COLLISION OF INTELLECTUAL PROPERTY RIGHTS AND ARTIFICIAL INTELLIGENCE

Dissertation submitted to National Law University and Judicial Academy, Assam in partial fulfilment for award of the degree of

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SUPERVISOR CERTIFICATE

This is to certify that ATEET PARIHAR has completed his dissertation titled "COLLISION OF INTELLECTUAL PROPERTY RIGHTS AND ARTIFICIAL INTELLIGENCE" under my supervision for the award of the degree of MASTER OF LAWS/ ONE YEAR LL.M DEGREE PROGRAMME of National Law University and Judicial Academy, Assam.

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DECLARATION

I, ATEET PARIHAR, do hereby declare that the dissertation titled "COLLISION OF INTELLECTUAL PROPERTY RIGHTS AND ARTIFICIAL INTELLIGENCE" submitted by me for the award of the degree of MASTER OF LAWS/ ONE YEAR LL.M. DEGREE PROGRAMME of National Law University and Judicial Academy, Assam is a bona-fide work and has not been submitted, either in part or full anywhere else for any purpose, academic or otherwise.

ATEET PARIHAR

Date: 15th July 2021

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TABLE OF ABBREVIATIONS

1	AI	Artificial Intelligence
2	CAD	Computer-aided design
3	CRI	Computer related Inventions
4	DL	Deep Learning
5	DRS	Amazon Dash Replenishment Service
6	EPC	European patent convention
7	EPO	European patent Office
8	ETRI	Electronics and Telecommunications Research Institute
9	IBM	International Business Machine
10	ICJ	International Court of Justice
11	IOT	Internet of Things
12	IP	Intellectual property
13	IPR	Intellectual property rights
14	IT	Information Technology
15	ML	Machine Learning
16	N-AIM	National Artificial Intelligence Mission
17	NLP	Natural Language process
18	SC	Supreme Court
19	TM	Trademark
20	UN	United Nations
21	UNDP	United nations development programme
22	USPTO	United States patent and trademark office
23	v.	Versus
24	WIPO	World Intellectual property Organisation

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CHAPTER – I

INTRODUCTION

The term "Artificial Intelligence" (AI) conjures up images of robots and a dystopian future where humankind is enslaved by robots, thanks to sci-fi movies and novels. But AI is not limited to robots. AI is an abstract concept as it seeks to replicate human intelligence, which is also an abstract concept to perform tasks. Technology has become all-pervasive, invasive, and omnipresent, and AI too has immense potential and implications on every aspect of our lives.

Artificial Intelligence[1]

There is no universal definition for AI. It is considered to be the stimulation of human intelligence in machines. Machines are programmed to think like humans and mimic their actions. The goal of AI is to mimic human cognitive activity such as learning, reasoning and perception. But the stimulation is based on different parameters. What may be considered to be an AI by one scientist may not be so for another.

AI can be classified as –

1. Weak AI – application is limited to a particular area. For example, when playing a chess video game, there is an option to play against the computer. The AI analyses the moves a player makes and makes its move, drawing on its stock of data on chess moves. Other examples are Amazon's Alexa and Apple's Siri.
2. Strong AI – more complex applications and carry out tasks which are near-human. For example, self-driving cars.

A subset of AI is machine learning. Machine learning is the concept that a machine can be programmed to learn and adapt to new data without human intervention. The algorithm built-in to the computer programme allows it to make predictions based on the data collected. The system essentially looks for patterns and detects changes in the pattern. For example, a Bank can use machine learning tools to detect fraud in transactions.

[1] Jake Frankfield, *Artificial Intelligence (AI)*, INVESTOPEDIA, (June 28, 9:42 AM), https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp.

Deep learning is a function of AI which enables machine learning. Deep learning imitates the workings of the human brain in processing data and creating patterns for use in decision making. With the advancement of technology, there has been an explosion of data, be it from social media, search engines, e-commerce platforms, online streaming platforms and even from taking a survey or quiz online.

Such data is unstructured and simply referred to as 'big data'. Analysing the big data can help businesses worldwide to streamline their products and services to increase customer satisfaction and customer base. It can also help detect cybercrimes. Deep learning analyses this big data, on the basis of which machine learning gives predictions, recommendations, suggestions or warnings.[2]

Impact:

The impact on AI can already be seen. Some examples are:

- Roomba[3]: An AI powered room-cleaning robot manufactured by iRobot. The Roomba has several features such as detecting the densest concentration of dirt particles and working harder in those spots, memorizing the layout of the room and the obstacles, and determining the best route for cleaning. Some of the newer models can be commanded to start and stop cleaning by using smartphones and even through voice assistants.
- Sophia[4]: Developed by Hong Kong-based Hanson Robotics, Sophia is the first humanoid robot to receive citizenship from Saudi Arabia. She is also the first robot Innovation Ambassador for the United Nations Development Programme (UNDP). Sophia can use facial expressions to convey human-like emotions. She has made appearances on numerous talk shows. She was created to understand human-robot interaction and their potential service and entertainment applications.
- Atomwise[5]: Uses deep learning to streamline the drug discovery process. AI is being used to make medicines and improve existing medicines faster and on a large scale.

[2] Marshall Hagrave, *Deep Learning*, INVESTOPEDIA (June 28, 2021, 10:55 AM), https://www.investopedia.com/terms/d/deep-learning.asp.
[3] Roomba (June 28, 2021, 11:00 AM), https://www.irobot.com/roomba.
[4] Sophia (June 28, 2021, 11:04 AM), https://www.hansonrobotics.com/sophia/.
[5] Atomwise (June 28, 2021, 11:17 AM), https://www.atomwise.com/company/.

- Waymo[6]: Google's project of self-driven cars. These cars have sensors to detect traffic, movement of other cars and make adjustments to route and speed. It understands how a car moves differently than a cyclist. It senses the road in multiple dimensions.

AI & IPR: How They Intersect

The goal of IP protection systems is to encourage innovation and creativity through new technologies for the betterment of society. IPR systems now need to make a distinction between human-created work and machine-created work.

The World Intellectual Property Organization (WIPO) is leading a Conversation on IP and AI, bringing together Member States and other stakeholders to discuss the impact of AI on Intellectual Property. The fourth session is due this year.[7]

WIPO's report on Technological Trends has focused on AI in the years 2019 and 2020. This year, the focus is on assistive technology. A lot of these assistive technologies are powered by AI.[8]

The Report of 2019 shows AI related inventions shifting from theory to practical applications, which has been discussed in a separate chapter in this essay. A large number of patents for AI technology have been filed in sectors such as telecommunication, transportation, aerospace, internet, radio and television broadcasting, and life medical sciences. The favoured countries for patent filing have been US and China, with India ranking 8th among the countries for first filing. Private AI research is being led by IBM, Microsoft and Google. Universities across the globe are also doing their own AI research.[9]

Copyright

Copyrights focus primarily on the encouragement of creativity as the economic and social development of the society are based on such creativity. The Copyright Act, 1957 does not

[6] Waymo (June 28, 2021, 11:22 AM), https://waymo.com/waymo-driver/.
[7] WIPO, *Artificial Intelligence and Intellectual Property Policy*, WIPO (June 28, 2021, 12:11 PM), https://www.wipo.int/about-ip/en/artificial_intelligence/policy.html.
[8] *Id.*
[9] WIPO, *Technological Trends 2019: Artificial Intelligence*, WIPO (June 27, 2021, 11:56 PM), https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf.

define the term "copyright." In general, the term copyright refers to the "right to copy". This right is generally only available to the owner of the work. Any person who copies the work without the permission of the author/owner would be in violation of the copyright held by the author/owner.

Section 13[10] states that copyrights subsist in the following works throughout India, subject to the provisions of the Act -

(a) original literary, dramatic, musical and artistic works;
(b) cinematograph films; and
(c) sound recording.

"Literary work" includes computer programmes, tables and compilations including computer databases.[11] Further, "computer programmes" means a set of instructions expressed in words, codes or in any other form, including a machine-readable medium, capable of causing a computer to perform a particular task or to achieve a particular result.[12] Thus, the source code or algorithm of an AI-driven computer programme as well as the data collected by such a programme is protectable under the Copyright Act. The specific issues will be dealt with in a separate chapter in this essay.

Patent

A patent protects scientific and technical inventions before being available in the public domain. The aim is:

- *To protect and reward creativity of the inventor by disclosing it to the public;*
- *To encourage further inventions which will ultimately contribute towards technological advancement of the nation.*

An "invention" is a new product or process involving an inventive step and capable of industrial application.[13] Further, an "inventive step" means a feature of an invention that involves technical advancement as compared to the existing knowledge, or having economic significance, or both.

[10] The Copyright Act, 1957, No. 14, Acts of Parliament, 1957.
[11] *Id*. Section 2(o).
[12] *Id*. Section 2(ffc).
[13] The Patents Act, 1970, Section 2(j), No. 39, Acts of Parliament, 1970.

Such a feature needs to make the invention not obvious to a person who is skilled in that field.[14] Thus, the prerequisites of patent protection are –

1. Novelty
2. Inventive Step
3. Non-obviousness[15]
4. Industrial Application

The Patents Act does not provide for any specific definition of the term 'non-obviousness.' The criteria of 'inventive step' makes it necessary that the invention be non-obvious. If there is merely a change or improvement that is obvious to a person skilled in that field, then it cannot be said to be inventive. All of this shall be discussed in the coming chapter of this paper.

The Artificial Intelligence Task Force[16]

The Task Force on Artificial Intelligence for India's Economic Transformation ("the Task Force") was constituted by the Ministry of Commerce and Industry, Government of India in 2018. It submitted its report on March 20, 2018.

The Task Force sought to answer the following policy questions –

1. What are the areas where the Government should play a role?
2. How can AI improve the quality of life and solve problems at scale for Indian citizens?
3. What are the sectors that generate employment and growth by the use of AI technology?

The guiding vision was to use AI as a large-scale socio-economic problem solver rather than as a booster for economic growth.

The report stated that AI is being used by nearly every global company. In contrast to that, traditional enterprises, brick-and-mortar enterprises have not been investing much in AI

[14] *Id.* Section 2(ja).
[15] Senthil Kumar, *India: What can be Patented in India?*, MONDAQ, (June, 27, 2021, 11:00 PM), https://www.mondaq.com/india/patent/526406/what-can-be-patented-in-india.
[16] The Artificial Intelligence Task Force, *Report of the Artificial Intelligence Task Force*, DIPP, 2018 (June 27, 2021, 9:30 PM), https://dipp.gov.in/whats-new/report-task-force-artificial-intelligence.

technologies. The Task Force acknowledges that AI will impact virtually every industry in the future. It will impact the consumers as well because AI might as well be a consumer or the target audience of products and services.

The Task Force identified the following domains where AI technologies can be used to attempt to solve some of India's problems –

(i) Manufacturing
(ii) FinTech
(iii) Health
(iv) Agriculture
(v) Technology for the Differently-Abled
(vi) National Security
(vii) Environment
(viii) Public Utility Services
(ix) Retail and Customer Relationships
(x) Education

The report concluded with 5-year recommendations to the Government of India –

1. Setting up an Inter-Ministerial National Artificial Intelligence Mission (N-AIM) funded under the Union Budget to the Rs. 240 crores per year. The main tasks of the N-AIM would include.
    (a) Seed funding of 6 Centers of Excellence.
    (b) Setting up a generic AI Test bed that could serve as a validation platform for AI based technology developers.
    (c) Creation of an interdisciplinary large data center for aggregation and interpretation of data generated.
    (d) Coordination with the concerned Ministries to accelerate and commercialize AI based products and technologies.
    (e) Increasing awareness of AI
2. Digital data banks, marketplaces and exchanges to ensure availability of cross-industry data and information of AI-applications.

3. Standards for the design, development and deployment of AI based systems.
4. Enablers to boost AI development including data sharing policies and tax and other incentives.
5. AI-based curriculum, AI-related education and re-skilling.
6. Leveraging key international relationships and participation in AI-based international standards setting discussions.

The objective of the Task Force was to make recommendations for governmental policies to integrate AI technologies for the socio-economic development of India. Thus, apart from mentioning that India needs to upgrade her IPR mechanisms in the face of advancement in AI technologies, the Task Force had not looked into the details of the relationship of AI with IPR.

AI is an abstract concept. It has far-reaching implications on society. It must be remembered that AI cannot be a substitute for human intelligence. At the core of AI is analysis of a large amount of data which is simply floating about and is impossible for human minds to collect and interpret.

Every single time a person interacts with technology, it is sending out data. One single person interacts with technology several times a day. Multiplying that by the world population, it is a dizzying amount of data which has no structure whatsoever. This data is an untapped source of information. AI aims to convert present data for human comprehension as well as assist in decision-making processes. In order to facilitate this, IPR mechanisms need to be modified to encourage development of AI-technologies.

1.1 RESEARCH PROBLEM

As technology advances, artificial intelligence-generated inventions, i.e., inventions created autonomously or semi-autonomously by computer systems, are deemed to becoming more common. The human ingenuity in such inventions is less visible, while at the same time the inventing activity becomes easier, as most of the mental effort is passed on to the AI. A given AI-generated invention might be non-obvious to a skilled person; but it will probably be obvious to a person that has access to a similar AI, and this is where it becomes difficult to assess the invention. The patentability of AI related inventions, proprietary issues of inventorship and the

lack of adequate regulations and standards have left some open-ended questions. As of now, the impact that AI has had on Intellectual Property (IP) has mainly centered on patency law and patent protection of AI technologies. However, AI has recently proven to be a challenge to trademark law as well as copyright law. Despite trademark law withstanding and adapting to three revolutions namely; self-service, E-commerce and social media, it still has to deal with AI. If an AI becomes a consumer there is a huge chance of confusion with respect to trademark and this situation can lead to a rigorous amount of litigation. Similarly with respect to copyright law, the question of who should have ownership of this intellectual property becomes crucial. Assigning it to the developer appears illogical under the current Intellectual Property Regime, as giving ownership rights to an entity that did not conceive of the concept or actively engage in its creation clearly violates the Copyright Law's stipulations. Despite the fact that the developer designed the software, it has no influence over what the software produces.

1.2 RESEARCH AIMS

Following the identification of the research problem, the research work's objectives are drawn up for review of literatures and methodological selection. This work aims to provide a holistic approach to analyse whether the present Intellectual property regime is adequate to deal with AI.

1.3 RESEARCH OBJECTIVES

The objectives of this research are –

i. To understand the basic concept of Patent Law, Trademark Law and Copyright Law.
ii. To understand the emerging concepts related to Artificial Intelligence
iii. To analyse the adequacy of the current Intellectual property law regime in dealing with challenges brought by the field of Artificial Intelligence
iv. To suggest possible solutions to harmonize the issues and challenges posed by the intersection of Intellectual property and AI.

1.4 RESEARCH SCOPE AND LIMITATIONS

The scope of this research work is confined to the general understanding of the intellectual property law and concepts along with AI. An attempt has been made to understand the varied judicial pronouncements and its impact on the working of AI within the legal framework.

In the light of the objectives and the purposes of this study, the researcher has tried to figure out the underlying problems and possible solutions to inadequacy of the present intellectual property regime in dealing with AI. The scope of this work is limited to the issues revolving around the legal framework. Due to certain restrictions of time and money, the researcher has made the best efforts to make use of the available resources to find out the appropriate information and the interpretation of the vast number of judicial decisions on this subject for the loopholes in this sector to be identified.

1.5 LITERATURE REVIEW

1. Plotkin, Robert. *The Genie in the Machine - how computer-automated inventing is revolutionizing law and business. Stanford university press, 2009*.

The Author begins with the reality: many products and processes used today were created through automated software. He states that the automated software is akin to a genie granting the wishes demanded by software developers. The trend toward automated inventing will likely continue to grow as both computing power and the level of problem-complication increase. The author is considering how patent law interacts (and should interact) with computer created inventions. He believes that automated computer-generated inventions should be patentable. However, he would make some changes to ensure that the computer inventions are not overbroad.

An excerpt from the book reads as follows,

“We need . . . to reinterpret the patent rules in light of artificial invention technology to ensure that they continue to achieve their original goals, just as a butcher recalibrates a scale after it has been in long use . . . In particular, we need to strictly apply patent law’s utility requirement and

its distinction between abstract ideas and practical applications to protect against the worst kind of abuses"

2. Abbott, Ryan Benjamin, *Everything is Obvious, 66 UCLA Law Review, 2 (2018)*

According to author "obviousness" has set the bar for patentability since more than sixty years. He further affirms that the invention cannot be patented if a hypothetical "person having ordinary skill in the art" would find an invention obvious in light of existing relevant information. According to the author, the more creative and informed the skilled person is, the more likely an invention will be considered obvious. He further states that the standard has evolved since its introduction, and it is now on the verge of an evolutionary leap: Inventive machines are increasingly being used in research, and once the use of such machines becomes standard, the person skilled in the art should be a person using an inventive machine, or just an inventive machine. As inventive machines continue to improve, this will increasingly raise the bar to patentability, eventually rendering innovative activities obvious. The end of obviousness means the end of patents, at least as they are now. The author focuses upon a related phenomenon: What happens when inventive machines become a standard part of the inventive process? He has divided his discussions in three parts. Part I considers the current test for obviousness and its historical evolution. It finds that obviousness is evaluated through the lens of the skilled person, who reflects the characteristics of the average worker in a field. Part II considers the use of artificial intelligence in research and development and proposes a novel framework for conceptualizing the transition from human to machine inventors and Part III provides examples of how the Inventive Machine Standard could work in practice, such as by focusing on reproducibility or secondary factors. It then goes on to consider some of the implications of the new standard.

