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INVENTING THE FUTURE: A COMPARATIVE STUDY OF AI INVENTORSHIP AND PATENT OWNERSHIP IN SOUTH AFRICA, USA, EUROPE AND INDIA

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Abstract

The recent developments in Artificial Intelligence (AI) have modified the scope of innovation and creativity. Various AI software platforms have now the ability to provide novel outputs with a simple prompt by a user (human). This collective operation has ignited a global debate on Intellectual Property laws that Whether AI should be recognized as an inventor or an owner of the invention?

Conventionally Patent law follows or is imbedded with the concept of the human intellect. The inventors are granted exclusive rights for the disclosure of their innovations. The sudden rise or technological development in the AI sector and the usage of AI in innovations has raised serious concerns relating to the legal framework, as the legal framework all over the World is human-centric. Along with concerns of legal framework, the definitions of ownership and inventorship have come into question and are being reconsidered. South Africa has made headlines all over the world by granting an AI system (DABUS- Device for the Autonomous Bootstrapping of Unified Sentience) a patent to an invention and the inventor/owner being the AI. While the USA and Europe Union have clearly rejected the concept of AI being the inventor. On other hand India has not yet formally addressed the issue hence leaving a gap in its legal framework. This paper tackles a comparative study of different jurisdictions responding to the question of AI inventorship and ownership.

Keywords

Patent, Artificial Intelligence, Inventorship, Ownership

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Introduction

Artificial Intelligence refers to the stimulus of human intelligence processes by various software or machinery. These processes include all functions that humans can perform, but the duration of output is faster than that of humans. Initially there was a need for humans to prompt to the various systems, the software has been updated such that there is no more need for humans for novel innovations.

Patent law is a branch of intellectual Property law which gives the inventors the exclusive power to have right towards their invention for a specific period. The objectives of Patent are that it should encourage innovation, promote public disclosure of inventions and provide legal protection. To requirements to be qualified as Patents are to be the following:

- Novelty – The invention must be novel or new
- Inventive Step – The invention must not be obvious to the person skilled in art.
- Industrial Application – There must not be any prior use in the industry.

Inventorship is said to be given to the person who has invented or who has contributed to the invention. On other hand, a person who has ownership has legal rights to exploit the invention commercially. The inventor himself is to be considered the owner unless he assigns a legal representative or a third party.

Jurisdictional Analysis

The technological development of AI complicates Inventorship and Ownership. If an AI generates an invention at the prompt of humans, it makes it difficult to identify who is inventor or who is the owner. The legal dilemma is whether a non-human entity can be stated or given inventorship under patent laws. This has made the legal systems worldwide reconsider the foundation principles of patent law. Following is legal analysis of four key jurisdictions- South Africa, the United States, the European Union, and India.

South Africa

South Africa has made headlines in the year 2021 in the month of July by becoming the first country to grant a patent to AI as an inventor or owner. The granting of patent was given to an AI system named- DABUS as the inventor.

DABUS is an AI system developed by Dr. Stephen Thaler. DABUS created a novel food

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container design. Dr. Thaler filed for patent applications in different jurisdictions listing DABUS as an inventor and himself as the owner. The European Patent Office and the United States Patent and Trademark office rejected the application on the grounds that an AI system cannot be patented, they specified that an inventor must be a human. On other hand South Africa accepted the Patent application and granted it under the patent application number- (ZA2021/03242). Lot of questions were raised on the approval of patent application. Some of them stated that the approval was an administrative oversight as South Africa has a non-substantive patent examination system which does not assess the merits of the invention. Nevertheless, legal scholars like Donrich Thaldar and Meshandren Naidoo argue that the decision taken by the South Africa is legally sound and aligned to their public policy.

