

Legal and Judicial Dealings with Artificial Intelligence as an Inventor

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Abstract:

In this article associated with an opportunity for the court to consider whether artificial intelligence can be an inventor. In this case, the development of AI technology in the United States where AI has already become inventors and innovators. In this article, there are appropriate explanations for the development of artificial intelligence technology in which artificial intelligence technology has been used in various aspects. In this scenario, the detailed concept of artificial intelligence, which was used as an advanced technology in human life, took place. In this context, a legal and judicial approach was taken regarding the innovation of artificial intelligence, and the importance of the research is due to the fact that artificial intelligence has become a reality to a large extent in human life, and it was necessary to clarify whether it should be considered an inventor or not. The research aims to define artificial intelligence and Clarify whether artificial intelligence can be considered an inventor or not, and indicate how the law deals with the innovation of artificial intelligence, and indicate whether artificial intelligence should be considered an inventor? The research adopts the critical analysis approach with the concept of legal personality, artificial intelligence systems, and arguments related to whether artificial intelligence can be considered an inventor or not.

Keywords: Artificial Intelligence, Intellectual property, the Copyright, Designs and Patent Act 1988, European Patent Office, DABUS, UKIPO, Open AI's GPT-2, USPTO.

1. Introduction:

In order to understand whether an AI can be an inventor or not, it would be useful to first consider how AI is defined. This is so because much of the issue is also based on the question of personality of the AI in the legal sense, and whether AI is capable of being vested with rights and liabilities in the law. In other words, even if it is considered that AI can be an inventor or be capable of inventing something, in law, an additional context of personality would have to be considered in order to determine the capacity of the AI to be a holder of a patent. Therefore, the starting point of this discussion is related to the nature of AI. In a recent case decided by the Court of Appeal, *Thaler v Comptroller General of Patents Trade Marks And Designs*, the court specifically refused to consider an AI to be an inventor for the purpose of the Patents Act 1977 (*Thaler v Comptroller General of Patents Trade Marks And Designs*, 2021). This case was an opportunity for the court to consider whether AI can be an inventor. At this point, however, the court has decided this question in the negative. As this essay will later discuss, courts in the United States have come to a similar conclusion. Considering the significant developments in the technology field where AI have already become inventors and innovators, the approach of the courts (and the law) to the question of AI inventorship begs the question whether the law needs to be reconsidered since the traditional approach to inventorship does not take into account the recent developments in AI.

The traditional law of intellectual property is considered to be human centric in the sense that it takes a view generally that only humans are capable of the intellectual effort required to create subject matter capable of being treated as intellectual property (J Baldocchi, 2020). This traditional viewpoint is based on the concept of intelligence and creativity, which are seen to be peculiarly human attributes. In addition to this, the recent developments in the AI field, where AI are demonstrating creativity and intelligence and using these attributes to create new inventions, are raising a relevant question about whether the traditional precepts of intelligence and creativity need to be reconsidered since AI are increasingly depicting these attributes. Furthermore, it needs to be considered whether the AI using these attributes, have the capacity to be recognized as inventors. The last mentioned also depends on the concept of personality of the AI and whether law can attribute personality in the legal sense to a machine.

The case of DABUS, an Artificial Intelligence (AI)-inventor, on whose behalf patent applications were made, and refused, in the UK, Europe and the United States, has brought renewed focus on the question of whether an AI can be an inventor. Arguments are made both for and against recognition of AI as inventors. On the one hand, it is argued that AI cannot be an inventor since it does not have the necessary attributes that humans have which can lead to creativity while on the other hand an argument is made that AI is already making inventions that would have received patents had these been made by humans (Shlomit Yanisky-Ravid and Xiaoqiong Jackie Liu, 2017). As this essay will discuss later, there are also relevant economic arguments that are made to support recognition of AI as an inventor. The question whether an AI can be an inventor or not has implications for the law of patents, since this law allows the use of patent for the protection of the inventor's rights in the invention. In the UK, the relevant laws for defining patent and the rights of the patent holders are the Patents Act 1977 and the Copyright, Designs and Patent Act 1988. This is one of the areas that will be discussed in detail in this essay. This essay critically engages with the concept of legal personality, artificial intelligence systems and arguments related to whether AI can be considered to be an inventor.

