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Breaking the Boundary of the Concept of Inventor in Patent Law in the Age of Artificial Intelligence——The Limitations of Anthropocentric Legislation: A Look at the DABUS Case

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Abstract

In the field of patent law, the concept of "inventor" faces real challenges in the era of artificial intelligence, as exemplified by the DABUS case. Judicial decisions and reasoning in relevant cases in major countries demonstrate the adaptability of the concept of "inventor" within the framework of anthropocentric legislation. This concept is closely related to the question of artificial intelligence subjectivity in philosophy, reflecting the historical legacy of subjectivity philosophy and its contemporary dilemma. From the perspectives of functionalism and post-humanism, we should break through the traditional concept of inventorship and construct a patent law system adapted to artificial intelligence innovation, achieving a dynamic balance between incentivizing innovation and protecting the public interest. This provides theoretical references and practical solutions for resolving the patent protection dilemma of artificial intelligence inventions.

Keywords

Patent law; Inventor; DABUS case; Artificial intelligence; Anthropocentrism

1. Introduction

With the advancement of science and technology, the autonomous output capabilities of generative artificial intelligence in fields such as technological research and development and artistic creation are becoming increasingly prominent. Traditional legal systems, which prioritize human subjects, face unprecedented challenges. The question of whether artificial intelligence can qualify as an "inventor" under patent law not only involves literal interpretation and value judgments of legal provisions but also touches upon profound philosophical reflections on subjectivity and free will.

Stephen Thaler in 2018, brought this controversy to the global forefront through a transnational judicial debate. When an AI system independently completes a complete technical solution, should current patent law transcend the inherent framework that "inventors must be natural persons"? Courts around the world largely ruled in the negative, exposing the tension between legal conservatism and technological foresight, and reflecting the contradiction between traditional human-centered legislation and the innovative demands of the AI era.

2. Global Judicial Controversy Raised by the DABUS Case

In 2018, American scientist Stephen Taylor applied for patents in 22 countries for a " food container " and " emergency signal light " independently designed for his artificial intelligence system, DABUS (Device for the Autonomous Bootstrapping of Unified Sentience). DABUS is an intelligent device with multiple systems and thousands of neural networks. One system automatically generates ideas or concepts, while another evaluates and refines the outputs. The entire invention process is completed without direct human intervention. Taylor listed " DABUS " as the inventor in his application and himself as the applicant.

Based on a literal interpretation, the USPTO denies AI the status of "inventor."[1] Section 100(f) of the US Patent Act defines an inventor as a person who contributes to the conception of an invention. [2] The US Patent Act frequently uses the term " himself " or " herself " to refer to a " patent inventor, " clearly referring to a natural person. The US Court of Appeals for the Federal Circuit (CAFC) ruled in the Thaler case that "only natural persons can be inventors, and therefore AI cannot be an inventor." This ruling asserts that inventors must form a complete, clear, and actionable idea in their minds, and AI cannot conceive and, therefore, cannot be a patent inventor.

7(3) of the UK Patent Act defines an inventor as “the person who actually devised an invention”, while Section 13 (2)(a) refers to inventors as “persons or persons” and requires that the patent application specify “the identity of the individual inventor or, in the case of a collaborative invention, the inventors”. [3] The UK Supreme Court ruled in its final instance that the “ inventor ” in patent law must be a human being and that AI is merely a tool, upholding the lower court’s decision to dismiss the DABUS patent application.[4] The European Patent Office, basing its inference on the scope of inventors under Article 19 of the European Patent Convention (EPC) , argued that the patent application in the DABUS case failed to correctly designate the inventors and did not meet the formal requirements for EU patent applications.[5] The EPC requires patent applications to provide complete information such as the inventor’s surname, name and address to determine their identity, while the name of the machine cannot be used to determine the inventor’s identity.

The State Intellectual Property Office of China rejected the application, citing Article 13 of the Implementing Regulations of the Patent Law of the People's Republic of China, which states that "the term 'inventor or designer' as used in the Patent Law means a person who has made a creative contribution to the substantial features of an invention." The application was then rejected. The Civil Code also incorporated the provisions on rights holders under civil law into the review. Civil law defines three types of civil subjects: natural persons, legal persons, and unincorporated organizations. DABUS does not fall under any of these three categories and, as a civil subject, cannot enjoy the property and personal rights associated with inventors under patent law. Therefore, DABUS cannot be identified as an inventor during the patent administrative review process.

