

Can Artificial Intelligence Be Inventor?

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ABSTRACT

Artificial intelligence (AI) is an extensive domain of computer science apprehensive of creating smart machines adept of carrying out tasks that normally need human intellect. Where a few decades ago, only humans used to read handwriting or play chess, now AI machines consistently do both of such jobs. AI is rapidly becoming a part of everyday lives. It is an important technology supporting day-to-day financial activities and social life. In recent eons, it has gained attention as a main for progress in developed nations such as the United States and Europe and developing nations such as India and China. At present, researchers are working toward much striving AI applications that will modernize the means in which we are currently communicating, enjoying, working, and studying. However, there are concerns regarding the AI nature and the challenges it may present as an inventor in the intellectual property world to humans in terms of morality and safety. The patentability of AI associated inventions, exclusivity concerns of inventorship and the absence of sufficient standards and regulations have left certain open-ended queries.

Key words: Artificial Intelligence, Types, Inventor

INTRODUCTION

Artificial intelligence (AI) is referred to as the human intelligence virtualization mechanisms through technologies, particularly CPU structures. The mechanisms comprise learning (the attainment of rules and data for utilizing the info), self-correction, and reasoning (utilization of rulebooks to accomplish definite or approximate inferences). Specific AI applications involve recognition of speech, expert structures, and machine visualization.^[1]

It is an interdisciplinary science with several approaches; however, developments in machine learning and deep learning are making a paradigm swing in virtually all areas of tech commerce. AI in the sphere of intellectual property (IP) has posed certain very fascinating debates and questions. The inventions related to AI usually utilize techniques such as machine learning, neural networks, and deep learning. Any strategy reaction to such issues needs a joint factual foundation for discussions among decision-makers.^[2,3]

Classification of AI

AI is classified into two categories:

- Strong or general AI
- Weak or narrow AI

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Weak AI

It is also called as narrow AI, which is a mechanism of AI, which is trained and designed for a specific task. Simulated personal assistants, like Siri of Apple Company, are a weak AI example.

Strong AI

It is also called general AI, which is a system of AI with comprehensive human intellectual skills. When faced with an unexperienced assignment, general AI is competent to discover an answer devoid of human involvement.

AlaaS-AI as a Service

As staffing, software, and hardware AI expenses can be costly, several retailers are involving AI constituents in the usual assistances, moreover right to use to the platform of AlaaS – Service form of AI. This permits companies and individuals to try out with AI for numerous corporate drives and sample numerous stages afore going for commitment. Prevalent AI cloud assistances consist of AI facilities of Google and Amazon and that of Microsoft and IBM services.^[1]

TYPES OF AI

An associate lecturer-Arend Hintze of integral engineering and biology and computer science at State University-Michigan classifies AI into four categories, from the type of mechanisms of AI that is present currently to sensitive mechanisms that do not so far exist. The following are the types:

- (1) Reactive machines (Type 1)
- (2) Limited memory (Type 2)
- (3) Mind Theory (Type 3)
- (4) Self-awareness (Type 4)

(1) Reactive machines (Type 1)

It has no memory and cannot use past experiences to inform future ones. Deep Blue is an example, the chess platform of IBM that dog-tired in the 1990s, Garry Kasparov. Former can recognize portions on the board of chess and generate guesses; however, this has not one retention and cannot utilize previous familiarities to update forthcoming ones. This examines probable moves, the ones of the opponent and oneself and then selects the best-calculated move. Alpha-GO of Google and Deep Blue were intended for constricted determinations and cannot simply be useful to a new state.

(2) Limited memory (Type 2)

This mechanism of AI could utilize former familiarities to notify forthcoming choices. Self-driving cars are one of the examples. Certain of the functions of decision-making for self-driving automobiles are constructed in such a manner. Annotations notify movements occurring in the near future like as automobile switching tracks. These annotations are not retained eternally.

(3) Mind Theory (Type 3)

The psychology word states to the insight that other individuals have their individual intentions, desires, and beliefs that influence the choices they make. Such an AI type does not up till now be existent.

(4) Self-awareness (Type 4)

This type of mechanism of AI has cognizance, has a self-sense. Mechanisms having self-awareness apprehend the present situation and could utilize the data to deduce what someone is feeling. Such an AI type does not up till now be existent.^[4]

COMPONENTS OF AI

With increasing attention toward AI, vendors now are swarming to endorse the way their services and products are using AI. Often the reference to AI by vendors is just its single component, like machine learning. AI needs a footing of dedicated software and hardware for training and writing algorithms of machine learning. Only one single encoding language is not AI synonymous; however, a few, comprising Java, Python, and R, are prevalent [Table 1].^[1]

Examples of AI

- Smart assistants such as Alexa and Siri
- Drone and manufacturing robots
- Disease prediction and mapping gears

