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L’intelligence artificielle et la propriete intellectuelle

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List of Abbreviation

AI	Artificial Intelligence
IPR	Intellectual Property Rights
IP	Intellectual Property
ML	Machine Learning
WIPO	World Intellectual Property Organisation
SNARC	Spatial-numerical Association of Response Codes
GPS	General Problem Solver
BCE	Before the Common Era
US	United States
MCC	Microelectronics and Computer Technology Corporation
IoT	Internet of Things
NLP	Natural Language Processing
UK	United Kingdom
EU	European Union
IBM	International Business Machines Corporation
MGM	Metro-Goldwyn-Mayer
EUTM	European Union Trademarks
USPTO	United States Patent and Trademark Office
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UCL	University College London
CONTU	National Commission on New Technological Uses of Copyrighted Works
OTA	Office of Technology Assessment

Introduction

The ability of robots to mimic or improve human intelligence, such as reasoning and experience-based learning, is known as artificial intelligence (AI). Although it has long been employed in computer programmes, artificial intelligence is now used in a wide range of different goods and services.

AI uses techniques from probability theory, economics, and algorithm design to address problems in the real world. The field of artificial intelligence also makes use of linguistics, computer science, mathematics, and psychology. While computer science gives tools for building and developing algorithms, mathematics provides techniques for modelling and solving the resulting optimization problems.

AI may be used to create instruments or software that can swiftly and precisely handle a range of real-world issues, such as those pertaining to marketing, traffic, and health. It serves the same purpose as Cortana, Siri, Google Assistant, and other personal virtual assistants. It can build robots that work in environments where people's lives could be at jeopardy. Artificial Intelligence opens up new avenues for technology, gadgets, and possibilities.

The phrase "Intellectual Property" is being used more frequently than ever due to the rapidly evolving nature of technology and the thinning of international borders. All businesses, from tech giants like Samsung, Apple, and Google to biotechnology companies like Monsanto, are vigilant about protecting their intellectual property. Understanding what intellectual property is and what rights people obtain when their intellectual property rights become crucial.

Intellectual property rights (IPR) are concepts, inventions, and artistic expressions that the public wants to be given the status of property based on. IPR offer certain

exclusive rights to the inventors or developers of that property so they can earn monetarily from their creative endeavors or reputation. Intellectual property is protected in a number of ways, such as patents, copyright, and trademarks. A patent is awarded to an invention that meets the standards of universal novelty, non-obviousness, and industrial utility. IPR is necessary for improved invention or creative work identification, planning, commercialization, and rendering.

The management and protection of intellectual property rights (IPR) are being transformed by artificial intelligence (AI). Artificial intelligence (AI)-driven solutions are being used to find potential violations, examine data to spot trends, and automate procedures for quicker IPR protection.

AI can also be used to provide data for patent applications and provide insights into the competitive landscape of a certain technology or market. It can help identify any infringements on previously granted intellectual property rights, enabling companies to act quickly to put an end to any infringements they may find.

IPR-related operations like copyright protection, trademark filing, patent document analysis, and patent search are being handled by AI-driven solutions. AI can be used to detect possible IPR violations and assist in the enforcement of rights. Businesses can rapidly and accurately determine the possibility of an IPR infringement or violation thanks to AI. They can therefore better protect their resources and keep up their competitiveness in their specific markets.

Artificial intelligence (AI) is quickly becoming a key tool in the field of intellectual property rights (IPR). Artificial intelligence (AI) can automate a number of laborious and time-consuming IPR-related processes, including copyright registration, patent and trademark searches, and others. AI can also assist in defending intellectual property rights (IPRs) against unauthorised or inappropriate use by identifying

possible infractions. AI can also be used to generate data-driven insights on how to monetize intellectual property rights (IPRs) in a way that maximises return on investment. As technology advances, AI is expected to become more significant in IPR.

1.1 Objective of the Study

This thesis aims to talk about the relation between artificial intelligence and intellectual property rights law, and how legislations must improve to include AI in their laws as it is developing rapidly. Moreover, it talks about the debate of being the owner in case AI was the author or inventor.

1.2 Problematic

To what extent is intellectual property law applicable on AI, and what is the possibility of AI being an author of a work?

The following questions arise from this problematic:

1) What is the definition of AI and Intellectual Property? How AI and IP started? And what is intelligence?
2) What is Berne Convention for the protection of literary and artistic work?
3) What are the types of AI and Intellectual Property?
4) What is the impact of AI in the world of IPR on work distribution, law and procedure, and the future?
5) Who owns copyright if AI was the author?

1.3 Methodology

This thesis is library based where the available literature on the subject has been made use of. Hard copy sources accessed from the internet are utilized. Reliance is made on information related to the topic of AI and IPR as accessed on the Internet.

1.4 Overview of the Thesis

This thesis is divided into two sections.

