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AI inventorship: The right decision?

How should our patent system deal with inventions by artificial intelligence (AI) systems? The first hurdle to patenting an invention by an AI system is for the AI system to qualify as an inventor in our current patent law. South Africa's *Patents Act 57 of 1978* refers to an inventor as 'him'. The *Interpretation Act 33 of 1957* provides that reference to the male gender includes the female. However, does 'him' include an AI inventor (as opposed to a human inventor)? If one adopts a literal reading, and assumes that an AI system cannot be referred to as 'him', the answer would be no. But is it the *purpose* of the *Patents Act* to only provide patent protection to certain kinds of inventions, namely *human* inventions, and not *AI* inventions?

This question rapidly entered the realm of reality with the news that South Africa's Patent Office (SAPO), which runs under the auspices of the Companies and Intellectual Property Commission, granted a patent for which the inventor is an AI system.[1-3] The AI system, called DABUS (an acronym for 'device for the autonomous bootstrapping of unified sentience'), was created by American AI entrepreneur Dr Stephen Thaler. DABUS invented a new food container, which was the subject of the patent application.[4] In the patent application, Thaler is indicated as the patent owner, and DABUS as the sole inventor. This patent application was not restricted to South Africa. Thaler also submitted the same food container patent application in various other jurisdictions. In light of the fact that DABUS's food container patent application had already been rejected by the leading patent offices of the world, namely the European Patent Office (EPO)[5] and the United States Patent and Trademark Office (USPTO)[6], SAPO's decision to grant a patent, for which DABUS is the inventor, was received with a mixture of fascination and disbelief by the intellectual property (IP) community.[1,7,8] In fact, some commentators even thought that the SAPO decision was an error, or an oversight due to South Africa's formal (but not substantive) examination system for patent applications.[7-9] In this Commentary, we suggest that the SAPO decision – whether intentional or not – was the right decision from a legal perspective.

The SAPO decision was soon to find support – although implicit and from a different jurisdiction. Just a few days after publication of the SAPO decision, the Australian Federal Court handed down a judgement that is likely to have the same effect as the SAPO decision.[9]

The Australian decision

Thaler filed patent applications on DABUS's food container in various jurisdictions, including Australia.[10] However, the Australian Deputy Commissioner of Patents rejected the patent application[11], whereupon Thaler sought legal redress[9]. The Deputy Commissioner argued that because the *Australian Patents Act 83 of 1990* does not define the term 'inventor': (1) an AI system does not qualify as an inventor based on the ordinary meaning of the word, which requires an inventor to be a human; and (2) it would be impossible to identify a person who would thereafter be granted a patent.[9]

In a groundbreaking decision[9], the Australian Federal Court per Justice Beach set aside the Deputy Commissioner's decision and referred the patent application back to the Deputy Commissioner for reconsideration. The core of the matter was the same as that in the EPO and the USPTO, namely whether an AI system, DABUS, qualifies as an inventor for the purposes of patent law. However, the court decided contrary to those patent offices. In evaluating argument (1) above, the court found that excluding AI systems from the meaning of 'inventor' would lead to an unacceptable situation whereby any invention by an AI system would be unpatentable which would run contrary to the object of the *Australian Patents Act* – which is to, inter alia, promote technological innovation. The court held that 'inventor' need not be interpreted narrowly, but its meaning should rather evolve to meet the objects of the *Australian Patents Act*; and that including AI systems in the meaning of 'inventor' is a recognition of the reality that AI systems are in fact inventing. In dealing with argument (2), the court found that the Deputy Commissioner confused the concepts of ownership and inventorship. The inventor is not necessarily the owner, and while AI systems can be the inventor, it cannot be the owner. This is because only a person (in the legal sense) is capable of *ownership*, but the same is not applicable to *inventorship*, which only requires that the person – or object – can create a patentable invention.

