



IPR ISSUES IN ARTIFICIAL INTELLIGENCE: A COMPARATIVE STUDY

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ABSTRACT

As Artificial intelligence (AI) continues to evolve, Intellectual Property law is grappling with how to protect creations and inventions derived from it. This topic has gained practical importance due to the intense AI-related business activity and regulatory measures taken by international organisations and legislators. As AI technology advances rapidly, it is crucial to explore the complicated realm of Intellectual Property Rights concerns. The rapid growth of AI business and the new promulgation of international regulations have significantly enhanced the practical importance of this topic. It is important to investigate this and find solutions for any possible issues. For instance, we must study the variations in legal techniques used in different countries and how they affect innovation, including patents, copyrights, trademarks, and trade secrets.

Furthermore, it is essential to understand how AI can create, use, or modify intellectual property, leading to unique legal challenges. This includes issues such as ownership, liability, infringement, and fair use of AI-generated content. It is necessary to analyse the worldwide legal frameworks that govern Intellectual Property Rights (IPR) in relation to Artificial Intelligence (AI). This analysis should take into account ethical and policy implications and provide guidance for future advancements in IPR laws. The objective is to promote innovation while ensuring that ethical concerns are taken into consideration.

KEYWORDS: Artificial Intelligence, Digital Technology, Intellectual Property Rights, Copyright, Trade Secrets, Patents, Trademarks, Legal Frameworks, Comparative Study, Innovation, Global perspectives, India.

CHAPTER 1- INTRODUCTION

As artificial intelligence systems continue to evolve, issues related to intellectual property rights are becoming increasingly complex. It is crucial to establish a system for proactive adjudication of these issues and to develop appropriate policies that allow for granting patents, copyrights, and other necessary rights to AI-generated content while ensuring consumer protection is not compromised. Given the growing importance of AI in the current economic system, it is essential to expand and broaden the scope of intellectual property rights to embrace AI innovation, while safeguarding the rights of inventors and developers throughout the process.

The complexity of software added to advanced artificial intelligence systems causes them to increase exponentially. Systems powered by artificial intelligence may now perform simple computations as well as more intricate creative tasks like poetry and artwork. This begs the question of whether, in addition to any other type of work created by an individual (who is identifiable), and protected by intellectual property rules, a distinct identity and status may be conferred under those laws. Their inquiry brings up a number of more difficult problems, which the writers hope to draw attention to in their writing. This research article begins with a discussion on intellectual property rights, encompassing copyright and trademark, as well as artificial intelligence (AI). The paper dives deeper into of copyright concerns related to AI solutions. It explores how current Intellectual property laws

influence affect the development and use of AI systems. Further, this study tackles these issues head-on by proposing potential solutions.

1.1 Meaning and Definition of Artificial Intelligence:

Artificial Intelligence is all about bringing machines to life with human-like intelligence. This is accomplished by training the robots to mimic or replicate human thought processes and behaviours, such as language comprehension, learning, reasoning, and problem-solving. The study of cognitive functions and brain patterns in humans is the foundation of AI. By deciphering these thought processes, we can create intelligent software and systems that mimic human capabilities. The main objective of AI is to build and enhance systems that can independently solve problems, adapt to changing environments, and improve the performance of AI technology over time without any explicit programming. The domain of AI is typically separated into two distinct groups: "narrow AI" and "general AI". Weak AI, or narrow AI, functions similarly to a highly qualified specialist. It is taught to be exceptionally good at one or a small number of related tasks, like as face recognition or chess playing. Nonetheless, the pinnacle of artificial intelligence is general artificial intelligence, also referred to as strong AI. It's the kind of AI that could completely replicate human intelligence. Like a human, a general artificial intelligence (AI) system might comprehend data, pick up new skills on its own, and use that knowledge to accomplish a wide range of jobs.

The world of Artificial Intelligence (AI) is a vast and exciting one. It's like a toolbox filled with amazing technologies, each with its own special power. Robotics allows us to build intelligent machines, computer vision lets machines see the world, natural language processing helps machines understand and generate human language, machine learning enables machines to learn from data, and expert systems capture and use human knowledge. This powerful toolkit is transforming many aspects of our lives, from revolutionizing healthcare and banking to shaking up entertainment and transportation. But with great power comes great responsibility! As AI races forward, we need to think carefully about potential drawbacks like privacy concerns, ethical dilemmas, and the impact on jobs. Let's delve into some of the innovative ways AI is being used today¹⁹⁷⁸:

- 1.1.1 Siri-** It is Apple's virtual assistant, and has been a part of the company's smartphone operating system since the iPhone 4S debut in 2011. Known for its focus on user privacy, Siri leverages artificial intelligence to assist users with everyday tasks. This includes setting reminders and updates, making calls, and even searching the web.
- 1.1.2 Cortana-** Microsoft jumped into the smart assistant game in 2014 with Cortana, first appearing on Windows Phone 8.1. Today, Cortana acts as a personal productivity assistant within the Microsoft 365 suite. Think of it as a helpful AI buddy that can remind you of important emails or let you join meetings with a simple voice command using the Teams app.
- 1.1.3 Bixby-** 2018 saw the release of Samsung's own smart assistant, Bixby, along with the Galaxy S8 and S8+ smartphones. The core idea of Bixby is convenience. You can play music, turn on the camera, and even manage smart home appliances like lighting with short voice commands. You may also use it to locate misplaced Bluetooth headphones. Bixby is available on select Samsung products, such as smart refrigerators, in addition to smartphones and tablets.
- 1.1.4 Cruise-** With its innovative use of AI, Cruise is a leader in the provision of robot taxi services for large cities. Their autonomous vehicles consume enormous amounts of data one petabyte every day. Their AI is continually learning the safest manoeuvres, smoothest driving styles, and most efficient routes thanks to this wealth of knowledge. Providing motorcyclists with a worry-free experience is the main goal.

¹⁹⁷⁸ Sam Daley, "54 Artificial Intelligence Examples Shaking Up Business Across Industries", Built In. (Access Here- <https://builtin.com/artificial-intelligence/examples-ai-in-industry>)

- 1.1.5 Tesla-** Tesla has four electric car models in its lineup that are nearly self-driving on motorways. They continuously enhance their cars' capacity to brake, change lanes, and even park themselves by utilising a potent AI system in conjunction with state-of-the-art software and infrastructure. The AI and robotics team at Tesla is always pushing the envelope in the background by experimenting with things like autonomy algorithms, robots, and neural networks.
- 1.1.6 Google Maps-** For expediency, Google Maps leverages artificial intelligence (AI). Whether you are travelling by car, bicycle, bus, rail, or foot, Google's artificial intelligence system analyses road data to determine the optimal path. With the addition of voice search and interactive virtual reality maps that assist with real-time navigation, they have even raised the bar for AI.
- 1.1.7 My AI-** Snapchat isn't just about social media and photos anymore. They've got a cool new AI assistant called "My AI" that can hang out on their app. You can add your friends and family, and My AI is there to help you with all sorts of things. Stuck on a trivia question or need travel tips. My AI can be your brainstorming buddy for finding the perfect gift. It's like having a mini personal assistant right in your pocket.
- 1.1.8 Meta-** Facebook has introduced a platform called Meta. All-out AI is being used to improve user experience. AI is present throughout the site, from highly targeted advertisements and customised news feeds to chatbots in Messenger and photo tag suggestions. They even fight spam and abuse using a combination of AI and human strength to keep things clean. Meta is largely reliant on artificial intelligence (AI) to monitor its platform, with continuous picture recognition research and a strong emphasis on AI technology.
- 1.1.9 Birdbrain-** This is an artificial intelligence tool used by Duolingo to ensure that the exercises on Duolingo are at the appropriate difficulty level based on the user's skills and shortcomings.

1.2 Meaning and Definition of Intellectual Property Rights:

A legal framework known as intellectual property rights gives people and organisations the exclusive right to create and own works of art or other creations that are the result of their inventiveness and creativity.¹⁹⁷⁹. These rights offer protection for intangible assets and encourage innovation by granting exclusive rights to creators or inventors, allowing them to have control the use of their intellectual creations for a specific period. Certain types of IP rights are as follows:

1.2.1 The Patents Act, 1970 (amended 2005): This act follows a thorough review process and then grants exclusive rights to inventions for a period of twenty years. It uses the "first-to-file" method, which rewards the innovator who applies first.

1.2.2 The Copyright Act, 1957: This act provides protection to original literary, artistic, musical, and cinematographic creations.

1.2.3 The Trade Marks Act, 1999: It regulates the course or the process required for registering and safeguarding of the trademarks for products and services. It identifies a trademark as an indication or a symbol that differentiates the goods of one company from another, which may include logos, forms, or packaging.

1.2.4 The Designs Act, 2000: This protects an object or article's visual appeal instead of its practicality. Registration offers exclusive rights for ten years, fostering creativity in the design of products.

1.2.5 The Geographical Indications of Goods (Registration and Protection) Act, 1999 (GI Act): Ensures the credibility and calibre of items associated with a given geographic place. It inhibits unauthorised usage of certain names, hence maintaining customer trust.

¹⁹⁷⁹ Lalit Jaipura, Bhupinder Singha and Rajkishore Nayakb, "An Introduction to Intellectual Property Rights and their Importance in Indian Context", Journal of Intellectual Property Rights, Vol 22, January 2017, pp 32-41

Because intellectual property rights encourage innovators and inventors to invest their time, resources, and money in creating new ideas, they are crucial for promoting innovation, creativity, and economic progress. However, there is always a challenge in balancing these rights with the public's right to receive information while maintaining fair competition. Global norms and guidelines for intellectual property protection and enforcement are developed with the assistance of legal frameworks and international agreements¹⁹⁸⁰ such as the Berne Convention, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and the Patent Cooperation Treaty (PCT).

IP rights are significant within the domain of AI due to a number of reasons. They serve a vital role in stimulating innovation by assuring creators and innovators that their creations will be safeguarded and valued. Exclusive rights under IPR, such as patents and copyrights, encourage substantial investments in AI research and development, supporting continual technological growth. Furthermore, IPR fosters collaborations and moral considerations by clearly specifying ownership and usage rights, allowing for competent and ethical AI applications. Safeguarding trade secrets is a prevalent practice in artificial intelligence, is crucial to preserving a competitive advantage. In its entirety, an effective IPR system protects individual initiatives.

In addition, IP rights contribute to economic growth by promoting innovation and recruiting talented experts and investors. Protection of intellectual property is necessary for preserving a reasonable advantage in the quickly growing AI business, allowing companies to commercialise their ideas without risk of unlawful usage by competitors. IP rights also helps to standardise AI technology and cross-entity collaborations by establishing an environment for appropriate exchange of knowledge. However, maintaining a balance between preserving innovation and enabling open information exchange for everyone is a constant problem. As AI improves, the moral consequences of IP rights become increasingly crucial, affecting responsible AI development and deployment on a global scale. In its entirety, the presence of the IP rights in AI provides as a foundation for creativity, collaboration, and moral practices, as well as adding towards the industry's overall development and competitiveness. We must also address the nexus of confidentiality of information, IP rights, and AI. It creates a complicated terrain with serious consequences. The huge volumes of sensitive and personally identifiable details handled by AI systems pose data privacy concerns, while intellectual property rights play an important role in preserving the discoveries and algorithms that use this data.

1.3 Literature Review

Conducting a review of literature has proven to be beneficial in gaining a comprehensive understanding of research topics. The diverse perspectives of various researchers have contributed to the effectiveness of the research. It has also broadened the research scope and facilitated the formulation of appropriate research objectives for the research paper.

Here are some of the literary references:

1.3.1 INTELLECTUAL PROPERTY PROTECTIONS IN AN AGE OF ARTIFICIAL AND NON-HUMAN INVESTORS by Hrutvi Nerurkar-

This paper explores the possibilities of expanding intellectual property systems to support innovation in artificial intelligence while ensuring that human-centred perspectives are taken into account alongside the remarkable creative capabilities of AI technologies. To achieve this, the study suggests a measured evolution of current statutory frameworks that maintain a balance between encouraging ongoing AI innovation and protecting access. This includes introducing additional protections for algorithmic outputs that surpass specific creative

¹⁹⁸⁰ International IP treaties, United States Patents and Trademarks Office (Access here- <https://www.uspto.gov/ip-policy/international-ip-treaties>)

contribution thresholds and creating mechanisms that foster collaborative creativity between humans and machines.