Section one defines the terms AI and intellectual property, as it states the types of AI and intellectual property. It also talks about the relation between them.

Section two talks about AI being the owner of Intellectual Property Rights, and who owns copyright in this case.

Section One: Intersection Between Artificial Intelligence and Intellectual Property

Artificial Intelligence (AI) has revolutionized various industries and is poised to profoundly impact society, economy, and law. It has transformed the way humans work by replacing manual labor with algorithmic processes for efficient data retention and retrieval.

As AI continues to advance, there is a growing need to consider its role in administering intellectual property (IP). AI operates on algorithms, which are step-by-step procedures that guide machines in processing data. These algorithms can perform complex calculations, generate automated reasoning, and even create new algorithms. However, this raises the question of ownership and patent rights for AI-generated algorithms. Current IP laws are not well-equipped to address this issue[1].

The growth of AI will go hand in hand with the growth of the IP sector, encouraging innovation by enhancing transparency, reducing costs, minimizing errors, and simplifying the process. While the possibility of AI owning IP cannot be dismissed, it would require a redefinition of ownership and inventorship in IP laws, along with a deeper understanding of algorithms and the distinction between AI and its developers.

[1] Khushi Malviya, Understanding The Intersection of Intellectual Property and AI, Clatalogue, 14 July 2023, https://lawctopus.com/clatalogue/clat-pg/understanding-the-intersection-of-intellectual-property-and-ai/, accessed 20 August 2023.

AI has significant potential in streamlining IP administration by automating tasks such as patent searching and trademark clearance. It can enhance efficiency, reduce costs, and eliminate errors through machine learning methods.

AI has the potential to be extremely important in managing the growing IP portfolios due to the IP's constant growth, which is being driven by advances in technology and computational expertise. AI has the potential to completely transform the process of awarding patents, increase accessibility to legal services and databases for people who cannot pay them, and bring about openness and accountability[2].

1. The Influence of AI and IP

The year 2022 brought AI into the mainstream through widespread familiarity with applications of Generative Pre-Training Transformer. The most popular application is OpenAI's ChatGPT[3]. The widespread fascination with ChatGPT made it synonymous with AI in the minds of most consumers. However, it represents only a small portion of the ways AI technology is used today.

Artificial intelligence's ideal quality is the capacity for reasoning and making decisions that maximize the likelihood of accomplishing a given objective. Machine learning (ML), a subtype of artificial intelligence, is the idea that computer programs can automatically learn from and adapt to new data without help from humans. This automatic learning is made possible by deep learning techniques, which absorb vast volumes of unstructured data, including text, photos, and video[4].

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[2] Ibid.

[3] ChatGPT is a sibling model to InstructGPT, which is trained to follow an instruction in a prompt and provide a detailed response.

[4] What is Machine Learning ?, IBM, https://www.ibm.com/topics/machine-learning, accessed 9 May 2023.

When most people hear the term artificial intelligence, the first thing they usually think of is robots. That's because big-budget films and novels weave stories about human-like machines that wreak havoc on Earth. But nothing could be further from the truth.

The foundation of artificial intelligence is the idea that human intelligence can be described in a way that makes it easy for a machine to emulate and perform jobs of any complexity. One of artificial intelligence's objectives is to simulate human thought processes. When it comes to concretely defining processes like learning, reasoning, and perception, researchers and developers in the field are moving at an unexpectedly fast pace. There are others who think that in the not-too-distant future, inventors will be able to create machines that are more intelligent than humans in any given field. However, because value judgments are inherent in all cognitive activity and are influenced by human experience, some people choose to remain sceptical[5].

As technology advances, previous benchmarks that define artificial intelligence become outdated. For example, machines that calculate basic functions or recognize text through optical character recognition are no longer considered to embody artificial intelligence, since this function is now taken for granted as an inherent computer function.

AI is continuously evolving to benefit many different industries. Machines are wired using a cross-disciplinary approach based on mathematics, computer science, linguistics, psychology, and more.

[5] Jake Frankenfield, Artificial Intelligence : What it is and how it is used, Investopedia, 24 April 2023, https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp, accessed 9 May 2023.

Rights to intellectual property are also essential. Businesses, scientists, artists, and inventors invest a great deal of time, money, effort, and thought into the development of their inventions. They must have the opportunity to earn a reasonable return on their investment to motivate them to accomplish it. This entails granting them the ability to defend their intellectual property[6].

Copyright, patents, and trademarks are examples of intellectual property rights that are fundamentally comparable to other types of property rights. By offering them control over how their property is used, they enable the creators or IP owners to profit from their labour or from their investment in a product[7].

