

Artificial Intelligence – An Innovator in the Pharma Industry

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ABSTRACT

Since the late 1980s, artificial intelligence (AI) has advanced quickly. The performance of healthcare datasets has increased, and during the past 20 years, articles on AI have advanced exponentially. On the other hand, more AI devices became available as processing power expanded. Artificial Intelligence consists of two primary tools: machine learning, which analyses structured data (such as pictures, EP, and genetic data), and natural language processing, which analyses unstructured data. Over the previous 20 years, both AI devices' techniques, algorithms, and applications have undergone tremendous improvement. Nonetheless, there have been several recent attempts and novel applications of AI, and a small number of illnesses, including cancer, diseases of the brain system, heart disease, liver disease, congenital cataract disease, etc., may be examined via AI. Deep learning, an advanced technique, is currently driving the AI boom, and significant changes to diagnostic medical imaging systems, including those used in dermatology, pathology, and endoscopic diagnosis, are anticipated soon. Over the past several years, the application of artificial neural networks (ANN) for classification, modelling, and forecasting of various factors linked to cattle productivity in the livestock and associated sectors has led to an exponential expansion in the use of ANN. From determining the milk yield of Deoni Cows to its application in Neurology highlights the growth of application of Artificial Intelligence in the Pharma Industry. Even though there has been such tremendous development and application of AI in the pharmaceutical industry, the laws governing the same are yet not matured. There are questions raised with respect to the ownership and authorship of the work that may be created using artificial intelligence and that may be created by the Artificial Intelligence. The author of this paper has analysed the importance of Artificial Intelligence in the realm of Pharmaceutical industry, highlighting the challenges faced due to the dearth of legal provisions governing this sector. Further, the author has provided recommendations to strengthen the current system of AI for the purposes of better usage, accountability and propagation.

Keywords: Medicine Innovation, Artificial Intelligence, Innovator, Patent Rights, Pharma Industry, Ownership.

1. INTRODUCTION

Intelligence is hard to define but we as humans have tried to define it. Intelligence is a fundamental aspect of the human existence; we even called ourselves after it. The ability to comprehend (get meaning from) the sentences you are reading here is a sign of intelligence. We are uniquely qualified as humans to engage in this mental exercise. The ability to read and comprehend is made possible by a variety of components and functions within your brain, some of which interact with other aspects of your biology (such as your eyes) (De Spiegeleire, Stephan, 2017). Intelligence in today's time however carry a different meaning to different people. Legg & Hutter undertook a thorough assessment of over 70 definitions of "intelligence" and concluded that while it is difficult to choose a single "correct" term, many of the most succinct and accurate explanations have certain characteristics in common. (1) Intelligence is a quality of an agent that interacts with its surroundings; (2) intelligence typically indicates an agent's capacity to accomplish a specific task or articulated objective; and (3) learning, adaptation, and flexibility across a broad spectrum of situations and environments are prioritized (Shane Legg and Marcus Hutter, 2007).

Artificial Intelligence, which is fuelled by a wide "study of intelligent agents," both biological and artificial, has been defined in its broadest meaning as "the study of the computations that make it possible to perceive, reason, and act" or "the automation of intelligent behaviour." Furthermore, there are numerous typologies and definitions of artificial intelligence. In practical terms, AI is defined as nonhuman intelligence that can mimic human mental abilities such as pattern recognition, natural language processing (NLP), adaptive learning through experience, strategic planning, and reasoning about other people. This definition is applicable to the majority of applications (Defense Science Board, 2016).

The notion of AI should not restrict to how it functions internally or how it is made. Practically speaking, artificial intelligence (AI) systems give businesses a competitive advantage by matching or even exceeding human intellect in tasks

like information analysis and reaction time. AI is regarded a rational optimization agent that can assist humans to function competently in the world, with mental processes and behavioural performance being vital for strategic reasons. Nils J. Nilsson describes AI as the activity committed to making machines intelligent, and intelligence as the property that enables appropriate and foresight in its surroundings (Nils J. Nilsson, 2010).