1.3.2 OVERVIEW OF ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY RIGHTS by Ms Rashmi Dubey & Dr Ujwala Bendale-

In this paper, the term "Intellectual" is explored as a substitute for "Intelligence". It is argued that intelligence is a limitless quality that takes countless forms in every individual's mind. Intellectual Property Laws serve to protect intelligence, and the trend towards using intellect for success over physical effort is on the rise. In modern warfare, intelligence plays a greater role than bloodshed. The field of Intellectual Property is undergoing significant advancements across all aspects of life, with technology and Artificial Intelligence (AI) at the forefront. AI is an incomparable form of intellect that is synonymous with excellence, and the algorithms used in AI are creating a demand for new forms of Intellectual Property Rights.

1.3.3 IMPACT OF ARTIFICIAL INTELLIGENCE ON INTELLECTUAL PROPERTY RIGHTS by Niteesh Kumar Upadhyay & Mahak Rathee-

The paper talks about how the advancement of Artificial Intelligence has become a reality and has influenced various industries, including Intellectual Property Rights. AI can prove to be an advantageous tool in patent research, conducting precise investigations, and organizing inventions. In this research paper, the authors analyse the implications of AI on IPR, its advantages and disadvantages concerning innovation, and its potential for future development.

1.3.4 LEGAL AND HUMAN RIGHTS ISSUES OF AI: GAPS, CHALLENGES AND VULNERABILITIES by Rowena Rodrigues-

This piece delves into the complex legal and human rights issues surrounding the use of artificial intelligence (AI). It explores the current efforts to address these concerns, as well as the challenges that remain, and examines how AI impacts human rights principles. Among the issues discussed are algorithmic transparency, cybersecurity risks, discrimination and bias, lack of accountability, intellectual property concerns, adverse effects on workers, and privacy and data protection. While recognizing the progress made in the field of AI law, it stresses the importance of ongoing evaluation and adaptability in addressing these complex issues. Given the significant impact of AI on vulnerable individuals and groups, protecting human rights should remain a top priority.

1.3.5 AI AUTHORSHIP AND OWNERSHIP OF CONTENT AND WHERE IT STANDS IN THE PATENT AND COPYRIGHT LAW: THE CURRENT SITUATION AND WAY FORWARD by Arya Hartalkar-

This paper delves into the rapid advancement of artificial intelligence (AI) in our society thanks to advanced technology. Soon, AI systems will be capable of creating innovative works without human intervention. As this technology continues to evolve, it will have a significant impact on the economy, making it crucial for intellectual property laws to address potential future developments in AI. With AI systems already performing human tasks and creating artistic works, concerns about intellectual property rights (IPR) and the control of such creations are on the rise. This paper takes a global perspective on the subject and aims to explore the evolving IPR laws' application to artificial intelligence and the resulting issues. Currently, there is no legal framework for AI activities, but establishing a comprehensive legal framework is becoming increasingly necessary. Additionally, the paper addresses concerns about criminal responsibility for the content produced by AI technologies and provides recommendations that go beyond IPR.

1.3.6 ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY LAW by Swapnil Tripathi & Chandni Ghatak-

This paper aims to explore the expanding scope of IPR laws related to artificial intelligence and the challenges that come with it from a global perspective. Additionally, it examines the issue of criminal liability for content created by these technologies and provides suggestions beyond IPR. As technology continues to advance, artificial intelligence systems are becoming more prevalent in our society. While these systems have the potential to generate groundbreaking inventions without human intervention, it also raises important questions about Intellectual Property Rights (IPR) and the regulation of these creations.

1.3.7 ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY by R.O. Omorov-

This article delves into the complex issues that arise at the intersection of intellectual property rights and the development of artificial intelligence systems. It explores how AI is impacting legal relations in modern society, both in the economy and in culture. Additionally, the article examines policies regarding the development of AI and intellectual property rights, with a focus on promoting innovation and creativity. Copyright and ownership issues are also addressed, particularly regarding human, collective, and AI systems. The author proposes granting copyright and ownership of intellectual property objects created by autonomous AI to the subject responsible for its development, whether that be an individual or a collective. Ultimately, the article suggests that harmonizing international intellectual property rights policies is necessary to bridge the technological gap between countries in the context of AI development.

1.3.8 THE LEGAL CONUNDRUM: INTELLECTUAL PROPERTY RIGHTS IN THE ERA OF ARTIFICIAL INTELLIGENCE by Subharun Pal-

The subject of this research paper is the intricate nature of applying conventional Intellectual Property Rights (IPR) principles to Artificial Intelligence (AI) creations. With the advent of AI, a new form of authorship and ingenuity has emerged which raises questions about our current IPR understanding. This paper delves into the complex legal issues surrounding AI-generated work, including the concepts of authorship and ownership. It pays particular attention to the blurring of lines between human and machine creativity. The paper concludes by recommending a re-examination of current IPR frameworks to better accommodate the distinctive qualities of AI creations. It draws upon actual cases and legislative initiatives from various jurisdictions.

1.3.9 THE IMPACT OF ARTIFICIAL INTELLIGENCE ON INTELLECTUAL PROPERTY RIGHTS by Muhammad Hamza Zakir, Syed Hammad Khan, Zahira Saeed & Sajida

This paper explores the impact of Artificial Intelligence (AI) on Intellectual Property (IP) rights. With the advancement of AI technologies, the traditional IP frameworks are facing new challenges, which call for a re-evaluation of legal norms. To set the context for the present-day intersection of IP and AI, the paper delves into the historical development of IP rights and the evolution of AI. It then examines key areas such as the recognition of AI in creating copyrightable works, its role in patent innovations, and its impact on trademarks. The paper also provides a comparative evaluation of global jurisprudence, highlighting the range of legal responses to these emerging challenges. Along with addressing the ethical implications and policy issues of integrating AI into the field of IP, the paper offers insights into potential legal reforms. By providing a nuanced understanding of the complex relationship between AI and IP rights, the paper aims to anticipate future legal trends and proposes recommendations for lawmakers and practitioners.

1.3.10 AI AND IP: THEORY TO POLICY AND BACK AGAIN – POLICY AND RESEARCH RECOMMENDATIONS AT THE INTERSECTION OF ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY by Peter Georg Picht & Florent Thouvenin

The paper addresses several topics, such as AI inventorship and authorship, sui generis rights to protect innovative AI output, rules for the allocation of AI-related IPRs, IP protection carve-outs, use of AI tools by IP offices, and appropriate software protection and data usage regimes. This paper has presented an initial set of policy recommendations for the development of IP law in an AI context.

1.3.11 ARTIFICIAL INTELLIGENCE: THE LEGAL IMPLICATIONS OF INTELLECTUAL PROPERTY RIGHTS FOR AI-GENERATED INVENTIONS by Perpetua Ogwuche

The article delves into the ongoing legal turmoil surrounding the allocation of intellectual property rights to inventions made by machines. It closely scrutinizes the implications of granting such rights to Artificial Intelligence and concludes that recognizing AI as a subject of intellectual property rights would pose significant and long-lasting legal challenges. As a suggested solution, the article proposes that inventors of AI should be assigned intellectual property rights about inventions created by Artificial Intelligence, as opposed to granting such rights to AI itself.

1.4 Research Methodology

This study uses qualitative investigative techniques to examine the ways in which artificial intelligence (AI) systems and intellectual property (IP) rights regimes are becoming more autonomous in creating new works that may be protected. By using case study examples of AI technologies that raise new issues for intellectual property laws focused on human creativity, policy discussions about whether to modify existing legal frameworks or create new ones that are more creatively suited to computers can be thoroughly examined.

IP conflicts are highlighted, for instance, by Instagram's 2022 release of AI Human product models that synthesise original, human-like face images by an algorithm. The new challenges of deciding whether and how to formalise ownership rights over creative generative applications versus enabling public dissemination arise as this generative neural system imaginatively reinvents identity composite training on biometric data. Instagram is breaking conventions by asserting intellectual property over computer-generated virtual celebrities, despite their artificial origins. It brings up difficult issues with copyrights and trademarks for AI personas that live in the grey area between data reconfiguration and machine originality.

Examining problems brought to light by instances such as Instagram's AI Humans via an academic perspective provides a significant approach to evaluating proposals to broaden, narrow, or completely reframe intellectual property law in light of the rapid advancements in machine learning. There are opportunities to strike a balance between policy prescriptions and social consequences and attribution issues arising from actual technological deployments that are framed against established statutory and jurisprudential norms. In general, the intellectual property rights around Instagram's AI Human models highlight the difficulties in defining who owns newly developed generative technologies that create new products by digitally combining public and private data. For consumer clarity, controlling proper attribution and limitations is still essential.

The use of influencer-like digital personas by the platform raises a number of issues with intellectual property law, trademark protection, and AI-mediated innovation. Examining the controversies surrounding the intellectual property rights of AI-generated works requires a substantive approach

that grounds the current tensions between technology disruption and long-standing legal frameworks.

In response to a LinkedIn survey on the topic, one hundred IP professionals, computer scientists, law students, tech enthusiasts, and legal experts shared their thoughts on topics pertaining to the nexus between machine learning and established legal frameworks. The questions focused on open-ended viewpoints on the general problem of balancing the increasing demonstrations of AI's autonomous inventiveness in the absence of human generation with the anthropocentric presumptions encoded in most of the world's trademarks, copyrights, patents, and other intellectual property regimes.

CHAPTER 2- IPR & AI TECHNOLOGY OVERVIEW

2.1 Overview of IPR

Intellectual property rights (IPR) are a set of legal rights conferred to individuals or corporations in exchange for their creative or intellectual efforts, which result in new innovations or creations. These rights are intended to safeguard intangible assets and promote innovation by granting creators and inventors exclusive rights to their intellectual creations for a predetermined length of time. These legal protections and rights apply to a wide range of intangible assets, incorporating inventions, literary and creative works, designs, symbols, and more. The primary goal of IPR is to encourage invention and creativeness by guaranteeing that innovators and inventors profit from their efforts.

IPR establishes a legal framework for individuals and businesses to control the use, distribution, and industrial manipulation of their intellectual property. By giving exclusive rights for a specified amount of time, IPR seeks to achieve a balance between inventors' interests and the public's desire to access and use fresh ideas and works. Overall, intellectual property rights (IPR) serve an important role in supporting innovation and creativity by establishing a fair and equitable system for recognising and rewarding innovators and creators. It promotes the creation of new ideas and technologies while also ensuring that the public may reap the advantages of these advancements.

In today's fast-paced world of technology, science, and medicine, intellectual property (IP) has grown in importance. The global economic climate has also had an impact on business models that rely heavily on intellectual property to determine value and potential growth. To intersect with international obligations under the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), India has passed numerous laws to protect intellectual property rights (IPRs). As a result, intellectual property has emerged as one of the world's largest and fastest-growing areas of law, compelling the expertise of lawyers who are familiar with IPRs across national and international boundaries

Intellectual property (IP) refers to a broad variety of works that can be protected under IP regulations. This includes inventions such as patents, utility models, and trade secrets, industrial designs, trademarks, and brand names, literary and artistic works such as copyrights, music, books, paintings, sculptures, computer programmes and films, symbols, names, and images, and computer code.

Intellectual property rights (IPR) management is a challenging process that calls for a range of actions and strategies that adhere to both international treaties and state legislation. National interests are no longer the main foundation for it. Intellectual property and related rights are significantly impacted by market demands, market reaction, and the cost of turning IP into a commercial enterprise. To put it another way, issues related to trade and commerce are crucial to IPR management. Different IPR forms require different handling, planning, and strategies that involve

people with a variety of subject-matter expertise, such as in research, engineering, medicine, law, finance, marketing, and economics. Depending on its own field of expertise, each industry must have its own intellectual property laws, management philosophies, tactics, and so forth.

2.1.1 Beginning of IPR in India:

Intellectual property rights (IPR) are critical to supporting innovation and protecting human creativity. The need to safeguard intellectual property rights (IPR) is essential for promoting economic expansion, innovation, and creativity. Let us examine the landscape of Intellectual Property Rights in India, looking at the country's historical growth, current situation, and issues in protecting and enforcing IP.

2.1.1.1 Historical Perspective: The foundation of modern intellectual property laws in India can be traced backwards to the colonial period.¹⁹⁸¹ The Indian Patent and Designs Act of 1911 was one of the early legislations. Post-independence, India has made strides in aligning its intellectual property framework with global standards.

