



THE IMPACT OF ARTIFICIAL INTELLIGENCE ON PATENTS

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Article DOI: <https://doi.org/10.36713/epra20804>

DOI No: 10.36713/epra20804

ABSTRACT

The worldwide patent system is anticipated to benefit from artificial intelligence in a number of ways. This will be a logical step forward from the existing system, where a crucial step in the patent examination process is the categorization and search of previous art. Successful examination throughout this procedure depends on the examiner's ability to find very relevant previous art for a certain application. However, the amount of information accessible may be overwhelming, and it can be challenging to locate previous art materials. In technical domains, where patents are often written in very detailed, jargon-filled language, this is particularly true. Examiners would greatly benefit from an AI system that could swiftly and precisely identify and categorize pertinent previous art in these situations.

The ways that artificial intelligence (AI) may affect the international patent system will be examined in this article. These include the idea that AI might produce patentable innovations, the use of AI as a tool to analyze patent data to facilitate patent examination, and the possibility that AI could influence patent enforcement. The goal of artificial intelligence (AI) in computer science is to build machines that are capable of carrying out activities that ordinarily call for human intellect. This includes a wide variety of skills such as voice recognition, visual perception, decision-making, and language translation. From basic tools to expert systems meant to mimic human decision-making, artificial intelligence (AI) systems may take many different shapes.

KEYWORDS: Artificial Intelligence, AI System, Global Patent System.

1. INTRODUCTION

1.1. Definition of Artificial Intelligence

The definition of artificial intelligence is at the heart of the whole problem. According to current legislation in the US and the EU, a computer program is not an inventor since it is not a real person; instead, the genuine inventor is the program's owner. This rule, however, applies to a time when computer programs were not yet invented. There is a blur between this earlier rule and the present state of AI, machine learning, and automated systems; certain AI may be identified as having independent creative and decision-making processes from their owners, while others are tools for inventors to use. It may also be argued that under a work-for-hire relationship, the AI does not maintain ownership of its invention since it can be seen as an automated entity whose owner is a user. A work-for-hire arrangement is when AI is used as a tool to do a worker's duties. The agreement may be explicit under US law, but it is implicit under EU law, which assumes that the employer would retain ownership of any work produced while the employee is employed. The outcomes of the AI's works belong to someone else even if it is seen as a worker. As a consequence, an inventor who wants to patent AI would only need to patent the AI's output and actions rather than the AI itself. This does not, however, address the problem of patenting AI since current rules maintain that an employee's innovation is always the employer's property. When AI is autonomous, there is a little distinction since it needs its own

patent to accomplish what it does. However, any assumptions made are inconclusive since this is a relatively new topic with no precedence and because the laws of the US and EU nations are changing.

The article "The Impact of Artificial Intelligence on Patents" explores the relationship between AI and patents and makes the case that the US and EU's present patent rules lack a suitable description for AI, which has become very sophisticated and complicated. According to the author, if appropriate action is not done right away to change patent rules, it might harm the AI sector and impede the progress of AI for humanitarian purposes in areas like healthcare. The article is especially relevant now as artificial intelligence (AI) is becoming a more and more important aspect of human existence, from the automation of industries to the personal usage of virtual assistants on smartphones.

1.2. Importance of Patents in the Technological Landscape

A patent is a collection of temporary, exclusive rights that a state grants to an inventor or their assignee in return for disclosing their innovation to the public. By restricting others from financially using the patented idea in exchange for the public disclosure to encourage future innovation, patents provide the patent holder a temporary monopoly to use their creation for profit. Since the 16th century, English law has included patents. By providing the creator with financial compensation and a kind of public recognition in exchange for



the time and effort invested in studying and producing an invention, the system aims to promote technical advancement. Patents are recognized in a wide range of technical fields, including computer software and medicines, and are seen to be crucial to a company's ability to compete in a technological market. Essentially, patents are a catalyst for technological innovation for a variety of uses, whether those uses be just for financial gain or to advance societal welfare. However, by giving patent holders the ability to stop others from using the protected idea, this monopoly may impede competition and subsequent innovation, which might have a detrimental effect on many new technology sectors.