South Africa's Patent Act 1978, the whole act refers to the inventor as "him". Under the Interpretation Act 1957 this includes both genders but does not specifically mention non-human entities. However, South Africa follows a purposive approach which means that judge has the privilege to interpret the legislation in such a method that it reflects purpose by considering beyond the text of statue. The Intellectual Property of South Africa (*Phase 1*) concentrates on promoting innovation, technology transfer and economic growth. Thus, this policy favors the view of giving an inventor the right to an AI system in patent law. The patent was granted on the basis that Inventorship does not require legal personhood. There was a comparison between a deceased person and an AI system. Both can be inventors without possessing legal rights. The ownership was granted to Dr. Thaler based on Intellectual property law principle of South Africa. The owner of a principal object is deemed to be the owner of its fruit. This principle is firmly established in South African law and thus provides legal backing to the owner to act as one in AI generated inventions. South Africa's decision does not imply that an AI system has legal personhood. This approach only recognizes AI generated inventions without hampering the integrity of legal doctrines as the role of inventor is symbolic and enables patent protection without altering the fundamental legal status. This decision also aligns with the *Fourth Industrial Revolution strategy*. By this decision South Africa exhibits dedication to legal modernization and ethnological leadership.

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FORM P2

REPUBLIC OF SOUTH AFRICA	REGISTER OF PATENTS	PATENTS ACT, 1978
Official application No.	Lodging date: Provisional	Acceptance date
21 01 2021/03242	22	47
International classification	Lodging date: National Phase	Granted date
51 B65D;A61M	23 2021/05/13	
International Application No.	International filing Date	Priority Date
PCT/IB2019/057809	2019/09/17	2018/10/17
71 Full name(s) of applicant(s)/Patentee(s):		
THALER, Stephen L.		
71 Applicant substitued:		Date registrered
71 Assignee(s):		Date registrered
72 Full name(s) of inventor(s):		
DABUS, The invention was autonomously generated by an artificial intelligence		

Priority claimed:	Country	Number	Date
	33 EP	31 18275163.6	32 2018/10/17
	33 EP	31 18275174.3	32 2018/11/07

54 Title of invention

FOOD CONTAINER AND DEVICES AND METHODS FOR ATTRACTING ENHANCED ATTENTION

European Union

The European Union through the European Patent Office (EPO) has taken a sturdy decision on the issue of AI inventorship. EU rejected the DABUS patent application filed by Dr Thaler. The European Patent Office rejected the patent application by specifying that inventors must be natural persons under European Patent Convention.

The European Patent Convention (EPC) governs the process of patent application in Europe from registration to grant of the patent application. EPO has restricted the rights of inventorship and ownership to natural persons. Inventorship under EPO involves complementary rights such as- the right to assign ownership and the right to be named. EPO believes that the AI system lacks legal personhood and thus cannot be inventor. The application of the DABUS AI system failed to meet the formal requirements of the EPC- Identification of the inventor. They repeatedly emphasized that a patent cannot be granted to a non-human inventor. The main concern was accountability. If an AI system is granted a patent, if there are issues of integrity then who will be held liable. And giving patents on an AI system will hamper the integrity of the concept intellectual property.

United States of America

Same as the EU, the USA has also taken a human-centric approach to patent law. They also had the same opinion as the EU in the landmark case of the DABUS AI system. The United

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States Patent and Trademark Office (USPTO) and federal courts have repeatedly stated that only natural persons can be inventors under US patent law. The US Patent Act defines an inventor as an "individual" which was interpreted by the federal court as a natural person. Under 35 U.S.C. § 115 the inventors are required to submit an oath or declaration affirming their inventorship which AI system cannot perform. The USA approach is restricted towards legal principles and statutory interpretation. In judgments such as Thaler V. Vidal and Thaler V. Hirshfled the decision by court stated clearly that an inventor can only be a human being, not an AI system. As the USA concentrates or emphasizes only on legal personhood and mental conception which play a key role in inventorship.

India

India is a growing hub for technology and innovation which is engaging more with legal and ethical challenges posed by AI. While AI systems like DABUS have been rejected or recognized as inventors in different jurisdictions, India does not have a say yet as it did not formally address the issue. The concept of AI as an inventor is not accommodated in Indian Patent law. The Patents Act 1970 governs the Indian Patent law. Under Section 6 – A Patent application must be filed by a "person" who is a true inventor or first inventor or an assignee. Section 2(y) defines a "Patentee" as a person to whom a patent is granted. The General Clauses Act 1857 defines "person" to include natural and legal persons (companies, firms...etc.) but not non-human entities like AI. The Indian Patent Office did not yet adjudicate any AI inventorship claims, there is no statutory or a judicial recognition of AI as an inventor. India's is approach is same as the USA and EU, it is a human- centric approach. It is assumed that inventions are the result of human creativity and effort. Thus, can be derived that India does not recognize AI system as an inventor.