2.1.1.2 Legislative Framework: The key legislations governing Intellectual Property Rights in India include:

2.1.1.2.1 **Copyright:** This is covered by the Copyright Act, 1957. This helps to safeguard original and unique creations of authorship, such as literary, artistic, and musical productions. This includes books, paintings, music, and software. This intellectual property right grants the inventor substantial rights, including the exclusive right to reproduce, circulate, carry out, and exhibit the work they have created. The author's copyright protection continues for his or her lifetime in addition to 60 years from the year of death.

2.1.1.2.2 **Patent:** Patents are registered under the Patent Act, 1970. The law grants innovators the exclusive rights to their works for a short time, which aids in the protection of inventions and discoveries. These rights are commonly awarded for unique and valuable procedures, machinery, material formulations, or improvements. A registered patent is legitimate for 20 years from the date of filing of the application. This 20-year term was established by the Patents (Amendment) Act of 2002 and applies to all authorised patents whose terms did not expire on May 20, 2003.

2.1.1.2.3 **Trademarks:** The Trademark Act of 1999 is a law dealing with trademarks that provides for the registering process and improvement protection of trademarks for products and services, as well as the prevention of the utilisation of fraudulent marks. Distinctive aspects that differentiate between goods or services in the market, such as emblems, names, and slogans, are protected by trademark laws. They also assist consumers in associating certain attributes with a specific brand. A registered trademark in India is applicable for 10 years from the date the application was filed and is capable of being reissued an infinite number of times by reregistration and payment of required fees.

2.1.1.2.4 **Trade Secrets:** There is no specific law that governs trade secrets in India. It can be governed by common laws such as Section 27 of the Contract Act, which requires the parties not to divulge data that is contradictory to the conditions of the contract between the parties, i.e., Non-Disclosure Agreements, as well as the principles of breach of confidence and equity. These rights cover confidential corporate information like as formulas, methods, designs, and customer lists, which might

¹⁹⁸¹ "Intellectual Property Rights in India", Reference Note, Members' Reference Service Lardis Lok Sabha Secretariat, New Delhi No.57/RN/Ref./Nov/2017

provide a competitive edge. Unlike patents, trade secrets are not granted a predetermined period of protection rather, the duration of protection is dependent on the information being kept confidential.

2.1.1.2.5 *Industrial Design Rights:* The Designs Act of 2000 and the Designs Rules of 2001 safeguard industrial designs in India. The Designs Act of 2000 defines intellectual property, and the Designs Act and its accompanying Rules govern the protection of industrial designs. The Act's objective is to prevent new designs from being copied, so protecting the proprietor from damages. These rights cover the visual design of items, such as their shape, surface, and decoration. These rights are meant to protect a design's unique aesthetic traits. The registered owner has exclusive rights to use the design in the class for which it is registered. The registered design is protected for ten years from the date of registration, as per Section 11 of the Act with the possibility to extend for an additional five years.

2.1.1.2.6 *Geographical Indications:* In India, Geographical Indications (GI) are protected by the Geographical Indications of Goods (Registration and Protection) Act of 1999. It protects commodities of a specific geographical origin that have features, reputations, or characteristics that are distinctive to that area. Examples include the Madhubani painting, Tirupati Laddu, Tirur Betel Leaf etc. The Geographical Indication Registry, under the Department of Industry Promotion and Internal Trade, Ministry of Commerce and Industry, is authorised by the act to issue GI tags. Registered GI tags in India are valid for ten years from the date of filing and can be renewed for another ten years under the legal provisions outlined in Section 18 of the Act, as long as they are still in use.

2.1.1.2.7 *Plant Variety Rights:* The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act of 2001 safeguards plant variety rights in India. This intellectual property right is utilised to safeguard novel plant types by granting permission to breeders. The act recognises and safeguards the rights of farmers to contribute to the production of new plant types through the conservation, improvement, and distribution of plant genetic resources. The statute also permits farmers to conserve, use, sow, re-sow, exchange, share, or sell agricultural products, including seeds of a variety protected by the act. The act protects registered plant types for 18 years in trees and vines and 15 years in other crops.

2.1.1.3 International Agreements: India is a signatory to numerous international agreements and treaties related to intellectual property, such as the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). These agreements influence the shaping and enforcement of IPR laws in the country.

2.1.1.4 Challenges and Concerns: Despite progress, India faces challenges in effectively enforcing intellectual property rights. Issues such as lengthy legal proceedings, piracy, and the backlog of patent applications require ongoing attention.

2.1.1.5 Government Initiatives: The Indian government has implemented various initiatives to strengthen the intellectual property ecosystem, incorporating the establishment of specialized IP courts and offices.

India's policy regarding intellectual property rights demonstrates a commitment to supporting innovation while considering the socioeconomic context. Ongoing efforts to streamline legal processes, resolve issues, and comply with global rules will have an enormous influence on India's intellectual property future. We need an in-depth knowledge of India's intellectual property rights landscape, particularly its historical backdrop, regulatory structure, challenges, and

government operations. The dynamic nature of IPR in India demonstrates the country's commitment to supporting innovative thinking and creativity in a rapidly changing global landscape. This legal idea identifies and protects people' or entities' rights to intellectual innovations, permitting them to regulate and profit from their inventive and creative endeavours.

2.2 Overview of AI Technology

The rapidly developing discipline of artificial intelligence (AI) studies the capacity of artificial entities to use their own intelligence to solve complex problems. It combines physiological and computer science ideas to construct machines capable of replicating or improving human intelligence, such as reasoning and learning through experience. Although AI has been used in computer programmes since a very long time, and is currently being used in an extensive range of goods and services to solve real-world problems using probability theory, economics, and algorithm design methods. The field draws on a variety of fields, including computer science, mathematics, psychology, and linguistics.¹⁹⁸²

In essence, intelligence is the computational component of a person's capacity to accomplish real-world objectives. It includes a variety of talents such as reasoning, perception, memorization, information absorption, pattern identification, decision-making, and adaptation. The prime directive of AI is to build and develop systems that act similarly to humans while being more efficient and adaptive. By broadening the field of computer science, AI hopes to create more powerful, flexible, and adaptable systems capable of redefining and disrupting business practices for both services and products. While technology innovation has generally increased manufacturing efficiency, the introduction of new and disruptive service models will alter the service industry by leveraging big data analysis to tailor services to each customer's individual needs.

AI has progressed substantially from its early days as basic rule-based systems to strong machine learning algorithms capable of analysing large volumes of data. Self-driving cars, virtual assistants, and photo and speech recognition are all examples of AI applications in use today. Despite its present triumphs, AI research has faced numerous obstacles, ethical quandaries, and setbacks. Nonetheless, comprehending the technological breakthroughs that have transpired allows us to obtain a better grasp of AI's current state and future prospects.

The future of AI is bright. With its help, we might soon have software that tackles real-world issues like traffic jams, marketing roadblocks, and even healthcare problems – all with speed and precision. It fulfils the same purpose as a personal virtual assistant, such as Cortana, Siri, or Google Assistant. It has the ability to build machines that can operate in hazardous conditions. AI clears the way for more inventive technology, products, and opportunities.

Artificial intelligence (AI) is all about creating machines that can think and act like us. This covers spoken comprehension, perceiving their surroundings, decision-making, and even language translation. Artificial intelligence (AI) is a potent instrument utilised in many different industries, and it is becoming more intelligent and useful every day.

2.2.1 Uses AI Technologies:

2.2.1.1 Machine learning (ML) is the procedure used to train an algorithm on a dataset with labels so that its algorithm can be trained to navigate the input data provided towards the corresponding output label. While on the other hand, unsupervised learning contains training a model on an unlabelled dataset so that it can uncover connections and patterns in the data

¹⁹⁸² Prof. Neha Saini, "Research Paper on Artificial Intelligence & its Applications", IJRTI, Volume 8, Issue 4, 2023

without explicit direction. Reinforcement Learning is another type of learning in which an agent engages with its surroundings and learns to make decisions making use of feedbacks provided in the form of rewards or penalties.

2.2.1.2 Deep Learning: It is a special kind of machine learning that borrows from the human brain. Imagine a complex web of connections, just like neurons firing in your head. Deep learning uses these "artificial brains" with many layers, called deep neural networks, to learn and improve from massive amounts of data. This allows them to uncover hidden patterns and make sense of complex information.

2.2.1.3 Natural Language Processing (NLP): This bridges the gap between computers and our everyday language. It lets machines understand what we say, interpret the meaning behind our words, and even respond in kind. This makes NLP super useful for things like translating languages, figuring out people's feelings in text (sentiment analysis), and building chatbots that can have conversations with us.

2.2.1.4 Computer Vision: It is like giving machines eyes. They can now see and understand the world around them, just like us. This lets them do cool things like recognizing objects and faces in pictures and videos, which is super useful for things like security systems and helping robots navigate.

2.2.1.5 Robotics: AI provides brain to the robots, by integrating AI, robots become smarter, better at sensing their surroundings, making choices, and interacting with the world. This brainy upgrade makes them super helpful in factories, hospitals, and beyond, tackling tasks like automation and even assisting humans.

2.2.1.6 Expert Systems: These are rule-based systems that mimic the decision-making abilities of a human expert in a definite domain. They are used for tasks where a set of rules and knowledge can be explicitly defined. AI is a rapidly evolving field with broad applications across various industries, and ongoing research continues to expand its capabilities and address challenges. AI can be deployed in hazardous situations, such as search and rescue missions or exploring hostile environments, minimizing the risk to human lives.

2.2.1.7 Speech Recognition: This technology helps to convert spoken language into text. It is used in voice-activated virtual assistants and transcription services.

2.2.1.8 Recommendation Systems: Under AI technologies, this aspect suggests products, services, or content based on the user preferences entered by the user. It is commonly used in the domains of e-commerce, streaming services, and social media.

2.2.1.9 Healthcare Applications: AI provides assistance in the identification of diseases based on medical images and patient data. The tool help predict patient outcomes and recommend personalized treatment plans.

2.2.1.10 Autonomous Vehicles: AI Technologies help enable self-driving cars and drones to navigate and make decisions with the assistance of computer vision, sensors, and machine learning for the purpose of real-time decision-making.

2.2.1.11 Finance and Fraud Detection: AI facilitates to analyze financial data for risk assessment and investment predictions and also helps in detecting any fraudulent activities through anomaly detection algorithms.

2.2.1.12 Cybersecurity: AI provides help towards cybersecurity as well, it does so by detecting security threats and preventing any such security threats using anomaly detection and pattern recognition. It also provides assistance in enhancing security measures through the AI-driven tools.

2.2.1.13 Language Translation: AI Technologies translate text or speech from one language to another and also facilitates communication across different languages.

2.2.1.14 Virtual Assistants: AI technologies perform tasks based on voice or text commands. It can schedule appointments, answer questions, provide information and is capable of many more things. AI can automate monotonous jobs, boosting productivity and freeing up human attention for more intricate and imaginative pursuits.

2.2.1.15 Education: The evolutionised AI Technologies personalize learning experiences for students and also offers intelligent tutoring systems and adaptive learning platforms to the students.

2.2.1.16 Human Resources: It helps to streamline the recruitment processes through resume screening and makes it accurate and easy. It also assists the employee during the process of onboarding and training.

Currently, AI is capable of finishing jobs that call for human intelligence. AI capabilities are projected to go beyond human comprehension in the near future due to ongoing research and development. But remember that, at the end of the day, it's a machine for a machine, and there have been cases where the machine has taken over and started doing duties without the programmer's guidance, so evaluate the advantages carefully.

Now, these actions can be beneficial or harmful, but if the AI device or software starts acting on its own and develops beyond the programmer's supervision, it becomes harder to regulate. Even though artificial intelligence has come a long way, there are still a lot of unanswered questions. We think they will be resolved soon. giving us a clear roadmap for how far AI can function in our lives and innovations.

AI technology have advanced significantly over the years, yet there are certain downsides. For example, automation and AI can create job displacement in particular areas, resulting in unemployment and the demand for new skills. Furthermore, AI systems might effect the prejudices present in training data when giving specific data, resulting in unfair or discriminating outcomes. AI lacks human characteristics such as creativity, emotional intelligence, and intuition, which are required in particular decision-making situations. AI raises ethical challenges, particularly in areas like as autonomous weaponry, monitoring, and privacy violation, which must be carefully considered and regulated. Furthermore, overreliance on AI systems might result in a lack of human control, potentially producing problems when systems fail or make mistakes. Finally, the intricate nature of AI algorithms might be difficult to interpret, resulting in a lack of transparency and responsibility.