1.6 RESEARCH QUESTIONS

After a detailed review of the existing literatures and identifying the gaps, the researcher has framed the following research questions –

i. What is the concept of Artificial Intelligence and how does it affects the realms intellectual property.
ii. What are the basic concepts underlying Trademark law, Patent law and Copyright Law.
iii. How does the current Intellectual property law deals with the dynamic concept of Artificial Intelligence.
iv. Whether current Intellectual property regime is adequate to incorporate the technicalities and problems relating to Artificial Intelligence.

1.7 RESEARCH METHODOLOGY

The methodology adopted by the researcher in this research work, entitled "COLLISION OF INTELLECTUAL PROPERTY RIGHTS AND ARTIFICIAL INTELLIGENCE" is analytical and doctrinal in nature. The researcher has adopted doctrinal method on the basis of the data available for the present study. The researcher has referred to a great number of books, journals, newspapers, articles, reports and e-books for preparing this work.

1.8 RESEARCH DESIGN

In the light of the objectives and research questions formulated by the researcher, the research work has been divided in the following chapters for convenient and systematic study –

Chapter I titled 'Introduction' provides a brief introduction into the entire subject matter of study in hand, wherein the researcher has highlighted the basic and foundational understanding of the topic in general. It also includes the detailed review of literature which exists on the subject matter. Furthermore, it provides an analysis of the problem, the aims and objectives of this particular study, scope and limitation in this area of work and the methodology used work the research work.

Chapter II titled 'Trademark and Artificial Intelligence' provides a detailed understanding of the topic. It investigates intersection of trademark and AI. It discusses trademarks issues in general and also with respect to AI.

Chapter III entitled ‘Copyright and AI – Adequacy in protecting the invention or artistic work produced using AI’ focuses on the intersection of copyright and AI. It discusses issues with AI authorship and ownership.

Chapter IV titled ‘Patents and AI’ elaborates the intersection of AI with patents. The chapter throws light on the current issues relating to patent. Lastly it discusses AI as a patent owner statutory provisions and the developments in the Indian legal scenario with regard to reproductive rights and sexual well-being in the country.

Chapter V titled as ‘Some Recent Development: An analysis 2019 WIPO Technology Trends Report, and Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence, 2020’ discusses the WIPO technology trends report 2019 under the Indian perspective.

Chapter VI entitled ‘Conclusion and Suggestions’ sums up the whole work and tries to give a broad-spectrum idea of the intersection of AI and IPR. It also discusses how AI can be dangerous under certain circumstances. Lastly it provides for a roadmap for new reforms for AI and IPR.

CHAPTER – II

TRADEMARK (TM) AND ARTIFICIAL INTELLIGENCE (AI)

Before we continue explaining the complex structure of AI and TM, it is imperative that we understand the basics of Trademark and its corresponding legal provisions. Simply put, a Trademark is a product's (service/brand) unique identification medium. It need not be only restricted to a mundane logo but can also find itself in the form of letters, words, phrases, numbers, sounds, images, shapes, smells, movement, display, or an amalgamation of all these contributing factors.[17]

The objective and purpose of Trademark Law is centered on the protection of the rights of individuals who innovate and sell their respective goods with its own distinct trademark against other individuals who intend to encroach on their products and sell them off as fraudulent knock-offs of the original good.[18] Although trademark law has an impressive record with regards to it fulfilling its purpose, the rise in prominence of the earlier mentioned entity i.e. Artificial Intelligence, has proved to be problematic to the basic tenets of trademark law and has posed some hurdles to it.

Over the past few years, Trademark Law has carried out its function without hitting any hurdles and brand suggestions and product purchasing process has remained mostly static. This, however, is no longer the case due to the rise in prominence of disorderly technologies such as AI, Internet of Things (IoT), Blockchain, Data Analytics, etc. Although trademark law has been able to fend off and adapt to three of the four mentioned technologies, it is yet to properly integrate itself with Artificial Intelligence.

During the ascent of Trademark law, customers were dependent on shop assistants and subsequently, the consumer's purchases were based on the assistant's suggestions. The shop assistants were the first ones to be affected by the first disruptive revolution where modern self-service groceries essentially made them obscure. This replacement of the shop assistants not only acted as a catalyst in the product suggestion system but it also increased the likelihood of confusion that the consumers would eventually face between the trademarks.

[17] https://www.ipaustralia.gov.au/trade-marks/understanding-trade-marks.
[18] Supreme court of India in Dau Dayal Vs State of Uttar Pradesh AIR 1959 Sc 433

Furthermore, the emergence of E-commerce as the second revolution not only aided Trademark law but also faced issues from novel innovations like Google and other search engines. Trademark Law had to deal with the complexities of keyword advertising and other technical issues like domain names, meta tags and the doctrine of initial interest confusion.

Trademark Law also has to deal with new issues in the form of social media and the processing purchase that goes along with it. It has to take into consideration that the general public is not spending most of their time on various social networking sites such as Facebook, Twitter, Whatsapp, Instagram, etc.,[19] as a result of which, brands are suggested, promoted, encouraged and purchased in dramatically different ways.

Whether it was the intention or not, AI has indeed managed to establish its presence into almost all facets of human life and interaction and a majority of this presence can be found in the retailing scene. This obviously calls for Trademark Law to adapt itself so that it can properly deal with the complexities that AI brings.

Intersection of Trademark and Artificial Intelligence:

The concept of AI was first introduced by Alan Turing and was first coined by John McCarthy in 1950 during a conference at Dartmouth.[20] It is established by now that there is no proper singular definition for AI, at least one that is universally accepted. While some define AI as a computerized system exhibiting behaviour commonly thought of as requiring intelligence, others define it as a system capable of rationally solving complex problems or taking appropriate steps to achieve the desired result in real world circumstances.[21] Based on the issue it faces, an AI will solve it using logical reasoning, knowledge representation, planning and navigation, natural language processing (NLP) and perception[22] and also includes Machine Learning (ML), Deep Learning (DL), artificial neural networks, expert systems and robotics in its arsenal.[23]

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[19] INTELLIGENT TRADEMARKS "Is Artificial Intelligence Collides With The Trademark Law?", Pg 6.

[20] Exec. Office of the President National Science and Technology Council Committee on Tech., Preparing for the Future of Artificial Intelligence (2016)

[21] Sachin Chitturu et al., Artificial Intelligence and Southeast Asias Future, McKinsey Global Inst. 4 (2017); Benjamin Alarie, Anthony Niblett and Albert H. Yoon, "How Artificial Intelligence Will Affect the Practice of Law´, Univ. of Toronto Fac. of L. 8 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3066816.

[22] 2nd Obama Report, supra note 11, (citing Frank Chen, "AI, Deep Learning, and Machine Learning: A Primer´, Andreesen Horowitz (10 June 2016), https://a16z.com/2016/06/10/ai-deep-learning-machines).

[23] Michael Mills, Thomson Reuters, "Artificial Intelligence in Law: The State of Play´ (2016), https://www.neotalogic.com/wp-content/uploads/2016/04/Artificial-Intelligence-in-Law-The-State-of-Play-2016.pdf

The rise in prominence of AI in daily facets of human life and the ever-changing nature of product purchasing and service providing has significantly placed the spotlight on traditional trademark law. A huge majority of start-ups are making their way into the AI market and according to the Gartner Inc. study, the global business value derived from AI is predicted to reach from 1.2 trillion US dollars in 2018 to roughly 3.9 trillion US dollars in 2022. And the major contributing factors to these figures are predicted to come from customer experience, new revenue and cost reduction in services.[24]

A report released by Frontier(less) Retail on the state of the retail industry which included original consumer data from the UK, US and China markets has observed that an approximate of 89% of millennials from the US and about 91% of Gen Zers prefer to indulge in online shopping rather than to physically go to the shops and purchase their desired products. A whopping 96% of Chinese respondents were sceptical about counterfeit products and 94% of them about payment security. 43% of UK millennials and 53% of UK Gen Zers ordered their products from the net and had an expectancy rate of delivery in no more than 2 days.[25] In addition to this, a report by Statista established that 38% of consumers depend upon AI suggestions to make an informed purchase.[26]

As of now, the impact that AI has had on Intellectual Property (IP) has mainly centered on patency law and patent protection of AI technologies. However, AI has recently proven to be a challenge to trademark law. Despite trademark law withstanding and adapting to three revolutions namely; self-service, E-commerce and social media, it still has to deal with AI.

AI, at its very core, is a computer that has been thoughtfully and intricately programmed in such a way so as to imitate natural innate intelligence of humans by way of learning, logical reasoning or decision making. The probability of risks associated with human error can be reduced by the usage of AI. Several companies from around the world have started to market AI systems to lawyers at a cost-effective rate to undertake document review, to scan through voluminous information, to assess and interpret contracts and to perform legal research, assist in trademark clearance searches and policing. Some companies claim to use machine learning and natural

[24] Gartner Inc study on Global Artificial Intelligence Business Value, https://www.gartner.com/newsroom/id/3872933

[25] New trend report: Frontier(less) Retail - 06-15-2016 by JWT Intelligence - JWT Intelligence - https://www.jwtintelligence.com.

[26] https://www.statista.com/topics/3104/artificial-intelligence-ai-worldwide.

language analysis to quickly determine if a mark is able to be protected. Such products also enable a party to police its mark, evaluate potential infringers, and monitor the trademarks of its competitors.

With AI technology, tasks can be performed much faster, guaranteeing greater accuracy and in turn saves a lawyer's time and resources. There are numerous tools and software services that have been introduced in the market to carry out pre-filling searches to determine the likelihood of confusion between marks with respect to similarity of marks and/or similarity of goods/services which have a robust knockout or preliminary screening process that quickly gives one clearance to advice one's client to use and adopt the proposed trade mark at a much faster rate and in turn capturing semantic, structural, and textual similarities between trademarks- word, device, logos, images etc. with a much higher success rate.

In contemporary times, trademark law comprises the basic tenets of the average consumer, phonetic, aural and conceptual similarity, imperfect recollection and blurring of trademarks all of which have their roots from the 19th century when Trademark law was first developed. Considering this as a first concept, the average consumer – under the current law is deemed to be reasonably well-informed, circumspect and aware, but rarely encounters the chance to initiate direct comparisons between two marks and rather relies on his average intelligence of imperfect recollection of the relevant marks.

However, to date, there is only one proper case that has come to light with respect to the intersection between trademark law and AI. In the case of *Lush v/s Amazon,*[27] the court reprimanded Amazon for infringing upon trademarks belonging to Lush. The details of the case encapsulates that Amazon which had bought the keyword Lush from a Google bidding process somehow redirects the term "Lush" to its website whenever it is typed on the Google search engine. Also, when it is searched on the Amazon website, it redirects to a page suggesting other marks with the term "Lush" and not to the products sold and displayed by Lush on its website. The AI of the website is configured as such that it suggests similar products based on the keyword searches which makes it a clear and blatant case of infringement. The court has held Amazon liable for infringement as its conclusion.

[27] Cosmetic Warriors and Lush v Amazon.co.uk and Amazon EU ([2014] EWHC 181 (Ch))

Powerful and intelligent legal technological advancements such as these have paved the way for trademark attorneys to efficiently harness the power of artificial intelligence and use it on a daily basis advising clients like never before in turn meeting deadlines, revenue objectives, client satisfaction, and probability effectively. The usage of such a disorderly form of technology will inevitably continue to rise in prominence in the near future.

2.1 Trademark issues (general):

To properly explain this subject matter, one must first understand the six facets related to trademark law:

i) Doctrine of likelihood of confusion,
ii) Doctrine of initial interest confusion,
iii) Post purchase confusion,
iv) Average consumer/average internet consumer,
v) Imperfect recollection and,
vi) Visual, phonetic and conceptual similarity.

Doctrine of likelihood of confusion

The rationale for trademark protection is to preserve the distinctiveness and commercial magnetism of marks without regards to consumer confusion.[28] The law gives a lot of priority to marks and symbols so that consumers need not actually be confused but it is the likelihood that they will get confused which itself amounts to liability. Confusion is created at different stages of the purchasing process. Mainly, "source confusion" is the foundation of trademark law and it comes into play only if there is a similarity between marks and symbols. "Sponsorship confusion" is next and it arises when consumers believe that the original owner is behind certain goods which is not at all factually true. Other confusions include initial purchase confusion (before purchase) and post purchase confusion (after purchase).

[28] Frank I. Schechter, The Rational Basis of Trademark Protection, 40 HARV. L. REV. 813 (1927)

Doctrine of initial interest confusion

When the consumer is attempting to make a purchase of a certain product but he/she receives a suggestion to purchase a different but similar product then a temporary confusion is dispelled before the purchase of the desired product. Though this doctrine came into existence in the 1970's, it was first applied on the internet by the 9th circuit in *Brookfield Communications Inc. v/s West Coast Entertainment Corp. case* while addressing the issue related to the use of registered trademarks as "meta tags" by the non-trademark holder.

Post purchase confusion

Consumers are confused when there is an alleged improper use of protected trademarks on a lower quality (non-genuine) product which diminishes the reputation of the holder of the rights of that mark.[29] The basic subject matter of post purchase confusion includes:

- Competing products – where the parties differ on whether on "trade dress" (or the products) are very similar.
- Counterfeits – where either the trademark or the trademarked product was copied and sold as authentic.
- Reselling altered product – where one party was selling the original item but after altering it to make it into something more expensive or reselling it as refurbished and not attaching their company name.
- Use of genuine products to make and sell something – post-sale confusion does not apply.

The above are some of the contributing factors where infringement can take place even after the purchase.

Imperfect recollection

Although the average consumer is deemed to be reasonably well informed and reasonably observant and circumspect, the fact is that the average consumer gets a rare chance to compare

[29] GIBSON GUITAR CORP. v. PAUL REED SMITH GUITARS, LP U.S. Court of Appeals for the Sixth Circuit, September 12, 2005 http://www.tabberone.com/Trademarks/TrademarkLaw/Confusion/PostSaleConfusion/Analysis.shtml.

the similar marks and ultimately the consumer has to depend upon the imperfect picture he/she has stored in their mind. The average consumer is attracted to different aspects of the goods and services and certainly his attention depends and varies according to the category of the products and services.[30] Even consumers with high level attention cannot recall the marks and symbols accurately.[31]

Visual, phonetic and conceptual similarity

The degree of confusion created by visual, phonetic and conceptual marks depend upon the category of goods and services and also includes the marketing strategy related to them. Though it is presumed that the visual, aural and conceptual aspects are linked, it can only be decoded during the purchasing process. For instance, if the products are visually examined, the assessment of likelihood of the confusion is particularly based on the visual impression of the signs rather than the aural or conceptual similarity. But proper precaution should, nevertheless, be taken while dealing with the visual, aural and conceptual similarity and it should always be dealt with on a case-by-case basis.

2.2 Trademark issues with respect to Artificial Intelligence:

Ever since its inception, Trademark law has always strived to eliminate the confusion surrounding marks and to protect the original copy. During this process, the consumers develop a kind of emotional bond with the brands and subsequently place an amount of sentimental value on it. The question to be asked here is what if this emotional bond is broken and replaced with an artificial one? It is true that the choices humans make are being replaced by the choices that technology makes. In the present generation it is the technology which all in all determines the choices that the public makes. Taking this context into consideration, it is safe to observe that artificial intelligence technology has more or less replaced the common or average consumer. Once this average consumer is replaced by its artificial counterpart, it is inevitable that the basic aspects of trademark law be challenged. It was assumed that this widespread replacement would

[30] Judgment of 22/06/1999, C-342/97, Lloyd Schuhfabrik, EU:C:1999:323,§ 26
[31] Judgment of 21/11/2013, T-443/12, ancotel, EU:T:2013:605, § 54

take time to come into fruition, however this replacement has already been established. A few instances of this replacement would be:

Beginning with the simple Amazon website, as earlier mentioned, the majority of millenials prefer purchasing their desired products online and specifically through the Amazon website. The thing that makes a website like Amazon stand out from similar such websites is that it makes suggestions or recommendations on products based on the browsing history as well as the purchase history of the consumer. This can be considered as a modern shop assistant.

But how exactly does this algorithm work? The simple answer is the AI system which is integrated into the website which analyses the data and certain other factors after which it makes the suggestions of products that the consumer feasibly would desire. The question which needs to be asked after this is what factors contribute to the suggested products. Are they the brands of the product or other criteria like price and speed of delivery? Additionally, if the website suggests a counterfeit product can it be considered as a secondary infringer?

Before we delve into answering the above presented question, let us first have a look at the other amazing products from Amazon's Echo known as "Alexa". Alexa is also another form of AI which functions on an in-built voice recognition software program. A similar AI to Alexa would be Apple's "Siri", and IBM's prestigious AI system, "Watson" along with a plethora of other Google home devices.

All the above products interact with humans "naturally." And these products are advanced enough to understand the emotions that humans have and their respective cultural aspects. To add on to this is the recent release of the "Pepper" AI which is a robot that behaves as humanly as technologically possible, understands human moods and acts accordingly. And the common aspect among the mentioned is all of them being AI. Alexa not only interacts with humans but has the capability to automatically order the products based on the current market trends and brand information.

A few questions that now need to be asked are namely:

i) Can the doctrine of an average consumer be applicable to the Alexa AI?
ii) Is there any possibility of a scenario where Alexa gets confused?
iii) On what basis does the Alexa AI make suggestions of products and brands?

iv) What if only a few specified brands are integrated into the AI for suggestions while withholding other brands?

Similar questions can be asked to another one of Amazon's products known as "Amazon Dash" which is also an AI powered system and provides replenishment services. In this case, the Dash automatically reorders the consumable items which are running out of the consumer's home or office.

The other forms of AI present in the current market are known as "bots". These are very essential in online trading or customer service. Bots like eBay shop bots or Mona, shopping app bots identify the customer preferences and suggest the products based on price, location and style, etc.