1.1. Research importance

The importance of the research is due to the fact that artificial intelligence has become a reality to a large extent in human life, and it was necessary to clarify whether it should be considered an inventor or not.

1.2. Research Objectives

- 1- Definition of artificial intelligence
- 2- Clarify whether artificial intelligence can be considered an inventor or not
- 3- Explaining how the law deals with the innovation of artificial intelligence
- 4- Statement whether artificial intelligence should be considered an inventor?

1.3. Research Methodology:

The research adopts a critical analysis approach with the concept of legal personality, artificial intelligence systems, and arguments related to whether artificial intelligence can be considered an inventor or not.

2. Concept of AI

Artificial Intelligence has been defined as “the implementation and study of systems that exhibit autonomous intelligence or behaviour of their own”. The two important attributes that are recognised by this definition are the capacity for autonomous intelligence and behavior (K Chitra and B Subashini, 2013). The core feature or characteristic of this definition is the capacity for autonomy. This autonomy feature is for the application of intelligence and creativity. As per the opinion of Wang (2019), the notion of ‘intelligence’ while defining AI and explains intelligence as the “capacity of an information-processing system to adapt to its environment while operating with insufficient knowledge and resources”. Even if it is considered that AI has the intelligence to adapt to environment and make decisions, the question however remains whether the AI has intelligence in the same way as a human has intelligence and whether the difference in AI intelligence and human intelligence has any implications for the AI to be considered as an inventor. It can also be argued that it is not necessary for the AI to depict the same nature of intelligence as human beings because an AI is essentially an artificial entity and cannot have the same attributes as a human being.

In other words, equalising AI intelligence with human intelligence for the purpose of assessing whether AI can be considered an inventor is inappropriate because they are essentially different natured entities. In literature on AI, there are certain components or essential properties that have been identified as the markers of an AI; these markers include the ability of the AI entity to apply reason, have autonomy, have decision making and problem solving skills, and the ability to respond to new situations. Three elements that are identified as being common to all AI are software, algorithms and data (Wolters Kluwer, 2020). This is important because AI does not have a uniform physical characteristic and while some have humanoid features, others are more in the nature of machines that resemble computers rather than humans. Since AI are not uniform and do not have the same features across the spectrum of machines that are considered to be AI, it is important to identify the common markers of AI. These markers can be identified as software, algorithms and data.

Due to the changes brought forth by the informational technologies as well as robot technologies, AI is increasingly developed as an entity with problem solving skills but these skills are not the same as those exercised by the human entity,

which makes it difficult at least in the legal sense to determine how rights and liabilities can be bestowed on the AI (Bokovnya *et al.* 2020). At the same time, there is an interest in the legal field that AI must be defined and conceptualized because the conceptualizing of rights and liabilities in law will first require the definition of the entity in whom such rights and liabilities can be vested (Sam N Lehman-Wilzig, 1981). In the legal context of recognizing AI as an inventor, a question may be raised as to whether the AI is capable of having rights and liabilities that are associated with inventors under the law. It can be argued that if the AI is not capable of enforcing its rights as an inventor or if the law cannot take actions against AI for wrongs done by it, then the issue of inventorship for AI may be futile. To go back to the issue of intelligence of the AI, it has been accepted that the mechanisms of AI can summarise content faster than the human mind (Andrew Arruda, 2016).. However, does this mean that the AI is intelligent in the same sense as a human being? And even if so, should the AI be treated as a person?

There are two broad objections to treating an AI as a constitutional person, which are that only natural persons should be given the rights of constitutional personhood and that AI lack “the critical components of personhood such as souls, consciousness, intentionality, and feelings” (Lawrence, 1992). Since AI is essentially a machine, it would not have the consciousness and soul like a human person. However, it can also be argued that even corporations do not have souls and consciousness, but the law recognises their personality. Similarly, an AI can be recognised as a legal person even if it does not have human attributes. The reasoning for recognising AI personality can be the same as that for recognising corporation as a person.