World Intellectual Property Organisation (WIPO) revealed the filing of two international patents for "AI-generated inventions" in August 2019 (Ryan Abbott, 2019). That is, inventions produced on their own by an artificial intelligence (AI) under situations where we think no human, in the traditional sense, can be considered an inventor. The AI is identified as the inventor in these applications, and it serves as the owner of the patent application and the potential owner of any issued patents. The United Kingdom Intellectual Property Office (UKIPO) and the European Patent Office (EPO) have previously assessed these applications on their merits. Before the applications were published, both offices concluded that the applications, to the greatest degree possible, met the standards of patentability. The applications are presently under assessment in an increasing number of patent offices. They were also filed under the Patent Cooperation Treaty, which streamlines the process of getting patent protection in over 150 countries. Nearly all AI-generated inventions are unregulated by law. The majority of governments require that patent applications list a natural person as the inventor. The purpose of this provision is to uphold and safeguard the rights of human inventors. However, inventors do not always own patents; in fact, businesses control the majority of patents. A firm may acquire ownership rights from an individual through a contractual assignment or another legal means. For instance, if an invention is made while an employee is working, ownership of it oftentimes instantly transfers to the company. Laws requiring a natural person to be recognized as an inventor ensure that people get credit for their contributions, even in cases where the inventor does not possess a patent. These laws, however, were formulated without taking into account the prospect of future creative activity by robots.

Our legal system is not defined to deal with problems arising from the rapid growth of artificial intelligence. The way AI is currently positioned under IPR is confusing and complex; while acknowledging the work that AI produces is seen as a positive step for the future, putting it into practice becomes a challenging undertaking. However, the Ministry of Industry and Commerce acknowledged the importance of AI to the country as a whole and highlighted the difficulties and worries in order to support the expansion and development of systems in the nation. As a result, an 18-member task force published a report that included specific recommendations for AI policy in India. It addressed a wide range of topics, such as bilateral cooperation, international rule making, banking, and education (Maheshwary Twinkle, 2022).

2. WHAT IS ARTIFICIAL INTELLIGENCE?

Artificial Intelligence (AI) is a broad field of computer science concerned with creating intelligent machines capable of doing activities that would normally need human intelligence. Automated interfaces for speech recognition, visual perception, decision-making, and language translation are a few uses of artificial intelligence. AI is a multidisciplinary field of study (Basu K, Sinha R, Ong A, Basu T, 2020). The term artificial intelligence (AI) has not been defined in unanimity; instead, it is often understood to refer to the process of creating intelligent computers through the integration of human intelligence. Computer scientist Mr. John McCarthy first used the term artificial intelligence explicitly in 1956 at the Dartmouth Conference (Prof. A. Lakshminath & Dr. Mukund Sarada, 2012). According to him, artificial intelligence is the idea that a program can digest and respond to data in a way that is comparable to how a rational human would react to the same information (Raquel Acosta, 2012).

Artificial Intelligence (AI) is simply a field of study that creates computers intelligent enough to mimic or duplicate human intellect, exhibiting human-like traits and abilities. These machines, endowed with the ability to significantly surpass human performance, are built to "think" and "act" like humans. It is defined as the area of computer science that focuses on the investigation and creation of intelligent agents—agents that perceive their environment and respond appropriately to succeed. To put it simply, artificial intelligence (AI) drives every experience by enhancing human potential with knowledge and forecasting abilities that are unattainable through independent effort. AI is a way of thinking where a computer or a robot under computer control thinks intelligently in a way that is similar to how people think. It examines how the human brain functions and how people think, learn, make decisions, and work at the same time. The findings of these investigations are then used to create intelligent software and systems. Even though there is no denying that computers are capable of processing logic, some people are still unaware that robots are capable of thinking in the same ways as people. In order to prevent misunderstandings and disagreements over the viability of a given idea, it is crucial to provide a clear definition of "think." Furthermore, kids possess the ability to independently make decisions. Key players in the tech industry, such as Google, Facebook, and IBM (Maheshwary Twinkle, 2022).

In the modern world, artificial intelligence (AI) is the most often studied subject in all academic disciplines, including science, business, economics, medical, and education. Since the discovery of computers with artificial intelligence (AI) capabilities, the field of computer-based intelligence has expanded greatly, influencing government, business, and society at large (Antonella Ptrillo et al., 2020). They also have an effect on the larger global sustainability trends. The scientific community has been very interested in it because of the ongoing advancements in technology and instruments. Machine learning is an umbrella term for a collection of sharing approaches and methodologies. It is an AI application that makes use of algorithms to analyse data and draw conclusions from it so that decisions or predictions about the outside world can be made (Ahmed Habeeb, 2017). As a result, knowledge is no longer transferred from humans to machines; rather, machines now acquire knowledge on their own. Humans are solely involved in defining how a machine operates, i.e., how it will automatically acquire knowledge and learn from its surroundings.