South Africa and Australia are the only countries to have issued affirmative rulings in global disputes over patent eligibility for AI inventions. Their judicial practices provide unique reference models for patent system reform in the AI era. In 2021, South Africa became the first country in the world to recognize AI inventors, approving DABUS's "Fractal Container" patent (patent number ZA202103242).[6] However, this system is designed with strict application limitations, requiring AI to meet the core requirement of " completely autonomous creation," meaning the invention process must be independent of human intervention, and patent rights ultimately vest in the owner or controller of the AI. Due to the difficulty in defining AI autonomy in practice and the lack of clear technical standards and evaluation systems, distinguishing the boundary between human guidance and autonomous machine innovation has become a difficult issue in judicial practice. After three years of operation, this system encountered practical bottlenecks, and the South African Patent Office suspended relevant authorizations in 2024, entering a phase of system optimization and standard improvement.

Guided by Section 15(1)(b) of the Australian Patents Act, which stipulates that "on the grant of a patent for an invention, the person shall be entitled to transfer the patent to that person," the Australian court effectively upheld all of the plaintiffs' claims in the DABUS case and supported the view that the owner of the AI should be the patent applicant.[7] Although the judgment did not directly declare AI inventorship, through flexible application of the legal provisions, it pointed out that the role of the inventor is to identify the person or entity responsible for the creation of the invention, indirectly recognizing DABUS as the subject of the invention and explicitly supporting the legal status of the owner of the AI as the patent applicant, thus providing a judicial solution for patent protection of AI inventions at the level of ownership. This judgment not only avoids theoretical disputes that directly challenge the traditional concept of inventorship but also responds to the need for protection of AI innovation at a practical level.

The DABUS case sparked widespread attention and heated debate worldwide over whether AI can be patented by inventors. The controversy primarily focused on two aspects:

First, how does AI meet the definition of "inventor" in patent law? The core issue lies in the legal entity qualification requirements for inventors. AI is not a natural person. As a non-natural and non-traditional legal entity, it is neither a human individual in the biological sense nor explicitly granted the same subject status as a natural person under current law. Under this premise, can it fall into the category of "legal person or unincorporated organization" and become a legal entity qualified as an inventor?

Second, if artificial intelligence cannot be an inventor, how should the ownership of the relevant inventions be determined? And when AI demonstrates a certain degree of independent innovation capabilities, how should the current patent system adapt to the needs of this new innovation model?

This case not only challenges the anthropocentric concept of inventors in traditional patent law but also prompts countries to re-examine the balance between the patent system encouraging innovation and maintaining legal stability.

3. Discussion on the Subjectivity of Artificial Intelligence from a Philosophical Perspective

The patent law rule that "the inventor must be a natural person" wasn't established out of thin air; it reflects a profound philosophical understanding of the concept of "subject." The legal controversy sparked by the DABUS case is, in essence, a reflection of the collision between technological practice in the AI era and traditional philosophical theories of subjectivity. The philosophical discussion of "who qualifies as the subject of creative activity" provides the underlying logic for defining the concept of inventor in patent law and reveals the ideological roots of the current legal dilemma.

3.1 Traditional Philosophy of Subjectivity and the Human Foundation of Legal Subjects

In traditional philosophy, the concept of the subject has deep theoretical roots. Anthropocentrism, the core position of this system, emphasizes the centrality of humanity in the order of existence. It holds that only humans, endowed with reason, consciousness, and practical abilities, are the only subjects worthy of moral and legal consideration, while other beings exist merely as objects serving human needs. This perspective has profoundly influenced the understanding of the creative subject: Aristotle viewed the subject as a bearer, emphasizing its fundamental role in the process of change. Descartes, proposing the principle "I think, therefore I am", defined the subject as a self-aware thinker, with self-awareness becoming the core hallmark of the subject's existence. Starting from universal reason, Kant defined the core characteristic of the subject as " the autonomy of free will "—the ability of humans to transcend sensual impulses and act according to universal laws. This rational autonomy is the hallmark of the subject's existence. In his view, the essence of creative activity is the "externalization of personality",[8] with the work being a reflection of personality and, essentially, the author's will. This view directly links creativity with human rational will, emphasizing that only a subject endowed with free will can accomplish original activities. Hegel further developed this idea, viewing creative activity as the "self-realization of the spiritual subject". He pointed out that scholarship, knowledge, and art are internal spiritual endowments, and that works inherently reflect the unique individuality of their authors, the product of their own spiritual and technical talents.[9] Marx further clarified that the subject is man, the object is nature, and "man is always the subject". Through conscious life activities, humans demonstrate subjective initiative in social practice, creating and changing the world. This creativity and practicality constitute the essential characteristics of man as a subject.