An argument is made that AI is not a moral producer although it can be a moral consumer (Torrance, 2009). There is a crucial difference between a moral producer and a moral consumer, which is also relevant to the question of whether an AI can be a moral agent. A moral producer produces the moral action and is capable of producing moral actions or making moral decisions whereas a moral consumer has the capacity to receive moral actions and be considered to have rights and needs recognised and respected by others. Even if AI is considered to have a limited personality in order to be considered to have the capacity to be the bearer of some rights, it is not at this time clear if AI can be the bearers of responsibility to generate moral actions. Related to this point is the argument that AI do have the experience of feelings and emotions and experience of such feelings and emotions (Kurt Gray and Daniel M Wegner, 2012).

It is possible to develop AI that can make decisions, but this does not become equated to human decision making processes since humans learn emotions and feelings because by experience and in this respect are unique in their moral agency. At the very least, it can be argued that AI intelligence is not the same as human intelligence.

Another argument that can be made in favour of AI having the capacity to be treated as persons is that the personality of the AI can be devised in the same sense as the personality of the corporation since the latter is also not a natural person (Solaiman, 2017). It is a principle that has been generally recognized in the law that legal personhood is not necessarily synonymous with or confined to human beings and that in certain circumstances law may extend the notion of personality to artificial entities (*Byrn v New York City Health & Hosp Corp*, 1972). This principle has been used to treat companies as separate legal person with the capacity to have their own rights, property, and liabilities and the *Salomon v Salomon* case is a good example of this approach (*Salomon v Salomon*, 1897). However, even if AI is considered to be a person for this purpose, the question of whether it can be an inventor would still be one that is contentious, since there is a judicial view that invention involves an “inventive step” that is not obvious to a skilled person in the art, and this suggests that inventive matter is one arising from the mind of a natural person (*Yeda Research and Development Company Ltd v. Rhone-Poulenc Rorer International Holdings*, 2007). Therefore, even consideration of a AI having a personality in law would not be enough to make an argument that such legal person is capable of invention.

It may also be mentioned that even in the case of corporation, a distinction is drawn between human and artificial personality as was noted in *People ex rel Nonhuman Rights Project, Inc v Lavery* that while the Black’s Law Dictionary defines the term person as a human being or an entity (such as a corporation), it notes in the case of the latter that it is recognised by law as having the rights and duties of a human (*People ex rel. Nonhuman Rights Project, Inc. v Lavery*, 2014). To put this matter in the more specific context of this essay, a corporation is also not considered to be an inventor, although it can be considered to be an owner of the patent. There is a difference between an inventor and an owner as noted in *Beech Aircraft Corp. v. EDO Corp.* where the difference was clarified as inventorship being a question of who invented the subject matter while ownership being a question of who owns legal title to the subject matter (*Edo Corp. v. Beech Aircraft Corp*, 1988).

The question of personhood for the purpose of intellectual property rights have become relevant as the question of who has intellectual property in a specific subject matter has also been raised with respect to a monkey in what has come to be known as the ‘Monkey Selfie case’ (Naruto v. Slater, 2018). In *Naruto v Slater*, a question arose as to whether animals can have statutory standing under the Copyright Act. In this case, a wildlife photographer left his camera unattended at an Indonesian reserve and a macaque named Naruto allegedly took several photographs of himself with the camera. The photographer published the Monkey Selfies in a book and identified himself as one of the copyright owners of the Monkey Selfies while also admitting that the photographs were taken by Naruto. People for the Ethical Treatment of Animals (PETA) filed a “Next Friends” complaint against the photographer on behalf of Naruto for copyright infringement. However, in the process of suits and appeals, the conclusion was that the Copyright law does not authorise animals to file copyright infringement suits.

While the law continues to take a traditional and human centric approach to AI and intellectual property, AI continues to evolve in ways that shows it to be increasingly creative and innovative thus begging the question as to whether law is not responding to the changing landscape of AI systems. “Modern AI is now also able to generate a diverse range of sophisticated creative outputs. In November 2019, the Prague Philharmonic performed an AI-generated composition based on an unfinished work by Antonín Dvořák, 115 years after his death. Similarly, algorithms such as OpenAI’s GPT-2 language program can generate poetry and other literary works (with varying levels of success). In addition to these creative works (which may in theory be protected by copyright), AI is now increasingly being utilised to produce inventive outputs (which may be subject to patent protection). In fact, AI systems have already generated a wide array of inventions essential that helps to products such as medical devices, kitchen appliances and drug synthesizers” (Bonadio, McDonagh and Dinev, 2021).