3. ARTIFICIAL INTELLIGENCE AND PHARMA INDUSTRY

Artificial intelligence is the integration of several technologies. Applications for medical diagnostics use AI to make disease diagnoses. Although there are many practical applications of these technologies in the fields of nutrition and healthcare, there may be significant differences in the methods in which they are processed. The rapid advancement and change in applied science has changed people's perspectives and the way knowledge is presented nowadays. More often than not, artificial intelligence can detect diseases and make predictions about outcomes faster than most medical practitioners make. Additionally Technology can be utilized by a healthcare decision-making interface to improve diagnosis.

An enormous amount of data can be quickly stored by an AI-powered medical diagnosis system, which can also create complex relationships between the data. Applications for medical diagnosis draw on a variety of artificial intelligence mechanisms to highlight the many benefits these mechanisms have brought to the field of medical decision-making. However, these mechanisms also have drawbacks, which have been discussed in order to determine which AI method is best for a given task. A few of these characteristics (benefits and drawbacks) can be found in the domain literature review, which serves as compelling proof for the decisional systems that are offered. After these systems were created, some more were seen (Szolovits, P., Patil, R.S. and Schwartz, W.B., 1988).

Medical diagnostics are crucial in determining or interpreting illnesses based on individual symptoms. A user-interface application, such as a mobile or web app, uses intelligent machine learning algorithms to generate prognoses based on symptoms, enhancing decision-making in medical fields.

One such application is a chatbot known as Babylon Health's symptom checker, which allows users to engage with the system and receive a prediction based on input. The system uses a standard Q&A (Question and Answer) structure to gather data from users.

In addition, there are other systems like Cura (<http://cura.healthcare/en/>) and Mayo Clinic (<https://www.mayoclinic.org/>), which are typically connected to certain hospitals and accessible solely to their patients. Furthermore, many of these solutions cost money (Adriana ALBU1, Loredana STANCIU2, 2015).

While AI has long been used to support inventors in their creative process, it is now more than simply a tool—some types of AI can even generate ideas on their own. In 1997, Dr Stephen Thaler, for instance, received a patent for the Creativity Machine, which went on to develop the Neural Network-Based Prototyping System and Method. In 2005, Dr John Koza's Invention Machine created a technology that increased factory efficiency while requiring less human input. KOJAC developed a sophisticated lens system for binoculars and telescopes in 2006 by generating and assessing 75,000 lens prescription iterations. In 2014, IBM's Watson was given the responsibility of managing a food truck and designing a delectable menu using recipes, taste components, and nutrition data. Watson did not get patents for its recipes, but its work produced a cookbook and a web tool for recipe generation (Trevor F. Ward, 2023).

4. RELEVANCE OF PATENTS IN THE PHARMA INDUSTRY

For the creators of advanced AI systems, copyright and patent rights are crucial since these developments demand significant funding and safeguarding. The law stipulates that before patents and copyrights can be granted, several requirements must be met, including novelty, inventive step, non-obviousness, and industrial application. The ownership model in the case of AI is still questionable because non-human invention is not mentioned in the legal definition of any of these conditions.

After years of study and development, IBM's AI engine "Watson" can now accurately identify cancer in 10 minutes, and this technology saved a life that would have been lost to an undiscovered case under traditional diagnostic techniques. AI has been affecting our lives in a variety of ways, from automatically correcting text messages to saving lives. Conversely, India's intellectual property laws still need to catch up in order to keep up with the advancements in AI. Currently, intellectual property rules only address human behaviour, including content creation and infringement on the rights of others. A new policy is required under the laws to handle cases when AIs and IP are involved (OECD, 2019). In contrast to conventional inventions, artificial intelligence robots rely heavily and intrinsically on data. These training data are also heavily relied upon to produce output that is reliable and consistent. The topic expertise that falls within the purview of human intelligence is necessary to produce these accurate training datasets. Regarding ownership and rights to such output, the law is still ambiguous. Because of the ambiguous regulations pertaining to ownership and rights of the generated output, deliberations are necessary (Tata Consultancy Services, 2019).

The recognition of work created by AI systems has always made the situation of AI under IPR difficult. Acknowledging such an idea or creation, however, is a genuine challenge. Before granting patents for inventions made by AI machines and robots, it is first necessary to comprehend the patent system. Patents are thought of as a mechanism that protects inventors' rights and enables them to reap all the financial rewards of their creations. In fact, this encourages inventors to create more innovative and better work. Additionally, it is observed that AI will eventually transcend human intelligence to the point that patents may be submitted and approved without the help of people. This presents a challenge and a risk to the fundamental idea of intellectual property rights. The impact of AI on the intellectual property rights framework has been a focal point due to its exponential expansion in the sector.

