



## **WIDENING THE PERSPECTIVES OF PATENT LAW IN ARTIFICIAL INTELLIGENCE**

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### **ABSTRACT**

Artificial Intelligence (AI) which was once considered fictional has now advanced enough to take over human tasks creating a technological impact on humanity. AI is the cause of sweeping changes in virtually every industry; be it agriculture, healthcare, manufacturing or beyond.

According to WIPO, more than half of all identified AI patents were published in the last five years. The initial purpose of AI was intended to rescue humans from the burden of monotony, extend cost and time effectiveness and provide assistance with enhanced efficiency and output. As it soared to greater heights, the era has almost come where AI is mastering mankind. And it forms the responsibility of the creator of AI, the humans, to ensure protection of AI with regulated patent laws. But as we stand at the crossroads, unable to discriminate between invention and inventor, who gets the patent—the owner, inventor, programmer or the AI itself? And once it is surpassed, will the fundamentals be monopolised by the inventor deterring beginners to flourish.

### **INTRODUCTION**

Natural intelligence displayed by humans is the vital factor in controlling the lives of human beings through inventions and discoveries. However, over the years, we realised the monotony of natural intelligence

in repetitive tasks. The purpose to reduce the burden of mankind and develop a cost effective assistance, has led us to think of an era of machine intelligence better known as Artificial Intelligence (AI). As we embark on our journey towards an 'age of implementation' of Artificial Intelligence, with machines becoming exponentially capable, applications which would revolutionize the ways in which we perform our daily tasks are within the reach of researchers.

Despite the aforesaid pros, AI raises challenges in the human minds. The complex technology which necessitates involvement of expensive machines, restrictions in replicating humans, little improvement with experience, no creativity of its own and potentially affecting different areas of human activity are matters of concern. It also raises questions on privacy, trust and autonomy that may be difficult to deal with. Probably this may be pointing to Narrow Artificial Intelligence with softwares that use technologies like machine learning, data mining and pattern recognitions which makes autonomous decisions.

Contrary to this, is strong artificial intelligence known as 'Artificial General Intelligence' or 'Super-Intelligence' which enables AI systems to successfully perform any intellectual task that could be undertaken by the human brain or the hypothetical ability of a machine to surpass the human brain. Such concepts are not something that the current technology permits but the way to it is not too long.

### **THE EFFECTS OF ARTIFICIAL INTELLIGENCE WAVE**



The impact of AI technologies on humans is likely to be profound. Martin Ford<sup>1</sup> thinks that with this, many workers need to equip themselves as skilled in different areas while employers and governments will have to find ways to address loss of employment. He predicts that in the next 10 to 20 years, routine and predictable jobs are most vulnerable to automation.

This unveils the truth that AI will change the world, but with frequently asked questions being how and when. Though the term was coined in the 1950s, its power and application geared up only in the last decade. Now the AI algorithms perceive and interpret the world around us. The roots of this change in the last few years emanate from deep learning, an architecture inspired by human brain with neurons and connections. The input involves deep networks to pick up large scale data or observations and recognise incredibly subtle patterns which diverge to outputs with precise decision, be it business, health or legal matters.

While the AI is aimed to do something beneficial, it might develop destructive methods also to achieve the goal. As it progresses in leaps and bounds to surpass vivid waves and reach the destination of super intelligence and beyond, AI might become super human too. It is too early to predict on those lines but it cannot be ruled out.

However, with such a development and advancement in AI technology, the protection and regulated use of inventions are highly important.

## ARTIFICIAL INTELLIGENCE UNDER PATENT LAW

Patents are a form of intellectual property rights. Patents are territorial in nature and provide protection in the jurisdiction where an application has been filed and a patent is granted. Patents are generally granted by National Patent Offices – or through regional systems, such as the European Patent Convention (EPC) administered by the European Patent Office (EPO). In many jurisdictions, the Patent Office scrutinises each application to see whether it meets the required criteria:

- (a) the invention falls under a patentable subject matter in the concerned jurisdiction;<sup>2</sup>
- (b) is novel<sup>3</sup>, and should involve an inventive step/ should be non-obvious;
- (c) has a potential industrial application;
- (d) is sufficiently disclosed.

The period for publication of patents is normally 18 months after filing. If the Patent Office decides that the application meets all the patentability criteria, the patent is granted. The term of protection is generally 20 years from the filing date in most jurisdictions.

Once a patent is granted, the claimed invention cannot be used, sold, offered for sale, or imported for the intended purposes, without the consent of the patent holder. The inventor has the right to a patent, which can be assigned to another natural or legal person.

<sup>1</sup> Author of “The Rise of the Robots”

<sup>2</sup> Discoveries, scientific theories, mathematical methods and computer programs per se are in general

not patentable, whereas software is patentable in some jurisdictions.

<sup>3</sup> New, not be part of the state of the art



Data sources for analysing AI trends are collected from accessible databases in patents. The areas of innovation that inventors focus in AI technologies are revealed through patent applications and are available for public with all useful information, such as the name of the applicant, date of patent application etc. They also include a vast technical description of the invention, including previous technical solutions known as ‘state of the art’. Also, AI technologies described in patent applications are disclosed in scientific publications, shared through open source projects or collaboration platforms, or developed in-house and protected by trade secrets. Once published, the information in a patent is available for anyone to read, and analyze for research or academic purposes. Upon expiry of the patent, it becomes part of the public domain.

