

Examining the Patent System in the Light of Applications of Artificial Intelligence

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ABSTRACT: In this paper, the patent system has been investigated in the light of use of artificial intelligence in a descriptive-analytical way. In intellectual property rights, which have been formed with the aim of supporting the intellectual achievements of "human" and promoting this type of creativity and innovation at the level of society, a new actor has entered, which has caused doubts to apply the traditional rules and principles of this system. It can be said that the intellectual property system, considering that only humans can create intellectual property, has always tried to support him and has based its principles and rules on this assumption. Artificial intelligence has broken the human monopoly in creating innovations and has achieved achievements that may have the necessary criteria to obtain the support of the intellectual property rights system to some extent without human intervention. The use of artificial intelligence in the process of creating inventions has been able to affect some formal and substantive conditions of the patent system, such as the condition of novelty, innovativeness and the need to disclose the invention. It is necessary to consider the best approach to determine a standard appropriate to the level of advancement of expertise and existing skills in different fields of

technology; For this reason, it is necessary to increase the level of knowledge and skill of a person with normal skills in the fields where the use of artificial intelligence has become a common tool based on the capabilities of applied technologies.

KEYWORDS: Patent, Artificial Intelligence, Intellectual Property Rights

I. INTRODUCTION

Human has always tried to make his life path smoother by using better tools. Developed societies are also trying to achieve maximum convenience and comfort for humans by spending huge funds to increase the speed of creating new technologies. The use of these technologies in the cycle of daily life, as well as in various fields of industry and business, has helped today's humanity to eliminate many of its cognitive and physical limitations by relying on such achievements; Therefore, the achievements that once seemed impossible for humans have become the axioms of modern life. Artificial intelligence is one of the most important new technologies that has affected various aspects of human individual and social life. In the meantime, the field of creating new

inventions is not exempted from this importance, and the progress of the phenomenon of artificial intelligence has transformed the process and the way of achieving new innovations; Because in recent years, it has resulted in inventions that have the three necessary conditions for protection under the patent system. Also, the phenomenon of artificial intelligence will soon become the main factor in the continuation of creativity in society; For example, in 2018, the inventor and scientist Dr. Thaler, in the declarations he gave to the patent offices of the United States, the European Union, and the United Kingdom, for the first time introduced a smart device that "food containers and containers" and "warning lights" (Deshpande et al., 2020). Artificial intelligence inventions can be divided into two categories based on the degree of human participation in their creation: a) inventions that arise with the help of artificial intelligence; b) Inventions that artificial intelligence creates independently. Artificial intelligence with these types of inventions, especially inventions that involve insignificant human intervention in their creation, has caused the need to review the conditions for granting patents. The main problem that should be investigated about such innovations of intelligent systems is the possibility of matching the formal and substantive terms of the patent system with the nature of these inventions. In the opinion of some lawyers, it is necessary to revise some of the formal and substantive conditions regarding artificial intelligence inventions; Otherwise, the patent system will lose its efficiency (Strauss, 2021). Concepts such as "prior knowledge" or "a person with normal skill in the field" are affected by the introduction of artificial intelligence into the process of creating inventions, and their limits must be determined with special care; Otherwise, any kind of creative activity will be repetitive and obvious. Another important issue that exists due to the use of artificial intelligence in the process of creating inventions is the possibility of infringing other patents provided by these systems. Artificial intelligence may infringe a patent in a number of ways. The multiplicity of actors involved in this field has also created difficulties and disagreements in assigning responsibility for such rights violations. Also, at the moment, the possibility of assigning responsibility for the violation of rights to artificial intelligence itself seems ruled out, which is because the legal personality for this phenomenon is not recognized in different legal systems; Therefore, the amount of use of these intelligent systems in the way of patent infringement should be reduced by determining how to compensate for the damages caused by

cases where artificial intelligence commits patent infringement. In this article, the patent system is examined in the light of the application of artificial intelligence.