In traditional philosophical systems, the subject is closely linked to humanity. Human self-awareness, rationality, and the agency demonstrated in practice are key factors in distinguishing subject from object. This understanding of subjectivity, centered on human self-awareness, rationality, and practical agency, directly shaped the initial legal definition of the subject: the natural person as the core form of the legal subject, whose status is highly consistent with the philosophical understanding of the uniqueness of the human subject.

However, the concept of legal subjects is not exclusive to humans. The emergence of the legal person system marked a significant breakthrough: as a non-natural entity created by law through fictitious technology, the legal person, while lacking biological self-awareness and rationality, can, through organizational structures, express its will, participate in social interactions, and transfer property, endowed with an independent legal personality. This demonstrates the extensibility of the concept of legal subject, allowing for technical adjustments to the connotation of "subject" based on functional needs and social realities. However, such adjustments have either long failed to break

through the fundamental premise of anthropocentrism or have been short-lived in the history of legal development (e.g., animal trials in medieval Europe [10]). In traditional legal systems, neither the natural subject status of natural persons nor the "fictitious subject" status of legal persons has, and can not, be applied to the context of artificial intelligence.

3.2 Contemporary Philosophical Thought's Expansion of Subject Boundaries and Legal Responses

Functionalism and posthumanism, from a contemporary philosophical perspective, have expanded the boundaries of the concept of "inventor". As a key school of thought in cognitive science and philosophy of mind, functionalism argues that the essence of a subject lies not in its material composition (such as a biological brain), but rather in its realized functional state and input-output relationships.[11] In other words, if a system can exhibit cognitive, decision-making, and creative functions similar to those of a human subject, its subjectivity should be recognized to a certain extent. Since the core function of the patent system is to incentivize innovation by confirming rights, recognizing AI as a "functional subject" when it can consistently output creative results that meet patent law requirements is, in essence, optimizing the system's functionality by adjusting the scope of its subject. In the DABUS case, the AI system autonomously generated technical solutions and evaluated optimization results through a neural network. Its functional output approaches the creative process of a human inventor, and therefore its status as a "functional subject" should be recognized.

Posthumanists go a step further, believing that technological development has blurred the boundaries between humans and non-humans. Katherine Heller points out in "How We Became Posthuman" that machine intervention in creation has broken through the limitation of " creator = natural person ", marking a major shift in the assumption of subjectivity in the posthuman era. AI will become a new form of subjectivity.[12]

If, philosophically, we acknowledge that AI possesses a certain degree of subjectivity, then granting it corresponding legal status, such as inventor status in patent law, becomes reasonable. This may mean that the law needs to break away from the traditional anthropocentric framework and redefine the scope of all legal subjects. Conversely, if we adhere to the traditional philosophical view that AI cannot possess true subjectivity, then maintaining a human-centered standard for identifying subjects in the law is more reasonable.

Regardless of which perspective is adopted, legal system design requires full consideration of how to balance technological innovation with the maintenance of legal order, as well as how to safeguard fundamental human interests and social fairness and justice. Philosophical discussions prompt the legal community to reflect on the adaptability and limitations of the current legal system in the face of the challenges of artificial intelligence, providing theoretical guidance for legal reform and improvement. This philosophical controversy is clearly evident in the judicial practice of the DABUS case: the brief recognition by the South African and Australian courts implied a partial acceptance of AI's functional subjectivity, and the logic of their decisions reflects the functionalist emphasis on creative output. Meanwhile, the dismissal decisions by courts in the United States, the United Kingdom, the European Union, and China, while continuing the traditional philosophical position of "human subjectivity", also incorporate the pragmatic considerations of functionalism.

In fact, while functionalism emphasizes designing institutions based on practical utility, the core of this "utility" remains anchored in the fundamental needs of human society. The essential function of the patent system is to incentivize human intellectual creativity and promote the transformation of knowledge by clarifying ownership of rights. Granting AI subjectivity might seem to address the functional nature of its creative output, but it would undermine the very foundations of the system: AI cannot assume legal responsibility or enjoy the full range of rights enjoyed by humans, nor can it become the actual beneficiary of the incentive chain. Ambiguity in ownership diminishes the innovative drive of human developers, while directing incentives toward AI itself is meaningless. Therefore, even when courts in major countries around the world recognize the technical functionality of AI, they consistently deny AI subjectivity in determining its subjectivity. Essentially, by strictly limiting subjectivity, they ensure that the legal system consistently serves the ultimate goals of human innovation and social development, preventing functionalism from degenerating into technological supremacy divorced from core human values. In its ruling, the USPTO explicitly stated that "inventorship must serve the institutional function of incentivizing human innovation". Granting AI inventor status could lead to confusion in patent ownership and weaken incentives for human creators. This indirectly addresses the functionalist logic that "subject identification must serve institutional functions". The European Court of Justice, combining the anthropocentric tradition with functionalist analysis, emphasized that the core of the patent

system is the protection of human intellectual labor, while also recognizing the need for other institutional designs to respond to the real needs of AI innovation.