Since AI is already in the process of innovating and developing new products and services, question can be raised as to why the law should not recognise the status of inventor for the AI. In the next section, the essay explores the approach of laws and courts to the issue of AI inventorship and critically engaged with the arguments in legal scholarship.

3. How do law and judiciary approach AI inventorship:

In a recent case, the Court of Appeal had the opportunity to consider whether an AI can be an inventor and to determine whether an AI is capable of having a patent (*Thaler v Comptroller General of Patents Trade Marks And Designs*, 2021). The judgment of the Court of Appeal in *Thaler v Comptroller General of Patents Trade Marks And Designs* is also central to the discussion in this situation since the case involves an appellant who applied for patents with the UKIPO, but the application listed the AI machine as the inventor of the product. The UKIPO rejected this application using Sections 7 and 13 of the Patents Act 1977. Section 7 of the Patents Act 1977 provides that an application for a patent can be made by ‘any person’ either alone or jointly with another person and that such patent for an invention can be granted to the inventor or joint inventors. Section 7 specifically notes that the term inventor means the actual deviser of the invention. It is important to note that Section 7 uses the term ‘person’. Similarly, Section 13 provides that an applicant for a patent shall file a statement identifying the ‘person’ or ‘persons’ whom he believes to be the inventor or inventors and if he fails to do so, the application shall be taken to be withdrawn.

Therefore, the important point is that the inventor is supposed to be a ‘person’. The question is whether the term ‘person’ can be defined in terms of an AI or in other words, whether an AI can be said to have a personality in legal sense. In *Thaler*, the UKIPO did not allow any such construction of the term ‘person’ and held that the AI is not a person and cannot be considered an inventor for the purpose of the Patents Act 1977. In his appeal to the High Court and later to the Court of Appeal, Thaler was unable to make a case for considering the AI to be a person for the purpose of making an application for the patent. The Court of Appeal held that a machine cannot be considered to be an inventor. Interestingly, in the first paragraph of the judgment, the following is noted:

“At first sight, and given the way this appeal is presented by both parties, the case appears to be about artificial intelligence and whether AI-based machines can make patentable inventions. In fact this case primarily relates to the correct way to process patent applications through the Patent Office and turns on material which was either buried in the papers but ignored in the written and oral argument, or not referred to at all. It is an object lesson in the risks of advocacy being distracted by glamour.”

The court's statement suggests that the principal issue in Thaler was not related to whether AI can make patentable inventions but to the process of patent application and that the presentation of the case merely distracted from this issue and instead focused on the issue of the AI as an inventor. With reference to the application itself, the court noted that the applicant, gave the name of the AI machine and indicated that the AI had the right to be granted a patent "by ownership of the creativity machine." Also relevant is the reply given by Dr Thaler to the notification of the UKIPO that the former had failed to identify a 'person' in the application. To this question, Dr Thaler responded in the Amended Form 7 that "the applicant identified no person or persons whom he believes to be an inventor as the invention was entirely and solely conceived by DABUS".

In *Yeda Research and Development Company Ltd v. Rhone-Poulenc Rorer International Holdings*, Lord Hoffmann considered the meaning of inventor under Section 7 and observed that the term refers to the actual deviser of the invention in contrast with deemed or pretended deviser of the invention (*Yeda Research and Development Company Ltd v. Rhone-Poulenc Rorer International Holdings*, 2007). In *University of Southampton's Applications*, Laddie J was more specific in saying that inventor is the natural person who "came up with the inventive concept" (*University of Southampton's Applications*, 2005).

Therefore, there is some question about whether an AI can be considered to be a legal person and as such be allowed patent. It may be mentioned that in Thaler, the appellant himself did not make the argument that the AI (DABUS) is a person (whether natural or legal) (*University of Southampton's Applications*, 2005). Thus, an argument may be made that the Court of Appeal did not have the opportunity to engage more deeply with the issue of personality of AI for the purpose of patent. It may be argued that there is scope for an argument that if AI is considered to be a legal person, there is a possibility for considering the AI as an inventor for the purpose of patent law.