The domains of a) telecommunication, b) transportation, and c) life and medical sciences are home to the majority of AI functional applications. Aerospace or avionics, as well as smart cities, have shown to be the fastest expanding application domains, while robotics and control methods have proven to be rapidly evolving AI functional applications (WIPO, 2019). The invention of AI system has led to some interesting questions and debates that can be broadly classified into three parts:

- 1) Patentability of AI related inventions
- 2) Proprietary issues of Inventorship
- 3) Lack of adequate regulations and standards

The topic of patenting inventions created by AI has been the subject of continuous discussions. The question under debate is whether giving such a right will stimulate funding for software-related research, therefore fostering more innovations. Some who oppose patents claim that they could hinder innovation. As per current law, only a normal person is rewarded for AI innovation, and under patent law, only the actual and first inventor is protected and granted exclusive rights. Thus, it follows that AI cannot be considered the owner of intangible rights and cannot be held responsible for them (Pankaj Soni & Kartikay Vikrant Singh, 2018).

The non-obvious rule outlined in the Act is another requirement that all inventions must meet in order to be eligible for patents and protection. Put otherwise, only innovations that show themselves to be novel to a person with reasonable skill can be protected under the Patents Act. Determining whether an innovation is non-obvious is a complex and obscure process, particularly for Artificial Super Intelligence (ASI) because of its self-improvement aspect. Thus, in the event that artificial intelligence (AI) is granted a patent, it follows that, as a result of its superintelligence, all subsequent inventions will logically fall under the purview of AI system development, thereby doing away with all requirements for patent protection. Rob Sterne announced the results of the European Patent Office conference on patenting artificial intelligence (Shrimant Singh, 2018). He did this by introducing the topic of artificial intelligence as "a technology that has arrived" and emphasizing its importance for a worldwide conference. Additionally, he discussed its effects on the field of intellectual property (IP), particularly as it relates to patents (European Patent Office, 2018).

A California-based advocacy group called Consumer Watchdog looked into patent filings for upcoming smart products. They discovered that patent applications from Google and Amazon suggest that smart speakers are being developed to recognize people by speech and to create localized advertising profiles that are targeted at them even in the absence of a spoken wake word. Whether they realize it or not, customers provide businesses a tonne of information about their location, internet search patterns, and digital device purchase habits. It's possible that this data includes personally identifiable information (PII). "Any information about an individual maintained by an agency, including (1) any information that can be used to distinguish or trace an individual's identity, such as name, social security number, date and place of birth, mother's maiden name, or biometric records; and (2) any other information that is linked to an individual, such as medical, educational, financial, and employment," is what the National Institute of Standards and Technology defines as personally

identifiable information (PII) (Erika Mccallister,2010). There are major legal repercussions for this. The only way for the corporations to share personal information is to get rid of traceable PII. For example, when a customer shares his interests on any website, that website sells such information to a marketing firm or some other third party.

The most important issue that has to be addressed is the granting of patents for inventions produced by AI systems. The fundamental legal precepts upon which patent law is built may be contested by AI systems. Concerns concerning AI-based inventions under patent law have always existed. A small number of them ask what happens when AI-enabled machines produce an innovative idea. Without human involvement, who will be the owner of these patents on new inventions made by AI machines? Will the patents in this scenario be filed in the names of machines or robots? Will they be regarded as a body with the authority to uphold these rights? Furthermore, in the event that an AI system replicates an invention or copies a work of art, how will losses be determined?

To answer all these questions, we need to first analyse *Section 3* of the Indian Patents Act (1970) specifying subject matter of invention, which cannot be protected, and the invention based on any of such subject-matter will not be patented. One of such subject matter includes:

“mathematical and business methods, computer programmes per se or algorithms”

It is crucial to remember that some AI-generated ideas are composites of multiple inventions rather than single inventions. For example, an invention does not have to be mathematical or computational; it might be a combination of the two. However, it becomes doubtful whether certain combinations may be protected in a claim. It is crucial to remember that the Patent Act does not cover the mathematical models and algorithms that form the basis of artificial intelligence. Furthermore, because these algorithms are updated and changed frequently, even if the AI system's idea is protected, it will not persist for very long. Currently, algorithms and mathematical models cannot be patented in India unless they result in a technological advancement or effect, which is almost unfeasible for inventions produced by artificial intelligence.