II. ARTIFICIAL INTELLIGENCE AND ITS TYPES

The different definitions of artificial intelligence that have been presented throughout history can be placed in four different approaches. With the passage of time and the progress of artificial intelligence science, these definitions have adopted a new approach in order to determine the criteria of intelligent agents. The agent in these definitions means anything that can understand its surrounding environment and act based on the stimuli received from this environment (Russell, 2010). The initial definitions that have been proposed about artificial intelligence have a "human-like thinking" approach. In this approach, artificial intelligence is evaluated based on human thinking. It is also an intelligent machine that thinks in the same way as a human. In the following, the approach of "human-like behavior" has overcome the presented definitions of artificial intelligence. Therefore, only the behavior of the machine is taken into consideration, and its internal structure and the manner in which such behavior and results occur are not important; Because artificial intelligence is only a tool for simulating human behavior. The third approach that can be seen in the presented definitions of artificial intelligence is "wise thinking". Based on this approach, an intelligent agent must be able to explain the reason and logic based on which he presents his behavior and results, and if he cannot justify the method and reasoning he used, he is not considered an intelligent agent. There is another approach called "wise behavior" based on which an intelligent agent is an agent that can show the best performance in complex conditions and situations, but in evaluating the behavior of this agent, the human and his behavior are not the criteria, but the machine must pass the human to show better performance (Russell, 2010).

According to these materials, artificial intelligence is considered one of the sub-branches of computer science, whose goal is to create intelligent agents that can perform the actions that humans need to perform using their intelligence, like humans, and even by passing through Human limitations and learning from their experiences, in facing complex and undetermined situations, to have better performance and efficiency in confrontation with humans (Hammond, 2015).

III. THE SUBSTANTIVE CONDITIONS OF THE PATENT SYSTEM

The ever-increasing developments of intelligent systems have increased the power of human problem solving and data processing in the process of creating inventions. In some cases, it has even led to the creation of new and innovative inventions and has led to doubts and concerns whether the existing patent system is capable of responding to the problems caused by the increasing role of intelligent systems in the process of creating inventions or not. Also, how does the patent system, which is based on the assumption of being a "human" inventor, cope with the fact that a being other than a human being has an important and essential role in creating inventions and continuing innovation in society. Can humans and artificial intelligence be subject to the same rules and regulations, or should the level of creativity and innovation of artificial intelligence be evaluated with different criteria and rules? In the national and international regulations related to patent rights, the three substantive conditions of "newness", "innovativeness" and "having an industrial application" are among the main conditions for obtaining the protection of the patent system. In this topic, firstly, the results of the artificial intelligence of the right for the condition of novelty of the invention have been discussed, and then the interaction of the condition of innovativeness of the invention with intelligent systems has been studied. Although the essential condition of industrial application of having an invention is one of the most important conditions of the patent system, this condition does not create a new problem from the point of view of artificial intelligence and its inventions; As a result, it is not reviewed in this article.

IV. THE CONDITION OF NOVELTY OF THE INVENTION

The novelty of the invention means that the information related to the invention does not exist in the previous knowledge and the invention has surpassed the level of existing knowledge in the society. Prior knowledge refers to information, know-how, technologies and products related to the field of the claimed invention that has been disclosed and made available to the public in any part of the world by written, oral or practical use or any other method before the filing date of the statement (Mirhosseini, 2016). In Article 27 of the TRIPS Agreement, without providing a definition of this concept, the necessity of novelty of the invention has been mentioned that "... patent rights shall be available for all inventions that are new...".

In Iran's legal system, in articles 1 and 2, and paragraph "e" of article 4 of the Law on Patents, Industrial Designs and Trademarks approved in 2016, it is possible to understand the necessity of newness of the invention to obtain protection. Article 2 of this law considers an invention that "contains a new innovation..." to be registered. The meaning of the new initiative is that which does not exist in the previous art or industry...".