4. Limitations and Development Path of Patent Law

Anthropocentrism is evident in the current patent law system. Regarding the definition of the inventor, patent laws across the globe generally restrict the inventor to a natural person. For example, US patent law explicitly refers to a natural person through the use of terms such as "himself" and "herself". UK patent law defines the inventor as the "actual designer" and refers to him or her as a "person". This emphasis on natural persons is also evident throughout the patent application and grant process. For example, US patent grants require the inventor to make an oath or declaration. This procedure is designed to constrain the words and actions of natural persons and aims to ensure the legitimacy of patent grants and the legality of the source of the rights. The European Patent Office requires patent applications to provide complete identifying information of the inventor to confirm their identity, which is also based on the traditional understanding of natural persons as inventors. This anthropocentric legislative model primarily targets human inventors as the incentivized subjects of the patent system, emphasizing the dominant role of humans in the process of invention and creation.

With the rapid development of artificial intelligence (AI) technology, the limitations of anthropocentric legislation are becoming increasingly prominent. In the DABUS case, the strict restriction of inventors to natural persons prevented innovative and practical inventions independently developed by AI from obtaining patent protection, inevitably discouraging innovation using AI. From the perspective of incentivizing innovation, AI has demonstrated a strong capacity for innovation, capable of creating novel and valuable technological solutions. If patent law fails to adapt to this change, a large number of AI-driven innovations will be excluded from patent protection, hindering scientific and technological progress and economic development.

Furthermore, human-centered legislation also faces difficulties when it comes to the ownership of rights in AI inventions. Traditional patent law determines the source of rights for non-inventors based on employment relationships, rights transfer contracts, and other relationships. However, these rules are difficult to apply to AI inventions, resulting in unclear ownership and numerous disputes. This legislative model may also lead some parties to conceal the fact that inventions were created by AI in order to comply with the current legal requirements for inventors, thereby undermining the patent system's principle of good faith.

To balance philosophical concepts with legal practice, it is necessary to redefine the concept of inventor in patent law. Drawing on some perspectives from functionalism, the concept of inventor can be redefined not solely based on biological attributes, but rather from the perspective of substantial contributions to the invention. If AI plays a key and indispensable role in the invention-creation process, and the invention meets the patent law requirements of novelty, inventiveness, and practical application, then under certain conditions, AI can be considered a special "inventor". However, the extent and role of humans in the entire invention process must be clarified to ensure that the core position and value of humans are not undermined. For example, it could be stipulated that in AI inventions, humans must act as supervisors or guides, participating in key aspects of the invention, such as proposing the basic direction of the invention and screening and evaluating AI-generated solutions. This approach both recognizes the innovative contributions of AI and embodies the leading role of humans in scientific and technological development, aligned with certain philosophical concepts of the subject.

Regarding the patent authorization system, specialized review standards and procedures should be established for AI inventions. During the review process, attention should be paid not only to whether the invention's technical content meets patent authorization requirements, but also to AI's operational mechanisms, data sources, and human involvement in the invention process. Regarding ownership, a diversified ownership model could be established. If an invention is completed by humans using AI assistance, the rights belong to the human inventor. If an invention is independently completed by AI within broad human-defined goals and conditions, consideration could be given to assigning rights to AI's owner. However, the owner would need to assume certain social responsibilities, such as making some technical details publicly available to promote technology dissemination and further innovation. A dedicated fund or reward mechanism could be established, allocating a percentage of the proceeds generated by AI invention to support basic research and public services related to the development of AI technology, thereby balancing the public interest with individual rights.

Artificial intelligence (AI) technology will play an increasingly important role in innovation. Patent law inevitably requires further adjustment and improvement to adapt to the demands of the AI era. Globally, countries are likely to

gradually converge on a relatively unified set of patent laws governing AI inventions. The legal system will prioritize incentivizing and regulating AI innovation while safeguarding the dominant position and fundamental interests of humans. Legal provisions regarding the dominant position, rights, and obligations of AI must be further refined to clarify the relationship and respective roles between AI and humans in different technological scenarios and application areas. With the coordinated development of technology and law, it is hoped that a legal order can be established that fully unleashes the innovative potential of AI while upholding fairness and justice, achieving a virtuous interaction between scientific and technological progress and social development. The expansion of the concept of inventorship in patent law is an inevitable trend, providing solid legal protection for innovation in the AI era.

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