Jurisdiction	AI as an Inventor?	Legal Basis	Key Judgements	Policy Orientation
South Africa	Yes	No statutory definition; purposive interpretation	DABUS patent granted (2021)	Innovation-driven; legal modernization
European Union	No	EPC requires human inventorship	EPO DABUS Decision (2020)	Procedural clarity; legal consistency

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United States	No	Inventor must be a natural person	Thaler v. Vidal; Thaler v. Hirshfeld	Legal formalism; statutory interpretation
India	No	"Person" excludes AI; human-centric approach	Patents Act, 1970; no case law	Human-centric; traditional approach

Landmark Case laws

There are three landmark case laws which have brought the issue of AI and inventorship into the limelight. It has become a hot topic. The cases are following:

Thaler V. Vidal (August 5, 2022)

Stephen Thaler is a technologist and AI researcher who developed an artificial intelligence system named DABUS (Device for the Autonomous Bootstrapping of Unified Science. Thaler claimed DABUS invented two new inventions independently of one another: a "Neural Flame" and a "Fractal Container." In July 2019, he filed two patent applications with the United States Patent and Trademark Office (USPTO) listing DABUS as the sole inventor.

Thaler unequivocally declared he had not engaged in creating these inventions and that DABUS independently created them. To comply with statutory requirements, Thaler filed an affidavit on behalf of DABUS under 35 U.S.C. § 115,A "Statement on Inventorship" naming DABUS as a "Creativity Machine," and An assignment agreement conveying rights from DABUS to himself.

The USPTO rejected the applications, on the ground that they lacked a valid inventor because DABUS is not a natural person. The petitions for reconsideration submitted by Thaler were denied. He then sued in the Eastern District of Virginia, which upheld the USPTO's decision. Thaler appealed to the United States Court of Appeals for the Federal Circuit. The court began its analysis with the plain words of the Patent Act. Under 35 U.S.C. § 100(f), an "inventor" is expressly "the individual… who invented or discovered the subject matter of the invention." Although "individual" is not so defined within the Patent Act, the court employed the Supreme Court's definition in Mohamad v. Palestinian Authority (2012) that "individual" is a natural person. The court emphasized that:

In ordinary usage, "individual" signifies a human being. Dictionaries and the Dictionary Act (1

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U.S.C. § 1) also distinguish between "individuals" and corporations and other artificial entities. The Patent Act uses personal pronouns like "himself" and "herself" in referring to inventors, further substantiating the interpretation that inventors must be human. Thaler made several points to support his argument that AI systems qualify as inventors. Use of "whoever" in § 101 and § 271: Thaler argued that the term "whoever" implies wider eligibility. The court rejected this on the basis that while in some cases corporations or other groups would be covered by the term "whoever" (i.e., infringement), the very specific term "individual" in § 100(f) is used in inventorship and clearly means natural persons.

§ 103 and the method of invention: Thaler contended that excluding AI inventors is consistent with an infringement of § 103, which establishes that patentability may not depend on the method of arriving at the invention. The court clarified that § 103 addresses obviousness and not inventorship and does not preempt the definition in § 100(f). Constitutional and policy concerns: Thaler argued that recognizing AI inventors would stimulate innovation and be in keeping with the constitutional underpinning of patents (Article I, § 8, Clause 8). The court dismissed this as speculation and insisted that courts are obligated by the statutory language, not policy caprice. Additionally, the constitutional clause is a grant of power to Congress, not a command to recognize AI inventors. Foreign precedent: Thaler cited South Africa's holding that a patent could be issued with DABUS as the inventor. The court clarified that foreign holdings based on other legal schemes do not affect the construction of U.S. law. The court cited its own precedents to support its construction: In University of Utah v. Max-Planck-Gesellschaft (2013), the court held that inventors are natural persons and not sovereigns or corporations. In Beech Aircraft Corp. v. EDO Corp. (1993), the court reiterated that inventors can only be natural persons. The Federal Circuit Court did not change the decision of the District Court and agreed to it, saying that: The term "inventor" in the Patent Act unambiguously refers to natural persons. Thus, DABUS cannot be listed as inventor in patent applications. Thaler's appeal was dismissed. This case sets as an landmark case in U.S. patent law, reaffirming that only human beings can be inventors.