The mentioned examples depict a clear picture of how AI is rapidly replacing the natural consumer. It is clear to see that the scenario of retail shopping is shifting by being reactive rather than predictive and almost removing the human element from the purchasing process.[32]

The question to be asked now is how the basic tenets of trademark law will react to this new artificial consumer. It is well known that trademark law was brought into existence to balance out the inherent human errors in this scene but is AI also at risk of committing such mistakes? In essence, the AI is challenging the concept of the "average consumer" with its perfect recollection.

A similar line of question that can be asked is whether there is any possibility of an AI suffering from confusion. If the answer is yes, then Alexa would fail in its goal to provide the predictive suggestions but the truth is that an AI is capable of analysing data by recollecting it perfectly which avoids any confusion between brands. What sort of data is exactly being incorporated into the AI when it comes to brand recognition though? Can an AI think like a human when performing as a consumer and sense the difference in quality between brand value, intensity, and the emotions related to the products and services it so wishes to purchase?

As of now, the current state of AI primarily makes suggestions of products based on the price and speed of delivery which is proving to be quite detrimental to brands and consumers alike. Until and unless trademark law (which is already struggling to keep up with the issues related to

[32] Lee Curtis, Rachel Platts of HGF "AI is coming and it will change trade mark law.′ See http://www.hgf.com/media/1173564/09-13-AI.PDF.

an AI), as a whole, answers the above presented questions, the marks or brands of products and services are not free from it being potentially infringed upon.

2.3 Global Scenario

Trademark law strives to eliminate any confusion with respect to logo, appearance or packaging or any other marks which identifies a particular brand or company so that there is no confusion amongst consumers. It is difficult to analyse how an AI can infringe upon a trademark and issues such as patency cases and copyright cases can arise. There have been cases where the question of infringement of trademark with respect to an AI arose. In the case of *Louis Vuitton v/s Google France*[33], there was an issue of keyword advertising and the automated choices which are made through Google and it was alleged to be infringing the trademark of the petitioner.

However, the court held that there is no infringement unless the party itself took an active part in it. In the earlier mentioned case of *Lush v/s Amazon*, the need to structure the trademark laws as well as for future issues was observed. Lush had not allowed Amazon to sell its products on the website. Through a bidding process, Amazon had bought the keyword "Lush". Therefore, even if Lush was searched through Google, it would show Amazon advertisements as well. And though there were no sales on the website, the AI would keep showing the similar products based on the searched keyword. A suit for infringement of trademark was filed by Lush and the court found Amazon guilty for the same.

With the increasing use of AI in retail and business models as well as security and payment methods, this situation can get much worse. The case can deteriorate more if there are AI based consumers. AI is based on algorithms and uses the data by identification of prior choice. If an AI becomes a consumer there is a huge chance of confusion with respect to trademark and this situation can lead to a rigorous amount of litigation.

There are no particular laws in any country in this respect and it is the need of the hour that certain regulations are made to avoid any such confusion in coming years.

As has been observed earlier, trademark law is concerned about the purchasing process, how products are bought and the interaction between the consumer and the brand. This purchasing

[33] Google France SARL and Google Inc. v Louis Vuitton Malletier SA (C236/08), Google France SARL v Interflora Inc and another v Marks and Spencer plc [2014] EWCA Civ 1403

process is affected by information available to the consumer and who, or indeed what, makes the purchasing decision. AI has an impact on the information available to consumers and their purchasing decisions.

Moreover, trademark law is fundamentally based on concepts of human frailty. When you take the "human" and the "frailty" out of trademark law what are you left with?

Some of the basic tenets of trademark law concern aspects of human frailty, such as "imperfect recollection", "confusion", the "slurring of trademarks" and the aural, conceptual and visible impact and comparison of trademarks. These aspects of trademark law were heightened with the rise of supermarket shopping, but are likely to become less important with the rise of AI due to the reduced product choice, or at least reduced product and brand choice, individual consumers are presented with.

AI applications also have important implications for who is considered to be the "average consumer" in trademark infringement proceedings and issues of liability. If an AI application purchases a product, with little or no human interaction, who or, more importantly, what is the average consumer and who or what is liable for a purchase which leads to trademark infringement?

The *Louis Vuitton v/s Google France* decision, which concerned the issue of keyword advertising and the automatic choice of such keywords in Google's AdWords system, held that Google would not be liable for trademark infringement unless they took an active part in the keyword advertising system. Furthermore, the *L'Oreal v/s eBay case*[34], which concerned the sale of counterfeit goods on eBay's online marketplace similarly held that eBay would not be liable for trademark infringement unless they were actively aware of the infringing activity. A similar reasoning was followed in the *Coty v/s Amazon case*.[35] It would therefore appear that if an AI application provider had in place sufficient take down procedures akin to those described in the *Google* and *eBay* cases, and were not on notice of infringing activity, then they would not be held liable for infringing activity.

[34] L'oreal v/s eBay, Judgment of the Court (Grand Chamber), 12 July 2011, Case no. C-324/09
[35] Coty v/s Amazon, Judgment of the Court (Fifth Chamber), 15 June 2020, Case no. C-567/18

However, where the AI provider is more involved in any potential infringing activity, two cases suggest that liability could be found by the AI provider. In *Cosmetic Warriors Ltd. and Lush Ltd. v/s Amazon.co.uk Ltd. and Amazon EU Sarl*[36] before the United Kingdom High Court, Amazon were found liable for infringement in the use of trademarks which triggered links to its website that did not encompass the branded product referenced, such that the consumer could not tell whether the products on sale were those of the brand owner or not. Further, a series of cases before the Federal German Court concerning *Ortlieb Sportartikel GmbH*[37] held Amazon liable where ads on Amazon were triggered by the use of the search term "Ortllieb", on the basis of its use in product descriptions as well as on the basis of past consumer behaviour, a key aspect of AI applications. The courts reasoned that consumers would have been "conditioned" in the expectation that Ortlieb and only Ortlieb products were being sold. There has been speculation most notably by Markus Rouvinen on the IP Kat Blog that such logic could be applied to so-called online product listing ads (PLA's) where the search provider actively triggers ads based on past search behaviour, which is similar to past consumer purchasing behaviour, one of the main drivers of AI-based purchasing suggestions and decisions.

2.4 Indian Scenario

Online retailers are employing AI based algorithmic systems to make prospective recommendations to buyers. In doing so, they read and formulate data based on our search histories, preferences, buying profiles, and countless other miniscule details. It is imperative to note here that through this employment of AI based systems, the very essence of Trademark is being left redundant. AI can be well assessed as a plausible tool to deprive customers of their discretion in choosing the products of their choice. It is intriguing and perturbing at the same time to see that although the customer is under the impression that he is seeing the products of his choice, or is exercising control over his decision-making process, however, most consumers are unaware of this limitation set to their choices.

[36] supra at 14
[37] Ortlieb case, Federal Court of Germany, 15 February 2018, Case no. I ZR 138/16

An analysis of this market system was done by Mr. Ajay Agarwal in his book, *"Prediction Machines: The Simple Economics of Artificial Intelligence."*[38] He emphasizes how it is a cogent possibility that AI will take over the choices of people. Market retailers will utilize this technology to shift the existing approach of "shopping to shipping" to "shipping to shopping." This means that against the existing approach where a person shops for a particular commodity which is then subsequently shipped to them; with the emergence of AI, online retailers will ship the product to you based on your preferences decoded by these algorithmic systems, and you finalize the payment after trying out the product based on your liking. Customers would feel it is essentially their choice, but this process nevertheless creates limitations to their discretion. This prediction system based on AI, will not incur any hefty investments to the retailers once established, and the resources saved would be utilised to bring out efficiency in the delivery system: drone delivery, closer point of contacts, etc.

With these rapid advancements in place, we have witnessed a surge in AI assistance products in the market. Google Home, Amazon echo, Apple Home Pod, Samsung bots, etc. have been developing rapidly with parent manufacturers launching newer advanced versions, with an accretive competence in imitating human thoughts and likings. But it is crucial to contemplate over the possible ramifications of employing these products in making real life choices.

For instance, if a person uses one of these AI based systems to order a particular product, and the algorithm chooses the best possible option based on the data collected through monitoring the choices and preferences of the user, what determines the liability of such decisions? If the bought product turns out to be counterfeited, or there is a substantial discrepancy in the desired quantity or quality of the product thus ordered, would these tech giants like google or amazon be liable for such infringements? Would they be liable for the primary infringement with the intellectual property rights of the product manufacturer whose goodwill reputation for his product is being exploited? More importantly, the foundational elements of trademark law like "likelihood of ambiguity", "unwary customer", "imperfect recollection", etc. remain unaddressed in this new application of AI. These are worrying concerns, and demand pressing answers in order to justify this convergence of AI and trademark law.

[38] AJAY AGRAWAL, JOSHUA GANS AND AVI GOLDFARB, PREDICTION MACHINES: THE SIMPLE ECONOMICS OF ARTIFICIAL INTELLIGENCE (Harvard Business Review Press, 2018).

Another instance of AI striking at the roots of Trademarks is the new emerging technology by Amazon, called the "Amazon Dash Replenishment Service" (DRS).[39] This system lets you order supplies from Amazon automatically, in the event that the supply of that product is running low. The customer selects the products and opts for an automatic delivery system, and the DRS system places the order and executes the payment (default added method). There are two potential complications here. It sub-consciously takes away the choice of the consumer in trying different brands of products. Many times, we do not plan on switching our regular supplier of sugar or cream, but end up doing that when we come across a better option. Further, with development in this system, it might also have the option of choosing the brand on its own discretion.

This might seem like a bit of a stretch, but it hints to be a possibility when one sees the AI chatbots being used by various shopping websites that act as the online version of personalised shop assistants. Take for instance, H&M's Kik bot, or eBay's Shop bot, etc. A survey conducted by PSFK IQ, a trends research platform for strategy[40] reveals that people are inclined to disclose their personal information to these bot softwares if they are likely to find better and more personalised recommendations. An efficient AI chatbot carries the potential to influence a consumer's loyalty. But isn't an AI based bot capable of making biased recommendations? Algorithmic systems, based on machine learning are capable of developing codes as they receive inputs. They are capable of generating biased outputs.[41] This leads to an inference that what if the suggestion made by a bot entails an "infringing product"? If the consumers end up taking that suggestion and buying it, who is liable to face the legal repercussions? It is imperative to ascertain that such AI bots are incapable of indiscriminatory suggestions, refraining to make recommendations that are only of the company that pays the parent organisation manufacturing the bot.

These aforementioned instances project the need for a revision in the core terms of Trademark law. It underscores the need to revise terms concepts like "imperfect recollection", "secondary

[39] Amazon Alexa Team, Amazon Dash Replenishment, AMAZON DEVELOPERS (Jan. 26, 2021) https://developer.amazon.com/en-US/alexa/dash-services.
[40] PSFK, The Future of Retail, PSFK (Jan. 27, 2021) https://www.psfk.com/2018/04/chat-ai-shopping-assistantsconversational-commerce.html
[41] Harsh Pati Tripathi, Algorithm Based Systems and the State: A Brief Inquiry, TECH LAW FORUM @ NALSAR (Jan. 26, 2021) https://techlawforum.nalsar.ac.in/algorithm-based-systems-and-the-state-a-briefinquiry/.

infringement", "average consumer", "likelihood of confusion", etc. These terms form the foundation of trademark law and they need to be revisited in the light of these rapid advancements in technology. They all factor in the capabilities of human beings in choosing as per their discretion, and essentially "tracing" the origin of the products they are interested in. Let us take one of these terms and analyse to understand the possible ramifications.

Consider "average consumer", the Supreme Court of India elucidated in the case of "*Cadilla Healthcare Ltd. v. Cadilla Pharmaceuticals Ltd*."[42] that a consumer can be classified as an average consumer if he possesses average intelligence and carries the tendency of "imperfect recollection." This interpretation stands in complete contradiction with the essence of AI application already discussed above.

An AI based bot does not possess average intelligence, nor is it capable of imperfect recollection. There is going to be a minimalistic grade of confusion. Perhaps the threshold for trademark infringement would now be bleaker? Moreover, it is going to be a matter of grave contention how exactly the definition of "average consumer" and other such basic tenets of trademark law will be applied to AI. Consequently, the liabilities and secondary infringements will be more intricate to discern.

2.5 Conclusion

In conclusion, the revolution of Artificial Intelligence will undoubtedly affect every facet of the legal field, and trademark law is going to be no exception. Thus, there is a constant need of exploration and revamping of the legal structure, so that trademark law does not merely turn into a repository of loopholes, which cannot sustain trademark claims. As of now, no concrete suggestions can be made in this regard, as to how exactly the law needs to be shaped or structured, especially in the Indian context in order to accommodate the rapidly advancing Artificial intelligence into the bone marrow of Trademark law.

But it is nonetheless imperative to be open in this aspect, and keep in mind the basic ideals of preventing counterfeiting and exploitation of the goodwill of brands. Reducing monopoly,

[42] Cadilla Healthcare Ltd. v. Cadilla Pharmaceuticals Ltd, 2001 (2) PTC 541 SC.

increasing competition and ensuring quality products for the consumer are the ideals that serve as the purpose of Trademark law. Technological advancements should not be a hindrance to the same, but in fact should serve as tools to facilitate the process. The UK court's decision in the Lush case serves as a healthy precedent that elucidates a possible limitation exercise. It is high time that Indian jurisprudence too takes into account the relevance of such dynamic interpretations.

2.6 Comments

Although the issue of Artificial Intelligence and trademark liability have not found prevalence in the courts of law as of yet, a number of cases, especially during the past decade and in developed jurisdictions like the EU have addressed issues alike.

AI indeed is gaining prominence and is here to stay. Its impact on intellectual property and Trademark Law in particular cannot be overlooked anymore. It is very much possible that the basic and the conventional tenets of the Trademark law might not any longer apply in a marketplace that is slowly being taken over and driven by AI programs. The way products are brought forms the basis of Trademark law and the emergence of AI is ought to make a substantial change to that. The main legal question going forward revolves around liability and there has not been any clear cut answer found for that.

CHAPTER – III

COPYRIGHT AND ARTIFICIAL INTELLIGENCE (AI): ADEQUACY IN PROTECTING THE INVENTION OR ARTISTIC WORK PRODUCED USING AI

Artificial intelligence (AI) systems are evolving at a breakneck speed these days, with increasingly sophisticated software being integrated into them. AI-enabled systems have progressed from simple calculation to the creation of poetry, artwork, and other forms of more complex creative activity. Artificial intelligence (AI) has emerged in the realms of creativity and innovation, and it is projected to become a part of everyday life in the near future. New AI technologies provide intriguing possibilities for advancements in the creative arts, entertainment, and life-improving inventions.[43]

Intellectual property has always had a symbiotic relationship with the creation of new technologies, and legislation has had to adjust in order to keep up with technological and cultural changes. Artificial intelligence (AI) has the potential to upend the IP system, posing fundamental problems about inventorship, authorship, ownership, and infringement, some problems that are particular to copyright. Let us now see how they interact.

3.1 Copyright and Artificial Intelligence Intersection

Copyright is a crucial component of intellectual property protection. It is a legal right awarded to an original work's creator, granting him or her exclusive rights to use and distribute the work. The idea that the author is an originator was combined with Locke's economic theory of possessive individualism as the rationale and justification for this.[44] In general, two basic elements must be met in order for a copyright to be granted. First and foremost, the art must be *tangible*, and it must also be *unique*.

A copyright is exercised generally for literary and artistic works. Since one of the contemporary areas of AI's applicability is creation of literary works, the study of copyright in light of AIs,

[43] WIPO Begins Public Consultation Process on Artificial Intelligence and Intellectual Property Policy', PR/2019/843 (June 26, 2021, 05:00 P.M.)https://www.wipo.int/pressroom/en/articles/2019/article_0017.html
[44] Leenheer Zimmerman, It's an Original!(?): In Pursuit of Copyright's Elusive Essence, 28 COLM. J. L. & ARTS 1 87, 194 (2005).

becomes relevant. In order to understand the protection of copyright in light of AI, it is important to analyse the following judgments:

Burrow Gilles Lithographic Co. v. Sarony[45]

The question in this case was whether a photograph might be accorded copyright protection. It was an important case because it dealt with the distinction between creative and mechanical labour. The Court debated whether a product that is the output of a machine should be granted copyright protection. By ruling that merely mechanical labour is not creative in and of itself, the Court limited the scope of their protection. As a result, awarding copyright for works made by AI systems would be problematic if a rigid method like this were applied to them.

Bleistein v. Donaldson Lithographing[46]

This case was a continuation of the legal issue raised in the preceding one. The Court made a clear distinction between human work and computer activity in this case. In his majority opinion, Justice Holmes defined the uniqueness of human personality and stated that it was a requirement for a copyright. The Court made its position apparent by using the terms *"something irreducible, which is one man's alone,"* implying that anything that was not a result of man's imagination was out of the question.

Alfred Bell & Co. v. Catalda Fine Arts[47]

The Courts took a softer attitude to copyrights as a result of this decision. The Court lowered the criterion for originality, ruling that the work must not be reproduced from any other artistic work of similar kind in order to **be** considered unique. It even stated that an author can claim inadvertent or accidental alterations as his or her own. People claiming copyrights for work generated by AIs will be relieved by this decision because the work was not copied, despite the fact that it was developed through certain programming and algorithms. These three decisions help to clarify the ambiguity surrounding the grant of protection to AI systems to some extent. However, the lack of a firm stance still has an impact on potential right holders.

[45] Burrow Gilles Lithographic Co. v. Sarony, 111 U.S. 53 (1884).
[46] Bleistein v. Donaldson Lithographing, 188 U.S. 239 (1903).
[47] Alfred Bell & Co. v. Catalda Fine Arts, 191 F.2d 99 (2d Cir. 1951).