2. THE ROLE OF ARTIFICIAL INTELLIGENCE IN PATENT CREATION

To ascertain if an innovation is patentable, an automated intelligence system may examine and evaluate the corpus of existing patent art. Using keywords to locate patents pertaining to the innovation in issue is one way to search the patent database. Because two patents addressing the same topic may use different phrasing, these basic keyword searches are sometimes inadequate. In order to better grasp the link between patents on a certain topic, intelligent automated systems that use natural language processing or other AI approaches may assess the context and content of patents. Large sections of the patent database, or perhaps the whole database, may be analyzed by AI systems like data mining tools or genetic algorithms to look for trends or connections among already-issued patents. The link between a technology and the social and economic impacts of its patent protection, as well as regions of high or low patentability, may be determined with the use of this information.

Technology tools have been used in the Patent Office's patent examination and issuance process since its inception. The "Classification of American Patents," a technique first created for examining and evaluating the corpus of existing patent art, was used to assist in the initial reviews of patent applications. With little resources and tools, patent examiners nowadays are tasked with evaluating a high volume of complex patent applications. To help examiners discover, analyze, and finally comprehend the state of the art, automated intelligence systems are being created. In addition to being effective instruments for supporting human examiners, these intelligent systems have the capacity to generate novel, patentable innovations.

2.1. Automated Patent Search and Prior Art Analysis

For more than 20 years, automated patent document search and retrieval has become commonplace. Nevertheless, only around half of the world's patent filings are thought to have been converted into searchable text. Even fewer of these texts are available in an easily readable format. It is very important to make worldwide patent data more accessible. Patent claims have been converted into Boolean search query language using LSTM recurrent neural networks. More recently, WIPO

processing methods. One area where AI is expected to have a big influence is in automating the prior art examination and patent search processes. Numerous start-ups and university research groups have already shown interest in the high stakes and possible cost reductions. Because of the new patent validity assessment processes brought about by the recent America Invents Act, it is predicted that prior art searches will become 30% more popular in the US. In theory, a large portion of the effort involved in finding relevant patents and classifying data may be divided into a number of distinct processes, despite the fact that it is a highly specialized activity. Although the present generation of AI technology necessitates that the stages be strictly limited and the data be carefully structured, this enables the development of software to simulate this process. It is anticipated that previous art analysis automation will advance in sophistication and breadth as machine learning and natural language processing methods continue to advance. In the same way that automated chess programs have outperformed all but a few grand masters in terms of playing skills, this will move the function of human analysts toward quality control and decision making.

2.2. AI-assisted Patent Drafting

The patent specification, which provides a thorough explanation of the invention, is an essential component of the intricate process of creating a patent application. Typically, patent lawyers or patent agents develop patent applications, often with the inventor's help. It may be costly and time-consuming to prepare a decent patent specification; lowering the cost might encourage people or small firms to apply for patent protection. Artificial Intelligence (AI) algorithms have been created to evaluate technical document content and categorize it into many preset groups. A program like the IBM-patented method is an example. Although such systems may be helpful as drafting tools, there is a risk that the classification and claim that are produced may be inaccurate if there is no human knowledge of the invention in the first place and the categories that the computer is trying to categorize. Furthermore, these programs' predetermined categories restrict their use when discussing cutting-edge technology for which there is no corresponding nomenclature. The cost of preparing patents might be significantly decreased with the use of machine learning AI. Machine learning artificial intelligence (AI) may automatically produce predictions or conclusions by using statistical approaches to allow a computer to learn from a vast collection of sample documents. A collection of current patent specifications might be used to train the computer to anticipate the categorization of individual phrases or paragraphs of text in the specification. If accurate, these predictions would enable intelligent searching to automate the process of classifying abstracts or certain parts of the specification for subsequent coverage. As an alternative, the machine may be taught to generate descriptive text that is categorized in a particular manner, such as a set of instructions for creating and operating an apparatus and a thorough description of the equipment. AI-generated writing is still in its infancy, but it has a lot of potential

researchers have started investigating the translation and summarization of patent papers using novel AI language



2.3. Intellectual Property Protection for AI-generated Inventions

There will probably be an increasing number of innovations produced by AI as many AI approaches, especially those that result in the automation of jobs that are now done by people, continue to progress. As a result, the AI community will want less stringent intellectual property regulations. It seems sense that there would be some incentive for inventors to employ AI technology and then patent their creations, given the well-known role that patents play in the economy in encouraging innovation. This would include any kind of creation, whether it is created by AI or is used as a tool to help with the creative process. Reduced costs for AI ideas during the patent application process or longer patent periods for AI inventions in certain domains might be two examples of an incentive scheme. Any systemic changes must be evaluated by weighing the costs and benefits to the economy and society, and they must be implemented over an extended period of time with longitudinal research on the results.