Table 1: AI component

Applications	Hardware/software for training and running models
Image recognition	GPUs
Chatbots	Parallel processing tools like spark
Speech recognition	Cloud data storage and compute platforms
Sentiment analysis	
Natural language generation	
Types of models	Programming languages for building models
Machine learning	TensorFlow
Deep learning	Python
Neural networks	C
	Java

- For customer and marketing service – Conversational bots
- Treatment recommendations for personalized and optimized healthcare
- Recommendation from Netflix and Spotify for TV shows or songs
- Robo-advisors for stock trading
- Monitoring tools on social media for fake news or dangerous content
- Filters for Spam email.^[5]

PATENTABILITY OF AI INVENTIONS

With rapid advancements in AI-related inventions, the question that pops up is can AI be recognized as inventor and given inventorship rights. There is no definitive answer for this right now; however, arguments are there for pros and cons of recognizing AI as an inventor [Figure 1].

Benefits

Recent Developments

1. Tracking coronavirus through AI-related data Dashboard

The University of Johns Hopkins in its CSSE department develops a web-based interactive dashboard, which trails data from real-time on verified cases, recoveries, and deaths of coronavirus for every affected nation.

This trails reported coronavirus cases utilizing data from real-time, assisting researchers and the community to screen the epidemic as it develops.

Researchers observed that DXY is the prime source of data for this visual-dashboard, a virtual platform operated by Chinese medicinal community members. DXY gather reports of government and local media to give the cumulative total of COVID-19 case in China at the province level in close real-time and the nation level otherwise. The cumulative count of the cases is updated by DXY once after 15 min.

POSITIVE	NEGATIVE
STRENGTH <ul style="list-style-type: none"> › People credited with its inventions › Gives owners the ability to deliver novel ideas continuously 	WEAKNESS <ul style="list-style-type: none"> › monitoring the morality › failing to encourage the production of socially valuable inventions
OPPORTUNITY <ul style="list-style-type: none"> › Hotbed of commercial investment 	THREAT <ul style="list-style-type: none"> › owners of the AI will not have any protection

Figure 1: Pros and cons of AI as inventor

The team trails multiple sources of data to trail the novel coronavirus cases, involving different feeds of Twitter, online bulletin facilities, and direct communiqué sent the dashboard. Researchers first confirm this before dashboard update from organizations such as the WHO, CDC, the CCDC -China CDC, and at state and city level from authorities of public health.

2. Medical Home Network (MHN)

MHN is an association helping the patients of the region of Chicago. It is utilizing AI services for the identification of those Medicaid patients at most risk of coronavirus.

3. White House Insists AI Specialists to Advance Gears for Dataset of COVID-19

The White House is calling for the development of new AI techniques that can help researchers answer key questions about COVID-19.^[6,7]

Challenges

Ethical concerns

Although AI mechanisms present a series of novel functionality for commerce, the usage of AI nurtures moral inquiries. It occurs due to the profound learning processes, which strengthen numerous of the best-advanced AI mechanisms, are merely as insolent as the information they are provided within working out. For the reason that a human chooses what information should be utilized for AI system training, the possibility for human prejudice is intrinsic and need to be supervised thoroughly.^[1]

The AI is hacked for performing devastating tasks: In case self-driving or automatic cars, the question of ethical concern and security arises. If the car is hacked, it in the wrong peoples' hands could certainly cause mass sufferers. The involvement of such an autonomous automobile in an accident leads to unclear liability. In addition, when such vehicles are placed in a situation of an unavoidable accident, which forces the programing

to take a decision that is ethical toward the way for minimization of damage.

The possibility of deep fake creations: These are the media taking an individual from an existing video or image and replacing those with somebody else's resemblance utilizing artificial neural grids.

The AI devised for beneficial outcomes; instead, it accomplishes the goal through destructive means: This will occur in the case of failure of alignment of one's goal with that of AI. For instance, when one asks a compliant intelligent automobile to reach the airfield as fast as probable, it might make one reach the airport while being chased by helicopters performing exactly what one asked for rather than one wanted. When a super-intelligent structure is given an ambitious assignment of geoengineering, it may cause havoc to the ecosystem in the form of side effect, viewing attempts of humans for its stoppage as a danger to be overcome.^[8]

Case Example

DABUS –“device for the autonomous bootstrapping of unified Sentience.”

It is an AI system developed by Stephen Thaler.

It is the inventor of two ideas:

- Food container designed to fit tightly to others,
- Light that flickers in a pattern that mimics brain activity, making it harder to ignore and therefore useful in emergencies.

It is comprised of two smaller neural networks that work in conjunction with one another. The first generates novel ideas, while the second examines the validity of these ideas against its pre-existing knowledge base.

Two different patent applications were filed at UK IP Office (UKIPO) and European Patent Office (EPO)) with the inventor' name as DABUS for the aforementioned

inventions in August 2019. The same was also filed at USPTO (U.S. Patent and Trademark Office).