3.2 Copyright Protection of AI-produced works

Artificial intelligence (AI) applications are capable of producing literary and artistic works on their own. This capability creates significant policy issues for the copyright system, which has long been identified with the human creative spirit, as well as respect and compensation for, and encouragement of, human creativity expression.

The policy stances taken in regards to the assignment of copyright to AI-generated works will be at the heart of the copyright system's social purpose. The copyright system would be considered an instrument for supporting and prioritising the dignity of human innovation over machine creativity if AI-generated works were barred from qualifying for copyright protection. If AI-generated works were given copyright protection, the copyright system would be considered as a tool supporting the availability of the greatest amount of creative works for consumers, as well as placing equal value on human and machine creation.

3.3 The issue with AI Authorship

The content created through AI might be reported as an oversimplification of creative process however, it required a human to develop the software and to collate and input hundreds of screenplays used as the database.

According to a recent European Commission report on AI and IP, we may be approaching AI autonomy, at least to the point where human contribution is "trivial to the creative or inventive process," and thus we may be entering an era in which machines *"not only assist humans in the creative process but create or invent all by themselves."*[48] However, we are not currently at that stage and at present, AI technology is not considered truly autonomous. In fact, in a typical machine learning system there is human involvement and human intervention at a number of points, such as choosing how to set the system up – writing and choosing of the algorithm (including which learning models to use), choosing and collating data, often this includes the

[48] Maria Iglesias, Sharon Shamuilia and Amanda Anderberg, Artificial Intelligence and Intellectual Property - A Literature Review, EUR 30017 EN (Publications Office of the European Union, 2019).

undertaking of data cleansing or other actions on the data including how it is structured, providing feedback, reviewing output and revising model and so on.

Therefore, a fundamental problem is that it seems to present a false premise by assuming that AI is completely autonomous. Whereas, AI systems are highly dependent on programmers, developers and data input through human intervention to train intelligent algorithms. Stating that AI applications are capable of producing literary and artistic works autonomously, neglects to acknowledge that an AI application would need source data in order to do so.

It should also be noted that there are difficulties in distinguishing works generated by humans and by machines.[49] AI-generated works often arise as a result of collaboration between several humans and the machines. It is necessary to take precautions to ensure that works generated by humans using technology as a tool are not unduly recorded. For example, typing on a word processor to create a work would be regarded as human work aided by technology.

It should also be emphasised that distinguishing between works created by machines and works created by humans will be challenging; perhaps a follow-up question on how to deal with this, as well as discussion of shared authorship, would be beneficial.

The use of the word original in the context of AI-generated works may not equate to originality in the human sense, according to a growing body of evidence. Originality and whether we should recognise AI-generated works as such, or, more likely, categorise them as unoriginal copyright works, as is the case with films, sound recordings, and other media, is an essential debate that has to be aired. If only original works can be protected by copyright, and that unoriginal works cannot be protected, it neglects to appreciate copyright protection for works such as sound recordings.

A more in-depth discussion of originality in the context of AI-generated works is needed to determine whether we should recognise AI-generated works as original or categorise them as unoriginal copyright works: similar to how films, sound recordings, broadcasts, and typographical arrangements are classified.

[49] Toby Bond and Sarah Blair, Artificial Intelligence & Copyright: Section 9(3) (2019) JIPLP 14(6), 423.

3.4 The issue with AI Ownership

The copyright system is associated with the human creative spirit for the encouragement of the expression of human creativity. In the case of *2011 CJEU case Painer,*[50] the Court held that *"an intellectual creation is an author's own if it reflects the author's personality. That is the case if the author was able to express his creative abilities in the production of the work by making free and creative choices… by making those various choices, the author of a portrait photograph can stamp the work created with his 'personal touch.'"* This emphasises the need for human personality input to the creation of copyright works.

Furthermore, it is incumbent to recognise that extending copyright protection to AI-generated works may weaken the conceptual underpinnings for copyright and the foundations on which protection is now based. In some jurisdictions, such as the UK, South Africa, Hong Kong, India, Ireland, and New Zealand, copyright ownership has already been provided to AI-generated works through protection for computer-generated works. The ownership of the copyright is granted to the person who set up the arrangements necessary for the creation of the work.[51]

It's also worth noting that AI systems are extremely data-dependent; for example, millions of photos, texts, videos, sounds, and raw data are necessary to feed and train AI systems like machine learning and deep learning. Copyright may be used to protect the data's content. In theory, the developers should be able to access and utilise the data for that reason after obtaining authorization.

Finally, there have been reports of AI-generated works being recognised as AI-generated works. The implications of ownership are critical, and private deals based on this ownership are already being negotiated. This has important ramifications for the topic of copyright ownership in AI-generated works. In these cases, it's also worth considering whether private agreements may or should be formed prior to, or after any official decision about copyright ownership in AI-generated works.

It should be explored whether giving AI a legal personality may or should be considered the same as giving an author personality. It's also worth considering why copyright protection should

[50] Painer (C-145/10) ECLI:EU:C:2011:798.
[51] Hayleigh Bosher, 'Warner Music Signs Distribution Deal with AI Generated Music App Endel' (IPKat, 2019), (June 26th, 2021, 5:04 P.M.)https://ipkitten.blogspot.com/2019/03/warner-music-signs-distribution-deal.html

be provided in the first place. In terms of copyright and moral rights, the use of data in AI processing must be addressed.

3.5 Infringement and Exceptions

Another important consideration is whether it would ever be possible for AI systems to be "taught" copyright law and be trained not to infringe, particularly in view of complex copyright principles such as the idea-expression dichotomy, the possibility of non-literal copying constituting infringement of certain works, tests that operate on a qualitative instead of quantitative basis, different periods of protection for different subject-matters etc. It is also suggested that consideration of moral rights should also be expressly referred to along with economic rights.[52]

It is critical to address new limitations and exceptions, both in the context of innovative AI applications and in the framework of existing sector-specific conversations: For example, discussions on constraints and exceptions to allow digitization of libraries and archives can address the need to make it easier to create or access datasets for AI to "learn" from. However, it is also essential to consider the extent to which existing limitations and exceptions, such as the Berne Convention's Article 10(1) quotation exemption, may already be employed in the context of certain AI deployments.

As a result, it is advised that the following two general difficulties, as well as their specific subtopics, be addressed in depth in regard to individual AI deployments:

1) the extent to which exclusive rights may be infringed (e.g., reproduction, adaptation, public communication, etc.) and with respect to whose subject-matter; and

2) the extent to which current limitations and exceptions are already applicable, as well as whether and how new limitations and exceptions should be formed (e.g., exceptions to which rights and under which conditions, as in the three-step tests).

[52] E.g. Berne Convention, art 6 bis, WIPO Performances and Phonograms Treaty 1996 (WPPT), art 5.

3.6 Global Scenario

It has never been expressly forbidden to grant copyright to works created by artificial intelligence. However, there is evidence that non-human copyright is not recognised by many countries' laws. The Copyright Office in the United States, for example, has stated that it will *"register an original work of authorship, provided that the work was created by a human being."*[53] This viewpoint stems from *Feist Publications v. Rural Telephone Service Company, Inc.,*[54] which said that copyright law exclusively protects *"the fruits of intellectual labour that"are grounded in the creative faculties of the mind."*

Under the American Copyright Act, a work is fixed in a tangible medium of the expression "when its embodiment in a copy or phono record, by or under the authority of the author, is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration."[55]

The requirement for "tangible form" is fairly loose since it only has to be permanent or stable to permit it to be "perceived, reproduced, or otherwise communicated." Thus, tangible form is not limited to actual physical form like on paper, canvas or film reel, but can be even on a computer screen. This implies that to qualify for the requirement of tangible form an AI can make do with just displaying the end result or in any form capable of being perceived, as long as it is able to be retained for long enough time.

A court in Australia recently ruled in *Acohs Pvt Ltd v. Ucorp Pvt Ltd.*,[56] that a work created with the assistance of a machine could not be protected by copyright since it was not created by a human.

In Europe, the Court of Justice of the European Union (CJEU) has stated on several occasions, most notably in the landmark case of *Infopaq International A/S v. Danske Dagbaldes Forening,*[57] that copyright only applies to original works and that originality must reflect the author's "own

[53] Copyrightable Authorship: What can be registered, (June 27, 2021, 05:08 P.M.) https://copyright.gov/comp3/chap300/ch300-copyrightable-authorship.pdf
[54] Feist Publications v. Rural Telephone Service Company Inc., 499 U.S. 340 (1991).
[55] The Copyright Act, 17 U.S.C. §102 (1976).
[56] Acohs Pvt Ltd v. Ucorp Pvt Ltd., [2012] FCAFC 16.
[57] Infopaq International A/S v. Danske Dagbaldes Forenings, C-5/08.

intellectual creation." This is commonly interpreted as meaning that an original work must represent the creator's personality, implying that a copyright work must have a human author.

The second option, granting programmers authorship, is used in a few nations, including Hong Kong, India, Ireland, New Zealand, and the United Kingdom. Section 9(3) of the Copyright, Designs and Patents Act (CDPA) in the United Kingdom best encapsulates this approach:

"In the case of a computer-generated literary, dramatic, musical, or aesthetic work, the author must be deemed to be the person who makes the required arrangements for the work's creation."

A computer-generated work, according to section 178 of the CDPA, is one that "is generated by computer in circumstances such that there is no human author of the work." The goal is to make an exception to all human authorship requirements by recognising the effort that goes into developing a computer capable of producing works, even if the creative spark is provided by the machine.

The English Court of Appeal had to rule on the authorship of a computer game in the case of *Nova Productions v. Mazooma Games,*[58] and declared that a player's input "is not creative in nature and he has contributed neither skill or labour of an artistic sort." Considering user behavior on a case-by-case basis could be one answer to the problem.

3.7 Some Examples

Google Magenta's NSynth Super, Amper Music, IBM's Watson Beat, Spotify's Creator Technology Research Lab, and Jukedeck have all used AI to produce music. Deep learning networks are used by the majority of them. The songs that are developed are absolutely unique. It is developed with very little to no user input.

It is obvious that the music created or the books written by AI are eligible for copyright protection but ambiguity begins in determination of 'to whom' the copyright should/would go. For the AI to get the claim, it is essential that AI is a legal person. It is also required that the work was done by AI, independent of any human association.

[58] Nova Productions v. Mazooma Games, [2007] EWCA Civ 219.

The ability of AI to apply existing knowledge to a new set of facts or situations distinguishes it from machines meant to perform a limited range of behaviours firmly under human direction. It has been argued that all the work created by Artificial Intelligence is a derivative work of the generator program.[59] But in general, computer generated works do not incorporate recognizable blocks of expression from the underlying program or from the database that the program draws upon in the generative process. For this reason, computer-generated output should not automatically be considered "derivative works" merely because in common parlance it could be said that the output was "derived" from or "based upon" the generator program.

It's possible that AI is capable of originality and creativity. As a result, it appears that the sole roadblock to AI obtaining a copyright claim is legislative recognition. Giving AI authorship makes sense in a world where AI is becoming more and more reliant on a variety of services.

An AI is capable of producing original as well as derivative work. In 1993, the author used a computer program (heuristically based expert system) to copy the style of another writer Jacqueline Susann, and assist him in writing the book 'Just This Once.'[60] In this case there was a collaboration between the computer program and the author. The book could not be said to be directly copying the original book of Jacqueline Susann, 'Valley of the Dolls'. The computer was creative. Although it had emulated the book's style, the end product was a collaboration between the program and the author, which was completely new, something perceptively and evidently different from the "source material."

3.8 Indian Scenario

Computer programmes were found to be tangible in *Tata Consultancy Services v. State of Andhra Pradesh.*[61] It was pointed out in *R.G Anand v. M/S. Delux Films*[62] that the law does not recognise property rights in abstract ideas, that an idea is not protected by a copyright until it is

[59] Darin Glasser, Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?, 1 DUKE L. & TECH. REV. 24 (2001).
[60] Scott French, Just this once (1993).
[61] Tata Consultancy Services v. State of Andhra Pradesh, (2004) 137 STC 620.
[62] R.G Anand v. M/S. Delux Films, AIR 1978 SC 1613.

given embodiment in a physical form, and that a copyright only exists when the idea is given embodiment in a tangible form.

The Indian Copyright Act[63] requires a certain amount of creativity to characterize work as copyrightable. Section 2(y) of the Act defines work as a literary, dramatic, musical or artistic work, a cinematograph film, a sound recording. Section 2(o) expands on the list to include computer programs, tables compilations etc. Section 13 enlists what work qualifies for a copyright claim.

This '*modicum of creativity'* standard was laid down in the famous case of *Eastern Book Company v. D.B Modak*.[64] The word 'original' does not mean that the work must be the expression of original or inventive thought. As regards to derivative work, originality is a matter of degree depending on the amount of skill, judgment or labour that has been involved in making the compilation. The judgement also defined primary work as literary work not based on the existing subject matter. It defined secondary or derivative work as work based on existing subject matter. As the copyright pertains to the expression of idea and not the idea itself, it does not require that the work should be in an "original form" but just that it should not be copied from another work.

The copyright work which comes into being should be original in the sense that by virtue of selection, coordination or arrangement of preexisting data contained in the work, the work is somewhat different in character as produced by the author. Although the programmer may help in creating a framework within which the computer makes selection or arrangement of data, it is actually the computer that makes the selection, and going through a combination of selections is what computers are apt for. Machines have been able to exhibit sufficient originality to qualify for copyright protection.

Under the Indian Copyright Act 1957, the term 'author' though defined, is somewhat left open ended in matters concerning autonomously generated computer work. On plain perusal of Section 2(d) of the Act, it does not take into consideration any computer machine which is

[63] The Indian Copyright Act, No. 14 of 1957, India Code (1957).
[64] Eastern Book Company v. D.B Modak, (2008) 1 SCC 1.

intelligent to act as humans, it only considers those computers which are operated by human agency or have some amount of human interaction.

Chapter V of the Indian Copyright Act, in Section 22 talks about the term of the copyright in published literary, dramatic, musical and artistic work- where it mentions term of any work published within the "lifetime" of the author until sixty years from the beginning of the calendar year following the year in which the author "dies." It is clear that the intention of the legislators was at that time to include only mortal beings as subjects of copyright law.

Whether or not the legislators at that time foresee the idea of making non-living immortal entities such as Artificial Intelligence itself the subject of copyright law is still not clear. But under current law, the author must be a living being or at least a corporation comprising living beings.

3.9 Recommendations

The alternatives of giving ownership to Artificial Intelligence for Artificial Intelligence created work is either giving the ownership to the developer of the Artificial Intelligence that created the work or to put the work in public domain. The developer is the closest human agent when an Artificial Intelligence creates something. A developer of Artificial Intelligence could be credited for all creations of Artificial Intelligence. Here we are assuming that the developer does not sell or license the Artificial Intelligence to someone else but uses it to create work.

Putting the work created by Artificial Intelligence in the public domain is another option. By putting the work in the public domain, the work is free for anyone to access and use. It makes the work readily available, accessible and free. Since the Artificial Intelligence did not incur any cost to produce the work, making the work accessible for free would not be illogical.

3.10 Developer of Artificial Intelligence

Artificial Intelligence is distinguished from previous machines by the fact that it does not require human input. Before this, other devices and software required human involvement. Because Artificial Intelligence operates independently of human agency, it is debatable whether it can be

considered a tool of humans. A narrow line exists between what is termed a tool and what is considered a human comparable machine.

It would be fair to attribute some part of the output of the computer to the programmer. To develop an excellent output generating machine requires high intellectual labour and persistence from the developer side. It is time consuming and expensive for the programmer, and it would be a fair reward to allow them copyright for the fruits of its intellectual labour even though the output is maybe something they might not have envisioned. After all, the machine at least starts with following the instructions of the developer. It was the programmer who gave Artificial Intelligence the initial capability to produce the output.

3.11 Public Domain

One option for assigning ownership is to leave the work in the public domain rather than giving it to anyone. It makes sense when one considers how inexpensive it is for AI to create work. Once AI has been trained to create a specific type of work, it may repeat the process indefinitely without incurring further costs or utilising additional resources.

Furthermore, AI does not require an incentive to generate work. The entire point of intellectual property law is to encourage authors to produce more material. There is no financial incentive for AI, and it has no requirements. Lastly, granting rights to the developer is illogical because the developer did not even conceive the end product or aid the AI in its creation.

3.12 Conclusion

A dire need exists, to find out the most effective legal manner to protect autonomously developed creations in the international market. More specifically, this controversy has focused on whether these creations should be protected by amending and modifying existing forms of copyright ownership rights or by creating a completely new form of legal legislation. Artificial Intelligence is taking a predominant place in the daily lives of many individuals.

Artificial Intelligence is becoming clearer that it will play a larger role in our lives in the near future. As they take on a more creative role, these AI bots will be credited with an increasing number of intellectual property inventions. As a result, the question of who should have ownership of this intellectual property becomes crucial.

Assigning it to the developer appears illogical under the current Intellectual Property Regime, as giving ownership rights to an entity that did not conceive of the concept or actively engage in its creation clearly violates the Copyright Law's stipulations. Despite the fact that the developer designed the software, it has no influence over what the software produces.

On the other hand, giving Artificial Intelligence ownership rights is a slippery slope. The Artificial Intelligence software would be represented by a body incorporated to hold the rights. The issue with this technique is that it defeats the law's aim. The aim of copyright law is to protect creators and encourage them to produce more work, but artificial intelligence does not require an incentive to produce more work. It would just not be possible to maintain a level playing field.