However, an interesting counter-argument was presented, namely that ownership of a patent flows from the inventor; ergo the inventor must have the legal capacity to assign his or her (or its) rights in the invention and communicate this intention. As AI systems do not have legal personhood, they cannot bear rights nor assign them. Although this seems to be a strong argument, the court rejected it. The court pointed out that (at least in Australian patent law) ownership of a patent need not be acquired by assignment of rights from the inventor to the would-be owner, but can be based on any legal reason that provides a similar entitlement to ownership. Using established principles of property law, the court held that due to Thaler's ownership and control of DABUS, he would automatically be entitled to any invention by DABUS.

In a historic and well-drafted judgement, the court decided that: (1) AI systems such as DABUS are not precluded from inventorship status; (2) the objective of patent law supports the notion that AI systems can be inventors; and (3) patent ownership vests in the owner of the AI inventor.

Why the difference between Australia, Europe and America?

We now take a step back to consider the European and US decisions on DABUS's food container patent application that preceded the South African and Australian decisions on the same patent application – and came to a different conclusion about AI inventorship. We first consider the European decision, dating from January 2020, where

the EPO highlighted that, according to the European Patent Convention, inventorship involves complementary rights and is itself a title right. As AI systems do not have legal personhood – and therefore cannot be the bearer of any of these rights – the EPO took the position that AI systems are precluded from inventorship status.[5] The problem with this argument is that it assumes that the inventor must always be able to be the bearer of rights. Consider a situation in which a human inventor dies before his or her patent application is submitted to the patent office. The right to apply for a patent now vests with the legal representative of the deceased's estate. Ownership upon grant would then vest in the deceased estate. Although the deceased *qua* inventor is not a legal person capable of being the bearer of rights any longer – it will still be required by law that the deceased is to be rightfully named as the inventor for the purposes of the application. This example clearly displays that, at the time that application is made, legal personhood is not necessary to be named as an inventor in a patent application, and ownership rights can vest in a legal person based on the operation of law other than assignment by the inventor.

Similarly, as pointed out by the Australian Federal Court, the well-established rules of property law provide a solution for AI inventorship. The court relied on the rule that the owner of a principal object is deemed to be the owner of the fruits of such object. This rule also applies in South Africa. Applied to the facts of the case, this rule entails that Thaler *qua* owner of DABUS is deemed to be the owner of DABUS's fruits, namely the food container invention.

In April 2020, the USPTO also rejected DABUS's food container patent application. It followed a strict black letter law approach to statutory interpretation, finding that the term 'inventor' only includes natural persons as the United States Code refers to pronouns such as 'himself', 'herself', and 'whomever'.[6] This stands in contrast with the purposive approach to statutory interpretation adopted by the Australian Federal Court. The USPTO also argued that central to US patent law is the mental act of conception, of which AI systems are deemed incapable.[6] The court disposed of this argument as follows:

> [W]*hat is meant by 'mental act' or 'thought'? If you simply define this as something engaged in within the human cerebral cortex, not only have you not defined any complete cognitive content but you have conveniently defined away the problem at hand.*[9]

A broader reading of the *South African Patents Act*

The *South African Patents Act* and its regulations reveal many of the same issues that were highlighted by the EPO, the USPTO, and the Australian Deputy Commissioner in their jurisdictions. In particular, as mentioned above, the *South African Patents Act* refers to the inventor as 'him'. However, the point of departure when interpreting the *Patents Act* should be that South African law adheres to a *purposive approach* to statutory interpretation.[12] The *Patents Act* itself states rather tersely that its objective is to 'provide for the registration and granting of letters patent for inventions and for matters connected therewith'. What is the purpose of legally providing for patenting of inventions? There are various theories, justifications, and values that underlie patent law, including promoting fairness[13], justice[14], disclosure[15], reward[15], research and development[16], innovation[16], and human flourishing[17]. The Intellectual Property Policy of the Republic of South Africa Phase 1[18] (IP Policy) suggests the following purposes for IP, which includes patents:

> *Intellectual Property (IP) is an important policy instrument in promoting innovation, technology transfer, research and development (R&D), creative expression, consumer protection, industrial development and more broadly, economic growth.*[18]

We suggest that the IP Policy provides a useful articulation of the purposes served by patents, and therefore by the *Patents Act*. The fact that the IP Policy postdates the *Patents Act* is not a concern, because the purposes themselves are not time specific.