2.3 Comparison of AI And IPR Laws

Artificial intelligence and intellectual property law have a complicated and evolving interaction in India. AI's inclusion in the scope of the Indian Patents Act of 1970 is severely limited by the act's explicit prohibition against acknowledging any entity other than a human as a patent holder. But since South Africa is the first country to grant a patent with an AI tool listed as the inventor, questions have been raised concerning the examination of non-obviousness and the patentability of ideas created by AI. In the domain of AI, intellectual property rights are important for several reasons. By giving artists and inventors the confidence that their works will be respected and protected, they play a critical role in fostering innovation. IPR-protected exclusive rights, including patents and copyrights, promote significant expenditures in AI research and development and sustain ongoing technical advancement. In addition to offering protection, this framework promotes finance and investments, two things that are essential for the expansion of the AI industry. Furthermore, by defining ownership and usage rights precisely, IPR promotes morality and collaboration while enabling ethical and professional AI applications. Maintaining a competitive edge necessitates protecting trade secrets, which is a common practice in AI.

In the AI sector, intellectual property rights (IPR) are very important. They safeguard individual endeavours, foster economic expansion, stimulate creativity, and draw in qualified experts and financiers. By offering a framework for responsible knowledge sharing, intellectual property rights (IPR) enable businesses to commercialise their ideas without worrying about their being unlawfully used by rivals. This promotes standardisation of AI technology and cross-entity collaboration.

It is constantly difficult to attain a balance between advancing the open information sharing and safeguarding innovation. As AI develops, this dilemma becomes more pressing, and the moral ramifications of intellectual property rights (IPR) grow more pressing, impacting the responsible expansion and application of AI technology across the globe. IPR in AI essentially acts as a foundation, promoting creativity, teamwork, and moral behaviour while also boosting the general expansion and competitiveness of the sector. Additionally, it interacts with data privacy, resulting in a convoluted environment with important ramifications. Data privacy is an issue due to the large volumes of sensitive and personal data handled by AI systems; intellectual property rights (IPR) are essential for safeguarding the technologies and algorithms that use this data.

There have been granted patents in the disciplines of computer vision, speech recognition, and natural language processing. We are still a long way from having fully autonomous AI systems, though, and autonomous computers are not going to be commonplace in our daily lives. This begs the question of whether content and inventions produced by AI systems as a tool are patentable or protected by copyright. AI systems are not protected by intellectual property rights (IPR) laws in most jurisdictions because these laws only confer rights to entities that are granted legal personhood, be they natural or corporate. Legislating on this issue is challenging, though, because AI technology is nonetheless in its infancy stage and there is vagueness surrounding the concepts of AI and autonomy.

Despite being two separate domains, AI and IPR laws cross in a variety of ways due to how quickly technology is developing. Artificial intelligence (AI) is the phrase applied to designate the creation of computer systems that are capable of activities like speech recognition, visual perception, language translation, and decision-making that previously required human intelligence. However, intellectual property rights (IPR) cover the legal frameworks that safeguard mental works, including inventions, literary and creative compositions, designs, names, symbols, and pictures used for commercial purposes. Ownership and protection issues with AI-generated content can be complicated, particularly when AI systems produce new content on their own. It's still difficult to figure out who owns the intellectual property rights to work produced by AI. IPR provides legal tools, such as trade secrets, trademarks for symbols and brand names, copyrights for literary and creative works, and patents for inventions, to safeguard the intellectual property of people or organizations.

The speed at which artificial intelligence (AI) is developing has raised concerns about whether the current intellectual property (IP) regulations are adequate to protect and encourage AI developments. These laws provide artists exclusive rights to their works in an effort to promote innovation, but as AI grows more self-sufficient, problems start to surface. The legal responsibility for decisions or actions taken by AI systems is one such problem that may affect both users and creators. Nonetheless, the main goal of intellectual property laws is to safeguard artists' rights, not to hold them accountable for the deeds of their inventions.

International cooperation is frequently involved in the development and application of AI technology, which raises concerns about the harmonisation of legal frameworks and standards across many jurisdictions. International agreements like the TRIPS Agreement and the Berne Convention address these problems by offering a framework for the international recognition and enforcement of

intellectual property (IP) rights. AI does, however, also bring up moral concerns of prejudice, accountability, openness, and the technology's effects on society. Consequently, since ethical issues are frequently handled independently of the legal system, conversations regarding ethical standards and laws have been started.

Even though their areas of focus are different, AI and IP laws overlap in situations where the swift advancement of AI technology presents obstacles for established legal frameworks. Determining ownership, culpability, and ethical issues are some of these difficulties. As a result, continuous attempts are being made to modify and update IP laws in order to handle the particular difficulties that AI presents. Artificial intelligence (AI) and intellectual property rights (IPR) have a complex interaction that takes into account a number of ethical, legal, and commercial factors. Artificial intelligence (AI) is the study and implementation of novel algorithms, procedures, or tools to build reasoning, perceiving, and learning systems. AI can be utilised in the business sector to create goods and services that give businesses a competitive edge. Because AI is so important to so many different industries, businesses and individuals frequently choose to patent their AI ideas in order to secure their intellectual property rights and obtain a competitive advantage.

Global patent offices are adjusting to the difficulties presented by ideas relating to artificial intelligence. Certain legal jurisdictions have established particular protocols for the review and issuance of AI-related patents. Ensuring that AI-related ideas are examined and given patents in a way that complies with current rules and regulations is the aim. AI systems are capable of producing literary, musical, and artistic creations. It can be difficult to ascertain who owns and protects such AI-generated content, though. It becomes unclear who created the AI system—the AI system itself, the human programmer, or a combination of the two. It could be necessary to amend copyright laws to address these problems. AI algorithms are frequently regarded by businesses as trade secrets. Businesses benefit from a competitive edge as a result of trade secret laws protecting them from disclosure. It can be difficult to strike a balance between the need for transparency and protection, particularly in fields like healthcare or finance where algorithms have a direct impact on people's lives.

Large datasets are essential for the guidance and learning of AI systems. It is crucial to ask questions about who owns these datasets and who can use them, particularly if they contain personal data. The collection, processing, and usage of data in AI applications are heavily influenced by privacy laws and regulations. The increasing integration of AI into diverse industries gives rise to ethical problems. Businesses that want to guarantee ethical and responsible usage of their AI technologies may decide to licence them. In order to guarantee that inventors maintain ownership of their innovations, licencing agreements might specify the conditions under which AI technology are employed. Whenever AI systems create injury or violate the rights of others, culpability and accountability issues arise. Legal frameworks must handle accountability in these kinds of situations.

The worldwide scope of AI development necessitates international cooperation in the establishment of AI and IPR standards and norms. Together, organisations and legislators develop frameworks that preserve intellectual property rights while fostering innovation. AI and IPR have a complex and dynamic interaction. Legal and moral frameworks must change to meet the particular difficulties that AI technologies provide in order to promote innovation and safeguard the rights of persons and creators.

Intellectual property rights (IPR) and artificial intelligence (AI) have a complicated and nuanced interaction. This intersection has several effects on technology, law, and innovation. The question of whether AI may be considered innovators and if their inventions are eligible for patent protection is

one that is hotly contested. This begs the question of whose creations created by AI belong and who is the author. Furthermore, the necessity to reconsider established intellectual property ideas like copyright is brought to light by the use of AI algorithms to creative content creation. Strong procedures are required to preserve secrecy since protecting AI algorithms as trade secrets adds another level of complexity. The enormous data sets needed for AI also present privacy problems, raising issues with ownership and licencing. To establish who is liable for the actions of autonomous AI systems, precise legal frameworks are necessary. Licencing agreements for AI technologies also require careful drafting to cover royalties, usage, and limits. Establishing worldwide standards and working together on IPR rules are crucial given the global nature of AI development. Laws and ethics are closely related because governments must uncover the equilibrium between protecting intellectual property rights and fostering innovation.

The relationship between Artificial Intelligence (AI) and Intellectual Property Rights (IPR) is multi-faceted and complex, with significant implications for the realms of innovation, law, and technology. One of the most pressing debates in this area is whether or not AI can be considered inventors, and the resulting implications for patentability. The question of inventorship is fundamental because it encounters traditional perceptions of authorship, invention, and ownership, which are the bedrock of the intellectual property landscape. In the realm of copyrights, AI algorithms are increasingly generating creative content, which raises a series of questions about the acknowledgement of rights and the duration of copyright protection for AI-generated works.

Specifically, questions arise as to whether these works should be attributed to the developers of the AI algorithms or to the AI itself, and how long copyright protection should last for such works. Another critical consideration in this area is the protection of AI algorithms as trade secrets. These algorithms are often the result of significant investments of time and resources, and their intricate nature requires robust mechanisms to safeguard their confidentiality while balancing transparency.

Establishing the appropriate balance between these two objectives is crucial to ensure the continued development of AI and the protection of the interests of stakeholders. Ownership, licensing, and ethical use of datasets used to train AI models are other key issues that require clear legal frameworks. The use of large datasets to train AI models raises questions about who owns these datasets, who can license them, and how they can be used. There are also ethical considerations surrounding the use of datasets, particularly when they contain sensitive or personal data. Lastly, determining liability for the decisions and actions of autonomous AI systems is an area of increasing concern. As AI systems become more sophisticated and act autonomously, questions arise as to who bears responsibility for their decisions and actions. This issue requires nuanced and context-specific solutions that take into account the nature of the AI system, its purpose, and the context in which it is used.

Licensing agreements for AI technologies require close attention to detail, with clear contractual terms that define the scope of use, restrictions, and royalty agreements. These agreements are crucial for protecting the interests of innovators and fostering a collaborative environment that encourages responsible and ethical deployment of AI technologies. On an international level, the global nature of AI development calls for the establishment of standards and collaborative efforts to harmonize IPR policies. The cross-border nature of innovation requires a unified approach to address challenges related to patent harmonization, copyright enforcement, and trade secret protection in the context of AI. Ethical considerations are significant in this complex interplay, influencing the evolution of policies that aim to strike a delicate balance between promoting innovation and safeguarding intellectual property rights. The ethical use of AI becomes a cornerstone in shaping legal frameworks that not only facilitate technological advancement but also ensure responsible and fair

practices in the rapidly evolving landscape of AI and IPR.

The relationship between Artificial Intelligence (AI) and Intellectual Property Rights (IPR) is a complex and dynamic one that demands thoughtful consideration. As AI algorithms increasingly contribute to the creation of diverse content, ranging from art to literature, traditional notions of authorship and ownership require careful reevaluation. At the same time, the protection of AI algorithms as trade secrets necessitates robust mechanisms to safeguard proprietary information and maintain a competitive edge. Given the intricate challenges arising from the use of vast datasets, crafting legal frameworks that address the intersection of AI, data privacy, and ownership is vital. Determining liability for the actions of autonomous AI systems poses intricate questions that demand clear legal guidance. Licensing agreements for AI technologies must navigate complex landscapes, ensuring clarity on usage, restrictions, and royalty structures. On a global scale, the establishment of international standards and collaborative efforts becomes imperative to create a cohesive framework for intellectual property rights in the realm of AI.

In this fast expanding technological era, the legal environment seeks to find a difficult balance between safeguarding intellectual property rights and promoting innovation, as ethical considerations continue to gain significance. The ongoing discussions about copyright, patentability, and AI's status as inventors highlight the necessity for sophisticated approaches to intellectual property in the era of machine-generated breakthroughs. In summary, the interaction between AI and IPR necessitates a positive strategy that considers the ensuing ethical, legal, and technological ramifications. We can promote creativity, safeguard intellectual property rights, and ensure just and secure AI-powered systems by creating sophisticated approaches to intellectual property in the era of machine-generated inventions.

CHAPTER 3- CHALLENGES AND ISSUES

3.1 Issues and challenges in AI ¹⁹⁸³

Several serious difficulties stand in the way of successful AI system integration, each of which demands careful analysis and strategic intervention. First and foremost, the problem of data security and privacy dominates, emphasising the crucial necessity for strong safeguards to protect sensitive information from breaches and unauthorised access. Individuals and organisations face serious costs if proper protection mechanisms are not in place, ranging from financial losses to reputational damage.

In addition to data security problems, there is a shortage of skilled AI workers, indicating a clear need for increasing investment in research and development activities. Addressing this deficit is critical to maximising the potential of AI technologies and promoting innovation across multiple industries. Furthermore, the success of AI deployment is dependent on the availability and stability of infrastructure and internet access. However, major discrepancies persist, with some locations experiencing limited infrastructure and connectivity, impeding wider adoption of AI solutions.