It is notable that the Court of Appeal considered that Dr Thaler was the creator of the AI and was therefore the person who set it up to run to produce the inventions in issue (*Thaler v Comptroller General of Patents Trade Marks And Designs*, 2021). This brings to consideration another question that whether it is ultimately a human person who should be considered to be the inventor when the human person has been the one who created the AI that finally created the invention.

In Thaler, the Court of Appeal noted the following:

“In my judgment it is clear that, upon a systematic interpretation of the 1977 Act, only a person can be an “inventor”. The starting point is section 130(1) which provides that “‘inventor’ has the meaning assigned to it by section 7 above”. Section 7(3) provides that “‘inventor’ in relation to an invention means the actual deviser of the invention”. A dictionary definition of “deviser” is “a person who devises; a contriver, a planner, an inventor” (Shorter Oxford English Dictionary, 5th edition, Oxford University Press, 2002). Section 7(2) provides that a patent may be granted (a) “primarily to the inventor or joint inventors”, (b) “to any person or persons who ...”, (c) “the successor or successors in title of any person or persons mentioned in paragraph (a) or (b) above”, but “to no other person.

The above statement should be considered in conjunction with the statement made by Lord Hoffmann in *Yeda* where he noted that the “inventive step” for the purpose of patent should be something that is not obvious to a skilled person in the art, and this suggests that inventive matter is one arising from the mind of a natural person (*Yeda Research and Development Company Ltd v. Rhone-Poulenc Rorer International Holdings*, 2007). Therefore, as of this time, there is some judicial opinion that suggests that AI cannot be an inventor for the purpose of patent law.

The Patent Act in the United States does not use the term ‘person’ but uses the terms ‘individual’ and ‘inventor’. Section 100(f) of the said Act defines inventor as “the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention” but does not clarify who is deemed as an individual. Although the term person has been generally interpreted in the United States to include where relevant, legal persons (*FCC v. AT&T Inc.*, 2011), the court uses the specific legislations where the term person or individual is used to interpret whether that specific legislation uses the term broadly to include legal persons, or narrowly to include only natural persons (*Mohamad v. Palestinian Auth.*, 2012).

4. Should AI be considered to be an inventor?

One argument is that AI should be considered to be an inventor because of the features of AI systems and the Multiplayer Model. Furthermore, it is argued that the theoretical justifications concerning intellectual property have become irrelevant and there is a need to reform the patent law since the traditional principles encompassing the patent have become outdated, inapplicable and irrelevant in the era of advanced automated and autonomous AI systems (Shlomit Yanisky-Ravid and Xiaoqiong Jackie Liu, 2017).

The argument is based on the changes that have been brought into the AI technologies which have led to the greater autonomy of these systems. Indeed, eight of the crucial features identified with respect to AI systems are of the nature that bring AI closer to human intelligence, since AI systems are now “(1) creative; (2) unpredictable; (3) independent and autonomous; (4) rational; (5) evolving; (6) capable of data collection and communication; (7) efficient and accurate; and they (8) freely choose among alternative options.” In other words, the new generation AI systems can lead to independently developing inventions. What is more important is that similar inventions, if made by humans, would have presented a fit case for patent. Reform of the patent law (with respect to addressing changes made in the AI field) is also demanded on the basis of the Multiplayer Model, which refers to the inventions created by AI systems and which involve overlapping and independent multiple participants and stakeholders, who are involved in the invention process. These participants include software programmers, data and feedback suppliers, trainers, system owners and operators. The traditional patent law approach is outdated because it is still based on the need to identify a single inventor while the natures of invention processes have changed. In the case of DABUS AI which was listed as an inventor in the *Thaler* case, it is important to point out that the latter has also made an application for patent in the United States for listing DABUS as the inventor (Hopes, 2021).