It is possible that AI automation might develop an understanding of an invention that could be appropriate for an invention being derived, in accordance with the standard rule for the purpose of vulnerability of a patent that is the publishing under the permission. Key ideas in patent and copyright law as well as human-made inventions will be compared to the inventiveness of AI inventions. To lessen the difficulty of finding prior art, it can be suggested that some kind of organization reveal possible AI innovations in order to create a collection of them. Future developments that might be very helpful to society as a whole could be lost if AI breakthroughs are completely safeguarded. As a result, legislation and policy for the intellectual property protection of AI innovations must be carefully considered and balanced.

3. CHALLENGES AND CONSIDERATIONS IN AI-RELATED PATENT APPLICATIONS

Ownership and inventorship of innovations produced by AI the inventor or co-inventors must be named on a normal patent application for conventional patents in mechanical, electrical, and chemical technology. An oath or statement certifying that the inventor thinks they are the first to create the claimed invention must also be included in the application. An inventor is defined by US law as the person who came up with the idea for the innovation. A human inventor must have made a substantial contribution to the invention's idea, design, and implementation in order to meet the standards for inventorship. A person cannot be deemed an innovator if they only presented a basic strategy, a desired goal, or a mix of known components without actually inventing the invention. Since AI-generated innovations are made by computers or other machines rather than by humans, this challenge applies to patenting these sorts of inventions. It is debatable whether the computer would be regarded as the inventor if an AI program was the only one in charge of developing an innovative procedure or product. If given the legal meaning, an AI program may be considered an inventor under UK law, which defines an inventor as the person who really came up with an innovation. Dr. Stephen Thaler, the creator of Imagination Engines Inc., has applied for

patents with the US Patent and Trademark Office and the European Patent Office, citing his Artificial Inventor Creativity Machine (DABUS) as the invention. It is typical for the employer of the inventor or the person who commissioned the work that resulted in the invention to possess the invention rights when filing an application for a patent. As machines become more prevalent research and development tools, this will also present problems regarding how to distribute AI-generated ideas. When submitting an application for a patent, the owner of the rights is deemed to be the inventor and must therefore demonstrate inventorship. Once again, this might result in disagreements about who or what is credited as the inventor and whether or not the rights would be assigned to it.

3.1. Inventorship and Ownership of AI-generated Inventions

It is difficult to identify the "inventor" in the context of AI. According to contemporary patent law, it is widely accepted that the person who helped come up with the creative concepts or put the patented invention into effect is the inventor. However, there is no definitive answer as to who is the inventor of the AI-improved solution—the programmer, the AI, or a combination of the two—when the creative idea was first a set of general guidelines for how to solve a specific problem and the AI independently transforms this idea into one that is now creative. This is an important concern for patent ownership clarity as well as for encouraging AI innovation. Generally speaking, the AI will probably be considered a tool of the programmer, and the creative notion that the AI developed is likely to be considered an advancement of an already-existing concept. This is due to the fact that the programmer would have first instructed the AI to tackle the issue. There may be less innovation in AI itself and more usage of AI to tackle particular issues as a result of the argument that AI is a tool, which implies that utilizing AI is implicitly disconnecting from AI research and development. This is because research into artificial intelligence will be less profitable if the user, not the creator, owns the improved concepts. For instance, when a medical researcher uses AI to discover a treatment for an illness, the pharma firm with whom the researcher has a contract owns the data.

3.2. Patentability Criteria for AI Inventions

Therefore, in the numerous technical areas, the examiner must be aware of what may be deemed widespread public knowledge, the popular biases and preferences in the field, and the "state of the art" from which the field's innovators are steadily advancing. In certain domains, including computer-implemented inventions, the examiner may need to know not simply what the technology is today, but also where it is heading and what concerns are being addressed. This suggests that the examiner is under a lot of strain, and the EPO is continually exploring for solutions to increase the efficacy and efficiency of its search strategy and procedures so that a sufficient search may be performed in an appropriate length of time.