Navigating the complicated environment of regulatory compliance presents another hurdle for AI-focused organisations. Adhering to various standards governing data privacy, consumer protection, and algorithmic transparency requires painstaking attention and resources. Furthermore, ethical considerations highlight the significance of responsible AI development and deployment methods. Given the potential for AI systems to inject biases into decision-making processes, continual monitoring and vigilance are required to assure justice and equity.

¹⁹⁸³ Shivaram Kalyanakrishnan, Rahul Alex Panicker, Sarayu Natarajan, Shreya Rao, "Opportunities and Challenges for Artificial Intelligence in India",

Among these difficulties, job displacement due to automation is a major concern, needing proactive efforts to effectively manage this shift. To strike a balance between technological innovation and socioeconomic stability, comprehensive policies must prioritise reskilling and upskilling efforts that will prepare workers for future jobs.

Addressing these multidimensional challenges requires collaboration among stakeholders from various industries and locations. By addressing concerns such as data security, talent acquisition, infrastructure development, regulatory compliance, ethical considerations, and workforce change, we can pave the system for a future in which AI acts as a catalyst for innovation, prosperity, and societal improvement.

3.2 Issues and challenges in IPR concerning AI¹⁹⁸⁴:

Artificial Intelligence and Intellectual Property Rights intersect in various ways and several issues arise from their interaction. Determining the ownership of AI-generated outputs such as artwork, music, or literature can be challenging. Traditional intellectual property laws may not adequately address these issues, leading to ambiguity regarding who holds the rights to such creations¹⁹⁸⁵.

The patentability of AI-generated inventions raises questions about inventorship and eligibility criteria. There is a debate on whether AI can be recognized as an inventor and whether patents should be granted for AI-generated inventions. AI systems heavily rely on data, often collected from individuals or organizations. This raises concerns about data ownership, privacy, and the rights of individuals regarding the use of their data for AI development and deployment.

AI technologies can be used to create derivative works based on existing copyrighted material. Establishing what constitutes fair use and whether AI-generated content infringes upon copyright is a complex issue that requires consideration of the transformative nature of the work and the extent of human involvement in its creation. AI systems can perpetuate biases present in training data, leading to discriminatory outcomes. Balancing the need to protect intellectual property with the ethical imperative to mitigate biases and ensure fairness in AI applications poses significant challenges.

The tension between open-source and proprietary models in AI development affects intellectual property rights (IPR) considerations. Open-source AI projects often rely on collaborative contributions and encourage free sharing of code and algorithms, while proprietary models prioritize protecting intellectual property and monetizing AI innovations. Intellectual property laws vary across jurisdictions, creating challenges for global AI development and deployment. Harmonizing IPR frameworks to accommodate the unique characteristics of AI technologies is essential to facilitate innovation while ensuring adequate protection for creators and innovators.

AI systems may need to comply with various intellectual property laws, such as patents, copyrights, and trademarks. Navigating the complex regulatory landscape requires a deep understanding of both AI technologies and intellectual property regulations. Addressing these issues requires interdisciplinary collaboration among policymakers, legal experts, technologists, and ethicists to develop frameworks that promote innovation, protect intellectual property rights, and uphold ethical principles in the development and deployment of AI technologies.

¹⁹⁸⁴ Mr. Sanjeev Ghanghash, "Intellectual Property Rights In The Era Of Artificial Intelligence: A Study Reflecting Challenges In India And International Perspective", International Journal of Multidisciplinary Educational Research, VOLUME:11, ISSUE:5(6), May: 2022

¹⁹⁸⁵ "Challenges and Opportunities in AI Adoption for Indian and American Businesses", Nepal (Last visited- 9-04-2024) (Access here- <https://www.neebal.com/blog/challenges-and-opportunities-in-ai-adoption-for-indian-and-american-businesses>)

Another issue which will arise in the IP law with concern to AI is that there is a severe lack of qualified AI specialists in the IPR field in India, making it difficult for businesses to find and retain skilled AI experts who can design, develop, and implement AI solutions and also Generative AI has taken over several tasks leading to job losses.

Artificial Intelligence (AI) is rapidly transforming various aspects of society, including how intellectual property rights (IPR) are understood, protected, and managed globally. This paper provides an overview of the international perspectives on AI and IPR, examining the challenges, opportunities, and evolving legal frameworks. It explores the intersection of AI technologies with copyright, patents, trademarks, and trade secrets, highlighting key issues such as ownership, infringement, and the role of AI in the creation and exploitation of intellectual property. Additionally, it discusses emerging trends, policy considerations, and potential strategies for addressing the complex interplay between AI and IPR on the global stage.

The integration of Artificial Intelligence (AI) technologies into various sectors has brought unprecedented advancements, alongside complex legal and ethical implications. Among these implications, the intersection of AI with Intellectual Property Rights (IPR) stands out as a critical area of concern and exploration. This paper aims to examine the international perspectives on AI and IPR, shedding light on the evolving landscape and identifying challenges and opportunities for policymakers, industry stakeholders, and legal practitioners.

AI's role in content creation raises intriguing questions regarding copyright ownership and infringement. From AI-generated music compositions to automated news articles, determining authorship and originality presents unique challenges. International copyright laws are grappling with the concept of human versus machine creativity, with divergent approaches emerging across jurisdictions. Moreover, issues such as fair use, derivative works, and the duration of protection require careful consideration in the context of AI-generated content.

The patent landscape is also being reshaped by AI, with applications spanning from autonomous vehicles to healthcare diagnostics. While AI-enabled inventions offer immense potential for innovation, they raise uncertainties regarding inventorship, disclosure requirements, and the non-obviousness criterion. International patent offices are adapting to these challenges by revisiting examination procedures and patentability criteria to accommodate AI-driven innovations while ensuring a balance between incentivizing invention and preventing monopolies.

Trademarks serve as crucial identifiers of goods and services in the marketplace, yet AI poses novel challenges to trademark law and enforcement. Automated brand management tools, such as AI-driven logo generators, blur the lines between genuine trademarks and generic symbols. Furthermore, the rise of AI-powered chatbots and virtual assistants introduces complexities in assessing trademark infringement and dilution. International efforts are underway to modernize trademark laws and practices to address these emerging issues while preserving brand integrity and consumer trust.

Trade secrets are valuable assets for businesses, encompassing confidential information such as formulas, algorithms, and customer data. However, AI advancements present both opportunities and risks in safeguarding trade secrets. The proliferation of AI-driven cybersecurity threats, including data breaches and algorithmic espionage, underscores the need for enhanced protection measures and international cooperation. Moreover, the legal frameworks surrounding trade secret enforcement and remedies require harmonization to effectively address cross-border challenges in the digital age.

3.3 WIPO Conversation

Several meetings of the WIPO Conversation dealt with how AI has an impact on the IP policy. WIPO conducted the 1st session of the WIPO Conversation on the issue of IP and AI held in September 2019 included a debate regarding the influence of AI on IP policy and create policymakers' queries. In December 2019¹⁹⁸⁶, WIPO released a draft Discussion Paper on AI and IP policy, inviting public feedback to help outline the most important concerns that IP policymakers will face as AI grows in relevance. As of May 2020¹⁹⁸⁷, a revised Discussion Paper on AI and IP Policy was released. Below are some of the issues¹⁹⁸⁸ that were identified in the revised discussion paper that relate to the AI and IP policy:

3.3.1 Ownership and inventorship are the initial issues. It tackles issues such as whether the identification of the AI programme as the creator should be required by law, or if this needs to be a human. Additionally, it takes into account the practical challenges of determining whether or not human authorship or ownership should be indicated in the event that AI systems are unable to provide it. In other words, it explores whether or not this decision should be left to private agreements, such as corporate policy, as well as the possibility of judicial review through appeal in accordance with current laws governing inventorship disputes.

3.3.2 The second issue of the WIPO Discussion Paper addresses patentable subject matter and the principle of patentability. It discusses whether inventions generated autonomously by an AI application should be excluded from IPR laws, whether specific provisions ought to be included for inventions aided by AI, whether or not patent investigation regulations should be amended for AI assisted inventions, and so on.

3.3.3 The third issue explores the difficulty in understanding the innovative step test that requires to be met for the innovation to be granted a patent in the context of AI innovations.

3.3.4 The fourth issue is regarding the disclosure of the technology, and whether AI-assisted or AI-generated inventions present any challenges in the disclosure requirement; further, it considers whether the initial disclosure requirement would be sufficient where the algorithm continually changes over time through machine learning; how to treat data used to train an algorithm; and whether human expertise used to select data and to train the algorithm be required to be disclosed.

3.3.5 Issue 5 addresses general policy considerations such as whether a sui generis IPR system should be explored for AI-generated inventions, and whether or not the interface between AI and IPRs should be considered later, once AI technology has matured or is better understood.

3.3.6 The sixth issue, which deals with copyright, addresses authorship and ownership issues. It asks whether original literary and artistic works produced by AI should be granted copyright, who should own the copyright to such works, whether the issue of an AI application's legal personality should be taken into account when it produces original works, and whether or not such works should be protected by a separate sui generis system.

3.3.7 Concerning intellectual property rights (IPR) infringements, Issue 7 aims to determine

¹⁹⁸⁶“AI and Intellectual Property Rights”, India AI (Access here- <https://indiaai.gov.in/Ai-Standards/Ai-And-Intellectual-Property-Rights>)

¹⁹⁸⁷“The WIPO Conversation on Intellectual Property and Artificial Intelligence” (Access here- https://www.wipo.int/about-ip/en/artificial_intelligence/conversation.html#:~:text=In%20December%202019%2C%20WIPO%20published,received%20in%20the%20consultation%20process.)

¹⁹⁸⁸ WIPO Secretariat, “Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence”, WIPO/IP/AI/2/GE/20/1 REV.

whether using data from copyrighted works for machine learning without authorization would be a copyright infringement, and if so, what effect that would have on the advancement of artificial intelligence (AI) and the free flow of data to enhance AI innovation; whether there should be an exemption for specific uses of such data in machine learning, such as use for research or in non-commercial user-generated works; and how existing exceptions for text and data mining would interact with such infringement. It also states that if the unauthorised use of data contained in copyright works for machine learning can be identified and prosecuted, especially when a significant number of copyright works are produced by AI, and whether a licencing system would be helpful as a substitute for copyright infringement.

3.3.8 Issue 8 examines "deep fakes," or "the creation of simulated resemblance of real people and their characteristics, such as voice and appearance," and whether or not deep fakes themselves are protected by copyright. It also explores the possibility of establishing a system of fair compensation for individuals whose likenesses and "performances" are used in deep fakes.

3.3.9 Issue 9 concerns whether copyright has visible or unnoticed effects on bias in AI applications, and whether or not human creation dignity should be valued as a right more highly than AI invention.

3.3.10 Problem 10 examines whether new intellectual property rights (IPRs) for data should be created or if the current system of IPR laws is adequate; what types of data would be covered by these new rights, if they were created; whether certain attributes of the data, like commercial value or protection from certain types of activities, should serve as the criteria for these new rights; and how these rights would interact with current rights and be enforced.

3.3.11 Issue 11 focuses on industrial designs and explores issues including whether an AI programme should be able to develop an original design on its own and whether or not a human designer is necessary;

3.3.12 In order to contain or close the technological gap in AI capabilities, Issue 12 discusses capacity building and whether or not any policy actions are necessary in this area.

3.3.13 Issue 13 relates to who is in charge of making decisions on IP administration.

Policymakers must balance promoting innovation with defending intellectual property rights as AI develops. International cooperation and multilateral agreements are essential to the development of logical and flexible AI and IPR legal frameworks. Ensuring equal access to AI technology across a range of socioeconomic circumstances, encouraging collaborative innovation by means of open access efforts, and promoting transparency and responsibility in AI development are all important policy considerations. Furthermore, establishing credibility and confidence in the international AI ecosystem requires tackling ethical issues like prejudice and discrimination in AI systems.

3.4 Ownership of AI-Generated Data

Unquestionably, technological advancements have permeated almost every facet of contemporary culture as it exists today. The extent to which technology has become ingrained in our daily lives is a sign of how the physical world has been absorbed by the digital realm, with the distinction between the two becoming increasingly hazy. Technology cannot be used to disregard or make today's advances necessary. Even while human labour is crucial to modern advances, it has been diminished and in many cases completely supplanted by technology. This creates a special issue where new works produced by algorithms and software programmes can not be distinguished from those produced by human labour.

