the level of algorithm patent value assessment are difficult to fundamentally improve in a short period, a cautious attitude and a stricter inventive step standard should be adopted. This approach will reduce the risks of invalid examination and infringement litigation due to patent validity issues and will be conducive to promoting the healthy development of technologies in new fields and new business forms.

References

[1] National Intellectual Property Administration: "Patent Examination Guidelines", Intellectual Property Publishing House, 2010 edition, pages 119, 122-124.

[2] Qiu Fuen: "Discussion on the Patentability of Artificial Intelligence Algorithm Innovations", in "Artificial Intelligence", 2020, Issue 4, pages 47-55.

[3] Wan Yong: "Legal Protection of New Types of Intellectual Property and Construction of International Rules", in "Journal of China University of Political Science and Law", 2021, Issue 3, pages 100-102.

[4] National Intellectual Property Administration of China: "Explanation on the 'Patent Examination Guidelines Amendment Draft (Second Batch of Comments Draft)'", November 2020, page 31, the example scheme records the content of selecting a training scheme matched with a processor of different performance according to the size of the training data, thereby improving the overall system processing performance. This example provides guidance for the examination of the subject matter judgment of invention patent applications for improvements in the algorithm itself, which is conducive to strengthening the protection of algorithm-related patent applications.

[5] National Intellectual Property Administration of China: "Patent Examination Guidelines Amendment Draft (Draft for Comments)", August 2021, page 97, it is clear that if the solution of the claims involves improvements in technical fields such as deep learning, classification and clustering,

and artificial intelligence and big data algorithms, and can solve technical problems such as how to improve hardware computing efficiency or execution effects, including reducing data storage, reducing data transmission, and improving hardware processing speed.

[6] Parker v. Flook, 437 U. S. 584, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978).

[7] Translated by the International Cooperation Department of the National Intellectual Property Administration and the Examination Business Management Department of the Patent Office of the National Intellectual Property Administration: "United States Patent Examination Guidelines - Patentability", Intellectual Property Publishing House, 2021, pages 17-51.

[8] Cui Guobin: "Abstract Ideas and Specific Technologies in Patent Law", in "Tsinghua University Journal (Philosophy and Social Science Edition)", 2005, Issue 3, pages 41-45.

[9] Bilski v. Kappos, 561 U. S. 593 (2010).

[10] Alice Corporation Pty. Ltd. v. CLS Bank International, 134 S. Ct. 2347 (2014).

[11] Mayo Collaborative Services v. Prometheus Laboratories, Inc. 132 S. Ct. 1289 (2012).

[12] Zhang Jiyu: "The Theoretical Justification of Algorithm Patent Eligibility in the Intelligent Era", in "Contemporary Law Science", 2021, Issue 3, pages 90-91.

[13] Alice Corporation Pty. Ltd. v. CLS Bank International, 134 S. Ct. 2354 (2014).

[14] McRO, Inc. v. Bandai Namco Games America Inc. 837 F. 3d 1299, 1315, 120 USPQ2d 1091, 1102-103 (Fed. Cir. 2016).

[15] EPO "Examination Guidelines" (2015 edition) Part G, Chapter 2, Section 3.3 "Mathematical Methods", if artificial intelligence and machine learning are based on computational models and algorithms for classification, clustering, regression, dimensionality reduction, such as neural networks, genetic algorithms, support vector machines, K-means, kernel regression, discriminant analysis, then regardless of whether such computational models and algorithms are trainable, they themselves have an abstract mathematical nature and are therefore not patentable.

[16] EPO "Examination Guidelines" (2015 edition) Part G, Chapter 2, Section 3.1 "Artificial Intelligence and Machine Learning".

[17] National Intellectual Property Administration: "Patent Examination Guidelines", Intellectual Property Publishing House, 2010 edition, pages 119, 122-124, an invention means a new technical scheme for a product, method, or improvement thereof. Technical means are usually reflected by technical features. Schemes that do not use technical means to solve technical problems to obtain technical effects in accordance with the laws of nature do not belong to the subject matter stipulated in Article 25, paragraph 1, of the Patent Law. The patent-eligible subjects excluded by the first paragraph of Article 25 of the Patent Law include: scientific discoveries, rules and methods of mental activities, diagnostic and therapeutic methods for diseases, animal and plant varieties, and methods of atomic nuclear transformation and substances obtained by such methods.

[18] National Intellectual Property Administration: "Patent Examination Guidelines Amendment Draft (Draft for Comments)", August 2021, page 97, if the solution of the claims involves improvements in artificial intelligence and big data algorithms such as deep learning and classification clustering, and the algorithm has a specific technical correlation with the internal structure of the computer system, and can solve technical problems such as how to improve the efficiency or performance of hardware operation, including reducing data storage, reducing data transmission, and improving hardware processing speed, thereby obtaining technical effects of improved internal performance of the computer system in accordance with the laws of nature, then the solution defined by the claims belongs to the technical scheme described in Article 2, paragraph 2, of the Patent Law. The solution of the claims deals with big data in specific application fields, using classification clustering, regression analysis, neural networks, and other methods to mine the internal correlation of data that complies with the laws of nature, thereby solving technical problems such as how to improve the reliability or accuracy of data analysis in specific application fields, and obtaining corresponding technical effects, then the solution defined by the claims belongs to the technical scheme described in Article 2, paragraph 2, of the Patent Law.

ISSN: 1813-4890

[19] Di Xiaofei: "Analysis of the Patentability of Artificial Intelligence Algorithms - Distinguishing Abstract Concepts from Specific Applications from the Perspective of Knowledge Generation", "Intellectual Property", 2020, Issue 6, pages 94-95.