The inventive step may be expressed in a way that expresses the claim as a procedure or technique. In other situations, the



claim may be made to a system, such as a "search engine," "data retrieval system," or "computer program product," especially in the area of computer science. In other situations, it might relate to a product like a stent or a kitchen tool, or even to a novel application of a well-known material, item, or procedure, particularly in the fields of mechanical engineering or medical devices. This indicates that there isn't a single search approach that can find every piece of possibly relevant previous work.

3.3. Ethical and Legal Implications of AI Patents

The instance of institutions that hire professors and students to do research and own all of their creations is an intriguing scenario. The situation in which AI will take the place of a human tool fits under State Street Bank case law, which argues that everything that performs an action must be a person, and that if AI is to replace people in the near future, then its ideas will be eligible for patent protection.

As a researcher, it is too soon to determine whether or not AI, as intelligent computers, can be an inventor, yet there are instances of AI becoming an invention in a range of areas. According to the US patent laws, an inventor is any person who helps come up with the idea for the invention. Numerous rulings further clarify this, and as a tool, AI may be thought of as creating a few new things. The owner of the AI will be establishing a vicarious responsibility, even if the AI is not regarded as an inventor. In this scenario, the employer will be held accountable for the actions taken by the employee in carrying out the employer's orders. Therefore, the owner of AI will be held liable for any infringement by AI, and he will also own any patents deriving from AI ideas.

There are numerous approaches to grasp and address the ethical and legal repercussions of AI in regard to patents. These indicate to the context how AI, as an inventor, may be held responsible for rights breaches and how AI might hold rights to the patented invention. The topic of the inventor's patent application is the second factor that enters the picture. If AI as a tool in the hands of an inventor has contributed enough to make the idea patentable, or if the AI has been utilized to execute the innovation, may be the second example in this context of whether low or previously developed AI may be able to patent the invention.

3.4. International Perspectives on AI-related Patents

The international size of AI technology and its patenting poses special difficulties that have not yet been effectively addressed. An open letter to the present European Commission on the draft proposal of a legislative instrument to the effect that it should be possible to award patents for computer implemented innovations addressed some of the most critical difficulties with the international harmonization of AI patents. Leading specialists in the sector authored the letter, which addressed the topic of whether patentability standards for AI-generated ideas should differ from those for discoveries developed by a human. The authors suggest that applying the same criteria might ultimately "bias innovation in favor of AI on the assumption that it will always be an improvement." This

argument has not yet been fully developed, particularly in light of the fact that there may be significant fields where the advancement of AI technology would benefit humanity and that it is unclear whether there is any advantage to halting AI development from the perspective of the general public. The question of costs versus benefits to society is further raised by this. If it turns out that the costs of patenting AI technology are excessively expensive in proportion to the expected few marginal advantages, many firms and inventors may be deterred from developing AI further or may opt not to apply for a patent knowing that they will almost surely not be qualified. Additionally, it can be deduced that the general laws governing patentability are insufficient for AI technology and that the fear of losing international harmonisation has led to conjecture regarding different AI patent systems, such as the notion that a formal IP rights subsystem for works produced by AI should be included in the Berne Convention. An growth in AI patents might result in changes to the cost of international patent applications. Additionally, agreements between states, such as the patent cooperation treaty, may need to be updated to incorporate AI-specific elements. Before making substantial changes to the present international patent system, policymakers have a lot to consider as even the most sweeping ramifications of the WTO TRIPS agreement are still not totally understood.