AI's role in authorship and ownership raises a lot of questions, especially in light of its capacity to produce creative and novel works. The Indian Copyright Office acknowledged AI technology as a co-author of work of art for the first time, demonstrating the evolving perspectives on AI's place in authorship.

In the modern world, evident possession of IP rights over a work is essential for any person or organisation, as it often dictates the course of a company's expansion. Thus, it is essential to preserve this kind of intellectual property. The most controversial question in ownership law is whether or whether a non-human equivalent—such as software, algorithms, or other things that helped produce a product—may also be entitled to ownership. The software and algorithms used to create intellectual property that is appropriate to statutory protection are not explicitly recognised as owners under the current intellectual property laws in India.

The Copyright Act of 1957 recognises the author of the work that was generated by a computer as the individual who causes it to be made, to the extent that it creates an exemption. But the software/AI system, which is the non-human equivalent, cannot be given credit for writing the work. Section 2(d)(vi) of the Indian Copyright Act 1957 contains the details on this.

3.4.1 Copyright Act and AI

According to Section 2(d)(vi) of the Indian Copyright Act, 1957, an "author" is a person who causes a computer to be used in the creation of a literary, theatrical, musical, or artistic work. There are issues with this concept about data generated by AI and who owns it. While Section 2(d)(vi) of the Indian copyright law acknowledges the person who produces or commands the computer-generated work to be developed as the work's author, the legislation does not specifically address AI-generated content. But authorship of the work cannot be granted to the non-human comparable, i.e., the computer programme or AI system itself. This makes it unclear who is the owner and author of content created by AI.

Original literary, dramatic, musical, and creative works as well as sound recordings and cinematographic films are among the works to which the Copyright Act grants exclusive rights. Make careful that using or depending on the results of generative AI technology does not infringe upon the rights of other parties. By referencing earlier copyrighted works that were used to train AI, the Indian Copyright Office allows candidates for translated or varied works or derivative works to obtain copyright protection. This may lay the groundwork for future requirements requiring AI training to cite copyrighted works already in existence.

There is ongoing debate about whether the Gen AI tool's output is protected by copyright and whether the final product, which is built on big datasets without licencing, violates the copyrights of third parties. Certain platforms have implemented security measures to hinder web crawlers from collecting their data. Authorship is still a contentious topic since it involves the idea that a work cannot be distinguished from those created by human labour. The software or AI system itself, which is its non-human counterpart, cannot be acknowledged as the author of the work.

Case laws:

3.4.1.1 Rupendra Kashyap vs. Jiwan Publishing House Pvt. Ltd¹⁹⁸⁹–

In this instance, the Central Board of Secondary Education's copyright claim over question papers was handled by the Delhi High Court in accordance with custom. The Court decided that the CBSE cannot pursue copyright unless there is proof of individual involvement in the question paper's development, given its status as an artificial entity.

The court decided that authorship may only be given to a natural person in accordance with the Indian Copyright Act. The Tech Plus Media Private Ltd. v. Jyoti Janda case further solidified this position.

3.4.1.2 Navigators Logistics Ltd. vs. Kashif Qureshi & Ors¹⁹⁹⁰

The court dismissed the copyright claim for a computer-generated list because there was no human involvement in the process. This is in line with US policy, which states that authorship cannot be attributed to AI alone. The Indian government is aware of how important artificial intelligence is to progress. To use AI for economic and social growth, the Indian government has put policies in place including the AI Task Force and the 'AI for All' initiative. The intellectual property structure needs to be reviewed in light of the quick advancement of AI technology in order to make sure that the law keeps up with these developments. It may be possible to amend the Indian Copyright Act to acknowledge AI authors. It is vital to underscore that the ownership of the work ought to remain with a natural or legal person.

3.4.1.3 Stephen Thaler vs. The Registrar of Copyrights¹⁹⁹¹

In this decision, the US District Court upheld the fundamental ideas that copyright protection requires human authorship and that human beings are the only entities subject to the legal criteria for copyright infringement.

3.4.2 Trademark and AI

As long as they accomplish this primary goal, trademarks have historically included brand names, slogans, logos, and even unconventional elements like colours, forms, and sounds. When AI advances, these can be created by employing that kind of machine intelligence.

3.4.2.1 Content produced by AI must fulfil the prerequisites for trademark registration, including: Trademarks must serve as source identifiers. An AI-generated moniker, brand, or slogan may satisfy the essential requirements for trademark protection if it can accurately pinpoint the source of goods or services and set them apart from competing ones.

3.4.2.2 A trademark needs to be unique. This can be acquired over time by developing a close relationship with a particular provider of goods or services, or it can be innate, as in the case of the usage of unusual, non-descriptive names or designs. This need must be met for an AI-generated identity to be safeguarded as a trademark.

3.4.2.3 A trademark must be used for business purposes. This means that in order to identify goods or services sold or transported in interstate commerce, the AI-generated identifier must be utilised commercially.

Identifying who is the trademark's "author" or inventor in such cases is problematic. Trademarks have traditionally been registered by individuals or businesses with legal rights. The line between authorship and AI becomes more hazy, which causes issues with ownership and the ability to assert exclusive rights to use. The level of creativity and originality in content produced by AI is another problem. Evidence that the AI-created mark is not just a copy or something that was generated from a database of already-existing trademarks may be required by the legal system.

In this evolving landscape, a workable middle ground may comprise a hybrid approach, in which trademarks generated by AI are eligible for safeguarding if they satisfy all conventional criteria and there is clear evidence of human involvement in the mark's selection, refining, and intended

¹⁹⁹⁰ AIR ONLINE 2018 DEL 1483

¹⁹⁹¹ Case No. 1:22-cv-01564

commercial use. This plan will guarantee that trademarks produced by AI fulfil their primary function, which is to identify the source of goods or services, while also resolving any unique problems arising from the use of AI in trademark formation.

Artificial intelligence-generated names, trademarks, slogans, or other identifiers may be eligible for trademark protection, but only if they satisfy certain requirements set down by trademark law, including serving as a source identification, having been utilised in commerce, and being distinctive. The growing influence of AI in content generation might need a review of current standards or the development of new guidelines to address these particular problems.

There are no legal specifications in the Patent Act of 1970 or the Design Act of 2000 that identify a computer programmer or developer as the inventor or proprietor of any innovation emerging from the application of software, artificial intelligence, or an algorithm. When software, artificial intelligence, or algorithms are solely responsible for the labour or invention and no human input is involved, the challenge is increased. In order to maintain a strong and dynamic innovative ecosystem, formal intellectual property recognition should be broadened to such creators through express legal provisions, even if the software itself is not the subject of the recognition. This is because of the rapid advancement of technology and the industry.

The attempt to ascertain whether software can mimic humans in specific scenarios and be a valuable contributor is not new, even though innovators and legislators worldwide are now recognising the gaps in laws that accommodate and acknowledge non-human contributions. Renowned mathematician Alan Turing created the Turing test to examine the relationship between digital technology and rationality and to assess how well a piece of software can mimic human thought.

The Turing Test evaluates whether a machine is capable of intelligent activity that is indistinguishable from human behaviour. During the test, a human reviewer natters with a machine and a human in natural language without having a knowledge of which is which. The computer has passed the Turing Test if the judge is unable to reliably distinguish between the machine and the human based on their responses. This indicates a level of artificial intelligence that estimates human-like intelligence and communication. The test emphasises the machine's ability to replicate human-like replies by concentrating on its exterior behaviour rather than its internal workings. With the development of generative AI and technological advancements, the issue of whether this approach of thinking is comparable to human brain function has been answered. The software of today is no longer just a tool; rather, it is a thinker and creator that can produce works on par with those created by humans. Still up for debate, though, is whether or not the creators of such software should be entitled to intellectual property rights.

In a world where innovation and technological products permeate all aspect of our daily lives, safeguarding these intellectual property has become essential to economic growth as well as a necessity. Understanding how intellectual property rights may effectively protect and develop AI inventions is essential to realising the full potential benefits of AI. The idea that AI is intelligent comes from its ability to think creatively and originally; be surprising and act in unexpected ways; work on its own without needing constant guidance; make logical decisions; continuously learn and improve; gather information and share it effectively & perform tasks quickly and precisely. These characteristics allow AI systems to independently produce ideas and artistic creations that, if made by humans, would be qualified for copyright and patent registration if all legal requirements are satisfied.

In Report No. 161¹⁹⁹², the Parliamentary Standing Committee examined India's Intellectual Property Rights (IPR) regime and made numerous recommendations to strengthen it. The research highlights the need of enacting robust intellectual property laws that promote innovation and creativity. It also highlights the need to establish a distinct category of rights for AI and AI-related technology, as well as mechanisms for safeguarding them as intellectual property rights. The committee recommends that the existing laws, the Patents Act of 1970 and the Copyright Act of 1957, be reviewed to embrace new AI technologies and inventions.

The essay also looks at the obstacles to enhancing the intellectual property rights system, including limitations on both the substantive and procedural aspects, legal issues, and other problems including piracy and counterfeiting, poor IPR awareness, IP funding, and IPRs in the pharmaceutical and agricultural industries, among other problems. In order to expand the innovation ecosystem in the complete instructions on boosting R&D activities, encouraging IP finance, and involving state governments in the development of a strong IPR regime, the committee suggests reviewing the 2016 National IPR Policy and making the appropriate adjustments.

The study also emphasises how intellectual property rights help developing nations attract foreign direct investment. In order to safeguard AI-related inventions and solutions as intellectual property rights, it suggests establishing a new class of rights. The committee further suggests that new AI technologies and AI-related concepts be included in the purview of the 1970 Patent Act and the 1957 Copyright Act, both of which are currently in effect. The proposal also calls for the reinstatement of the Intellectual Property Appellate Board (IPAB) with increased institutional autonomy, upgraded administrative and infrastructural capabilities, and prompt hiring of professionals and officials.

The legal system needs to change to accommodate the capabilities of AI-based technology, especially the intellectual property framework. The legal context's ambiguity, especially with regard to authorship, presents problems that conventional frameworks are unable to address. The regulations as they stand need to be reconsidered in light of this ongoing change, which emphasises how crucial it is to foster an atmosphere that supports creativity while upholding the rights of artists. The complex relationship between AI capabilities and conventional creativity makes questions of AI authorship and ownership more difficult to resolve. Reaping the potential benefits of artificial intelligence requires a progressive legal framework

Other challenges faced by AI in protecting intellectual rights include deepfakes, altered content, automated content creation, and data privacy and security. Furthermore, the use of AI raises a number of ethical issues; as a result, it is necessary to introduce suitable frameworks that strike a balance between the advantages of AI and the defence of intellectual property rights. AI and IP rights coexist in a dynamic and complex environment that has broad consequences for economic competitiveness, creativity, and innovation. Other challenges faced by AI in protecting intellectual rights include deepfakes, altered content, automated content creation, and data privacy and security.

Because AI is constantly evolving and because humans are constantly producing new works of art, it is usual to see periodic updates and changes to intellectual property regulations. It may be necessary to enact legislative modifications to the current intellectual property laws in order to develop rules for IP works produced exclusively by AI. These regulations would determine which works belong in the hands of the public and who should be credited with ownership of the IP produced by AI. Furthermore, a number of ethical issues are raised by AI use. Stakeholders can maintain the reliability and

¹⁹⁹²“ Review of the Intellectual Property Rights Regime in India”, One Hundred and Sixty-First Report , Department Related Parliamentary Standing Committee on Commerce
https://files.lbr.cloud/public/2021-07/161_2021_7_15.Pdf?Versionid=S01fcqec5dzdqknymsggxal6yxmjbuwm

inclusiveness of the worldwide knowledge economy while utilising AI's transformational potential by embracing ethical values, adaptable legislative frameworks, and international cooperation.

The aforementioned difficulties underscore the necessity of adopting AI strategically in India, taking into account both the possible risks and benefits of the technology as well as the nation's distinct socioeconomic environment. Therefore, by implementing the necessary frameworks, it is necessary to strike a balance between the advantages of AI and the defence of intellectual property rights.