Thaler v. Comptroller-General of Patents, Designs and Trademarks [2023] UKSC 49

Dr. Stephen Thaler, creator and owner of an artificial intelligence system named DABUS (Device for the Autonomous Bootstrapping of Unified Sentience), filed two patent applications in the United Kingdom.

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He claimed that inventions covered by the applications were created solely by DABUS, with no human involvement in the process. Instead, he listed DABUS as the inventor and asserted that, as owner and operator of DABUS, he was entitled to assert rights in the inventions. The UK Intellectual Property Office (UKIPO) declined to accept the applications on the basis that DABUS is a machine and therefore cannot be identified as an owner or an inventor. The Supreme Court considered three core questions of law: Is section 13(2)(a) of the Patents Act 1977 required to have a person named as the inventor in all situations, including where the applicant believes that the invention has been created by an AI machine? Does the Patents Act 1977 permit the grant of a patent without a human inventor being named? Where an invention is created by an AI machine, is the user, maker, or owner of the machine responsible for the issuance of a patent for such invention? The Court closely examined the Patents Act 1977, in particular sections 7 and 13: Section 7 creates the right of application and grant of patent by formulating that the inventor is the "actual deviser of the invention." Section 13(2)(a) requires the applicant to name the inventor and explain how they acquire the right to be given the patent.

The Court held that the definition of "inventor" in UK patent law had always been referred to a natural person. The Court held that Thaler's inability to identify a human inventor made the applications not meet the statutory requirements.The court stated that if there is any reformation required to the definition of "inventor" it is the responsibility of the parliament and not the courts. This decision is a milestone in global debate on AI and intellectual property. It enforces that, as things are currently in the UK, inventions brought about by AI cannot be patented unless there is a human inventor identified, and that any change to accommodate AI inventorship must be legislative.

Thaler v. Commissioner of Patents (Australia)

Dr. Stephen Thaler, the creator of AI system DABUS (Device for the Autonomous Bootstrapping of Unified Sentience), filed a patent application in Australia for an invention titled "Food container and devices and methods for attracting enhanced attention".

Dr. Thaler listed DABUS as the inventor and stated that the invention was created by the AI system autonomously without human intervention.

The patent application was rejected by the Australian Patent Office (IP Australia) on the basis that under the Patents Act 1990 (Cth) and Patent Regulations 1991, the inventor must be a

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natural person. Thaler appealed the decision to the Federal Court of Australia, where Justice Beach ruled in his favor in Thaler v Commissioner of Patents [2021] FCA 879. But the Commissioner of Patents appealed to the Full Federal Court, which unanimously overturned the ruling in Commissioner of Patents v Thaler [2022] FCAFC 62, holding that an inventor must be a natural person. Legal issues under consideration are: Can an artificial intelligence system be considered an inventor under the Patents Act 1990 (Cth)? Does the "inventor" in the Act include non-human things like AI? Is it sufficient to maintain control or ownership of an AI system to be entitled to a patent?

Statutory provisions involved

Patents Act 1990 (Cth): Section 15 is where it is provided that it is the inventor, or person deriving title from the inventor, who is entitled to a patent.

Patent Regulations 1991 (Cth): Regulation 3.2C requires the identification of the inventor in a patent application.

There is no specific definition of an "inventor" in the Act, but legal construction has always assumed inventors to be natural persons.

Justice Beach's initial ruling interpreted "inventor" as an agent noun, which meant it could refer to an individual or an object (e.g., "computer," "regulator"). He argued that the Act's wording was not such that AI could not be particularly identified as an inventor and that AI inventorship would not be at variance with the objective of the Act—to promote innovation. The Court reiterated that legislative change, and not judicial interpretation, should introduce any change to the definition of the term "inventor". The Full Federal Court decided in Commissioner of Patents v Thaler [2022] FCAFC 62 that: Artificial intelligence systems cannot constitute inventors under Australian patent legislation. The term "inventor" applies merely to natural persons. Patent applications naming AI as the inventor do not comply with statutory requirements. The step placed Australia in line with other major jurisdictions like the U.S. and UK in maintaining the principle that legal inventorship is a human domain. It also furthered the necessity of legislative certainty in attempting to accommodate the evolving role of AI in innovation.