The Intellectual Property Center of the country's Deeds and Real Estate Registration Organization (the competent authority for registering patents and granting rights arising from them in Iran) takes into account the necessity of novelty in its evaluations to register a patent. Article 11, Clause 1 of the Industrial Property Rights Protection also mentions the necessity of innovation. Despite the benefits of Article 2 of the Law of Rights approved in 1386, such as this law, it has neglected the consequences of using new technologies in the process of creating inventions; Therefore, it is suggested to pay attention to the position of artificial intelligence and the inevitable developments that will follow for the substantive and formal conditions of the patent system in approving this plan; While artificial intelligence can affect the scope of previous technical knowledge in different ways and, as a result, the possibility of proving the newness of alleged inventions. As mentioned, in determining whether an invention is new or not, the presence of similar information in prior knowledge and the availability of this information to the public are evaluated and checked in the first place. In addition to creating new inventions, artificial intelligence increases the scope of available information and increases the possibility of accessing information for the public; Because due to the high capacity of artificial intelligence in searching for information and the possibility of processing a large amount of data in the shortest possible time, which is one of the reasons for the superiority of artificial intelligence over the limited cognitive powers of humans, it causes the information that becomes available to the public and as a result is part of the scope of knowledge are old and cause the novelty of the invention to deteriorate. This issue can increase the standard level of patentable inventions to such an extent that inventors lose the necessary motivation to continue their activities (Dornis, 2020). As stated, artificial intelligence is also effective in increasing the limits of previous knowledge with inventions; Because the outputs and achievements of artificial intelligence, which can take place in different fields are part of existing knowledge. Due to the extraordinary power and capability of these

systems in storing and processing information, such as natural language processing tools, as well as the cheapening of these systems, the amount of information and knowledge they collect in different fields is increasing day by day, and as a result of the unprecedented increase in the range of knowledge available in these fields. Although many of these outputs and effects of artificial intelligence may not have the necessary conditions to obtain the support of the patent system, the main criterion for determining the domain of prior knowledge is disclosure and public access to the document or published subject (Hottenbach et al., 2015).

Of course, some believe that the outputs of artificial intelligence should not be considered a part of prior knowledge and should be cited in evaluating the newness of inventions; Because accepting these cases in the realm of prior knowledge can have many negative consequences and even cause the owners of intelligent systems to abuse this possibility; For example, they may create fake knowledge in the relevant field by using artificial intelligence tools to block the way of other competitors in the path of obtaining a patent, and by making numerous claims, they may prevent the achievement of the goals of the patent system and as a result reduce public comfort and well-being. Also, the increase of these claims increases the workload of the patent offices in an incredible way, and the growth and development of the limited existing technical knowledge endangers the efficiency and the level of supervision applied to the declarations (Bonadio et al., 2021). The use of artificial intelligence can have positive effects by encouraging inventors to work in new fields. Also, if the level of newness of patentable inventions increases too much, it will destroy the incentive of inventors to continue their activities; Therefore, it is necessary for the policy makers of this field to think of a solution to establish a balance between the effects of artificial intelligence on the essential condition of the innovation of the invention. It seems that in order to prevent an unreasonable increase in the scope of prior knowledge, the achievements of artificial intelligence can be considered only in the areas within the scope of prior knowledge, where the use of smart tools in the creation of inventions in that field is common. Also, the common practice of experts and scientists in that field and scientific field should include the use of artificial intelligence, and in the fields where human expertise is still the main source of maintaining the unfair continuity of creativity and innovation in it, the competition between the limited cognitive abilities of humans and the

capabilities of artificial intelligence should be avoided. In addition, he did not consider artificial intelligence inventions as part of existing knowledge. Although it can be argued that this distinction is an obstacle to increasing the use of artificial intelligence in various fields, it seems that preserving the rights of inventors who do not have access to such equipment (such as individual investors who are deprived of the equipment and huge capital of large commercial companies) justifies such a distinction. Also, with the passage of time, the promotion of the use of smart systems and more universal access to these systems, the importance and necessity of such a distinction will gradually decrease.