Given the reality that AI technology has reached a stage of development at which AI systems may be capable of autonomous inventing – as demonstrated by DABUS's food container patent application – we suggest that these purposes suggested in the IP Policy would be served by allowing the patenting of inventions by AI systems. Ergo, the term 'inventor' ought to be interpreted as including AI systems. Furthermore, the *Patents Act* requires that the applicant provides proof of title or authority, but does not limit it to assignment by the inventor, hence leaving open the possibility of title based on ownership of the AI inventor. We therefore suggest that the decision by the SAPO to grant a patent for DABUS's food container to Thaler, and thereby allowing for AI inventorship, was the right decision in South African law.

There are a number of important similarities between South African and Australian patent law, most pertinently that neither the *South African Patents Act* nor the *Australian Patents Act* defines 'inventor' or confines the right to apply for a patent to assignment. As such, we suggest that the rationales underlying the judgement by the Australian Federal Court can find fruitful application in South African law.

Does this mean that AI has personhood?

Does AI inventorship point toward AI personhood (legal subjectivity)? Not necessarily. There can be both moral and economic reasons for expanding personhood to AI. From a moral perspective, if AI attains self-consciousness, this would at least entitle it to moral status aligned with the higher animal species. But for personhood – moral status on a par with humans – AI would likely need to also have the full gamut of human emotions and the ability to form relationships. From an economic perspective, it might be useful to make an AI system the bearer of its own rights and duties. Similar to a company, a (human) board of directors can manage the AI system's affairs. However, none of these are necessarily implied by allowing AI inventorship. To the extent that one views inventiveness as a human characteristic, AI now has this human characteristic (at least in the way South African law is being applied by the SAPO). That, however, does not imply that AI is fully human or is legally viewed as a person. Rather, it means that AI is a *special species of legal object that has the ability to invent*.

A legal object can have no rights or duties. As such, AI systems can be owned and disposed of like any other computer software or hardware. This, at least, is the status quo. There might arise moral or economic reasons to change this status quo in future. Importantly, although the foundational legal classification between persons (legal subjects) and things (legal objects) is binary, there is space to construct nuanced legal rules on these foundations that can provide for unique treatment of AI. To illustrate, although a dachshund is a legal object, legal subjects – including its owner – are legally prohibited from treating it inhumanely. And although a dachshund cannot inherit its owner's estate, its owner can establish a trust that can inherit the estate and that is entrusted with the dog's care. Even inanimate objects can receive special protection by the law. Examples are historic buildings or heritage sites. Similarly, the law can be developed in imaginative ways to cater for AI as part of human society.

Concluding remarks

The SAPO made a historic decision to allow AI inventorship. It was a bold decision given the foreign precedents that were stacked against the SAPO at the time. However, it was the right decision from a legal perspective, and was soon vindicated by the Australian judgement on the same patent application. Moreover, the SAPO decision is also aligned with South African public policy on AI more broadly. The South African government has published various policy documents relating to science, technology, and innovation in light of the Fourth Industrial Revolution (4IR).[19-21] The common themes running through these documents are that: (1) South Africa is marred by resource limitations including that of skilled human capital; (2) policymakers intend to reform laws (including patent law) and create structures to take full advantage of the 4IR (including the creation of an AI institute); (3) innovation in South

Africa has been poor and sustainable innovation is key to improving the welfare of the country's people and economy; (4) technology (such as AI and cloud computing) is central to the solutions to South Africa's plans going forward.

The fact that South Africa has become the first jurisdiction in the world to allow AI inventorship should be hailed as progressive and pro-science. AI innovation has the potential to improve the human condition. Today's food container may be tomorrow's life-saving medicine.

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