Liability occurs when AI infringes on patent rights, which is another concern related to AI-based inventions. The issue is who will be held accountable or responsible for AI activities that have the potential to violate other patent claims because of how quickly technology is developing. Analysing who will be held accountable—the AI system developer or the AI itself—and to what degree will be challenging. The goal of patent law must be considered when analysing and deciding certain patent-related issues, which could be harmful to human-conceived ideas.

5. INNOVATIONS DONE USING AND BY THE ARTIFICIAL INTELLIGENCE

These days, there are a ton of artificial intelligence (AI) devices that are just as intelligent as humans are, if not more so at times, and have the capacity to learn, comprehend, understand, and apply. Let us examine some of the AI-integrated products that are already in use and have the potential to rival or be comparable to humans, as well as the IP implications of these products as they stand right now.

5.1 Sophia- Sophia is the humanoid robot from Hanson Robotics.

The most sophisticated character robot, Sophia rose to prominence as a global cultural icon. She is intended to head Hanson Robotics' effort to build perceptive, intelligent robots that will improve humankind. She can read facial expressions, react to them, and take notes throughout conversations. She is primarily intended to support and facilitate research. It took nearly eight years to make Sophia's skin and her face is designed to resemble a human's so that facial expressions may be seen. As of right now, businesses such as Hanson Robotics typically keep certain other intellectual properties and release a significant amount of code as open source. As a result, the firm would claim intellectual property rights to any works produced by these AI robots, even if they did not originally create them.

5.2 Philyra

IBM and Symrise, a multinational manufacturer of flavors and scents, developed an AI product composition system to learn about formulations, raw materials, historical success data, and current trends in the fragrance sector. This artificial intelligence (AI) system makes use of computer vision, which includes image recognition, one of the most widely used AI features for trend identification. Philyra has received a patent, but the works she has completed are not regarded as her property; rather, the owners of Philyra are the ones who possess the proprietary rights.

5.3 Empatica Embrace

This watch uses an artificial intelligence (AI) application on its support vector machine to execute a seizure detection algorithm continuously in the hopes of identifying potentially fatal convulsive seizures. This device may track the occurrence of any such event and send out alerts on the connected device. Sudden, unexplained deaths caused by epilepsy claim many lives in the United States every seven to nine minutes. The gadget has a U.S. patent awarded. Nonetheless, the potential for AI-generated inventions in these categories is limited.

5.4 Farmbeats

Microsoft's FarmBeats project enhances farmer productivity and lowers expenses by utilizing machine learning algorithms, drone photography, and inexpensive soil sensors. Aerial maps that farmers can make using sensor data can help regulate water use, soil acidity, seeding, and flood patterns. FarmBeats operates without the usage of the internet or main electricity by utilizing solar energy and TV white space. In isolated locations with little access to arable land and water, the AI-enabled technology seeks to boost global food production.

6. RELEVANCE OF OWNERSHIP OF PHARMACEUTICAL INNOVATIONS

Identifying the person who conceived the innovation is one way to determine inventorship. Anyone claiming to be an inventor had to have been involved in the idea's creation. The question now becomes, does the original idea by the normal human suffice to be registered as an inventor, given that the machine can learn on its own and can accomplish a task without instructions? If so, what would happen if the AI system changed the definition of a human being to something entirely different through self-learning? The "Artificial Inventor Project" (DABUS) submitted two applications to the European Patent Office (EPO) in January 2020 pertaining to food containers and devices and methods for attracting enhanced attention. AI was named as the inventor on these applications together with seven other countries. The European Patent Convention (EPC) stipulates that an inventor may only be a human being and not a machine. As a result, the European Patent Office and the UK rejected these applications for patent protection. Furthermore, since the owner is now unable to possess property, there is no law that permits the transfer of ownership of an invention from the inventor to the owner. In US patent law, a "inventor" is defined as a person who invents or discovers the subject matter of the invention. Given this, it follows that the patent grant is not available for ideas involving artificial intelligence (AI) and can only be used against humans.

When it comes to identifying the creator of AI-generated ideas that require human involvement, there is no room for doubt. However, confusion emerges when a powerful AI (Artificial Super Intelligence) without human assistance creates an invention. In such a case, the question of who will receive the patent grants emerges. In accordance with Section 6 of the Patents Act, an invention may be submitted for patent by any of the following parties: any individual claiming to be the true and first inventor of the invention; any individual acting as the assignee of the individual claiming to be the true and first inventor with regard to the right to make such an application; or the legal representative of any deceased individual who was entitled to make such an application prior to his death.