The above guidelines throw some challenges in deploying AI systems which includes the following:

- (a) Data collection sources, archiving and data availability
- (b) Ensuring protection and privacy of innovations
- (c) Digitisation of processes disclosed ensuring safety
- (d) Deployment of automated vehicles like robots with adequate protection to employment and ensuring safety.

Thus the legal implications of AI patent laws are ambiguous at present and the patent regime is quiet on the matter.

## INVENTION AND INVENTOR- MULTIFACETED INTERPRETATIONS

The three relevant sections of the Indian Patent Act, 1970 are being referred to, for analysis.

**Section 6** states that “*an application for a patent for any invention can be made only by the true and first ‘inventor’ of the invention or an assignee.*”

Further, a ‘patentee’, according to **Section 2(1)(p)**, is a “*person as entered on the patent office register as the grantee or owner of the patent.*” This suggests that an ‘inventor’ and ‘person’ must mean a natural person. However, Section 2(1)(s) defines ‘person’ to “*include the government, a non-natural entity*”. Moreover, ‘true and first inventor’ has an exclusionary definition and there is no mention of a natural person (Section 2(1)(y)).

**Section 3** reiterates the list of exclusions as “*mathematical or business method or a computer programme per se or algorithms.*”<sup>4</sup> Prima facie, this indicates that patents should **not** be awarded to AI based inventions which fall under Computer Related Inventions (CRI), although they are potentially stronger than general software.

The primary requirement for inventorship is “*making a significant contribution to the invention.*”<sup>5</sup> The initiation of an AI invention involves a person to input seed information<sup>6</sup>, including existing technologies (e.g. for

<sup>4</sup> specifically Section 3(k) of the Patents Act, 1970

<sup>5</sup> Netscape Commc’ns Corp. v. ValueClick, Inc., 684 F. Supp. 2d 699, 721 (E.D. Va. 2010), on reconsideration in part, 704 F. Supp. 2d 544 (E.D. Va.

2010) (citing Pannu v. Iolab Corp., 155 F.3d 1344, 1351 (Fed. Cir. 1998)).

<sup>6</sup> “Computers require some amount of human input to generate creative output.”



neural networks<sup>7</sup>), or relevant parameters to be optimized (e.g. for genetic algorithms). Also, the fact that a person finances, owns, or operates AI is not sufficient to qualify him or her as an inventor.<sup>8</sup> As made clear in the case of *TS Holdings*, financing or initiating the process of invention (e.g. by setting inventors to task) does not satisfy the standard to be named on a patent. Under such circumstances, the person is responsible for the invention, but he has not actually invented a new technology.

A broader search concluded that there are significant differences when it comes to the definitions for ‘inventions’ and ‘inventors’ across the globe, especially in countries like U.S. and the uncertainty in AI patent law is presently global. This may not cause much ambiguity as to who would be considered as the inventor at an early stage which involves human intervention. But when the transition is made from weak to strong AI, the question that needs to be addressed is whether AI technology will be considered an ‘inventor’ when it is a technology and not a human, who creates inventions that are patentable.

So the main issues that stand out on a patent perspective for AI are on its invention, inventor, liability due to ownership and subsequent use of the fundamental technology. The time has come for the authorities to consider how the CRIs pertaining to next generation of AI should be covered under the Patent regime.

A detailed understanding of the above regulations vis-a-vis implementation on

factual inventions indicate that we need distinct and well-marked patent laws for Artificial Intelligence with differentiation before standardisation.

## CASE STUDIES

### 1) DABUS

Stephen Thaler, a pioneering AI researcher based in Missouri has come out with a creation, a Device for Autonomous Bootstrapping of Unified Sentience, (DABUS). Mr Thaler<sup>9</sup> taught DABUS to produce ever more complex items using words and images.

DABUS is a type of creativity machine which generates ideas without human intervention. It seeks to develop new ideas using complex interconnected neural networks by varying the connections between networks. In order to predict the consequences of the invention, equally complex neural networks run in the background.

The output generated by the AI forms the basis for two patent applications. The first is for a new type of container based on fractal geometry. The other relates to a flashing light device that can be used to attract attention during search and rescue incidents.

The two AI-designed patent applications were filed by a team headed by Professor Ryan Abbot, Professor of Law and Health Sciences at the University of Surrey. He said that the AI does fulfil the criteria that form the basics of inventorship in these two

<sup>7</sup> Artificial Neural Networks, a form of AI, mimic brain activity to accelerate technological development

<sup>8</sup> See *TS Holdings, Inc. v. Schwab*, No. 09-CV-13632, 2011 WL 13205959, at \*4 (E.D. Mich. Dec. 16, 2011)

(“There is no legal basis for the assertion that financing such reduction to practice equates to invention itself.”).