CHAPTER 4- INTERNATIONAL PERSPECTIVES

The intersection of artificial intelligence (AI) and creativity presents significant challenges for global intellectual property (IP) laws. The emergence of AI as a general-purpose technology poses major questions for the current state of intellectual property laws. Determining authorship and inventorship for AI-generated works is a significant problem that calls into question the core tenets of human authorship as they are currently outlined in intellectual property laws. An additional challenge is determining whether using copyrighted data for AI training is considered fair use or copyright infringement. Moreover, adjustments to IP strategy and policies are required due to AI's predictive abilities in identifying patent validity and IP trends.

Potential legal changes to allay these worries might include recognising AI as a non-human creator or inventor, which would make ownership more clear and promote AI advancements. As an alternative, copyright laws may be changed to specifically permit using copyrighted works for AI training, so overcoming the current issues. Moreover, patent strategy and portfolio management may change in light of AI's predictive capabilities in relation to patents and other intellectual property rights. In the digital age, when artificial intelligence facilitates quick content creation and distribution, enforcement systems also need to advance to monitor and identify IP rights infringement.

4.1 International Treaties of IPR:

The laws governing artificial intelligence (AI) and intellectual property (IP) around the world are always changing and adapting to the quick advancements in AI technology. A framework for protecting intellectual property rights is now provided by a number of international treaties and accords, which can be leveraged to the advantage of AI development.

These include the following:

4.1.1 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)¹⁹⁹³:

The World Trade Organisation (WTO) upholds this agreement, which sets fundamental standards for various forms of intellectual property law, such as patents, copyrights, and trademarks. Member nations must guarantee the protection of AI software, innovations, and associated intellectual property. The TRIPS Agreement recognises the significance of AI-generated works by supervising dispute resolution and requiring notification of pertinent legislation. It also establishes baseline requirements for intellectual property rights protection and enforcement, including civil, administrative, and criminal proceedings.

Although AI-generated works and authorship are not expressly covered by the TRIPS Agreement, it does offer a framework for the protection of intellectual property rights in the context of AI, raising the possibility that AI-generated works will be covered by copyright laws. Trade secrets and private information about AI algorithms and methods are protected under the TRIPS Agreement. Members are required by law to protect this data, including by contractual or criminal obligations, so long as it remains accessible to the public.

¹⁹⁹³ International Protection of Copyright and Related Rights, International Bureau of WIPO (Access here- https://www.wipo.int/edocs/mdocs/sme/en/wipo_wasme_ipr_ge_03/wipo_wasme_ipr_ge_03_9.pdf)

4.1.2 The Berne Convention for the Protection of Literary and Artistic Works¹⁹⁹⁴:

The rights of authors and the preservation of works are covered by this convention. It eliminates the need for procedures like registration by offering automatic protection. This norm is essential for maintaining AI-produced works since it raises questions about authorship and ownership with regard to content generated by AI.

4.1.3 The Patent Cooperation Treaty¹⁹⁹⁵ (PCT):

This convention streamlines the process of submitting a patent application in several countries. Under the terms of this treaty, inventions pertaining to artificial intelligence, such as algorithms, techniques, and applications, may be patentable.

4.1.4 The Madrid Agreement Concerning the International Registration of Marks:

This agreement streamlines the international registration of trademarks. As AI technology becomes more integrated into branding and marketing efforts, trademarks for AI products and services become increasingly important.

4.1.5 The Hague Agreement Concerning the International Registration of Industrial Designs:

A foundation for the international registration of industrial designs is established by this agreement. AI systems have the potential to create designs that fall under this agreement. AI systems are able to produce designs that adhere to the 1925 Hague Agreement¹⁹⁹⁶, which creates a worldwide industrial design registration system. By simplifying registration maintenance and facilitating simple renewals and amendments in a single step, this helps design owners safeguard their works all over the world.

4.1.6 The Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure:

This protocol makes it easier to deposit biological samples for patent proceedings, even though it has nothing to do with AI. This treaty can indirectly affect AI-related patent procedures when AI and biotechnology collide in sectors like healthcare and agriculture.

The framework for the protection of intellectual property relating to artificial intelligence is provided by these international agreements. Applying these ideas to AI, however, presents special challenges that call for ongoing adaptation in order to stay up to date with both ethical considerations and technological advancements. Regulators will probably take into account new agreements and frameworks as AI develops, specifically to solve the challenges associated with intellectual property related to AI.

In the era of artificial intelligence, international intellectual property law will need to have adaptable and flexible frameworks that can keep up with new developments in technology. Achieving a balance between safeguarding the works of human creators and advancing AI innovation is imperative in tackling the intricate and diverse intellectual property issues surrounding AI. AI and intellectual property law are related in a number of ways, with the primary goal of IP law being to foster and protect innovation and creativity.

Determining who should be acknowledged as the author of a particular work of art when artificial intelligence is used in the creative process is one of the most challenging problems in international

¹⁹⁹⁴ Berne Convention for the Protection of Literary and Artistic Works (1886), Access here- https://www.wipo.int/treaties/en/ip/berne/summary_berne.html

¹⁹⁹⁵ “Patent Cooperation Treaty (PCT)”, World Intellectual Property Organization (Access here- <https://www.wipo.int/export/sites/www/pct/en/docs/texts/pct.pdf>)

¹⁹⁹⁶ “The Hague Agreement Concerning the International Registration of Industrial Designs: Main Features and Advantages”, World Intellectual Property Organization (access here- https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_rs_ip_be_15/wipo_rs_ip_be_15_hague.pdf)

intellectual property law. Determining whether artificial intelligence (AI) can result in a unique product or process and, if so, whether the law should acknowledge the AI application as the inventor present a challenge to patent law. As of right now, only living things or formal entities are recognised as inventors; artificial intelligence (AI) entities are not considered to be legal persons, which raises questions about their ownership of intellectual property rights.

AI systems have the ability to produce literary and musical works, but the author of a work that is protected by a copyright is regarded as the copyright owner. This is how copyright law is expected to develop globally in the future. Nevertheless, there are significant exceptions, such as when the work is created while employed by another party, which begs the question of whether AI-generated content is covered by copyright laws.

Another area where AI raises problems on a global scale is trademarks. The only person with the exclusive right to use a mark is the registered owner or licensee. However, if artificial intelligence (AI) is able to create and register trademarks, this could lead to a situation where human- and AI-generated trademarks are in competition with each other.

CHAPTER 5- CONCLUSION

It is of utmost importance for companies, legislators, and legal experts to have a comprehensive understanding of the interaction between artificial intelligence and intellectual property rights. By delving deeply into this topic, we can uncover a plethora of legal opportunities and challenges, as well as devise effective strategies for innovation and growth. Additionally, we can carefully analyze legal practices and their impact on innovation.

While it is true that artificial intelligence has the potential to improve productivity, accuracy, and decision-making in Indian IPR law, there are certain drawbacks that need to be taken into account. These include but are not limited to risks associated with over-dependence on technology, emotional intelligence, creativity, and legal ambiguity. Consequently, any efforts aimed at integrating AI into Indian IPR law processes must strive to achieve a balance between harnessing the capabilities of AI and preserving the unique value of human expertise and judgment.

Intellectual property (IPR) regulations in India must change as AI technology advances to give guidance for creators, users, and inventors. This is due to the fact that AI is quickly changing the field of IP law by improving the effectiveness of patent searches and infringement detection.

As AI and IPR are about to intersect, governments and international organisations need to adjust existing regulatory frameworks to construct comprehensive legal frameworks that can handle the intellectual property issues that AI has brought up. It is also crucial to support creative solutions that uphold intellectual property rights and encourage the ethical application of AI. Collaboration between parties is required to accomplish this. It's critical to educate people about how AI affects intellectual property rights and to provide professional training in these areas. To preserve the moral foundation of creativity and innovation, provide ethical principles for the use of AI in IPR.

The future of AI and IPR is a complex and fascinating area that will require a keen focus on innovation and intellectual property protection. As we navigate this landscape, it will be essential to strike a balance between fostering AI-driven advancements and safeguarding the rights of creators. This balance will require careful attention to issues such as patent law, copyright law, and trade secret protection. There are many exciting opportunities on the horizon, including the development of AI-powered systems that can revolutionize industries such as healthcare, finance, and transportation. To capitalize on these opportunities, we must adapt, develop, and shape AI and IPR laws in a way that encourages innovation while protecting the rights of creators.

Despite the progress made in this area, there are still many unresolved issues that require further attention and consideration. For example, there is ongoing debate about the extent to which AI-generated works should be eligible for copyright protection, and how to balance the interests of creators with those of users. It is crucial that we tackle these challenges head-on to ensure that the future of AI and IPR is a fair, safe, and productive one.

5.1 Recommendation

Inclusion of legal provisions for the IP rights over the content generated by Artificial Intelligence.

There could be a lot of benefits from incorporating artificial intelligence (AI) into intellectual property rights (IPR) legal procedures. AI can improve the effectiveness of IPR legal practices by automating jobs, optimising workflows, and analysing large volumes of data to yield insightful information. The use of AI technologies can also aid in lowering the price of legal research, drafting, and case analysis, increasing the accessibility and affordability of legal services. AI systems can also significantly improve the precision of legal research, judgement, and case forecasting, which will produce more dependable results in IPR law situations. Artificial Intelligence (AI) can help legal practitioners make better judgements by offering data-driven insights and analysis, which will ultimately improve the calibre of legal strategies and advise.

Artificial intelligence is devoid of human judgement and emotional intelligence, which are critical in some legal situations where empathy, intuition, and a comprehension of the complexities of human emotions are needed. Furthermore, AI systems might not be creative or able to think creatively, which is important for legal interpretation, argumentation, and strategy formulation in intellectual property rights situations. IPR law's AI legal framework is still developing, which causes uncertainty in regards to issues like authorship, ownership, and culpability¹⁹⁹⁷. Using AI tools in IPR legal activities efficiently is hampered by this ambiguity. An over-reliance on AI technologies in IPR law practices could result in a decline in human competence, critical thinking abilities, and the capacity to adjust to particular legal situations that call for human involvement.

Increased intellectual property rights for AI in India is a complicated matter that needs to take into account a number of variables. AI has the capacity to produce innovative ideas and valuable technologies on its own, which raises important concerns about the assignment of intellectual property rights (IPR), such as patents and copyrights, for AI outputs. With modifications over the years, India's IPR framework—which was derived from the Copyright Act 1957 and the Patents Act 1970—protects innovative innovations with industrial applicability as well as original literary, theatrical, musical, and artistic works. Though IPR are still awarded to human creators and owners, AI systems are now able to create inventions and works that are on par with human outputs through the use of machine learning and other approaches.

Issues arise from the lack of clarity surrounding the creations of AI receiving IPR protection, and the policy gap has gotten worse given the speed at which AI is developing. The AI system DALL-E 2 showed in 2021 that it could generate realistic graphics on its own with written instructions. Poetry and news articles can now be created by AI according to specific topics and styles. Similar to this, without complete human supervision, AI systems have generated original scientific theories, designs, and medication prospects. There will be an increasing need to safeguard investments made in influential AI systems and their priceless outputs as AI applications spread throughout industries. Due to the ambiguity of present regulations regarding the patentability and copyright of AI creations, companies

¹⁹⁹⁷ Lee J. Tiedrich, Gregory S. Discher, Fredericka Argent, and Daniel Rios, “10 Best Practices for Artificial Intelligence Related Intellectual Property”, Intellectual Property Technology Law Journal, VOLUME 32, NUMBER 7, JULY-AUGUST 2020

may be reluctant to develop AI that will benefit society as a whole. If India's AI works aren't protected, they run the risk of flooding the market or being illegally duplicated.

However, blanket IPR protection for all AI outputs runs the risk of stifling competition and undervaluing human creativity. India will have to adopt a middle ground, supporting IPR's goal of protecting original human expression while simultaneously fostering AI innovation through restricted monopolies. This will probably require careful evaluations of AI works in order to determine the degree of human purpose and control involved. Another promising topic is shareable IPR between AI systems and human developers.

In conclusion, the question of whether or not AI requires more intellectual property rights in India is complicated and calls for careful analysis of a number of variables, including the possible advantages and disadvantages of granting IPR to works created by AI, the need to strike a balance between the interests of AI innovators and human creators, and the potential influence of IPR on the advancement and application of AI across a range of industries.

5.2 Future trends

5.2.1 Future of Artificial Intelligence:

Artificial intelligence is poised to revolutionise all facets of human existence as it reaches unprecedented heights of development. As the twenty-first century goes on, the combination of state-of-the-art technology and limitless human creativity pushes us closer to a future where the lines between the actual and virtual worlds are blurred and the capabilities of intelligent systems keep expanding rapidly. AI has a bright future ahead of it, one that will both revolutionise industries and significantly change how people interact with their environment.