Further, the terms "*patentee*" and "*person*" under Patents Act are defined as:

- **Section 2(1)(p)** of the Act defines the term "*Patentee*" as the "person" entered on the patent office register as the grantee or owner of the patent.
- **Section 2(1)(s)** of the Act defines the term "*Person*" to include the government, a non-natural entity. (1970).

While Section 2(1)(p) suggests that inventor and person should be a natural person, the "true and first inventor" criteria does not mention natural person in its exclusionary definition under **Section 2(1)(y)** of the Act (1970).

Section 2(1)(j)-(ja) of the Patents Act does not grant the patents right per se rather it frames the question of inventiveness with reference to creation i.e., it allows the rights only to a "new product or process" or "technical advance as compared to the existing knowledge". It can be derived from the provision that an inventor need not compulsorily be a natural person. The conditions seem to involve human invention to be considered patentable (1970).

As a result, the main concern is the definition of "inventor." Does it have to be a natural human alone? Sophia, a social humanoid robot created by Hong Kong-based "Hanson Robotics," was recently awarded citizenship by Saudi Arabia. Does this mean Sophia can no longer be regarded as a "natural person"? Should that be the case, will she be held completely accountable as no one else is involved? There was a recent incident involving an autonomous vehicle under test by Uber

that resulted in a death. It was unclear if Uber Technologies Inc. or the AI operating the autonomous vehicle should be held accountable independently (Bloomberg, 2018).

Section 48 of the Patents Act provides the rights of the patentee. It confers upon the patentee-

“the exclusive right to prevent third parties, who do not have his consent, from the act of making, using, offering for sale, selling or importing for those purposes that product in India.”

Likewise, if the subject matter of the patent is a process, the patentee has

“the exclusive right to prevent third parties, who do not have his consent, from the act of using that process, and from the act of using, offering for sale, selling or importing for those purposes the product obtained directly by that process in India.”

The question now is whether AI is capable of giving consent and, in the event that it does, how a human would identify the necessary consent. When ownership is changed by acquisition or assignment, the same problem arises. The use of AIs in the creation of new technologies has undoubtedly forced countries to review, amend, and update their patent rules. This review will also encourage nations to broaden their general national laws and give consideration to patent applications and inventions made by artificial intelligence (AI) or robotics. Another solution to this problem would be to refer to AI as "electronic people," just as people are referred to as "natural persons." At that point, ownership of the invention could be registered in the name of the business that owns the AI machine, and inventorship could be awarded accordingly.

7. GOVERNANCE OF ARTIFICIAL INTELLIGENCE IN PHARMA INDUSTRY

As patent law does not address AI, there are currently no ramifications. The provisions of Section 3(k) of the Patents Act, 1970, which is the legal foundation for this regulation, promote innovation in the fields of computers and electronics (1970). The regulations that are currently in place and the ongoing changes that occur in actuality differ greatly. Undoubtedly, the development of AI has presented numerous difficulties. Approximately 40785 patent applications are now filed for AI systems related to life and medical sciences. The volume of patent applications demonstrates the increasing interest in artificial intelligence, and our IP rules and patents now need to be updated. We need to design new moulds that will accommodate the emergency technologies.

Regarding the determination of patent law, one should also consider the government's initiatives in this domain. Analysing this disruptive phase is essential before drawing any conclusions, avoiding roadblocks, and responding to the AI-generated idea. Proactive and conspicuous action become important. The Indian Patent Office needs to address a number of difficulties pertaining to inventions developed by AI, and adjustments are thus necessary. The main question that needs to be answered is whether we think that AI and AGI are beyond human capabilities because we cannot replicate the evolutionary design on a piece of paper that has been coded into a machine, or if we think that machines can eventually make their own decisions because basic intelligence, knowledge, and cognitive thinking can all be programmed into AI systems. An open conversation can help create guidelines and criteria for patenting AI-generated ideas, which will address this. The discussions surrounding AI-generated inventions are expected to result in significant modifications to the Computer-Related Invention (CRI) standards, encompassing advancements in technology and innovative hardware. After the revisions, patent holders speculated about future updates in the guidelines.

