Should AI-Generated Inventions Be Patentable, and Can AI Be an Inventor?

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Abstract: With the progress of science and technology, Artificial Intelligence (AI) emerges at the historic moment. Unconsciously, AI with rapid development has penetrated many aspects of people's life. However, it has also brought a lot of relevant legal problems. For example, in the field of intellectual property, there are various issues on which no consensus has been attained yet. Especially when it comes to the common outputs of AI, such as writings, designs, and even inventions. Recently, a patent-related case called DABUS has attracted wide attention and has led to a consideration of the questions of whether the invention generated by AI can be patented and whether AI can be the inventor. This is also the main issue addressed in this article. This article will first introduce the current situation and reasons for the rejection of inventions generated by AI as patents, and then analyse such rejection as unreasonable in terms of the purpose of patent legislation, patent criteria, and patent exclusions; and further address some inherent concepts that should be changed, as well as existing cases and legislative tendency. Finally, it is concluded that the future trend should be to gradually grant patents for AI-generated inventions and to recognise AI as the inventor, which is more conducive to technological development and social progress.

Keywords: Artificial Intelligence; DABUS; AI-Generated Inventions; Patent; Inventor; Robot

1. Status of rejection and detailed reasons

To answer the questions mentioned above, Stephen Thaler, an American AI expert, has made attempts.[1] Since 2018, he has applied for patents for two inventions generated by his AI system - DABUS and listed DABUS as the inventor. Unfortunately, almost all countries and regions have rejected his applications.[2] That is, at present, most jurisdictions hold a negative attitude towards AI invention being protected by patent and AI becoming an inventor. The reasons for rejection are similar, but there are also differences. The following takes the UK, the European Patent Office (EPO), and the United States (US) as examples to introduce the basis of rejection in detail.

Based on the UK Court of Appeal's judgment on 21 September 2021 (the latest decision so far), there were two main reasons for refusal. Firstly, under section 13 of Patents Act 1977 in the UK, the statute itself does not make it very clear that 'the inventor must be a natural person', but the wording of the law indicates this view. According to general rules of statutory interpretation, such as the Literal Rule, the Golden Rule, or the Mischief Rule, if the pronoun 'who' is extended to AI, and then it will become too broad and exceed the scope of the patent offices or the courts.[3] Secondly, Tayler was neither the sole inventor nor one of the joint inventors, and he lacked a legal source of the right to apply - no 'person' has 'transferred' this right to him. [4],[5] Furthermore, Parliament, as the highest legislative body in the UK, has supreme power.[6] No agency or individual can undermine the authority of Parliament. In other words, even if AI could someday be developed to a level of intelligence and sophistication that would be considered sufficient to be an inventor, the law should be amended by the UK Parliament, rather than simply allowing the patent offices or the courts to override.[6]

Compared with the implicit explanations of the UK, the US's views on inventors are more straightforward. According to the provision of US Code§100, the inventor is clearly defined: 'The term "inventor" means the individual ...' In addition, from the website of the United States Patent and Trademark Office (USPTO), the US once again has a clear statement on the AI

issue: ' Under current law, only natural persons may be named as an inventor in a patent application.'[7] That means, unless the 'current law' is modified, AI cannot become an inventor.

The EPO has also given its opinions and which focused more on a formal examination, i.e. the form of the AI being listed as an inventor did not meet the requirements of the patent application, and it was less important that whether the substance met the criteria.[8],[9] On the one hand, the EPO, by Article 81 and Rule 19(1) of the European Patent Convention (EPC), states that the naming of a robot as an inventor does not meet the formal requirements.[10] According to these provisions, the patent application should designate the inventor by stating the surname, first name, and full address.[11] However, only human beings have names. On the other hand, as in the view of the UK, Tayler did not yet have the legal authority to apply.[12]

As can be seen from the reasoning in each decision appears to be well-founded. However, if this is just an ordinary, outdated, or unusual case, few people would question such results and challenge authority. But this case is the 'touchstone' of AI in the field of intellectual property, which determines the future direction of AI cases.[13] For such an emerging, controversial, and soon-to-be-universal issue, it is not enough to just focus on the provisions of existing laws, but a specific and detailed analysis from different perspectives should be carried out.

2. Three aspects of supporting AI: the purpose of patent law, patent criteria, and patent exclusions

First, on a macro level, the original purpose of legislation on intellectual property is to encourage valuable social activities, such as innovation and technological progress. Similarly, in the patent system, the core term that describes the aim of patent law is 'exchange', which gives the patentee a monopoly for a statutory period, provided that the technology is disclosed.[14] For the public, although manufacturing, using, or selling the technology requires authorization from the right holder, at least the innovative or progressive technology is made publicly available.[15] The objective of patent law is to maintain the balance of the exchange, and the grant of a patent is the fulcrum for maintaining that balance, The objective of patent law can only be achieved if the granted patent generates 'spillover value' (benefits outweigh costs).[15]

Back to this case, it seems that there is no correlation between 'inventor must be a natural person' and 'encourage innovation and promote technological development'. On the contrary, if AI is rejected as an inventor, then the owner of AI will be less motivated to use AI to innovate, or borrow a 'natural person' who has no substantial contribution to the invention as the inventor- maybe this person just clicks the switch of the machine. [16] For the person, this is a morally unearned gain, and also a legal unjust enrichment. [17],[18] This is not in line with human moral constraints, and it also violates the basic principle of honesty and credibility.