The patent applications were rejected by EPO and UKIPO in 2020 January by stating three main reasons for the decision. The reasons are as follows:

(1) Naming the AI system as an inventor

The UKIPO and EPO correspondingly applied the recognized necessities of the UK Patents Act and European Patent Convention, both of these needs an individual to be named as the inventor. The EPO further stated that the named person requirement as an inventor is an international standard, quoting a study carried out by it for AI inventorship concept in various nations.

(2) Misleading of public by naming inventor to be a natural person

The applicant of the application, which is Stephen Thaler, posed the argument to EPO that incorrect citation of human, as the inventor is public misleading. However, this was rejected by EPO, affirming that the EPO does not validate the correctness of titled inventors. In addition, the EPO mentioned that, as there will be publication of the application, any public member could challenge or question the contents in national law court.

(3) Transfer of patent applying right to AI owner by AI system

Stephen argued that he has the patent applying right from DABUS. Nevertheless, both the UKIPO and EPO rejected this concept that an AI system is capable of owning any IP rights. When an AI system is not capable of owning any IP rights, then automatically it is incapable of transferring or assigning such rights to the owner.

However, the question arises that will such decisions deject the information distribution regarding AI innovations. The UKIPO took into consideration the issue of information linked with the AI innovations but thought that such information can be acquired

or transmitted via many other ways and not only by granting a patent to AI.

In addition, the UKIPO observed that identifying AI-system, as an inventor will not affect the possibility that data concerning AI invention would be accessible to the community as this decision eventually depends on the developers or owners of the AI system.^[9]

AI AND WORLD

There are many different types of patents on AI all around the globe in various fields. Several companies such as Intel, IBM, and Samsung, and so on have patents relating to AI.

There are certain graphs for depicting a better picture of patents on AI around the world, which are discussed further.

The graph [Figure 2] depicts the number of patent documents per region, with China having the maximum number of 9728 while a minimum of 89 in the United Kingdom. The patent numbers in other countries are as follows:

- (1) USA – 3312
- (2) PCT – 1551
- (3) Republic of Korea – 1488
- (4) European Patent Office or EU – 458
- (5) India – 418
- (6) Japan – 311
- (7) Australia – 270
- (8) Canada – 213

The patents on AI around the globe differ in the type of patent such as granted patent and patent application [Figure 3]. The number of patents according to different types of patents is as follows:

- (1) Patent applications – 1,20,317
- (2) Granted patent - 71,168
- (3) Limited patent – 3,136
- (4) Search report – 1,442
- (5) Unknown – 555

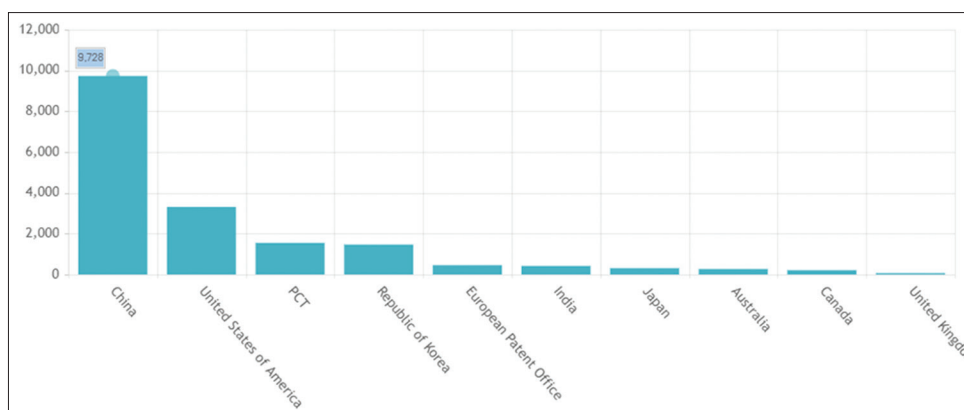


Figure 2: Patents by region^[10]