At this time, it would be ideal to vest the right in no one and instead place intellectual property in the public domain. The goal of law is to protect and reward the creator, but a creator in the traditional sense does not exist. Because AI-generated work does not require an incentive, it makes sense to exclude it from legal protection. However, there are problems with this paradigm as well. Putting the work in the public domain is not commercially viable since the developer of a machine whose work is not marketable will not make much money.

Artificial Intelligence is still in its inception, and its potential for development is enormous. But one thing is certain: the Copyright Law, in its current form, is incapable of dealing with artificial intelligence-generated content. There are numerous issues that arise as a result of Artificial Intelligence-created works.

Thus, it seems that the current Intellectual Property Law can be retained but a new interpretation can be provided which encourages growth in this budding technology and retains its principle that for an intellectual work to exist the closest human agency has to be found, or the law could be amended to include artificial intelligence as an author like a corporation, to put the ownership

rights in. It is clear that more research is needed in this field to find solutions to this problem to keep pace with the developments in Artificial Technology.

CHAPTER – IV

PATENTS AND ARTIFICIAL INTELLIGENCE (AI)

A patent is a monopoly right granted to an innovator by the patent office for a limited period of time. Section 2(1)(m) of the Indian Patent Act, 1970 defines a "patent" as a patent for any invention granted under this act. For the duration of the patent's protection, the patent owner has the authority to select those who can utilize the patented innovation. In layman's terms, it means that patent protection prevents others from commercializing, using, importing, selling, purchasing, exploiting or distributing the innovation without the permission of the patent owner who is also known as the "patentee." According to the Indian Patent act, 1970, patent protection is granted for a period of twenty years which begins from the date of submitting the application. An yearly fee is also required to be paid to the patent office by the patentee. Patents are usually granted on technological inventions ranging from a simple electric lamp to something as complex as artificial intelligence.

Many times, a single product is made up of many small inventions. For example: a computer or a laptop and therefore it is required that the patentee shall explain the whole invention in the patent application including all its elements with such clarity on all the technical aspects that anybody with normal skills in the field should be able understand the invention only by reading the description of the invention.[65] The owner or creator of a patented invention can also provide a license to an individual or an organization to utilize the patented idea in exchange of a fee known as "patent royalty." This usually takes place under an agreed- upon terms and conditions for a specified purpose, in a certain geographic location and for a fixed period of time.

Furthermore, it is critical to note that it is not mandatory to get an invention patented; however, if an innovator chooses not to do so, then in that case he will face the danger of his innovation being revealed or disclosed to his competitors. In the case of *Shining Industries v/s Shri Krishna Industries*,[66] the Hon'ble High court of Allahabad held that an innovation is not a property right until it has been patented. As a result, innovators file for patents in order to obtain a monopoly on the innovation for a set period of time after which the technology goes into the public domain

[65] Jaya Bhatnagar, India: *Patent Law in India*, MONDAQ (Dec 13, 2007), https://www.mondaq.com/india/patent/54494/patent-law-in-india.
[66] Shining Industries v Shri Krishna Industries, AIR 1975 All 231 (India).

and can be accessed by anyone and everyone. In India, Patenting of innovations increased at a Compound Annual Growth Rate (CAGR) of 10.8 percent from the year 2012 to 2017 which has only been possible because of the growing awareness of Intellectual Property due to various government policies and programs.[67]

4.1 ARTIFICIAL INTELLIGENCE AND PATENTS- AN INTERSECTION

With the availability of widespread cloud computing resources, massive data sets and tools like Azure cognitive services, artificial intelligence technologies seem to be fast evolving. The rapid development of artificial intelligence necessitates the need to protect it from theft by other people and organizations. Apart from this artificial intelligence is also being used in the intellectual property departments to protect the complex inventions. In this context, it will be correct to say that this new technology deals with intellectual property in a variety of ways. The intersection of patents and artificial intelligence is enumerated below in detail:

- **Artificial Intelligence as a tool for managing the patents:**

  AI plays a crucial role in patent practice, particularly in handling the increasing demand for patents to protect increasingly complicated technologies. There has already been an emergence of some new patent prosecution, searching, portfolio management, and enforcement technologies which will become common and mainstream in the near future. Artificial Intelligence technologies such as Natural Language processing (NLP), Machine learning and semantic analysis have proven to be effective in supporting intellectual property departments by lowering the amount of time they spend on patent searching. Apart from this, Artificial Intelligence has also proven to be effective in improving the quality of patents by taking a more targeted approach in the filing of patents. With the help of artificial intelligence, the process of screening of patent applications is completed in no time.

[67] Sudhir Chowdhary, *Funding for research and innovation is improving: Clarivate analytics*, FINANCIAL EXPRESS(Sep12,2018),https://www.financialexpress.com/industry/funding-for-research-and-innovation-is-improving-clarivate-analytics/1310165/.

Furthermore, as identifying important patents in a portfolio is a time- consuming and tedious task, artificial intelligence is quite helpful in the evaluation of specified parameters. Therefore, Artificial Intelligence can help inventors and third parties manage the ever-expanding world of patents. Artificial intelligence will soon become a necessity for maintaining the patent sector structured and efficient, thanks to the rise and increase of patents.

- **Patents as a means to protect the Artificial Intelligence:**

  Artificial Intelligence advancements serve society as a whole by increasing efficiency and opening up new prospects for economic growth in areas such as healthcare, banking, national security, etc. and therefore, it becomes extremely important to protect them from stealing or theft. Like any other innovation, the artificial intelligence invention must also fulfil all the eligibility criteria for the grant of patent, which includes the following:

  1. *The innovation must be novel and unique,*
  2. *It must be non- obvious, and*
  3. *The patent application must include the proper description of the invention*

In the landmark case of Alice Corp. Pvt. Ltd. v. CLS Bank Int'l,[68] the Supreme Court of the United States held that, '*patent claims covering certain computer-implemented transactions were abstract ideas ineligible for patent protection*.' After this judgment, the Artificial Intelligence inventions have been regarded as nothing more than abstract concepts which could be carried out by individuals very easily and therefore, it became difficult to get an innovation of artificial intelligence patented. Although obtaining a patent on artificial intelligence innovations is quite challenging, it is also tremendously beneficial.

Furthermore, given the potential to monetize patents through both litigation and licensing, the value of patents to investors is frequently easier to examine and quantify than the worth of other types of Intellectual property.

Today, Artificial Intelligence systems are progressing to the point where they no longer require any human intervention and can even generate a creative output on their own. For instance, in

[68] Alice Corp. Pvt. Ltd. v CLS Bank Int'l, 573 U.S 208 (2014).

2016, Google funded a research called "The Next Rembrandt," in which a computer analysed thousands of works by Rembrandt Harmanzoon van Rijn, a 17th-century Dutch artist.[69] However, it is still a question that who will be considered as the owner of such an invention as the existing laws consider only humans as a patent holder.

4.2 CURRENT ISSUES RELATING TO PATENTS:

There are various parameters that must be met in order for an invention to be patentable. These specific requirements frequently represent a roadblock in the process of obtaining a patent. The following are the prerequisites for obtaining a patent:

Inventive Step

The Indian Patents Act defines innovative step under section 2(1)(ja) as *"a feature of an invention that includes a technological advance over existing knowledge or has economic significance or both, and that renders the invention not evident to a person versed in the art."* Therefore, for the grant of patent, it is pertinent that there must be a technological invention and not any artistic or creative work. However, with the help of artificial intelligence, many artistic as well as creative work is also generated. For example, there are many famous and well- known artists such as Sougwen Chung, Trevor Paglen, Anna Riddler and so on who create art pieces with the help of artificial intelligence. A patent on such artistic work, however, cannot be awarded.

Ownership

Another issue with granting a patent to such an artificial intelligence - based invention is determining who will be the patent owner: the person or the artificial intelligence. It is noteworthy that only humans can be the owner of a patent according to the present legal system. For instance: In the United States, the word "inventor" can only be applied to natural beings who have invented or discovered the application and are the only ones who have the right to claim intellectual property. A similar situation exists in India. According to the Indian Patent Act of

[69] Andres Guadamuz, *Artificial Intelligence and Copyright*, WIPO MAGAZINE (October, 2017), https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.

1970, an inventor must be a human person; consequently, artificial intelligence cannot be an inventor or a patent owner because it is a machine.

As a result, artificial intelligence, unlike human beings, cannot become an owner of any innovation. Instead of being the innovator, Artificial intelligence can simply serve as a medium for humans to make inventions. In addition, becoming the owner of an invention or application entails signing contracts, accepting responsibilities for the innovation, filing lawsuits, and even obtaining permit licenses, all of which are tasks that can only be performed by humans, and hence can only be referred to as an owner. Apart from this, for being an inventor, the Artificial Intelligence needs to be a legal person, however it is currently classified as machines or services and therefore, it cannot be a legal person or become a party in the legal proceedings.

Non- Obviousness

Non-obviousness means that the invention is not obvious to those skilled in the art related to the present invention or to the general public. If the innovation is found to be obvious to anyone then it is not eligible for the grant of patent. In order to conduct a test of non- obviousness, experts in the same innovative field are hired. However, if innovation is driven by artificial intelligence, then the question that arises here is who will be hired for testing; experts in the field of technical application or experts in the field of artificial intelligence.

Another question to think about is whether the experts who will conduct the test of non-obviousness will be humans or well-trained algorithms. According to the existing laws, only skilled people can conduct the test of non- obviousness and not the machines.

Liability issues in case of Patent Infringement

A patent grants the owner an exclusive right to use and sell the creation. When someone without authority uses, exploits, sells, or intends to sell an innovation, they are liable for infringement. In the event of an infringement, the patent infringer must compensate the victim with damages. However, it is difficult to determine the infringer in case of an innovation by artificial intelligence. According to a resolution passed by the European Parliament on February 16, 2017, Artificial Intelligence cannot be held accountable for the acts and omissions of third parties.

Rather, the human agent behind Artificial Intelligence's mask, such as the operator, maker, or user, must be tracked down if such an individual was aware of or could have predicted Artificial intelligence's detrimental action.

Further, even if the artificial intelligence is made liable for patent infringement then another question which arises here is that how will their liability be assessed. According to the European Parliament Resolution, the damages for patent infringement should not be restricted solely because of the reason that the infringer was not a human being. This will defeat the purpose of having laws for punishing the infringer.

Other Issues

It is very likely that there will be a large number of patent applications, because compared to humans, artificial intelligence technology is much more efficient in creating inventions. In the future, artificial intelligence will have a negative impact on human innovation. The invention of replacing natural persons with autonomous algorithms will lead to the shrinking of human intelligence. This will lead to the disappearance of high-tech Research and Development jobs and industries. Therefore, there must be an appropriate mechanism to ensure that patent applicants will not have a false influence on the participation of artificial intelligence in the invention process.

Apart from this, we must always remember that inventions made with artificial intelligence and without any human supervision can have negative consequences. As a result, appropriate measures must be taken to promote transparency and accountability for the grant of patents on innovations by artificial intelligence.[70]

Therefore, it is clear that an invention must meet the above stated requirements and then only they will be eligible to get patented in India.

[70] *White Paper, Artificial Intelligence Collides with Patent Law*, WORLD ECONOMIC FORUM, (April, 2018),http://www3.weforum.org/docs/WEF_48540_WP_End_of_Innovation_Protecting_Patent_Law.pdf.

4.3 GLOBAL SCENARIO

The decades old patent laws of different countries only recognize a human being as an 'inventor'. Therefore, currently there are no countries where Artificial Intelligence can be an inventor or a patent holder. Let's take a closer look at the scenario in various countries:

United States of America:

The patent law in the United States, defines an inventor as an individual or individuals who invented or discovered the subject- matter of the innovation.[71] Furthermore, section 101 also states that whoever invents or discovers any useful machine, manufacture, process or composition of matter or any useful improvement of it, are eligible to get it patented.[72] From the above statutory provisions, it is easy to interpret that the US laws recognize only a human being as an inventor.

Lately, these provisions have been interpreted by the United States Patent Office (USPTO) in case of two patent applications- one for a food container and another for a flashing light, both of which were created by an Artificial Intelligence known as DABUS. The application was dismissed by the patent office on the grounds that the application failed to designate any human inventors or co- inventors despite the fact that the US patent law expressly requires human inventors.

Lastly, in the United States, a software can also be patented provided that it can perform a task with the help of artificial intelligence which was earlier carried out by human beings.

United Kingdom:

The patent applications for inventions created by the artificial intelligence systems- DABUS was also submitted in the United Kingdom Patent Office. However, complying with the statutory provisions envisaged under section 7 and section 13 of the United Kingdom Patents act, 1977; patent was not granted to the inventions. Section 7 of the act states that the patent application

[71] 35 U.S. Code §100(f).
[72] 35 U.S. Code §101.

must be made by a person or a group of persons and only that person or the group of persons will be the patent owner. Section 13 of the act concerns with an inventor's right to be mentioned in a patent application or patent, the applicant's obligation to identify the inventor or inventors, and the right to object to a named inventor. The Patents Rules 2007 prescribe relevant processes in rule 10 and part 7. Following the processes outlined in rule 11, the inventor may also apply to waive their right to have their name and address mentioned.

In United Kingdom, patents can also be claimed by European Patent Office. Article 52(2) of the European Patent Convention (EPC) provides that computers and mathematical methods are included in the list of things that do not constitute invention. However, they are patentable if they "add to the technical character of an invention," that is, if they "contribute to producing a technical result that serves a technical goal." Furthermore, it is noteworthy that even the European Patent Office (EPO) requires a human being as an inventor for the grant of patent.

Japan:

Article 29 (1) of the Japan Patent Act provides that the inventor must be a natural person. But in terms of seeking patent protection for Artificial Intelligence related innovations, the Japan Patent Office is a somewhat patent-friendly institution. Artificial intelligence and the Internet of Things-related inventions are classified as industry -related inventions. However, the allowance rates for such industry -related inventions are over 70 per cent, which is almost as high as the allowance rate for patent applications in all other technological fields.[73]

China:

In comparison to other nations, the number of patents containing the terms ‘artificial intelligence’ and ‘deep learning’ have increased in China. In terms of investment and research and development, China has even surpassed the United States.[74] To be eligible for getting patented in China, the artificial intelligence software must be presented in the form of "medium plus computer program process" claims and apparatus claims that describe a component executed by a computer program.

[73] Michael Anderson, *A Comparison of U.S and Japanese Patent Subject Matter Eligibility*, JDSUPRA (May 29, 2019), https://www.jdsupra.com/legalnews/a-comparison-of-u-s-and-japanese-patent-58154/.
[74] *China Becomes Top Filer of International Patents in 2019 Amid Robust Growth for WIPO’s IP Services, Treaties and Finances*, WIPO (April 7, 2020), https://www.wipo.int/pressroom/en/articles/2020/article_0005.html.

Canada:

In the landmark case of *Schlumberger Canada Ltd. v. Canada* (Commissioner of Patents)[75] certain principles were laid down for the patentability of artificial intelligence innovations. The federal court was of the view that any technique of gathering, recording, and evaluating data using a computer programmed on the basis of a mathematical formula was found to be non-patentable. In another case of Canada (Procureur General) v/s Amazon.com, inc.,[76] it was held that a data-processing approach may be patentable if it is merely one of several key parts of a new combination, rather than the whole invention.

As a result, it's reasonable to suppose that a single artificial intelligence algorithm is not eligible to get patented.

4.4 INDIAN SCENARIO

Since 2015, India has been ranked eighth in the world for artificial intelligence patent applications, according to the WIPO Technology Trends Report.[77] In recent times, India has witnessed a tremendous growth in the number of patent applications filed for patenting artificial intelligence innovations. International corporations like Microsoft and Accenture, as well as Indian firms like Tata and HCL Technologies, are among India's top patent filers. It is critical to note that artificial intelligence based inventions consist of several algorithms or computational methods which are non- patentable in India as per section 3 (k) of the Indian patents act, 1970. These inventions are covered under the umbrella of computer – related inventions.

However, after the Hon'ble High Court judgment in the case of *Ferid Allani v/s Union of India*[78], where it was held that a complete ban on computer programs would be regressive for all new inventions including the artificial based intelligence, have provided some solace. The court observed that only the computer programs are non-patentable and not the ancillary inventions. In this way, the legal position was deemed to be identical to that of Article 52 of the European

[75] Schlumberger Canada Ltd. v Canada, (1982) 1 C.F. 845 (C.A.F.).
[76] Canada (Procureur General) v/s Amazon.com, inc, (2012) 2 RCF 459, 2011 CAF 328.
[77] Yoshita Singh, *India emerging new target for patent filing in AI: WIPO*, OUTLOOK INDIA, (Feb 1, 2019), https://www.outlookindia.com/newsscroll/india-emerging-new-target-for-patent-filing-in-ai-wipo/1469983.
[78] Ferid Allani v/s Union of India, (2019) SCC Online Del 11867.

Patent Convention. The court reasoned that given the new IBAP rules were established after the Tribunal's judgment, it was only fair that the application be considered in the light of the recommendations provided by the Draft guidelines of 2013, Guidelines of 2016 and the Revised Guidelines of 2017.

This decision paved the path for artificial intelligence-based technologies to be granted patents. The decision clarifies that there is no bar in securing a patent for a computer-related invention. The term 'technical effect' was examined to determine what can be patented rather than putting every computer based invention under section 3 (k) of the Indian Patents Act, 1970. Furthermore, a computer software invention is patentable in India if it creates a technological advance over existing inventions or arts, or if it provides a technical solution to a technical problem by providing a practical application or an improved technical impact of the underlying software.[79]

4.5 ARTIFICIAL INTELLIGENCE AS A PATENT OWNER:

If the artificial intelligence would become eligible to become an inventor or a patent holder then it is important that it must be given all the rights and liabilities of the inventor as well. In case of patent infringement, an Artificial intelligence program should be able to sue for infringement and enter into legal contracts on its own, which does not appear to be possible or appropriate. This demonstrates that Artificial intelligence is not a legal entity and therefore, cannot be a party to a suit of infringement.