4. FUTURE OUTLOOK AND RECOMMENDATIONS

Flexibility in patent rules and institutions is vital when thinking about the future of AI and its patenting prospects. AI will probably undergo considerable change over the course of the next 10 years as software and algorithms continue to play an increasingly essential position in innovation and discovery. As previously noted, the nature of innovation itself is already being greatly altered by machine learning. Future technology will probably be influenced by developments in this field, such as those fuelled by deep learning. Even their creators will find these ideas incredibly unexpected, and as artificial intelligence (AI) goes beyond human capabilities in more and more sectors, desire to automate the creative process will rise. The idea of total AI authorship of patented discoveries is one scenario to ponder about. Due to current statutes that require an inventor to be a "natural person," this is now unlawful in many countries. However, it is simple to understand how authorship in AI may one day have a large economic influence, forcing a reevaluation of the underlying notion of inventor. The question of patentable subject matter is another significant one that needs to be examined in the future. This will be particularly essential in the context of public policy concerns around the promotion of innovation and the public interest. There will be a developing trend in the development of AI approaches to replace human activities in a range of sectors as AI becomes a more frequent tool for emulating human cognitive processes. Studies have demonstrated that the patentability of software and business operations varies widely among nations, and legal scholars largely believe that existing patent regulations are insufficient to handle advances made by primarily computer processes. The TRIPS agreement, which requires WTO member states to have a minimum level of



patent protection, is a matter of continual dispute on a worldwide scale. Nevertheless, there is a lot of latitude in what may be patented, and national laws and court rulings establish the precise limitations of what may be patented.

4.1. The Evolution of AI and Its Impact on Patent Systems

The landscape of AI and machine learning has developed over many years. The application of patent law to AI-based innovations is a development of a process that has addressed the underlying substance of AI, even if the area of patenting for AI breakthroughs is relatively new. This sort of software system has traditionally been put within the public domain since the educational and analytic community has historically been the driving force behind the development of AI technology. The objective has been to provide a collaborative platform and standard architecture that can be modified and enhanced by a variety of researchers. The conventional method used by the analytic community to handle software system developments is an excellent illustration. Software implementation protection is often not seen as a requirement of the development process. A piece of code created by an engineer or programmer to demonstrate a new technique's notion is not regarded as the invention itself. These researchers often effectively incorporate their novel ideas into pre-existing software platforms. In other situations, years of further study and development could be required before the strategy is widely used. Generally speaking, software implementation is only regarded as the method itself and not a failed experiment when the community is mostly in agreement on a certain approach.

4.2. Policy and Regulatory Frameworks for AI Patents

Without the proper structures, the patent system could fail to promote innovation and manufacturing centered on artificial intelligence. There might not be much motivation to divulge an AI-generated invention to the public if the author is not recognized as the "owner" of the work, since a patent cannot be secured without public disclosure. There is another circumstance in which enterprises are considered as the owners of AI creations rather than inventors. This may culminate in a new internal R&D patent system where only huge corporations can pay to patent AI advances.

The global extent of AI research and development, however, makes it hard to anticipate the future of AI and the features of its advances; as a consequence, international policy has been slow to adapt. It will require a lot of effort to unify AI patents globally. It is crucial that legal academics collaborate with AI scientists and technologists to better create future legislation.

Over the last several decades, artificial intelligence technology has advanced dramatically. AI has the ability to "invent" novel solutions to complicated issues as ML advances, and as AI systems are used more and more in a wide range of sectors, AI-based inventions will also grow in number. The present international patent regimes, however, did not take AI into account when they were being designed. Because AI-generated IP questions ideas of infringement and tests the boundaries of inventorship and machine autonomy, existing

patent regimes may not be able to accommodate AI-based innovation. The world's patent regimes will thus probably undergo significant modification in order to best support AI advancements.

4.3. Collaboration and Knowledge Sharing in AI Patent Space

In order to foster collaboration and the flow of knowledge throughout the AI patent ecosystem, open, publicly accessible patent databases are crucial. Full disclosure is difficult to achieve in the traditional sense when it comes to artificial intelligence patents since, unlike traditional patents, they often include substantial usage of data and machine learning models. Trade secret protection could not work for AI patents when the underlying data and models need to be made public for replication and verification. Given that patient welfare is at risk in the healthcare industry, this is particularly crucial for AI. The public and patentees may suffer if these patents are forced to be revealed in an unsuitable setting, which might result in early disclosure or less-than-ideal use. It is essential to establish international standards that facilitate the most efficient disclosure of these AI patents for the purpose of knowledge sharing and provide patent holders a range of protection options. The Open COVID Pledge (OCP), in which participants pledge not to assert patent rights for attempts to stop the epidemic, demonstrates how the joint efforts of patentees and users may foster a collaborative environment. The many demands and concerns resulting from the various technologies and sectors in which AI is used should be accommodated by norms and alternatives.

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