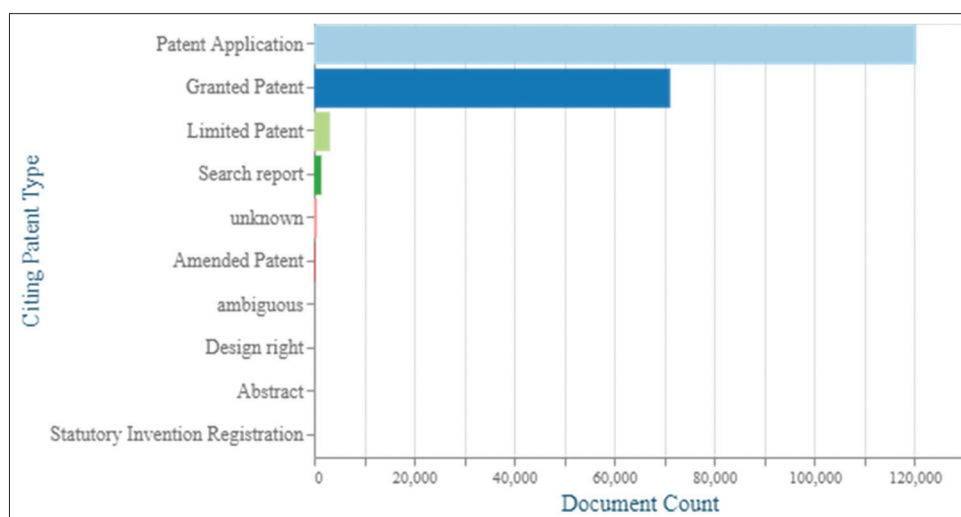


Figure 3: Patent documents by patent type^[11]

- (6) Amended patent – 218
- (7) Ambiguous – 34
- (8) Design right – 11
- (9) Abstract – 9
- (10) Statutory invention registration – 1

CONCLUSION

The creation of an AI that is capable of original creation is a landmark moment. On the one hand, it opens up a world of opportunities for future technological advancements such as feeding the developing world and tackling climate change. These advancements, without the power of AI, may not be humanly possible.

However, it also opens up a completely new world of potential issues, with none less important than ownership. As an AI capable of consistently generating original and worthwhile IP, would inevitably concentrate wealth, power, and influence in the hands of a very small proportion of people with higher ranks. Currently recognizing AI as an inventor raises many morality, safety and ethical concerns, which needs to be resolved before recognizing as an inventor for patent applications. Therefore, it is important that the lack of regulatory framework for identifying artificial intelligence as an inventor should be overcome and the guidelines defining the requirements for an inventor to be named as a natural person must be updated with time for the future. Hence, making it available to everybody all around the globe.

REFERENCES

1. Rouse M. What is Artificial Intelligence (AI)? SearchEnterprise AI. TechTarget; 2020. Available from: <https://www.searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence>. [Last accessed on 2020 May 08].
2. Lazaro L. Artificial Intelligence in The World of IP-intellectual Property-India. Articles on All Regions including Law, Accountancy, Management Consultancy Issues. Kochhar & Co.; 2020. Available from: <https://www.mondaq.com/india/patent/892134/artificial-intelligence-in-the-world-of-ip>. [Last accessed on 2020 May 08].
3. The Story of Artificial Intelligence in Patents. The Story of Artificial Intelligence in Patents; 2018. Available from: https://www.wipo.int/tech_trends/en/artificial-intelligence/story.html. [Last accessed on 2020 May 09].
4. Hintze A. Integrative Biology and Computer Science and Engineering. Understanding the four Types of AI, from Reactive Robots to Self-aware Beings. The Conversation; 2019. Available from: <https://www.theconversation.com/understanding-the-four-types-of-ai-from-reactive-robots-to-self-aware-beings-67616>. [Last accessed on 2020 May 09].
5. What is Artificial Intelligence? How Does AI Work? Built. What is Artificial Intelligence? How Does AI Work? Built. Available from: <https://www.builtin.com/artificial-intelligence>. [Last accessed on 2020 May 10].
6. Gardner L. Mapping COVID-19. CSSE; 2020. Available from: <https://www.systems.jhu.edu/research/public-health/ncov>. [Last accessed on 2020 May 11].
7. Leventhal R. Medical Home Network Uses AI to Identify High-risk COVID-19 Patients. StackPath; 2020. Available from: <https://www.hcinnoationgroup.com/covid-19/news/21130199/medical-home-network-uses-ai-to-identify-highrisk-covid19-patients>. [Last accessed 2020 May 11].
8. Rohde K, Vukovic R, Zeldich M, Ramesh S, Hershkowitz J, Farkas G. Benefits and Risks of Artificial Intelligence. Future of Life Institute. Available from: <https://www.futureoflife.org/background/benefits-risks-of-artificial-intelligence/?cn-reloaded=1>. [Last accessed on 2020 May 12].
9. Maughan A, Yuan A. Can AI Be an Inventor? Not at the European Patent Office. MoFoTech; 2020. Available from: <https://www.mofotech.mofo.com/topics/can-ai-be-an-inventor.html>. [Last accessed on 2020 May 12].
10. Search International and National Patent Collections. WIPO. Available from: https://www.patentscope.wipo.int/search/en/result.jsf?_vid=P10-KB3RBI-19911. [Last accessed on 2020 Jun 06].
11. Artificial Intelligence The Lens-free and Open Patent and Scholarly Search. The Lens-free and Open Patent and Scholarly Search. Available from: <https://www.lens.org/lens/search?q=artificialintelligence&preview=true&v=analysis>. [Last accessed on 2020 Jun 06].