V. THE CONDITION OF INNOVATION OF THE INVENTION

Inventive step means that the invention has a level of creativity and innovation and can add to the existing technical knowledge. The Inventive step has been defined as follows: "it means that the invention is not obvious to a person with ordinary skill in the related art, according to the previous information of the public, and a noticeable creativity and innovation has been applied in its creation" (Najafi, 2017); Therefore, the first step in determining whether or not an invention is innovative is to determine the characteristics of a person with extraordinary skill, which is extremely important; Because setting the wrong criteria can increase the skill level of this person so much that most of the inventions are considered obvious or by setting the skill level lower than the usual skill in that field, all the inventions seem innovative. The current criterion of a skilled person is based on the assumption that inventions are created by humans who have limited cognitive powers to process information. The skill level of skilled person is also determined according to these limitations. The use of artificial intelligence to continue creativity in society can bring about fundamental changes in the concept of a person with conventional skills; Because the combination of human abilities with the high power of intelligent tools will increase the cognitive abilities and skill level of people active in a field; As a result of the change in the nature of artificial intelligence, which in the past was only a tool in the hands of humans, to an independent inventor who was able to achieve new and innovative achievements without the help and guidance of humans, it causes the level of expertise of a person with conventional skills in the field to increase. This issue will require changing the essential condition of "innovativeness" of the invention (Ravid-Yaniski et al, 2020).

According to the European Union Patent Office's definition of a skilled person, it is assumed that such a person has access to common and practical tools and devices to create an invention in a field. According to this definition, some jurists believe that if artificial intelligence becomes a common tool for creating inventions and innovations in a specific field, the use of intelligent tools should also be considered in determining a person with conventional skills in that field. Also, the skill level of this person was determined based on the capabilities and improvements in the tool, and there is no need to completely abandon the current standard of a person with conventional skills (Holterman et al., 2021).

Another group of jurists believe that the current criteria for artificial intelligence inventions and the role of these systems play in the process of creating inventions will be ineffective, and the result will be nothing but a lot of patented inventions and inflict heavy damages on society; Therefore, the need to change the standard of such inventions is felt. In line with the situation, the new criterion of "machine with normal skill in the field" has been proposed; A machine that, with all the data and powerful computing tools at its disposal, surrounds all the information in the realm of former knowledge and its related fields (Fabris, 2020). Of course, the use of the "machine with normal skill in the field" criterion also has critics. According to some people, the use of this standard increases the standard of obviousness and patentability of inventions too much. Also, inventors who do not have access to artificial intelligence tools and systems will not have much chance to prove the innovativeness of their invention against a machine that has access to all the information in previous knowledge and related fields; Therefore, the solution to this problem is to separate inventions with the help of artificial intelligence or by means of it and human inventions, and each of these inventions is subject to its own criteria (Yadav, 2021).

Although it seems that putting human inventions and artificial intelligence inventions under the same legal system and applying two separate criteria, just because their inventors are different (the tools used in the invention process were different) is discriminatory. In addition, in the current patent system, there is no need to disclose the tools and process used in the creation of the invention. Applying a separate criterion for artificial intelligence inventions will only cause the owners of these tools and intelligent systems to keep the use of these tools secret in the process of creating inventions (Yadav, 2021).

Apart from these cases, the theory of the inventor machine as a person with normal skill has other disadvantages and problems. In the meantime, experts and evaluators of patent office's decide what can be obvious or innovative from the point of view of a skilled person. Also, performing this task is a difficult and complex task, even regarding the current standard that assumes a skilled person to be a human being, and sometimes it has led to contradictory and unequal decisions. Now, if a skilled person is promoted from a human to a machine and artificial intelligence, evaluating what the machine will consider as self-evident and what will be innovative will bring double difficulty for experts and evaluators (Abbott, 2019).