As we consider the policies, it is useful to consider the following hypothetical scenario: suppose the AI system exceeds its exposure threshold and achieves artificial intelligence (AI) standards. In that case, wouldn't it be able to decide whether to issue patent rights to a certain creation? If that is feasible, it can also determine whether an invention made using its own system qualifies for a patent. Additionally, it will be able to examine every application that has already been submitted and decide which ones to accept or reject. Additionally, if it has the ability to patent new discoveries and ideas, it will be able to locate those who are violating patent rights and produce claim charts that are non-disputable. In that case, the machine that humans built will eliminate every employment.

The following three points, when viewed through the lens of a patent, encapsulate all these issues: (1) whether AI as an invention is eligible subject matter; (2) who is the true and first inventor (i.e., inventorship); and (3) who owns the acts of the AI technology and is therefore liable for them (i.e., liability). India must improve its patent rules to guarantee that the nation stays open to inventors if it hopes to be the leader and seize the chance of being the first to market. It must approach the problem methodically and in the best interests of the technology community if it is to be the developer of AI rather than just an adapter.

Following the determination of patent infringement, the offender must reimburse the patent owner for damages in an amount commensurate with the infringement that was committed. Concern now is how the courts would apply the same ruling in cases where artificial intelligence is the infringement. Who will bear the consequences of an AI activity this illegal? AI on its own, the proprietor, the manager, or the user. These issues include criminal or civil tort liability in addition to intellectual property rights.

Legal scholar Gabriel Hallevy discussed three types of criminal culpability. These models are:

- 1) "Perception-via-another" liability paradigm: In this approach, the programmer or the end-user is deemed the guilty party and the mens rea is not attributed to the Artificial Intelligence entity.
- 2) The "natural probable consequence" liability model assumes that the user and programmer are involved in every daily action carried out by the AI entity with no malicious intent. As ignorance of the law does not serve as a defence, it is assumed that the AI entity's programmer and user are both responsible for any potential offenses and should be held accountable for them.
- 3) The "direct liability" paradigm places focus on the AI entity's liability for offenses, in a manner similar to how humans are held accountable for their own errors.

Do you remember Skynet from the movie *The Terminator*? Skynet was merely a made-up artificial intelligence platform that developed consciousness after infecting millions of computers worldwide. The development of humanoid robots that are able to think, feel, and reason was another major theme of the film. This is not the only movie out there right now; in fact, the majority of western television shows and films either are based on these made-up tales or at the very least demonstrate how these artificial intelligence technologies are used to stay up. The public's understanding of artificial intelligence (AI) was formed by these representations, and as science and technology have advanced, we can now observe that these machines already exist. These AI virtual assistants currently handle and respond to the majority of customer service calls and chats. The world is currently waiting for artificial intelligence to bring about change, and while these technologies have many advantages, there are risks. The virtual assistant, Alex, from IP Australia, is picking up knowledge from the questions people ask it as it converses with them. As a result, it will be better equipped to answer questions accurately in the future.

8. RECOMMENDATIONS

Artificial intelligence is developing at an exponential rate, and it might eventually surpass human intelligence. The technology's ability to perform effectively and efficiently makes it capable of eliminating all occupations. "Pepper," the robot, who works in the café owned by Softbank and eliminates the need for human servers, is a prime example of how AI might displace human workers. It might also spell the end for humanity. Drone terror assaults powered by AI and nanorobotics are equally terrifying for humanity. To make matters worse, AI safety breaks and vulnerabilities might potentially interfere with AI functionality. The discussion of AI as a threat to humans revolves around the misuse of AI and privacy issues. The application of China's "Orwellian" facial recognition technology in workplaces, schools, and other locations is one instance of this (Mike Thomas, 2019).

Ultimately, though, human beings and machines ought to collaborate rather than compete. It might help civilization advance by resolving its biggest problems, which include poverty, ignorance, and illness. "Understanding the values of those who actually build them is the best way to answer the hard questions about control in a world full of smart machines," according to John Markoff in his book *"Machines of Loving Grace."* To put it briefly, creating the future is the best method to anticipate it (Markoff John, 2015).

When creating AI systems, moral and ethical principles ought to be taken into consideration. By doing this, a responsible AI will be developed, empowering people to submit more creative ideas and fostering happiness. Industries everywhere would gain from increased economic growth and profitability if such an AI system were developed. In order to fully capitalize on the opportunity, several approaches and actions need to be determined in order to successfully deploy AI systems and apply the technology to businesses and organizations worldwide.

Currently, these artificial intelligence systems require basic information as their raw material, but what if their intelligence is on par with or even greater than that of humans? The result will be a shift in social and political structures, with AI systems assuming control as soon as they determine they can rule the planet without the help of humans. These technologies

may eventually create AI systems that can replicate themselves, rendering humans unable to use technology to defend themselves (Jahanzaib Shabbir, and Tarique Anwer, 2015).