Another major question which arises here is that if a patent infringement claim is brought upon, then the complaint will be filed against whom: the artificial intelligence or the artificial intelligence's owner**.**

Because of these difficulties, identifying artificial intelligence as patent owners is quite challenging.

[79] MC Donnel Boehnen Hulbert, *Global Artificial Intelligence Patent Survey*, JDSUPRA, (Dec 20, 2018), https://www.jdsupra.com/legalnews/global-artificial-intelligence-patent-21942/.

4.6 ANALYSIS

Artificial intelligence is one of the fastest growing industries in the world today, and it wouldn't be a stretch to predict that it will govern the world in the not-too-distant future. However, the issue here is that there is currently no specific legislation or laws that protect artificial intelligence-based inventions. Only a human being is recognized as a patent holder in the existing legal framework of patent law around the world. This is due to the difficulties that antiquated patent laws have in granting patents to artificial intelligence-based innovations.

To comprehend the possibility of patentability for Artificial intelligence - related inventions, one must first recognize that an Artificial intelligence-related invention is a composition of numerous inventions. It could be a computational, mathematical, or algorithmic method, or a combination of them all. It's debatable whether certain combinations can be captured in a claim, or whether doing so will limit the scope of the claim. Furthermore, the algorithms or mathematical models that serve as the cornerstone of artificial intelligence are not patentable. In India, algorithms and computer programs are not patentable unless they have a technical effect or make a technical contribution, which is difficult to prove in an Artificial intelligence - related innovation.

Because the current statutes are out of date, the courts have stepped in and issued rulings in support of patenting artificial intelligence-based inventions. Patenting of artificial intelligence-based technologies has increased dramatically in nations such as China and Canada. In Canada, Artificial intelligence-based innovations are examined to see which aspects of a claimed invention are required to solve a problem recognized by the Canadian Intellectual Property law office or CIPO during prosecution and if a computer is an essential component, the innovation will be eligible for patent protection.

Furthermore, computer programs are not patentable in India, but inventions that use artificial intelligence are eligible to get patented. However, there are certain inconsistencies in this decision of Hon'ble High Court of Delhi in the case of *Ferid Allani v/s Union of India*[80]. Firstly, the court held that section 3 (k) of the Indian patents act must be read along with the Computer Related Inventions or CRI guidelines. However, the court failed in providing the scope of this section and what all inventions are covered within its ambit. Apart from this, the scope of section

[80] Ferid Allani v/s Union of India, (2019) SCC Online Del 11867.

2(1)(ja) of the act was also not clarified. Furthermore, the court emphasized on the term ‘technical effect’ and its importance without actually explaining what the term really means.

In this judgment, an opportunity to re-examine an application that was rejected prior to Computer Related Inventions or CRI guidelines was provided; if new guidelines are introduced in the future, this will set a dangerous precedent and will open doors for re-examination of applications that were rejected prior to these guidelines.

4.7 Conclusion

The current criteria for the grant of patent includes careful assessment of the subject matter to see whether it has a material detrimental impact on Artificial intelligence or AI-driven innovations. If this is the case, stakeholders must determine what changes to the standard could be made to accomplish the primary goals of Patent law.

The aim of patent law is to promote innovation, disseminate useful information, and encourage investment in innovative and productive technologies. However, granting patents to artificial intelligence- based inventions would bring a lot of challenges such as determination of liability in case of infringement of patent, ownership issues and so on.

Another issue that arises here is that if artificial intelligence performs all of the labour, humans will become unnecessary. It will result in unemployment, destitution, and a loss of human talents and intelligence**.** Furthermore, granting Artificial intelligence patent rights will raise additional issues such as monopolistic behaviour, which can trigger antitrust laws, fitting into the definition of POSA (Person Ordinary Skilled in Art) in Intellectual property legal framework across the world, and possibly emerging as a potential patent violator if Artificial Intelligence begins writing its own codes and software.

On the other hand, if we look at the other side of the coin, artificial intelligence will aid in the nation's economic progress. The work could be completed with less resources and in less time. However, the time is not far when we will have laws and legislations which will recognize the artificial intelligence as an inventor and artificial intelligence based inventions will be protected by the law of patents.

4.8 PATENTS AND AI: THE WAY FORWARD

Seeing the growth in the number of patent applications for patenting artificial intelligence based innovations, there is a pressing need to amend patent laws that will protect artificial intelligence innovations. Here are a few proposals that can be implemented:

- The distinction between an inventor and an invention is well defined in patent law, but the category in which Artificial intelligence systems fall has yet to be resolved. The law has to be clearer and more detailed, and must specify whether artificial intelligence can be recognized as an inventor under the law or not.
- The World Intellectual Property Organization (WIPO) has previously recognized the potential challenges with Artificial Intelligence and has explored them through various channels; however, there is a need to create a proper international policy for the same.
- It is necessary to develop a test that can distinguish between Artificial intelligence -created and Artificial intelligence -assisted works. On this basis, the precise patent holder can be recognized.
- A specific Act dealing with data protection in relation to AI software must be passed. It must include all the civil as well as criminal liabilities and offenses that can be imposed on the offenders.

CHAPTER – V

SOME RECENT DEVELOPMENT: AN ANALYSIS 2019 WIPO TECHNOLOGY TRENDS REPORT, AND REVISED ISSUES PAPER ON INTELLECTUAL PROPERTY POLICY AND ARTIFICIAL INTELLIGENCE, 2020

In September 2019, WIPO hosted the first session of the WIPO Conversation on IP and AI, which began a series of discussions on the influence of AI on IP policy in various nations and related topics, laying the groundwork for more informed policymaking by member states. Following that, in December 2019, WIPO released a draught Issues Paper on IP policy and AI, as well as a public consultation process to help outline the most urgent problems that IP policymakers will confront as AI becomes more important.

In May 2020, a Revised Issues Paper on IP policy and AI[81] was published in which all of the comments and submissions received were incorporated.

Let's first discuss some of the changes made in the revised issue paper from the original draft paper and then we will look into the issues which have been dealt with in the revised paper.

- In making the revisions the WIPO Secretariat was governed by a set of principles. Many new sections have been introduced in case an obvious gap was discovered in the draft Issues Paper. In addition to this the phrasing of the Paper has also been changed.

- Overall, the updated Issues Paper attempts to maintain the main focus just on the substantive legal issues posed by AI for IP Policy. And because of this even though numerous important follow-up questions were expressed in the submissions, only a restricted number of those are incorporated in the amended document. In case of opposing viewpoints no modifications have been made for the sake of maintaining a neutral position by WIPO.

[81] WIPO Conversation on IP & AI, *Revised Issue Paper Intellectual property policy and artificial intelligence*, WIPO (2020), https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=499504.

- People who responded to the initial Issues Paper highlighted concerns about a wide variety of policy issues, such as ethics, standards, and privacy. It is because of this reason that questions outside of the WIPO mission were not included in the updated Issues Paper since the WIPO mandate is restricted to IP. The WIPO secretariat is aware of these concerns and recognizes that the wide challenges posed by AI will need a coordinated response. WIPO is in regular contact with the agencies in charge of these related sectors, and the WIPO Conversation on IP and AI will contribute to the various aspects of the ongoing debates.

- The issues that were identified in this revised paper were divided into 9 subcategory areas which are-

  (a) Glossary

  (b) Patents

  (c) Copyright and Related Rights

  (d) Data

  (e) Designs

  (f) Trademarks

  (g) Trade secrets

  (h) Technology Gap and Capacity Building

  (i) Accountability for IP Administrative Decisions

There is no specific section on artificial intelligence and unfair competition. Although IP law and competition law are inextricably linked, questions have been added to the various parts to emphasize this link.

This Revised Paper is said to serve as the foundation for the WIPO Conversation on IP and AI's Second Session, which was conducted in July 2020 and was organised in line with the Issues Paper.

There are 16 issues which are identified in this a WIPO Revised Issues Paper that relate to the issue of AI and IP policy:

- The 1st issue deals with glossary i.e. definitions of a number of terms. This issue was not there in the previous draft and was added in the revised version only. It was added because many stakeholders noted that the paper didn't provide a clear explanation of what was meant by phrases like "AI," "AI-generated," and "AI-assisted." Which creates a problem. In response to these claims the World Intellectual Property Organization (WIPO) issued a set of definitions to help with the discussion.

In the said issue Artificial intelligence (AI) is described as "a computer science discipline focused at developing machines and systems that can do activities that would normally need human intellect with little or no human interaction." Along with these definitions of, “Output”, “AI-generated” etc. has also been given. The definition of the term "data subsisting in copyright works" is also provided which distinguishes between mere ideas and manifestations of ideas that are protected by copyright. The issue also questions if the law should try to draw a distinction between "AI-generated" and "AI-assisted" outcomes. The distinction might be crucial to copyright and patents in the future, and it could be the topic of a lot of case laws.

- The 2nd issue concerns ownership and inventorship. It discusses whether the law should allow or mandate the AI application to be listed as the inventor or whether it should be required to be a human only. It also looks into the practical issues of determining if there should be any indicators to identify the ways of giving human ownership or authorship if AI systems cannot be given ownership i.e. to say whether this choice should be left to private arrangements, such as corporate policy, with the potential of judicial review via appeal in consonance under with current laws governing inventorship disputes.

- Issue 3 of the WIPO Discussion Paper is about patentable subject matter and patentability guidelines. It analyses whether autonomously produced innovations developed by an AI application should be exempt from IPR rules. Is it necessary to provide special provisions

for AI-assisted inventions or they should be handled the same as other computer-assisted inventions. Further whether patent examination rules for AI-assisted innovations should be changed, and so forth. Lastly, this issue in the context of AI inventions, examines the question of comprehending the inventive step test that must be fulfilled for the invention to be given a patent.

- Issue 4 deals with Inventive Steps or we could say Non-Obviousness. We know that an innovation must have an innovative step or has to be non-obvious in order to be patentable. The test used to determine whether an invention is non-obvious is whether it would be evident to a person who is versed in the relevant art to which the invention belongs. The questions addressed under this issue is whether it is important that in the case of AI-generated inventions also the same traditional standards of inventive step or non-obviousness which are fundamentally related with human acts of invention shall be applied. And if yes then what kind of art is the standard referring to i.e. will the area of technology of the product or process that emerges as an innovation from an AI application be considered the art in the present case.

- Issue 5 deals with the concerns of technological disclosure. This issue is based on the consideration that the patent system's primary objective is to reveal technology so that the public domain may be enriched throughout time and a systematic record of humanity's technology can be made available and accessible. The concern addressed under this issue is whether the disclosure obligation poses any obstacle specifically by AI-assisted or AI-generated inventions. It also analyses whether the initial disclosure requirement is sufficient in cases where the algorithm evolves over time as a result of machine learning and how to handle this data which is used to develop an algorithm. Further it also looks into the concern of whether it is necessary to disclose the human knowledge utilized to choose data and train the algorithm. Lastly

- Issue 6 relates to general policy considerations for the Patent System such as is it enough to include AI-generated innovations into the present legal system if they are given benefits of patent protection or whether a *sui generis* i.e. unique IPR system should be taken into consideration for these AI-generated discoveries. The issue also addresses the

question of whether the interaction between AI and IPRs should be explored later, once AI technology has evolved or has become more understandable.

- Issue 7 is based on copyright and explores authorship and ownership problems, such as whether copyright should be ascribed to autonomously created literary and artistic works and if it can be ascribed then whether sound recordings, broadcasts, and performances can be covered by related rights. Further, who should have the authority to hold copyright in an AI-generated work. Also, whether the question of giving legal personality to an AI programme that generates original works on its own should be addressed.

- Issue 8 is about IPR infringements, and it aims to determine if using data from copyright works for machine learning without permission constitutes an infringement of copyright, and what impact this will have on the development of AI and the free flow of data needed to boost AI innovation. Whether an exception should be provided for some sorts of machine learning applications such as usage in non-commercial user-generated works or study; how current exceptions for text and data mining will interact with such infringement. Lastly, whether a licencing system would be beneficial as a substitute for copyright infringement and the unlawful use of data from copyright works for machine learning can be discovered and regulated, especially when a huge number of copyright works are generated by AI.

- Issue 9 addresses the concern of "deep fakes," or "the generation of simulated likenesses of people and their features, such as voice and appearance," as well as the question of whether copyright can exist in deep fakes. Lastly, it also examines whether a system of appropriate compensation for those whose likenesses and "performances" are exploited in a deep fake should be established.

- Issue 10 concerns general policy issues which examines whether copyright has had or will have unintended repercussions in AI applications, and if the dignity of human creativity should be valued as a right above and beyond AI innovation.

- Issue 11 analyses whether a new range of IPRs data is needed or if the current system of IPR laws is sufficient. Further what types of data would be protected under these new rights if they were developed, and whether some particular features in the data such as

economic worth or protection against certain types of actions, should be the defining feature of these new rights. Lastly, consider how these new rights would relate with current rights and how they would be made enforceable.

- Issue 12 examines industrial designs, including whether design protection should be granted to an original design created by an AI programme or whether a human designer is necessary.

- Issue 13 deals with trademarks, this issue was not included in the initial draft issues paper and found its place in the revised paper only. In this issue it has been noted that since trademarks lack the equivalent of an author or inventor, AI does not impact them in the same way as it does to patents, designs, or copyright, but at the same time it recognizes that some AI-related concerns may nevertheless still affect the trade mark law. Concern of ownership, marketing, brand awareness, and unfair competition have all been mentioned as possible problem areas under the said issue.

- Issue 14 deals with trade secrets which also were not included in the initial draft and were considered in the revised paper only. This issue is particularly in relation to analyzing whether the existing trade secret legislation strikes the proper balance between protecting AI inventions and third parties' legitimate interests in relation to having access to specific data and algorithms. Further it also addresses the issue of whether trade secrets should protect data and AI applications, or is there a societal or ethical reason to override the current trade secret protection.

- Issue 15 talks about capacity building to meet the containment or reduction of the technology gap in AI capacity, as well as whether any policy actions are necessary in the said scenario.

Issue 16 is in regard to accountability for the decisions in IP administration i.e. whether artificial intelligence be used to make choices in the prosecution of patent applications and if so then what sorts of choices may be made using AI in IP offices. Further what legal issues can possibly be presented when these decisions are made by AI applications. Lastly, are there any other areas where IP offices should look at deploying AI technologies, such as IP prosecution and registration.

5.1 Indian Perspective

Talking about the report in the Indian context, we know that the country's growth model incorporates a significant degree of technology innovation, including AI. AI's use is not just limited to social media and entertainment, but has even expanded to being used in retail, such as online shopping etc.

In a growing country like India, the problems related to AI are considerably more serious since the fundamental infrastructure has to be updated for the same. There are well-established patent and copyright laws in India. However, there is no explicit legislation or regulation that regulates AI in particular. Existing laws do not address AI and are based on traditional intellectual property categories such as books, creative writing, and discoveries.

However, as we can see from the above data, the scope of AI is considerably broader and requires a different approach than the one now in place in India. In this case the issues discussed in the report come as a rescue for Indian IPR regime. Computer programmes, business procedures, and mathematical formulas are not deemed patentable innovations under the Patents Act of 1970[82]. But we saw that the report covers all these issues of the patent eligibility of AI-generated inventions, and whether or not computer-implemented inventions can be treated in the same way as AI-generated inventions.

Furthermore, the phrases "patentee" and "person interested" in Section 2 (p) and 2 (t) respectively of the aforementioned Act constitute a barrier to AI being included in its scope. The Act expressly terms patentee of any other person interested to be human but the issue 2 of the said report helps in solving this debate by giving us the scenarios where there is a possibility of granting inventorship to AI applications too. However, under section 2 (d) of the Act, copyright rights are granted to the "author" of the work only

In the case of the Copyright Act the 'Sweat of the Brow Doctrine' and the 'Modicum of Creativity' are two key theories that determine the uniqueness of a work. As these concepts allow for a minimal level of originality, therefore AI's original work can be included in the

[82] Patent Act, 1970, No. 39, Acts of Parliament, 1970 (India).

same and the author is inferred to be a human or legal person only under this act. This thereby makes the notion of a machine being protected under this Act is limited. In this case we could again refer to the issue 7 of the WIPO report which looks into this concern of whether copyright can be attributed to original AI-generated literary and artistic works or should a human creator be necessarily required and also all the policy issues related to the implementation of the same.

Concluding, we could say that even though India's current framework and regulations are inconsistent with emerging and even existing technological trends but with the help of the WIPO report these issues can be actively addressed by taking in the suggestions of the issues discussed in our IPR regime.

5.2 WIPO Technology Trends Report 2019

This report[83] by WIPO published in 2019 is one of the first to carefully examine the AI technology trends in order to determine which sectors have the most innovative AI activity, which businesses and institutions are driving AI development, and where future growth markets will be located. A new framework has been developed by WIPO for understanding AI developments, with AI-related technologies organised into three categories to reflect three dimensions of AI: First being AI techniques, as machine learning; second being functional applications, as speech processing and computer vision; and third being application fields, such as telecommunications and transportation. This will be discussed in detail at a later stage.

This study includes statistics and analysis for each of these categories, including trends, key competitors, geographic distribution, and market activity, including acquisitions and lawsuits. It also includes comments from AI specialists from across the world, covering topics such as AI's current and prospective applications, effect, legal and regulatory concerns, data security and ethical considerations. It also serves as a central repository of AI knowledge for policymakers and decision-makers in government and industry, as well as concerned people coping with this new disruptive technology.