The objections to the theory of a machine with normal skill in the field caused another opinion to be presented, according to which, in order to determine a person with normal skill in artificial intelligence inventions, attention should be paid to its user. Also, the focus should be on choices, how the user controls and uses intelligent systems, not on the capabilities and abilities of artificial intelligence itself; Therefore, in evaluating whether the invention is obvious or not, it must first be determined whether the normal user of artificial intelligence has considered the use of such algorithms and training data that have led to the creation of a new invention to be necessary for the system to achieve the intended result or not. In the next step, it should be determined whether the normal user had a reasonable and conventional expectation for the success of using intelligent systems in creating an invention and achieving a new and innovative solution, or whether the intelligent system's achievement of the invention was not predictable for such a user. If the answer to both questions is positive, the invention is an obvious claim that cannot be supported (Reinbold, 2020). Among the three mentioned approaches to determining the skill level of a person with normal skills, it seems that the first opinion is more in line with the existing facts, considering the extent of the involvement of artificial intelligence in the process of creating inventions, the level of skill and expertise of a person with normal skills is also the same. This theory is more consistent with the existing laws in the legal system of Iran. According to Article 2 of the law of 2016, an invention can be supported if it: "...contains innovation..."; This means: "... it should not be obvious and obvious to the holder of normal skill in the said technique...". According to the provisions of these articles, it can be said that in the cases where the use of intelligent tools and systems is prevalent in the industry or related technology and a person with conventional

skills is familiar with the use of these tools, his skill level should also be according to the capabilities of these tools and systems to be determined. However, the need to change the essential condition of the inventiveness of the invention will be inevitable with the comprehensive emergence of artificial intelligence in the process of creating the invention. It is also necessary to take the best approach to have a suitable standard with the level of advancement of expertise and skills available in various fields of technology so that the required balance can be achieved regarding the level of expertise of a person with normal skills in this field.

VI. CONCLUSION

In intellectual property rights, which have been formed with the aim of supporting the intellectual achievements of "human" and promoting this type of creativity and innovation at the level of society, a new actor has entered, which has caused doubts to apply the traditional rules and principles of this system. It can be said that the intellectual property system, considering that only humans can create intellectual property, has always tried to support him and has based its principles and rules on this assumption. Artificial intelligence has broken the human monopoly in creating innovations and has achieved achievements that have the necessary criteria to obtain the support of the intellectual property rights system to some extent without human intervention. The use of artificial intelligence in the process of creating inventions has been able to affect some formal and substantive conditions of the patent system, such as the condition of novelty, innovativeness and the need to disclose the invention. In addition, in cases where artificial intelligence infringes a patent, the multiplicity of actors involved in the process of building to the exploitation of these systems makes it difficult to assign responsibility due to such a violation of the right, and disagreements arise about how to divide the damage and assign the resulting responsibility. In order to solve the problems, it has been suggested that the essential condition of the innovation of the invention will undergo inevitable changes with the comprehensive emergence of artificial intelligence in the process of creating the invention; Therefore, it is necessary to consider the best approach to determine a standard appropriate to the level of advancement of expertise and skills in various fields of technology; For this reason, it is necessary to increase the level of knowledge and skill of a person with normal skills in the fields where the use of artificial intelligence has become a common tool based on

the capabilities of applied technologies. Second, it should be noted about the essential condition of innovation of the invention. The introduction of inventions and achievements of intelligent systems into the domain of prior knowledge can create an unfair competition between ordinary human inventors and inventors equipped with these systems. It is also suggested that in areas where human creativity is still the main source of continuous innovation, the achievements of artificial intelligence should not be considered as old knowledge. Also, the use of smart tools for searching this knowledge should be limited only to the same fields and disciplines where the use of smart systems is popular. On the other hand, regarding the non-transparency of artificial intelligence and the impossibility of full disclosure of its inventions based on the requirements of the patent system, it is suggested to adopt the approach of Article 3 of the Budapest Agreement regarding inventions in the biological field to use and deposit a sample of the intelligent system as disclosure of the invention; The approach that can be seen in the draft of the industrial property protection of Iran and the approval of this plan can be effective in solving this problem. Finally, it is suggested to use two institutions that are common in the legal system of Iran; The institution of "compensation agreements" means that by using contractual terms, it determines the way of assigning responsibility due to the violation of rights by artificial intelligence and prevents conflicting opinions in the judicial procedure. Also, the "mandatory insurance" institution will compensate the damages caused to the patent owners by mandating compensation insurance for all systems and products that use various artificial intelligence tools, including machine learning algorithms, so that the infringement of the rights of one of the involved parties is not definitively attributed and does not destroy the rights of the owner of the infringed patent and can be compensated for damages by referring to one of these two methods.

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