Secondly, from a specific perspective, to assess whether an invention is patentable is determined by whether it meets the criteria for protection (case-by-case). Generally, the claimed invention needs to meet three conditions, namely novelty, inventiveness, and enablement of industrial application (or 'utility' in the US).[19] It is worth noting that the DABUS in this case is not Tayler's first try at using the outputs of AI as patents. It was attempted as early as 1996, but the result was different.[20] Table 1 lists the differences between the two cases.

Name	Creativity Machine	DABUS
Time of application	1996	2018
Region of application	The US	The US
Applicant	Stephen Thaler	Stephen Thaler
Name of the filed inventor	**Stephen Thaler**	**DABUS**
Actual contributors	AI	AI
Patent Office	USPTO	USPTO
Result	**Granted**	**Refused**

Table 1 The comparison of the two applications

In terms of the data demonstrated in the table, a method named the contrast principle can be used to analyse.[21] When other factors are the same, it is the name of the inventor (the independent variables) that ultimately affects the outcome of whether a patent is granted (the dependent variable). It could be argued that the two questions that 'should AI-generated inventions be patentable, and should AI be an inventor?' are essentially one question. If the latter can be accepted, the former will be solved naturally. In other words, the invention meets the criteria for patenting. What the Patent Office minds is not the invention itself, but the identity of the inventor.

Such different results in the above table are questionable. On one hand, in the existing legal system, it is common to see legal provisions about eliminating discrimination. For example, the first article of the Universal Declaration of Human Rights, and the provisions in the General Agreement on Tariffs and Trade (GATT), mainly include the common principles of Most-Favoured-Nation Treatment[22] and National Treatment[23], as well as the domestic constitutions of some countries. This concept of 'non-discrimination' could also be learned for patent applications. It does not matter whether the invention comes from a genius or a chimp, as long as it meets the threshold of patent protection, and is beneficial to society, which should be equally treated.[24] The reality, however, is that the different treatment is only caused by different sources, which is unacceptable and is also inconsistent with the legal purpose of eliminating discrimination.

Regarding results and sources, a rule of evidence called 'fruit of the poisonous tree' helps illuminate the relationship between the two. The phrase is a legal metaphor used to describe illegally obtained evidence.[25] Although the rule and this DABUS case seem to be unrelated, they both explain the same question of whether the result (fruit) should be affected by the source (poisonous tree). Regarding the admissibility of evidence from illegal sources, various jurisdictions have not fully reached an agreement. For example, in the US, such evidence is generally unacceptable in courts.[26] While in Europe, this doctrine is not acceptable, and illegally obtained evidence can be adopted.[27] This is a controversial issue, rather than a completely rejected one. There was an old view called 'Ju zhong yi ming qing' in the law of the Tang Dynasty of China, meaning that in two cases, if the person who committed the more serious offence was not punished, the person who committed the less serious offence should not be punished. Therefore, in the DABUS case, the source of the invention was an 'AI system' (legal), and not a 'poisonous tree' (illegal), but it was unanimously rejected, which is unfair and unreasonable.

The last but not the least important point is the exclusion of patentability. Taking article 53 of EPC as an example, patents are not allowed to be granted for those that are against public order and morality or concerning new species of animals and plants, or for the treatment of humans or animals. The DABUS case has nothing to do with the latter two situations, so can it be related to public order or morality? The two words contain subjective concepts, which have been raised in the case of T 356/93 of EPO. 'Public order' refers to public security and personal freedom from infringement, as well as environmental protection; as for 'morality', it is the internal belief in the acceptability of behaviour, in what is right and what is wrong.[28] These exclusions do not involve the identity of the inventor. On the contrary, AI is beneficial to the public interest. Because in certain fields, AI is more efficient, accurate, and durable than humans, its output is superior to humans in

terms of quantity, quality, and beauty.[29]

To sum up, the decisions of the UK, Europe, and the US perhaps seem to have a legal basis. However, the refusal to grant a patent is insufficient and unconvincing, either from the point of view of the purpose of the legislation, the criteria for protection, and the exclusion of patentability, from the viewpoint of the elimination of discrimination, or the idea that the result should not be entirely influenced by its source.