Challenges

The challenges in recognizing AI as an inventor can be broadly divided into two main

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subheadings which are legal challenges and Ethical and Philosophical challenges.

Legal Challenges

- Inventorship: Most Patent laws worldwide including United States, United Kingdom, Australia, European Union, and India, define inventors as individuals capable of legal rights and responsibilities. The AI system lacks legal personhood in many countries and hence cannot hold any intellectual property rights, assign or transfer ownership, or can be held accountable for any legal obligations. Thus, this creates a gap between AI and the legal framework.
- Ownership and Accountability: Even if AI is recognized as an Inventor, the problem is who should own the invention. Since AI cannot hold any property, it must assign it to: The developer, User or the entity funding the AI. This will complex the adjudication and create a ruckus in the legal system. This is the reason multiple jurisdictions have rejected the patent application for an AI system.
- Patentability Standards: AI system innovations challenge the core criteria of patentability. Novelty is a big issue; it is difficult to identify that inventions generated by AI are truly new. Mostly AI uses the existing data, so can the output be non-obvious. Can AI produce an Invention which is not already present in the market. These questions have restricted many countries from granting patents to an AI system.
- Disclosure Requirements: AI systems cannot provide proper reasoning behind inventions, which makes it harder for patent disclosures.
- Lack of Statutory Regulations: Existing laws worldwide do not talk about AI or non-human inventorship and ownership. They are slow to adapt to technological advancements.
- Human-Centric Innovation: Patent law initially started for human innovation. Recognizing AI as an inventor or granting patents to an AI system will sabotage the value of human creativity. Along with this it steals away incentives from human inventors and questions ethical dilemmas about the role of machines in society.
- Moral Rights: All inventors have moral rights such as to name, if AI is granted a patent can AI be assigned moral rights.
- Bias: AI systems can generate inventions which may reflect biases, raising ethical concerns.

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- Procedural Challenges: Most patent offices worldwide have no idea or proper procedures for handling AI inventions. The examiners may not be equipped t assess AI inventions.

Recommendation

Since technology is changing so fast, Artificial Intelligence (AI) has become an integral part of numerous industries. I would recommend that instead of giving full inventorship to AI systems, co–inventors can be given to AI systems. That is, although the invention of the AI system is recognized, the ownership rights are entirely held by the human who is developing the AI system, user, or organizational entity that is developing the AI.

All patent legislations, the United States and European Union, India and others, demand that inventors incorporate human involvement. Mentioning AI as a co-inventor without giving the AI system legal rights fulfills current legal requirements. Since AI cannot own property or cannot be held legally accountable, by attributing ownership to a human makes liability, commercialization, and enforcement of rights easy.

Human inventors still have moral rights like the right to identification and credit. AI, not being moral, does not require such rights, avoiding ethical concerns. Recognition of AI's contribution can stimulate further development of smart systems, while human creativity continues to be rewarded.

AI is capable of accelerating the invention process. Credit to its contribution can lead to more efficient patent applications and evaluation, especially when AI is used to develop technical solutions or designs. We can also have ethical review committees for AI developed Inventions. For transparency. This model can serve as an example to more models.

Conclusion

Whether AI is an inventor or not is a colossal technology disagreement among countries and legislation. South Africa has taken a gigantic stride forward by responding with a yes to the question of whether AI is an inventor. But countries like the United States of America, the European Union, and India continue to think that inventors are human beings.

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This implies that there is no international consensus yet. A satisfactory middle ground is to refer to AI as a "co-inventor." That is, we are recognizing that AI was involved in the invention, but not the legal responsibility and ownership are attributed to the human inventor or the AI user.

As society becomes more technologically advanced, so too must our laws. We need to develop legislation that promotes thoughtful imagination without forgetting to respond to human beings. The future of patents will not be swimming against the tide of technology—it has to keep pace with it, sensibly and equitably.

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