In the application it is also specified that the invention is a “specially shaped container lid designed for robotic gripping and a flashlight system for attracting human attention in emergencies” for which Thaler cannot be properly listed as an inventor because he “has no background in developing container lids or flashlight systems, [did not] conceive of those two products and direct the machine to invent them.” It may also be noted that apart from the UKIPO, which rejected the application of Dr Thaler to list DABUS as the inventor, the European Patent Office also rejected the application. While rejecting the application of patent by Dr Thaler, the European Patent Office stated that it cannot grant the patent to DABUS since the application does not meet the requirement that the inventor has to be a human being, not a machine since legislative history supports the conclusion that the legislators understood an inventor to be a natural person only. In the United States where the application was also made by Dr Thaler, the USPTO released a Federal Register Notice noting that it would take a broad approach to seeing whether an AI can be an innovator but the decision taken by it also rejected the application on the ground that artificial intelligence systems cannot be listed or credited as inventors.

One of the objections that are relevant to the legal contexts of AI being an inventor concerns the enforcement aspect of the rights that are given to the patent holder and the question whether an AI can effectively enforce these rights. The argument is that if the AI is not capable of enforcing the patent through patent infringement it would not make sense to have patent for AI (Yohan Liyanage & Kathy Berry, 2021). Furthermore, AI systems are already showing characteristics that demonstrate their creativity and ability to innovate and create new subject matter. Arguments have been made that since computers are already generating patentable subject matter and overtaking human inventors' as primary sources of new discoveries and inventions, it is only appropriate that AI systems should be given patent rights to inventions (Ryan Abbott, 2016).

Another argument that is made in favour of considering AI systems as inventors is that AI is increasingly being devised as an autonomous entity, which is explained as follows:

“This feature [autonomy] is one of the most important to understand in order to grasp AI systems in general and their departure from the framework of current patent law. Although the definition of autonomous AI system might vary according to the specific industry and from one system to another, we can identify some common characteristics. Degrees of independence and creativity are both relevant. We can say that a device is independent and therefore autonomous to the extent that it accomplishes a high-level task on its own, without external (human) intervention. Human intervention can occur in many phases of the process—observation, orientation, deciding and acting—resulting in different levels of independence” (Shlomit Yanisky-Ravid and Xiaoqiong Jackie Liu, 2017).

An AI is not only capable of making decisions in an independent sense, it also increasingly has cognitive ability, which is an essential aspect of autonomy since the AI can now work independently without human intervention beyond defining goals; this is what happens with algorithms that allow the AI to collect data without human intervention (William C and Sonia K, 2013). In particular, the 3A era systems that are characterised as advanced, automated and autonomous AI system can create and invent products and processes for which patents would have been given had these been developed by humans (Shlomit Yanisky-Ravid and Xiaoqiong Jackie Liu, 2017).

One study makes an argument based on Coase Theorem to determine how economic efficiency can be maximised by allowing AI to create new technologies to obtain the resulting patents is the

optimal policy (W Michael Schuster, 2018). This is an important argument for supporting AI inventorship since it is based on economic efficiency. This argument is also based on the idea that since AI are already involved in invention and their inventions have been patented although not in the name of the AI, it makes economic sense to allow the AI to be listed as inventors since this can also be beneficial for the companies who are investing heavily in the development of innovator AI.

5. Conclusion

This essay engaged with the concept of legal personality, artificial intelligence systems and arguments related to whether AI can be considered to be an inventor. The discussion in literature makes a case for recognising the AI as an inventor based on different reasons. There are economic arguments that stress on the need to recognise AI as an inventor as this would encourage the firms developing AI for inventions. There are also legal arguments that emphasise on the need to reform the patent law so that it is able to respond to the new developments in technological field. AI can be recognised as an inventor based on such arguments if the law also changes in response to the technology. As AI personhood is central to the issue of whether AI can be an inventor or not, reference can be made to the recognition of corporations and other legal entities as legal person and similar recognition of legal personality for AI can be made as a first step to recognising AI as an inventor.

6. Research results:

- 1- So far, the status of the inventor has not been given to artificial intelligence
- 2- Many studies seek to prove whether artificial intelligence has the right to register some patents in its name.
- 3- Artificial intelligence must be given legal status.

7. Recommendations

At the end of the research, we recommend doing more studies and research on the extent of the eligibility of artificial intelligence to be granted the status of inventor, as it has become a key participant in many inventions, as well as changing patent laws to suit the changes of the era.

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