[83] WIPO TECHNOLOGY TRENDS 2019, *Artificial Intelligence*, WIPO (2019), https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

Let’s discuss all these elements which are included in the report in detail-

The boom of AI Inventions

According to the study, AI-based innovation has exploded. Since the 1960s, when AI emerged there has been a surge of innovators and researchers who have submitted approximately 340,000 patent applications for AI-related innovations and published over 1.6 million scholarly papers on the subject. Over half of the discovered innovations have been published after 2013. This is indicative of the fact that AI-related patenting has increased in recent years.

The study has also noted the transition from theoretical research to the implementation of AI technology in commercial products and services. Though scientific publications on AI date back decades, around 2001, the real boom and spike in scientific publications began, roughly 12 years before the surge in patent applications. The transition from theoretical research to practical application may be seen as a result of a drop in the ratio of scientific papers to inventions from 8:1 in 2010 to 3:1 in 2016.

Diving into deep learning

The phrase "artificial intelligence" refers to a variety of techniques that are explored in depth in this report. Machine learning is one of the most well-known of them. Machine learning, such as the approaches employed by ride-sharing services to reduce diversions, is a branch of AI that focuses on algorithms that allow machines to learn from fresh data and make predictions or judgments based on that data without being explicitly programmed to do so. More than one third of all documented AI inventions mention machine learning, particularly neural networks, which have transformed machine translation.

Out of all these the most remarkable thing is the dominance of deep learning, a machine learning method that has the potential to transform AI. Deep learning is the fastest-growing method in the applications examined, with a 20-fold rise in patent applications from 118 in 2013 to 2,399 in 2016, equating to a 175% annual growth rate. In comparison, the number of patent applications for all technologies increased by just 33% over the same time period, or at a 10% average annual pace.[84]

[84] *WIPO technology trends 2019: Artificial Intelligence*, ROSCONGRESS (May 5, 2019, 10:00AM), https://roscongress.org/en/materials/tekhnologicheskie-trendy-vois-v-2019-godu-iskusstvennyy-intellekt/

Deep learning is a type of machine learning that uses many levels of data processing and tries to comprehend the world in terms of a hierarchy of concepts. It's already proving to be useful in popular voice recognition and machine translation software.

Trends of Industry

Another important thing that is shown by this WIPO report is that AI-related patents in addition to revealing AI technology and applications also often refer to a sector or industry of application and that many sectors and industries are exploring ways to exploit AI commercially. Some of these sectors are Banking, entertainment, security, industry, manufacturing, agriculture, and networks. Many AI-related technologies can be used in a variety of industries, as evidenced by the huge number of AI patents that cover multiple sectors.

The report shows that agriculture, banking and finance, government computing, law, and transportation are the areas with the fastest growth rates in AI-related patent filings between 2013 and 2016, each rising at least 28 percent per year. Among these sectors the fastest growing industries are aerospace and avionics, which grew by 67 percent on average between 2013 and 2016. They are followed by smart cities (47 percent), autonomous vehicles (42 percent), customer service (38 percent), and affective computing, which allows machines to recognize human emotions (37 percent).

Leading Companies and Universities

As said by Francis Gurry, the Director General of WIPO, the number of patents filed in the field of artificial intelligence is rapidly increasing, implying that we may expect a large number of new AI-based products, apps, and techniques that will impact our daily lives.

In the report it has been shown through a table that Japanese and American companies hold the largest AI patent portfolios. While there is a dominance of Japanese consumer firms, but we see that IBM has the largest AI patent application portfolio with 8290 inventions which is followed by Microsoft with 5390 inventions, both of these are United States companies indicating that US still holds the top two places with patent portfolios that cover a wide variety of AI applications and techniques. However, certain businesses excel in some different technical sectors. For instance, Baidu, the Chinese Internet giant, is a leader in deep learning; Toyota, Bosch, and

Hyundai are leaders in transportation; and Siemens, Philips, and Samsung are leaders in life and medical sciences.

Among all these only 167 of the top 500 patent applicants are universities and public research institutions. They are, nevertheless, in the lead in several sectors. According to Table 2 in the said report 17 of the top 20 academic participants in AI patenting and 11 of the top 20 in AI-related scientific papers are Chinese research groups. They excel in deep learning, a new approach that is gaining traction. With over 2,500 patent families and over 20,000 scholarly scientific articles published on AI, the Chinese Academy of Sciences (CAS) surpasses other similar institutions. With 235 patent families, CAS has the biggest deep learning patent portfolio.

Chinese organizations are cementing their dominance. Their AI-related patent filings have increased by more than 20% each year from 2013 to 2016, equal or exceeding the growth rates of businesses in other nations.

The Electronics and Telecommunications Research Institute (ETRI), as well as other organizations from the Republic of Korea, are notable among the top academic players. The Republic of Korea has 19 universities or public research institutions among the top 500 patent applicants, followed by the United States with 20 and Japan with 4. There are just four European institutions on this list with the Fraunhofer Institute being at the top out of these i.e. on 159th rank.

Key Markets for Innovation

The report helps in highlighting the most significant jurisdictions for AI research based on the most prominent offices for submitting AI-related patent applications. The US Patent and Trademark Office (USPTO) and the China National Intellectual Property Administration (CNIPA) are at the top of the list, followed by the Japan Patent Office (JPO). Seventy-eight percent of all AI-related patent filings come from these three offices only.

However, there lies a significant distinction between applications submitted in Japan and the United States on the one side, and those filed in China on the other. Even though we see that the applications submitted in the first two offices, around one third of them are later filed in other countries, but in the case of China just 4% of applications filed here are afterwards filed in other

countries. This suggests that many Chinese companies choose to submit patent applications in China alone, maybe because they regard China as the most important market for their ideas.

Policy Challenges

The statistics on patents and scientific publication show how quickly AI is evolving. The report shows that this trend as well as the widespread use of many AI technologies and their potential influence on people's daily lives are suggestive of the fact that AI technologies are posing a variety of policy and regulatory hurdles for governments and regulators.

Among some of these hurdles and challenges are the use and security of personal data, the creation of standards and data sharing, question of how to fund innovation, the regulation of new technologies, and also the danger that extremely powerful AI which is called by some people as "superintelligence" might represent a threat to human life. In the WIPO report leading AI specialists respond to some of these concerns, which also helps us give an overview of some policy measures which are being taken by governments in various countries.

One of the contributor of these responses is Myriam Côté of Montreal Institute for Learning Algorithms who like other research groups in an attempt of raising public awareness and comprehension of AI related issues comments that *"we are currently in the initial wave of an AI revolution and that we will soon see more and more implications of this technology on our life, hence in the light of the same some of us should divert our attention towards the issues of personal data privacy, false news creation, job losses, financial market manipulation, data biases, diversity problems, and so on."*[85]

Some experts discuss the influence AI will have in specific sectors, such as digital health, as well as the issues that its use may create. One of the contributors, Kai Fu Lee, an investor, thinks that the next step in AI will be to fine-tune technology to meet specific applications. According to him, "we are nearing towards the end of the era of discovery, and the next phase will most likely be implementation of the same."[86] Another contributory i.e. Baidu's Haifeng Wang adds that the "most recent AI 'boom' may be summed up as a huge jump in functional applications, owing to

[85] *Supra* note 3, at 133
[86] *Supra* note 3, at 134

the emergence of massive data, computer capacity, and ever-improving algorithms and it is the time for Al applications to have a significant economic impact."[87]

However, the implementation of the same would pose a lot of problems and hurdles for both businesses and governments. The World Economic Forum is collaborating on creation of AI governance structures with different industry, government, civil society, international organizations, and academia, including an AI Board Toolkit. According to Kay Firth-Butterfield of the Forum, all businesses will soon need to establish an AI strategy and assess how it applies to their operations. He claims that if the incorrect decisions are made concerning AI, significant brand value might be lost. As a result, it is essential that different regulatory and other governance measures be considered soon.

5.3 Indian Perspective

India is becoming a new target for patent applications in the field of AI, and is among the top nations for publishing in particular categories such as computer vision and natural language processing and we can clearly make this out through this WIPO Technology Trends report.

While France, Germany, the Republic of Korea, and the United Kingdom are the primary patent offices receiving AI patent applications, India is emerging as a new target for patent filing. The patent offices of the United States and China get the most patent applications, followed by Japan, South Korea, Germany, Australia, and India.

According to the report, India was placed eighth for initial files in 2015 and has shown rapid yearly growth in recent years (with an average of 33 per cent in the three years up to 2015). In terms of scientific publications, India is fourth (behind Japan), Italy is ninth, and Spain is tenth. Further India comes in third place in fuzzy logic and fourth place in machine learning, however in terms of patenting it ranks eighth or below. But as mentioned in the report this thing is suggestive of the fact that India has abilities in AI research that might become even more apparent in terms of patenting activities in the coming years. According to one of the UN reports released "surge" in patent filings for AI-powered gadgets and machines in the previous five years

[87] *Supra* note 3, at 63

implies that AI could soon change all aspects of daily life well beyond the computer sector, according to a UN report on Thursday.

5.4 Grey Area

From the above analysis of the two reports we can make out that there are several ethical issues that also comes into picture due to the enhanced use of AI such as privacy and surveillance of data, embedded bias and discrimination, lack of transparency, susceptibility of inaccuracies in AI-based decisions.[88]

Another ethical repercussion of the use of AI can be on human rights, particularly, their right to private life and dignity. For example individuals in our society may become vulnerable to manipulation if AI can be used to identify people's political opinions.

5.5 Recommendations

Some of the things that were not dealt with in both these reports and are as follows-

- A test needs to be developed that has the ability to distinguish between AI-created and AI-assisted works on the basis of which the precise IP holder can be established.
- A separate statute dealing with the ethical issues such as data protection in relation to AI software must be passed which must include any civil and criminal obligations and offences that are equivalent to the same.
- In the said two reports WIPO has recognized the future issues and difficulties which may arise with AI and has addressed them via various ways but in addition to this an appropriate international policy also needs to be developed for these issues.

[88] EPRS, *The ethics of artificial intelligence: Issues and initiatives*, EPRS (March 2020), https://www.europarl.europa.eu/RegData/etudes/STUD/2020/634452/EPRS_STU(2020)634452_EN.pdf

CHAPTER – VI

CONCLUSION AND SUGGESTIONS

As discussed thoroughly in this paper, the author has tried to look at Artificial intelligence and its intersection with IPR and what are the issues that arise out of it. The applications for artificial intelligence are endless. Technology can be applied to many different sectors and industries.

Currently, AI is being tested and used in the healthcare industry for dosing drugs and different treatments in patients, and for surgical procedures in the operating room. For instance, machines with artificial intelligence include computers that play chess and self-driving cars. In each of these cases the machines must weigh the consequences of any action they take, as each action will impact the end result. In the case of playing chess, the end result is winning the game. The good thing about artificial intelligence is that it is always bringing together a combination of modern technologies to make life better. These technologies include driverless transportation and targeted treatments in the healthcare sector. However, this innovation is also impacting the way we live today and how we will live in the future.

For instance, AI technologies are taking up most of our jobs and increasing data privacy concerns. Due care and diligence should be taken while dealing with the AI since it can affect ethics and morality, and causes non-transparency issues and the "black-box problem." Artificial intelligence (AI) is increasingly driving important developments in technology and business. It is being employed across a wide range of industries with impact on almost every aspect of the creation. The availability of large amounts of training data and advances in affordable high computing power are fueling AI's growth. AI intersects with intellectual property (IP) in a number of ways.[89] Artificial Intelligence (AI) in the world of Intellectual Property has raised some very interesting questions and debate. The patentability of AI related inventions, proprietary issues of inventorship and the lack of adequate regulations and standards have left some open-ended questions.

[89] *Artifical Intelligence and Intellectual Property*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, https://www.wipo.int/about-ip/en/artificial_intelligence/ (last visited June 27, 2021).

6.1 HOW CAN AI BE DANGEROUS?

Most researchers agree that a superintelligent AI is unlikely to exhibit human emotions like love or hate, and that there is no reason to expect AI to become intentionally benevolent or malevolent. Instead, when considering how AI might become a risk, experts think two scenarios most likely:

1. **The AI is programmed to do something devastating and wrong:** Autonomous weapons are creation of artificial intelligence systems that are programmed to kill and destroy. If these are in the hands of the wrong person, these weapons could easily be misused and cause mass casualties. To avoid being thwarted by the enemy, these weapons would be designed to be extremely difficult to simply "turn off," so humans could plausibly lose control of such a situation. This risk is one that's present even with narrow AI, but grows as levels of AI intelligence and autonomy increase.

2. **The "Black-box" Problem**: AI applications rely on machine-learning algorithms or neural networks to mimic the functioning of the human brain. The problem is that it is impossible to explain how these algorithms manage to produce accurate results. This "black-box problem" is one of the dark sides of artificial intelligence and machine learning. It is sad that people don't get access to the information regarding the automated decision-making that AI applications subject them to.[90]

3. **The AI is programmed to do something good or beneficial, but it develops a destructive method for achieving its goal:** This can happen whenever we fail to fully align the AI's goals with ours. If you ask an obedient intelligent robot car to take you to the airport as fast as possible, it might get you there chased by helicopters and covered in vomit, doing not what you wanted but literally what you asked for. If a superintelligent system is tasked with an ambitious geoengineering project, it might wreak havoc with our ecosystem as a side effect, and view human attempts to stop it as a threat to be met.

4. **Creates an Opportunity for Cyber Attacks**: Cyber security is one of the major challenges that AI technologies seem to be targeting. However, there are concerns that

[90] Alexander Menzheres, *The Dark Side of Artificial Intelligence and Machine Learning*, ETEAM, https://www.eteam.io/blog/the-dark-side-of-artificial-intelligence-and-machine-learning (last visited June 28, 2021).

hackers are using the same approaches that AI developers are using to design cyber security mechanisms to develop malicious bots. Unethical people find it easy to break AI systems because the used codes have flaws and are usually a combination of several programming methodologies.

5. **Morality and Values**: People from different walks of life are raising ethical questions regarding the future of AI. There are data laws in other jurisdictions that protect the rights of people based on how AI technologies affect them. In some countries, when companies and individuals fail to adhere to these strict policies, they may be liable to criminal prosecution or penalties.[91]

As we come to the conclusion of this paper, let us quickly revise the legal and ethical issues of AI and IPR, as discussed in this paper:

6.2 LEGAL ASPECTS AROUND PATENT LAWS AND INVENTORSHIP

Patent laws were introduced before the advent of computers and softwares. Hence, they were made to exclude abstract ideas, mental acts or laws of nature. This ensured that the people do not misuse the patent system for their own benefit by patenting a mere extension of any theory or activities similar to that. In the present world, computers and software are an inevitable part and become an inherent part of technology. Even though there are some conundrums regarding patenting of software, software no longer remains constrained to the traditional rule-based system.

Current patent laws treat AI software inventions essentially as logical algorithms implemented on the computer. On inventorship, patent law states that someone (usually a natural person) who merely applies the logic to make something workable cannot be an inventor. So far machines were 'that someone,' hence they were not a possible inventor under the law. Today, as we rely on machines for making decisions, we have reached a crescendo where machines are intelligent enough to derive solutions independently or in conjunction with a

[91] *Ibid.*

natural person.[92] Naturally, the concept of a natural person as an inventor is in question. The other key aspect to deliberate upon is data-privacy and data-ownership issues. In a global ecosystem that involves multiple players, data is accessed and moved many times across jurisdictions. This is especially true when it comes to private data of individuals.

These three issues, the patent eligibility aspects of AI inventions, inventorship concerns and data handling aspects are subject to conflict and debate in the IP Community. Some are of the opinion that we should do away with old laws and update laws that can herald a wave of innovation, while others on the other hand, feel that this can be too dangerous and would lead to unprecedented and unknown consequences. Different views on this topic, some driven by fear and others by greed have derailed the process of 'patent law innovation'. Most patent offices today are still confused with this concept and often confine themselves to the existing rules, which seem to confuse rather than clarify the issue. The following sections provide a brief account of the current state of these three aspects.

6.3 PATENTABLE ASPECTS IN DIFFERENT COUNTRIES

United States

Title 35 of U.S.C Section 101 (35 U.S.C. § 101) limits patentable subject matter to 'new and useful process, machine, manufacture or composition of matter or any new and useful improvement thereof.' Patents were directed to exclude abstract ideas, mental acts or laws of nature. The courts usually consider whether the invention involves an '*inventive concept*,' which is an element or combination of elements *'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.'*[93] It ensures whether there is enough in the invention to transform the abstract invention to the patent eligible subject matter. In the case, *McRO, Inc. v. Bandai Namco Games America Inc.,*[94] the court demonstrates the

[92] *This Picasso painting had never been seen before. Until a neural network painted it,* MIT TECHNOLOGY REVIEW (Sept. 20, 2019), https://www.technologyreview.com/s/614333/this-picasso-painting-had-never-been-seen-before-until-a-neuralnetwork-painted-it/.
[93] Alice Corp. v. Cls Bank, 134 S. Ct. 2347 (2014).
[94] Fed. Cir. 2016.

extent of technicality to transform an abstract concept to the patentable subject matter and provides some clarity on '*significantly more.'*

The United States Patent and Trademark Office (USPTO) issued a set of revised guidelines[95] for patent examination of abstract ideas on 10th January 2019 and according to these guidelines;

1. The alleged abstract idea must be recited or written in the claims
2. Claim limitation enumerated as an abstract idea must be evaluated to determine whether it falls into any of the following three categories:

- ❖ Mathematical concepts: Relationship, formulae or equations
- ❖ Certain methods of organising human activity: Fundamental economic principles or practices; commercial or legal interactions; managing personal behaviour or relationships or interactions between people
- ❖ Mental processes: Concepts formed in the human mind

3. Claims that recite matter falling outside the purview of these are patent-eligible
4. An additional caveat allows claims if they are not directed toward an abstract idea, rather are integrated into a practical application

The revised guidelines have a good impact and provide more clarity and increase the scope of patent eligibility of AI inventions in the country, when integrated into a practical application. In a nutshell, the patentability landscape in the U.S. has been changing over the past few decades.