We'll go through innovation, ethics, and societal effect in this look into the future of artificial intelligence. To determine the elements driving the development of intelligent systems, we explore the most recent developments in computational neuroscience, neural networks, and machine learning. While we are amazed by the potential that artificial intelligence (AI) offers, we also need to consider the ethical implications of using autonomous technology, how to ensure that AI continues to be a constructive force in our rapidly evolving society, and other pertinent issues.

It becomes obvious that the future of AI is more than just a technological frontier as we navigate these complex intersections—rather, it is a reflection of our common values and objectives. It invites us to learn more about our relationship with technology by promoting cross-disciplinary cooperation and discussion. We may pave the way for a day when artificial intelligence (AI) serves as a growth-promoting agent, enhancing human potential and improving lives in ways that are still beyond our current comprehension by grasping possibilities and overcoming challenges¹⁹⁹⁸. AI can evolve in a few different ways, some of which are as follows:

5.2.1.1 AI in Industry and Commerce: AI is expected to significantly improve processes and encourage innovation across a wide range of organisations. For instance, by anticipating equipment failures, AI-driven predictive maintenance in the industrial sector can reduce downtime. AI algorithms are employed in finance for algorithmic trading, risk analysis, and fraud detection. AI is used by retailers to optimise their supply networks, estimate demand, and provide tailored recommendations. In general, businesses will employ AI more and more to boost productivity and get a competitive edge.

¹⁹⁹⁸ Nikita Duggal, "Future of AI (Artificial Intelligence): What Lies Ahead?", Simplilearn (Access here- <https://www.simplilearn.com/future-of-artificial-intelligence-article>)

5.2.1.2 AI-Powered Healthcare Revolution: The healthcare industry stands to gain greatly from the advancement of AI. AI-powered medical imaging can expedite and enhance the precision of disease identification, leading to earlier interventions and better outcomes for patients. AI systems can analyse genomic data and provide personalised treatment regimens based on the distinct genetic composition of each patient. Furthermore, particularly in remote or underdeveloped locations, AI-driven telemedicine platforms and virtual health assistants provide rapid, simple access to high-quality medical care.

5.2.1.3 Autonomous Vehicles and Transportation: Transportation is about to undergo a revolution thanks to autonomous cars, trucks, drones, and other self-driving vehicles. These vehicles can sense their environment, navigate safely, and make decisions in real time thanks to artificial intelligence (AI) technology. Widespread use of self-driving cars could reduce carbon emissions, traffic jams, and accidents. But before fully autonomous cars become commonplace, we need to solve a number of issues, such as legal frameworks, liability, and public acceptance.

5.2.1.4 AI and Robotics Collaboration: Combining robotics with AI skills can accelerate automation achievements in a variety of industries. AI-enabled collaborative robots, or cobots, can work side by side with humans in a variety of industries, including manufacturing and healthcare, to improve productivity and safety. Robotic systems driven by AI enhance logistical operations, order fulfilment, and inventory management in warehouses and logistics hubs. As robotics technology develops, robots will be able to perform more complex tasks than human workers can, complementing rather than completely replacing human labour.

5.2.1.5 Ethical and Regulatory Frameworks: As AI technologies advance, it is more crucial than ever to address ethical issues and create legal frameworks. AI systems must be made visible, accountable, and devoid of prejudice in order to preserve confidence and reduce potential risks. The ethical application of AI in security and surveillance applications, algorithmic fairness, and data privacy are among the issues that international regulatory agencies are battling. Governments, industry players, and academics must work together to create AI governance frameworks that combine technological advancement with societal concerns.

5.2.1.6 AI and Education Transformation: The use of AI in academic platforms and technology has the potential to revolutionise teaching and learning. Using AI algorithms, adaptive learning systems customise lessons to each student's needs, preferred learning style, and degree of proficiency. Smart tutoring solutions increase student engagement and performance by providing personalised learning materials and prompt feedback. AI also makes it possible to create immersive educational materials that enhance learning and memory of complex subjects. Examples of these include interactive multimedia experiences and virtual reality simulations.

5.2.1.7 AI Research Frontiers: Future AI research will concentrate on developing areas like AI safety, perpetual learning, and rational AI. The goal of explainable AI is to increase the transparency and understanding of AI systems, enabling users to understand how decisions are made and identify any biases or errors that may have occurred. Algorithms for lifelong learning enable AI systems to continuously pick up new skills and knowledge while adapting to changing environments and workloads. Furthermore, the advancement of AI safety research depends on guaranteeing that AI systems are robust, secure, and compliant with human norms.

Recent years have seen a surge in the use of artificial intelligence (AI), which has the potential to significantly advance technological advancement, economic expansion, and social change. Nevertheless, in order to fully utilise AI, much thought must be given to the ethical, legal, and societal repercussions of the technology. Research, education, and cross-sector collaboration are also necessary. The ethical ramifications of AI provide one of its main obstacles. AI systems are being used in many different industries, such as healthcare, banking, transportation, and more, as they get more and more advanced. Even while AI offers a lot of potential advantages, privacy, security, and bias are some of the issues it brings up. As such, it is essential to define ethical standards for AI development and application.

The legal foundation for AI is another crucial factor to take into account. IP rules must change to safeguard AI-generated work as AI develops and becomes more widely used. It will be necessary to carefully navigate legal obstacles, such as those pertaining to ownership, liability, and accountability. It's also critical to make investments in research and education if you want to fully reap the rewards of AI. To stay up with the evolving demands of the digital age, this entails creating new technologies and algorithms as well as educating the workforce. To fully utilise AI, collaboration is essential. In order to encourage innovation and guarantee that AI is created and applied in a responsible and ethical manner, this involves establishing collaborations between governments, academic institutions, and the commercial sector.

By tackling these problems, we can harness AI's potential to solve significant global concerns and raise people's standard of living everywhere. A concerted effort will be needed to address ethical and cultural issues, promote open innovation approaches, strengthen international cooperation, and modify regulatory frameworks. With regard to the problems in the field of artificial intelligence, stakeholders, businesses, and legislators can work together to foster a creative and innovative ecosystem in the digital age.

5.2.1 Future of IPR in AI:

In this glimpse at the future of IP laws in AI, we'll take a tour through the intricacies of innovation, ownership, and accountability in the digital era. We delve into the complexities of copyright, patent, and trademark law, analysing how these established concepts adapt—or fail to adapt—to the distinct qualities of AI-generated material and inventions. However, as we work through the legal complexity, we come across bigger problems regarding the role of intellectual property in stimulating innovation, motivating creativity, and protecting the rights of creators and consumers alike.

In the rapidly developing field of Artificial Intelligence (AI), where innovation knows no limitations and the boundaries of possibility are constantly pushed, intellectual property (IP) regulations are at a critical crossroads. AI technologies are evolving at an unprecedented rate, disrupting industries, reshaping society, and posing new and significant challenges to existing intellectual property protection regimes. From algorithms that generate creative works to autonomous systems that make critical decisions, the intersection of AI and intellectual property poses a number of legal, ethical, and practical challenges.

Let's take a look at the prospective development of intellectual property rights (IPR) in the realm of artificial intelligence (AI):

5.2.1.1 Ownership Dynamics in AI-Generated Works: As AI algorithms evolve to produce original content, the question of ownership becomes intricate. Imagine a scenario where an AI system autonomously composes a symphony or designs a piece of artwork. Who should be attributed as the creator: the programmer who developed the AI model, the entity that

owns the AI system, or the AI itself. Courts and legal systems worldwide face the daunting task of defining authorship and ownership in such AI-generated works, navigating through the complexities of copyright and patent laws.

5.2.1.2 Navigating Patentability in AI-Driven Inventions: Picture a world where AI systems continually churn out innovative solutions in fields like biotechnology, climate modelling, or drug discovery. The criteria for patentability—novelty, non-obviousness, and utility—must adapt to the rapid pace of AI-driven innovation. Moreover, the emergence of AI-generated inventions raises intriguing questions about inventorship. Should AI systems be recognized as inventors, and if so, what legal rights should they be granted? These are fundamental questions challenging the very fabric of intellectual property law.

5.2.1.3 Data Sovereignty and Control: In the age of AI, data is akin to fuel, powering algorithms and driving innovation. Picture the vast repositories of data collected by tech giants, research institutions, and government agencies. The ownership and control of these datasets are paramount, influencing the trajectory of AI development and commercialization. Yet, the quest for proprietary data clashes with the principles of data accessibility and privacy. Striking a balance between data sovereignty, open access, and privacy protection remains a formidable challenge for policymakers and industry stakeholders alike.

5.2.1.4 Ethical Imperatives in AI Development: As AI systems permeate various facets of society, ethical considerations loom large. Imagine an AI-powered hiring tool that inadvertently perpetuates gender bias or a predictive policing algorithm that disproportionately targets marginalized communities. The ethical ramifications of AI extend beyond technical prowess, encompassing principles of fairness, transparency, and accountability. Intellectual property rights intersect with these ethical dilemmas, as proprietary algorithms may hinder transparency and exacerbate biases, necessitating a delicate balance between innovation incentives and societal values.

5.2.1.5 Licensing and Collaborative Innovation: Collaboration lies at the heart of AI innovation, with companies and research institutions pooling resources and expertise to push the boundaries of AI capabilities. Picture a consortium of tech firms sharing AI-related patents, algorithms, and datasets to accelerate innovation and establish industry standards. Open-source initiatives like TensorFlow and PyTorch foster collaborative development, enabling researchers worldwide to build upon each other's work. However, navigating licensing agreements, IP disputes, and attribution rights in collaborative settings poses intricate challenges that require careful negotiation and legal frameworks.

5.2.1.6 Regulatory Complexities and Standardization Efforts: The rapid proliferation of AI technologies has prompted calls for regulatory oversight to ensure responsible AI development and deployment. Imagine regulatory bodies grappling with the complexities of AI algorithms, privacy concerns, and societal impacts. Standardization efforts aim to establish guidelines and technical standards for AI ethics, safety, and interoperability, fostering trust and reliability in AI systems. Yet, harmonizing regulatory frameworks across jurisdictions and balancing innovation incentives with public interests remain formidable tasks that require global cooperation and interdisciplinary expertise.

5.2.1.7 Emergence of AI and Machine Learning: As AI and machine learning technologies continue to advance, questions regarding ownership and protection of AI-generated works will become increasingly pertinent. Current legal frameworks for copyright and patents may need adaptation to accommodate AI-generated content and inventions. Additionally, ensuring transparency and accountability in AI algorithms to prevent

infringement of existing IP rights will be crucial.

5.2.1.8 Biotechnology and Genetic Engineering: Advances in biotechnology, including gene editing techniques such as CRISPR-Cas9, raise novel ethical and legal questions regarding the patentability and ownership of genetically modified organisms (GMOs) and biotechnological innovations. The evolution of GMOs may also include the AI-generated technologies. Regulatory frameworks must strike a balance between promoting biomedical research and safeguarding public health, biodiversity, and ethical considerations such as informed consent and equitable access to genetic resources. This may also include the AI-generated technologies that help evolve the GMOs.

A strong and flexible intellectual property framework is more important than ever as the lines between human and machine innovation blur and AI systems' capabilities advance. A solution to maintain a balance between the need to safeguard innovation and the needs to advance fair use and accessibility must be found. It is also necessary to address the issues of ownership and credit in a world where creative works are becoming more algorithmically driven and collaborative. These are some of the important issues that may influence IP rules in artificial intelligence in the future. They necessitate a thoughtful, nuanced approach that weighs the interests of all parties involved in the innovation ecosystem. Through constructive discourse, cooperative efforts, and deliberate policy formulation, we may mould a future in which intellectual property rules not only accommodate the realities of artificial intelligence, but also act as a stimulant for conscientious innovation and fair distribution of information and artistic expression. We ask you to travel with us as we explore the complex world of artificial intelligence and intellectual property, paving the way for a time when creativity is encouraged and everyone benefits from rapid technological growth.

The future of intellectual property rights in artificial intelligence is essentially characterised by a convergence of technological, ethical, and legal challenges. It need interdisciplinary cooperation, creative policy solutions, and a deep comprehension of the changing dynamics between AI innovation and social values to navigate this terrain. Stakeholders can responsibly develop AI by tackling these issues and paving the way for innovation to flourish while protecting the rights of creators, innovators, and society at large.

APPENDICES

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