3. Old notions and new future trends

Why is society today so mindful and emphatic about the fact that the inventor must be a human being? Apart from the law itself, there are some deeper reasons behind it, although these notions are gradually becoming less up-to-date and new trends are on the way in the face of rapidly evolving AI.

Firstly, laws were created as a tool to serve human beings, who should be at the centre of society.[30] So far, humans seem reluctant to accept that robots are smarter than them, although it sometimes happens. As one professor of the Peking University once said: 'I am sure that even the simplest cell is more sophisticated than any intelligent computer yet.'[31] Although the time of 'yet' (over ten years ago) is now obsolete, it can be seen that mankind's awe of life exceeds that of technological progress. At present, the law is still designed as human-dominant.[32] However, the complexity of the results created by AI has exceeded human expectations which can even imitate the operation of the human brain.[32] A good example is the Alphago, which is a computer program that plays board game Go.[33] At the 2017 Future Go Summit, the Master version of AlphaGo defeated then-world No.1 Jie Ke in three games. In other words, the people-centred thought should be changed because, in certain areas, AI has surpassed humans.[34]

Moreover, while the law is characterised by stability and authority, it is also somewhat conservative and lagging. However, the development of AI is hard to ignore, and the AI-related legal problems are increasing. Sooner or later, new legal regulations for AI must be created. As for innovation, there is a popular slogan in a well-known game called Evolution of Trust: 'The essence of human beings is a repeater.'[35] That means, what humans are best at is imitation and repetition, in contrast, innovation (zero breakthroughs) is very rare and precious. Therefore, once a country, especially a powerful one, embarks to recognise AI as an inventor, it is likely that other countries, particularly those with case law, will follow suit and make it universal. Conversely, if it is simply avoided, then the law is lagging and deviates from the essence of its functions - to resolve disputes and controversies.[36]

The last point is that some people do not distinguish between inventors, patentees, and patent applicants. When one hears that the inventor is a 'robot', one often imagines some problems that may occur only to 'persons', such as infringement, rights protection, responsibility for accidents, etc.[37] For example, in the controversial case of driverless cars, who should be held responsible for traffic accidents?[38] These are problems that only patentees may encounter; while inventors are only involved within a narrow scope of rights, not obligations. The requirements for the enjoyment of rights are very low compared to the assumption of obligations, which means that even incapacitated people can enjoy such rights. For example, a three-year-old child can be an inventor. Therefore, granting of the status of AI inventor involves a very small change in the law and there are no legal or practical obstacles.[39] By contrast, if the direct granting of legal personality to AI were to be done (like companies), the change would indeed be too radical – it is a fundamental change in not just patents, but in all aspects of the law.[40] Therefore, inventors, patentees, and patent applicants can be treated differently. The inventor can be an AI that makes actual contributions, while the patentee and the patent applicant are the owners of AI or someone else, who deals with legal disputes and relevant issues.

It is possible to foresee a future trend in which the rapid development of AI will drive the improvement of relevant legislation. In a few countries, AI has been recognised as an inventor, such as in South Africa and Australia.[41],[42] Although the legal paths of the two countries (via the Patent Cooperation Treaty) differ from those of ordinary countries and are therefore not applied in the same way.[43] Moreover, because common law changes are relatively limited, faster, and more specific changes would rely on new legislation. In fact, some legislative attempts have emerged. On 29 June 2017, the House of Lords in the UK appointed the Select Committee on Artificial Intelligence to consider the economic, ethical, and social impacts of the progress of AI.[44] Similarly, in May 2020, the World Intellectual Property Organization (WIPO) published a

Revised Issues Paper on Artificial Intelligence and IP The Policy.[45] And on 20 October 2020, the European Parliament has addressed the ethical framework for AI regulation.[46] It can be predicted that soon, the relevant legislation of AI will be further improved. It is therefore fair to say that the future trend of AI becoming recognised is positive.

Conclusion

At present, the prevailing view on patent protection for AI-generated inventions and AI as an inventor is not optimistic. The UK, Europe, and the US have not yet recognised AI and have given seemingly plausible reasons for doing so, but these are not sufficient or convincing enough. This is because, firstly, AI-generated inventions meet the purpose and protection criteria of patent and do not fall under the patent exclusions. Secondly, the rejection of AI is not conducive to innovation and social progress, nor is it consistent with the legal principle of eliminating discrimination. Finally, it can be argued that the result and source should be treated differently, i.e., an invention generated by AI should not be unpatented just because its source is not a human being.   Therefore, there is no legal or practical barrier to admitting AI as an inventor (not a patentee or patent applicant), as this is a small legal change, rather than granting an AI legal personality like a company. It is time to change the human-centric stereotype and to respect and accept AI. There are already precedents for acceptance in South Africa and Australia, and some countries and regions have embarked on AI-related legislation. It is foreseeable that, as AI technology develops further, the day when AI will be recognised is not too far away.

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