European Patent Convention (EPC)

The EPC does not explicitly define the term "*invention.*" However, EPC specifies the qualities an invention must have if it is to be patentable. The criteria are that the patent claims it must be new, involve an inventive step and be susceptible to industrial application. Under the EPC, the term "invention" should therefore be understood as "*subject-matter generally eligible for patent protection"* without a priori having the required qualities of being novel, inventive and industrially applicable.[96] The EPC contains an exemplary list of items that are not regarded as

[95] 2019 Revised Patent Subject Matter Eligibility Guidance, UNITED STATES PATENT AND TRADEMARK OFFICE (Jan. 10, 2019), https://www.uspto.gov/sites/default/files/documents/Quality_Chat_1_10_2019.pdf.
[96] *The Patentability of Software under the EPC*, BARDEHLE PAGENBERG (Aug. 2015), https://media.bardehle.com/contentdocuments/broschures/The_Patentability_of_Software_under_the_EPC_01.pdf.

inventions and are excluded from patent protection regardless of whether they have the above qualities.

Article 52 of the European Patent Convention states that:

1) *European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible to industrial application.*
2) *The following in particular shall not be regarded as inventions within the meaning of paragraph 1:*

a) *discoveries, scientific theories and mathematical methods;*
b) *aesthetic creations;*
c) *schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;*
d) *presentations of information.*

3) *Paragraph 2 shall exclude the patentability of the subject-matter or activities referred to therein only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.*

The patenting of computer programs is developed by a catena of judicial judgement and case laws. EPO has given very specific examination guidelines directed toward the patentability of the subject matter. Part G, Chapter II, Section 3 provides a list of exclusions. The guidelines specify that 'exclusion applies if a claim is directed to a purely abstract mathematical method and the claim does not require any technical means.' However, if a claim is directed either to a method involving the use of technical means (for example, a computer) or to a device, its subject matter has a technical character as a whole and is thus not excluded from patentability under Art. 52(2) and (3).[97]

[97] THE EUROPEAN PATENT CONVENTION, https://www.epo.org/law-practice/legal-texts/html/epc/2016/e/ar52.html (last visited June 28, 2021).

Thus, from a patent eligibility standpoint – an abstract invention is patentable if it is tied down to a technical purpose and its subject matter has a technical character.[98]

India

India was the first country to provide statutory protection to software programs under the Copyright Act, but from then the development was quite slow. The country has failed to have a developed jurisprudence that specifically and exclusively deals with software programs.

There are no AI-specific guidelines have been issued yet, patenting guidelines on Computer Related Inventions (CRI) have been deliberated in detail from the time the Indian patent amendment act of 2002 was introduced. This Act introduced explicit exclusions from patentability, under section 3. These include:

- a mathematical or business method or a computer programme per se or algorithms
- a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever including cinematographic works and television productions
- a mere scheme or rule or method of performing mental act or method of playing game
- a presentation of information

Patent is the realization of concept in a concrete form and the strongest way to protect Intellectual Property by fulfilling certain stringent criteria. Section 3(k) of Patents Act, 1970,[99] per se excludes computer programs. This caused much conundrum to determine whether software can be patented or not. The radical decision on the jurisprudence related to patentability of software and computer programs or Computer Related Inventions (CRI) was widely discussed in Ferid Allani vs Union of India & Ors.[100] The sub-section 3(k) of the Act excludes mathematical methods or business methods or computer programmes or algorithms from

[98] *Understanding the dynamics of Artificial Intelligence in Intellectual Property*, TATA CONSULTANCY SERVICES, https://www.tcs.com/content/dam/tcs/pdf/discover-tcs/about-us/press-release/understanding-dynamics-artificial-intelligence-intellectual-property.pdf (last visited June 28, 2021).
[99] Inserted by The Patents (Amendment) Act, 2002, Act no. 38 of 2002.
[100] W.P.(C) 7/2014 & CM APPL. 40736/2019.

patentability. CRIs are often claimed in the form of algorithms as method claims or system claims with some 'means' indicating the functions of flow charts or process steps.[101]

The three sets of guidelines, published by the Patent Office are The 'Draft Guidelines' (the initial Guidelines), the 'Guidelines' (second document) and 'Revised Guidelines' (issued in 2017) should be considered in determining whether the invention demonstrates technical effect or technical contribution. There can be no doubt as to the fact that the patent application deserves to be considered in the context of settled judicial precedents[102] together with these guidelines.

6.4 CONCERNS RAISED OVER AI-GENERATED INVENTIONS

New AI technologies present exciting opportunities for developments in the creative arts, entertainment industries, as well as life enhancing inventions. However, there are some social, economic and ethical implications that need to be addressed and taken care of. *'The real danger of artificial intelligence is not that computers are smarter than us, but that we think [they] are.*'[103] The conundrum around AI-generated inventions continues to gain momentum, reaching the agenda of policymakers at the various national as well as international levels. The European Patent Office (EPO) has refused two European patent applications in which an AI system DABUS, designated as the inventor, on the formal ground of failure to fulfil the requirement of the European Patent Convention that 'an inventor designated in the application has to be a human being, not a machine' on 21 December 2019.[104] Artificial Intelligence (AI) is increasingly becoming important across a diverse spectrum of technologies and businesses.

The World Intellectual Property Organisation (WIPO) also called for comments raising, *inter alia*, the question of how patent law and policy should react to inventions 'autonomously generated by AI'. This was preceded by a request for comments by the U.S. Patent and Trademark Office (USPTO) addressing issues of Artificial Intelligence.[105] Under the current

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[101] Helan Benny and Vijay Mathews, *Software patentability, A never ending conundrum*, BRAIN BOOSTER ARTICLES (Mar. 2, 2021), https://www.brainboosterarticles.com/post/software-patentability-a-never-ending-conundrum.
[102] *Supra* note 18, para 13.
[103] Gary Smith, *The AI Delusion* (OUP 2018) 237.
[104] *EPO refuses DABUS patent applications designating a machine inventor*, THE EUROPEAN PATENT CONVENTION (Dec. 20, 2019), https://www.epo.org/news-events/news/2019/20191220.html.
[105] *Request for Comments on Patenting Artificial Intelligence Inventions*, FEDERAL REGISTER, (Aug. 27, 2019). https://www.federalregister.gov/documents/2019/08/27/2019-18443/request-for-comments-on-patenting-artificial-intelligence-inventions.

patent system third parties can act as inventors of technologies generated by intelligent systems. Concerns were raised against that, as such grant of rights would impose an unjustified welfare loss on the society.

6.5 ISSUES CONCERNING IP POLICY AND AI INVENTIONS

A relevant question in this regard is to what extent application of Intellectual Property laws to AI should be considered, or whether the results provided by the computer system are the products of its own intelligence, or should be attributed to the underlying algorithms and commands. WIPO published a draft Issues Paper on IP policy and AI, and started a public consultation process inviting feedback to help define the most-pressing questions likely to face IP policy makers as AI increases in importance.[106] The expanding scope of intellectual property in the context of the increased role of AI is creating much concern in today's world.

6.6 AI AND COPYRIGHTS & RELATED RIGHTS

Copyright refers to the legal right of the owner of intellectual property and is granted to the creator of an original work, which allows him/her exclusive rights for its use and distribution. In simpler terms, copyright is the right granted to copy. This means that the original creators of some work and anyone having authorization are the only ones with the exclusive right to reproduce the work. Copyright (or author's right) is a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by copyright range from books, music, paintings, sculpture, and films, to computer programs, databases, advertisements, maps, and technical drawings.[107]

At present, AI can be employed for the creation of literary works and hence, the discussion on copyright in light of AI becomes relevant. Conventionally, the issue of copyright in computer generated works was not relevant since the computer system was merely a tool to support the creative or artistic work.

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[106] *Draft Issues Paper on Intellectual Property Policy and Artificial*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, Intelligencehttps://www.wipo.int/meetings/en/doc_details.jsp?doc_id=470053 (last visited 27 June, 2021).

[107] Copyright, WORLD INTELLECTUAL PROPERTY ORGANIZATION, https://www.wipo.int/copyright/en/ (last visited June 28, 2021).

A recent European Commission Report on AI and IP[108] stated that we could be moving towards AI autonomy, at least to a level that the human contribution is "trivial to the creative or inventive process" and therefore we could be entering into an era where machines will "not only assist humans in the creative process but create or invent all by themselves."

Authorship and Ownership issues:

AI applications have the ability to produce literary and artistic works by itself without the support of human intellect. This raises concern about the copyright system, which has always been intimately associated with the human intellect and as the expression of human creativity. If AI-generated works were excluded from eligibility for copyright protection, the copyright system would be seen as an instrument for encouraging and favouring the dignity of human creativity over machine creativity. If copyright protection were accorded to AI-generated works, the copyright system would tend to be seen as an instrument favouring the availability for the consumer of the largest number of creative works and of placing an equal value on human and machine creativity.[109] Therefore, here arise a lot of questions regarding the authorship, ownership and copyright protection in relation to AI-generated works.

Infringement and Exceptions issues:

An AI computer system or applications have the capacity to produce creative works by learning from data with AI techniques such as machine learning and deep learning. The data used for training the AI application may use the creative works that are subject to copyright. Therefore, using such data subsisting in copyright works without authorization for machine learning and deep learning constitute an infringement of copyright or should an explicit exception be made under copyright law or other relevant laws for the use of such data to train AI applications to the said infringement. Also, how would the unauthorized use of data subsisting in copyright works for machine learning be detected and enforced, in particular, when a large number of copyright works are created by AI. Further, does this have any impact on the development of AI and on the free flow of data to improve innovation in AI? Therefore, the granting of copyright rights to AI systems could raise the pertinent question of whether an AI system could be held liable for infringement of the others' right.

[108] Maria Iglesias, Sharon Shamuilia and Amanda Anderberg, Artificial Intelligence and Intellectual Property - A Literature Review, EUR 30017 EN (Publications Office of the European Union, 2019).
[109] *Supra* note 24.

6.7 AI AND PATENTS

A patent is an exclusive right granted for an invention. "New invention" means any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e., the subject matter has not fallen in public domain or that it does not form part of the state of the art.[110] "Invention" means a new product or process involving an inventive step and capable of industrial application.[111] For an invention to be granted a patent, it should pass the patentability criteria i.e., novelty, inventive step, and industrial applicability.

The challenge faced by the AI system to get a patent is the lack of legal personality status. Here also there arises the question of liability for infringement of other inventors' patents, including those held by other AI systems. This will lead to a legal grey area over ownership rights that are expected to become harder with time.[112] It is remarkable that, when raising the fundamental question of how patent law needs to be adjusted in the advent of 'artificial inventions', policymakers neither provide an operative technical definition of such inventions, nor clarify how they differ from AI-aided inventions, nor review the technological state of the art.[113]

The rationale and the fundamental principles of the patent system is based and are designed around a 'human inventor.' Thus, the primary justification of patent law is utilitarian, i.e. the objective is to promote innovation and creation and rewarding innovative activities of inventors. The patent is granted to inventions that satisfy certain standards prescribed and not merely to discoveries or an obvious extension of what was already known. The concept of 'invention' entails the 'act of intellectual creation original to the inventor',[114] i.e. the mental act occurring in the mind of the inventor. The distinction between what is patentable and what is a mere extension of existing knowledge is on 'human capabilities' by comparing what the notional 'person skilled in the art' would have been able to discover without unusual effort and the additional step of human ingenuity made by the inventor.

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[110] The Indian Patent Act 1970, sec. 2, cl. 1, sub. cl. l.
[111] *Ibid*, sec. 2, cl. 1, sub. cl. j.
[112] *Should AI own their own IP?,* RACONTEUR, https://www.raconteur.net/legal/intellectual-property/ai-ip-rights/ (last visited June 27, 2021).
[113] Daria Kim, *'AI-Generated Inventions': Time to Get the Record Straight?,* 69 GRUR INTERNATIONAL 443-456 (2020).
[114] Robert L Harmon, Harmon on Patents. Black-Letter Law and Commentary (BNA Books, 2007) 32.

Inventorship and Ownership issues:

Usually, AI is a tool that supports inventors in the process of invention or constitutes a feature of an invention. In these cases, AI is merely used as a support to human beings. Since AI has the capacity to invent something by itself without human beings. This can create much conundrum when several cases of applications for patent protection are filed in which the applicant has named an AI application as the inventor.

Patentable Subject Matter and Patentability Guidelines issues:

Amendments need to be introduced in patent examination guidelines for AI-assisted inventions and existing sections need to be reviewed in the case of AI-generated or -assisted inventions. Computer-assisted inventions and their treatment under patent laws are still a subject matter of lengthy discussions around the world.

Disclosure issues:

One of the fundamental goals of the patent system is to disclose technology in the public domain, in the course of time, so that the public domain may be enriched and a systematic record of humanity's technology is available and accessible. Patent laws require that the disclosure of an invention be sufficient to enable a person skilled in the relevant art to reproduce the said invention. This situation leads to many questions like what are the issues that AI-assisted or AI-generated inventions present for the disclosure requirement. or where the algorithm changes over time with access to data, is the disclosure of the initial algorithm sufficient or should the data used to train an algorithm be disclosed or described in the patent application and so on.

Patent system issues:

A fundamental objective of the patent system is to encourage and promote innovative talents and creative works of human beings which contribute positively to the welfare of society. The advent of inventions generated by AI applications will change the entire concept of the patent system.

6.8 AI AND INDUSTRIAL DESIGN

Industrial design is the creative act of determining and defining a product's form and features. In short, it is a process of design applied to products which takes place in advance of the making of a product. Industrial designers typically focus on the physical appearance, functionality and manufacturability of a product. Industrial Design is a strategic problem-solving process that drives innovation, builds business success, and leads to a better quality of life through innovative products, systems, services, and experiences.[115] In a legal sense, an industrial design constitutes the ornamental aspect of an article.[116] An industrial design may consist of the shape of an article, or patterns, lines or colour. Design rights are to protect the visual appearance of products. Design rights may overlap with other IP rights, such as Copyright.[117]

In 2018, the European Union also recognised the need for accessible, modern, effective and consistent legal protection for design rights in the EU. As a result, in order to encourage technological innovation through design protection, the European Commission (EC) conducted a public consultation on design protection between 18 December 2018 and 31 March 2019 in a view to assess the appropriateness of legislative measures for design rights protection in the EU.[118]

Authorship and Ownership issues:

Generally, designs may be produced with the assistance of AI and such AI-assisted designs or computer-aided design (CAD) has long been in use and seems to pose no particular problems for design policy. But in the case of designs generated by an AI application without the assistance of human beings, the questions and considerations regarding AI-generated inventions and AI-generated creative works will arise. Do specific legal provisions need to be introduced to govern the ownership of autonomously generated AI designs, or should ownership follow from

[115] Definition of Industrial Design, WORLD DESIGN ORGANIZATION, https://wdo.org/about/definition/ (last visited June 29, 2021).
[116] *Industrial Design*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, https://www.wipo.int/designs/en/ (last visited June 28, 2021).
[117] *Design Rights*, GANNONS SOLICITORS, https://www.gannons.co.uk/insights/design-rights/ (last visited June 28, 2021).
[118] *Evaluation of EU legislation on design protection*, EUROPEAN COMMISSION, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1846-Evaluation-of-EU-legislation-on-design-protection/public-consultation_en (last visited June 28, 2021).

authorship and any relevant private arrangements, such as corporate policy, concerning attribution of authorship and ownership?[119]

6.9 AI AND DATA

Data is a critical component of AI since recent AI applications rely upon machine learning techniques that use data for training and validation, and is, thus, potentially economically valuable.[120] Since data is generated by such a vast and diverse range of devices and activities, it is difficult to envisage a comprehensive single law framework for data. There are multiple frameworks that have a potential application to data, depending on the interest or value that it is sought to regulate. These include, for example, the protection of privacy, the avoidance of the publication of defamatory material, the avoidance of the abuse of market power or the regulation of competition, the preservation of the security of certain classes of sensitive data or the suppression of data that are false and misleading to consumers.

Sensitive Personal data includes financial data, biometric data, caste, religious or political beliefs, or any other category of data specified by the government, in consultation with the Authority and the concerned sectoral regulator. The general question that arises for the purposes of the present exercise is whether IP policy should go further than the classical system and create new rights in data in response to the new significance that data have assumed as a critical component of AI.

6.10 CONCLUDING REMARKS: THE ROADMAP FOR NEW REFORM

As AI systems are becoming more advanced, the number of 'inventions' by such systems is bound to increase in future. The growth of AI is enlarging and becoming more comprehensive. There is a need to frame suitable legislations in order to provide adequate legal safeguards for AI-generated inventions. Further, it appears ambiguous what degree of AI involvement should be considered to be prejudicial for recognising a human as an inventor, especially, given that the use of problem-solving tools and methods has not been a material factor from an inventorship perspective.

[119] *Supra* note 24.
[120] *Supra* note 41.

Ensuring uniform international and national recognition for AIs, passing of relevant acts regarding the protection of AIs and addressing the ambiguity in fixing criminal liability are the ways forward to tackle this. More importantly, there is a need to formulate vivid and widely accepted guidelines with respect to the application of patent laws to AI.

AI technologies may be manipulative if proper oversight is not taken in place. The authorities and policymakers must work together coming up with an effective regulatory statute that can guide AI-related decision-making processes. Since these technologies directly interact with people, various stakeholders must also join hands in regulating AI decision-making. An AI watchdog should be set up to ensure that the usage of AI programs is fair. Before the programs collect data from us, we have the right to consent to them or deny them permission.

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