The current intellectual property laws need to be reviewed, updated, and revised in order to prevent such a scenario. This will also offer a clear picture of current technology advancements and how they seem to be shaping the world of the future. It is imperative that the concepts of "authorship" and "inventor-ship" be addressed in detail. The inclusion of non-humans in the definitions of the aforementioned words will foster progress and growth, leading to an infinite number of inventions in the end. In order to preserve the balance between individual rights and the need to progress technological advancement, the legislation must be modified based on a harmonic approach. In addition, it is not necessary to follow the entire new set of guidelines. The regulators only need to include AI systems into the current legal framework to reorganize it. Not only would this save time, but it would also save the difficult and drawn-out process of creating new laws.

Giving AI authorship could prevent the works produced by the AI systems from entering the public domain and give the AI's creator a monopoly on the finished products. Innovations, society, and the economy would all be impacted by the modifications to the patent laws pertaining to artificial intelligence systems. Regulators must therefore update IP rules while keeping in mind the necessity to strike a balance between the benefits and drawbacks of AI system advancements. Without any restrictions, the law should always advance "the progress of science and useful arts."

Regarding AI, the common issue is- Will this transformation result in job losses down the road? MIT economist Daron Acemoglu provided the following response when asked this question: "Firms will be incentivized to create new tasks in which humans have a comparative advantage as machines replace labour in some tasks." One such instance is Kent International, the manufacturer of bikes bearing the Bicycle Corporation of America trademark. The company made headlines in early 2017 when it announced the relocation of 140 jobs from China to Manning, South Carolina, after making investments in robots to automate numerous operations that were previously completed by people. What was formerly a high labour, low-tech company is undergoing a digital transition of its own. CEO Arnold Kamler stated that he intends to create forty new positions annually, which is significant expansion for a small town. Microsoft purchased LinkedIn, in part, with the goal of leveraging digital platforms to give people access to the economy.

The European Parliament has suggested that AI devices be given the ability to think and feel like people, if only in certain situations. This could assist in addressing copyright and liability-related concerns. The question of whether robots should have legal standing grows increasingly pressing as AI becomes more unpredictable and responsive to incentives. Given that several legal provisions now permit corporate personhood, electronic personhood is not as complicated as it may seem. However, giving electronic personhood necessitates careful consideration of the bounds of related rights and obligations, including whether ownership status might be granted under a restricted version of inventor status.

The above-mentioned problems must be rectified by changing the current international intellectual property regime to include rules governing AI-generated works and ideas as well as imposing specific accountability on the AI's creator. Studies in this area have been conducted, but a conclusion must be made because there are many opposing viewpoints that are held at the same time.

9. CONCLUSION

Patents must protect AI-generated works in order to encourage innovation and knowledge sharing. Additionally, it aids in the commercialization of goods with social value. Businesses might stop employing AI to invent if AI-generated inventions are not permitted, which could lower the value of human invention. Furthermore, the rights of human inventors would be safeguarded if AI were to be listed as an inventor at the time of its functional invention. Although AI systems are not morally or legally entitled to be included as inventors, doing so would uphold the integrity of the patent system and the moral rights of conventional human inventors. According to the author, any patents on ideas produced by AIs should belong to the AI itself, in accordance with general property ownership principles and laws governing other aspects of intellectual property (IP) law, such as trade secret protections.

The argument that a natural person qualifies as an inventor for AI-generated work is not persuasive. An inventor may be someone who instructs an AI to solve a problem, designs an AI for a specific problem, or skillfully selects training data. However, the connection between programmers and AI development is tenuous, especially when many programmers are involved. Recognizing the relevance of an AI's output may also qualify as an inventor, but not when it is obvious and no further, human activity is needed.

AI-generated works pose a significant challenge to intellectual property (IP) law, as they may become a significant part of research and development. The rapid improvement of AI, unlike human researchers, may lead to a lack of clear rules on

patent protection, inventorship, and ownership. Listing AI as an inventor would protect the moral rights of traditional human inventors and the integrity of the patent system. As AI advances, it may even represent the skilled person, finding more obvious things than today's skilled person does. This could require changing the test for inventive step to focus on economic factors or the ability of AI to reproduce subject matter in patent applications. Existing legal norms will be tested by the phenomena of AI becoming more humanlike, and a legal neutrality concept for AI could enhance human welfare.

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