<sup>9</sup> According to the [Financial Times](https://www.ft.com/content/2019-01-10)



patents, had it been a natural person. Both the UKIPO<sup>10</sup> and the EPO accept that the inventions made by DABUS are eligible to receive a patent. This means, the light device and the container are considered to be industrially applicable and brand-new inventions.

If so, what is the concern in patenting DABUS?

The scientists believe that Dabus AI deserves legal credit as the inventor of the container that it designed, as well as a lamp that it built to flicker in a pattern that mirrors brain activity. And the legal rights over the creation should go to whoever actually built the algorithm.

A fair distribution of approbation could be as under:

- (a) the AI to be credited on the patent as the inventor,
- (b) the owner of the AI is given ownership of the patent.

Experts think that this is unlikely, as the person behind Dabus AI has no legal claim to a patent on the algorithm's inventions.

Stephen Thaler, has filed for patents in the U.K., Europe, and the U.S. arguing that the algorithm deserves proper attribution for designing new products<sup>11</sup>.

The two patents in question will be examined following their formal publication in April

and May 2020<sup>12</sup>. Applications for these two machine-created inventions are pending at the UKIPO, as well as at the EPO and the United States Patent and Trade Mark Office (USPTO).

## 2) **DROPOUT**

'Dropout'<sup>13</sup> is a solution widely used to regularize deep neural network, a powerful machine learning system with larger number of parameters. This is a method popular among data scientists and machine learning engineers for performing model averaging. 'Over-fitting' is a process that occurs in neural networks wherein the model learns the training data too well. As a generalised learning is not achieved, it picks up small details and noise. This results in inaccurate results with new data, due to the fact that the model has 'over-fitted' the learning dataset and is not able to extend it to more applications.

Dropout works by randomly selecting and removing neurons in a neural network during the training phase. This reduces 'over-fitting' and allows a computationally cheap, yet effective method of regularization.

Google has activated its patent for the application, who acquired the patent rights to the technology in 2016. This activation of patent by Google is a matter of concern for start-ups as well as major organizations because Google now holds the power to enforce the patent on any future competitor. Patenting of fundamental technologies is a bit worrisome at this exact moment. The

<sup>10</sup> Intellectual Property Office of the United Kingdom

<sup>11</sup> According to *BBC News*

<sup>12</sup> Wall Street Journal, 2019, dated 06<sup>th</sup> October

<sup>13</sup> Dropout is a solution proposed to this problem by Geoffrey Hinton, Nitish Srivastava and few other students at the University of Toronto in 2012. Geoffrey Hinton is currently an employee at Google.



enforcement of this IP seems to be reserved for future.

### CONCLUSION

It is clear by now that AI has advanced towards being a tool used by humans to automate innovation, which has the potential to alter human progress with far-reaching technology.

The above case studies indicate blatant illustrations of the impromptu of international legal systems to accommodate emerging technologies.

#### In the case of DABUS patent:

Currently, the UK Patents Act of 1977 and the European Patent Convention both say that inventors can only be 'natural persons'. In the US, the law says inventions must be made by an 'individual'. There are no comprehensible laws in any countries of the world to specify how cases involving AI inventions should be dealt with.

The patent system should support inventions and innovations **bypassing obstacles**. If we cling on to the outdated IP laws quoting redundant definitions towards leaping innovations, the lack of incentive for inventors would deter the way of remarkable advancement. Unless the **innovations are accredited properly** irrespective of the source of the complexities in the inventorship, as it is now looked upon as by offices, development and progress of humanity will be at stake and the whole intellectual property regime will cease to be of use.

#### In the case of Dropout,

What does the activation of patent by Google mean for creators of neural networks? What will happen if Google enforces this patent?

Patents on fundamental machine learning techniques are likely to deter development and withhold AI advancement. The extant guidelines granting patent monopoly for a company for a blanket 20 years does not appear sensible when it is on using well known techniques in a particular domain, even if they were the pioneers in introducing the technique. If granted so, it is limiting further technological advances of other companies who might intend to use that tool in other arenas. Such patents given to machine language techniques used in a particular field might trigger a competition among companies to patent their routine works also. This will restrain and localise inventions thus retarding the growth and usage of technological applications across fields. Start-ups which are likely to use the languages as a first step towards a larger technology may get discouraged and nipped in the bud.

As of now, usage rights and other AI and machine learning properties are not in the bounds of litigation. Still the move to patent fundamental algorithms in neural networks by leading companies is definitely a matter of concern for those who fear that companies claiming control over the technology might one day lead to monopolisation. We hope to trust Google that they will not sue anyone with the patent and hope that it is a mere check against patent trolls.

Global IP laws on AI must catch up with the rapidly changing pace of technological advancement keeping in mind:

- (a) the clear distinction between inventor and invention



- (b) the recognition of creations and inventions by AI without overlooking the involvement of a human agency or manufacturer, to fix the liability at any stage
- (c) the appropriate period of monopoly granted to any patent without restricting the use of abstracts or fundamentals for impending inventions
- (d) a necessary AI Data Protection Act, foreseeing the fast approaching era where machines overtake humans.  
The evolution of a well crafted patent law for AI will help in flourishing inventions towards advancement.

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