IP rights have long been recognized within various legal systems. For example, patents to protect inventions were granted in Venice as far back as the fifteenth century. Modern initiatives to protect IP through international law started with the Paris Convention for the Protection of Industrial Property[8] (1883) and the Berne Convention for the Protection of Literary and Artistic Works (1886)[9]. These days,

[6] What is Intellectual Property ?, World Intellectual Property Organization, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_450_2020.pdf, accessed 17 May 2023.
[7] Ibid.
[8] The Paris Convention, adopted in 1883, applies to industrial property in the widest sense, including patents, trademarks, industrial designs, utility models, service marks, trade names, geographical indications and the repression of unfair competition. This international agreement was the first major step taken to help creators ensure that their intellectual works were protected in other countries, World Intellectual Property Organization, https://www.wipo.int/treaties/en/ip/paris/, accessed 17 May 2023.
[9] The Berne Convention, adopted in 1886, deals with the protection of works and the rights of their authors. It provides creators such as authors, musicians, poets, painters etc. with the means to control how their works are used, by whom, and on what terms. It is based on three basic principles and contains a series of provisions determining the minimum protection to be granted, as well as special provisions available to developing countries that want to make use of them, World Intellectual Property Organization, https://www.wipo.int/treaties/en/ip/berne/, accessed 17 May 2023.

there are more than 25 international treaties on IP administered by WIPO[10]. IP rights are also safeguarded by Article 27 of the Universal Declaration of Human Rights[11].

1.1 Definition of AI and IP

Artificial Intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. Since the development of the digital computer in the 1940s, it has been demonstrated that computers can be programmed to carry out very complex tasks, for example, discovering proofs for mathematical theorems or playing chess, with great proficiency[12].

Still, there are currently no computer programs that can match human adaptability across broader fields or in activities requiring a great deal of common knowledge, despite ongoing advancements in computer processing speed and memory capacity. However, in some limited applications, artificial intelligence is used in fields as diverse as medical diagnosis, computer search engines, voice or handwriting

[10] The World Intellectual Property Organization (WIPO) is the global forum for intellectual property (IP) services, policy, information and cooperation. We are a self-funding agency of the United Nations, with 193 member states. Our mission is to lead the development of a balanced and effective international IP system that enables innovation and creativity for the benefit of all. Our mandate, governing bodies and procedures are set out in the WIPO Convention, which established WIPO in 1967, https://www.wipo.int/about-wipo/en/, accessed 17 May 2023.

[11] Article 27 says everyone has the right to freely participate in the cultural life of the community, to share scientific advances and its benefits, and to get credit for their own work. This article firmly incorporates cultural rights as human rights for all, Universal Declaration of Human Rights, https://www.ohchr.org/en/press-releases/2018/12/universal-declaration-human-rights-70-30-articles-30-articles-article-27#:~:text=Article%2027%20says%20everyone%20has,as%20human%20rights%20for%20all., accessed 17 May 2023.

[12] B.J. Copeland , Artificial Intelligence, Encyclopedia Britannica, May 9, 2023, https://www.britannica.com/technology/artificial-intelligence , accessed 10 May 2023.

recognition, and other areas where certain programs have reached the performance levels of human experts and professionals[13].

In other words, AI is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence[14]. While AI is an interdisciplinary science with multiple approaches, advancements in machine learning and deep learning, in particular, are creating a paradigm shift in virtually every sector of the tech industry[15].

Machines with artificial intelligence can mimic or even surpass human mental capacities. As self-driving cars become more commonplace and smart assistants like Alexa and Siri proliferate, artificial intelligence (AI) is becoming more and more integrated into daily life, and businesses in every sector are making investments in this field.

Broadly speaking, artificially intelligent systems can perform tasks commonly associated with human cognitive functions, such as interpreting speech, playing games, and identifying patterns. They typically learn how to do so by processing massive amounts of data, and looking for patterns to model in their decision-making. In many cases, humans will supervise an AI's learning process, reinforcing good decisions and discouraging bad ones. But some AI systems are designed to learn without supervision, for instance, by playing a video game over and over until they eventually figure out the rules and how to win[16].

[13] Ibid.
[14] Camille Medjigbodo, L'IA Facile Pour Tous : Le Guide Ultim de la Generation de Texte et d'image, 1 June 2023.
[15] Alyssa Schroer, What is Artificial Intelligence?, built in, 3 March 2023, https://builtin.com/artificial-intelligence, accessed 10 May 2023.
[16] Ibid.

Humanity's ability to create and innovate is essential to its progress and well-being. New inventions must be created and put to use for technology to advance, and a dynamic culture will always look for new means of self-expression.

In general terms, intellectual property is any product of the human intellect that the law protects from unauthorized use by others. The ownership of intellectual property inherently creates a limited monopoly on the protected property. Intellectual property is traditionally comprised of four categories: patent, copyright, trademark, and trade secrets[17].

Intellectual property refers to the creations of human intelligence that are generally classified as non-rivalrous public goods. This means that multiple people can use the same thing at the same time without reducing its availability for usage by other users[18].

Similar to the law governing tangible property, the law governing intellectual property also consists of a set of rights granted to the owner of the property. The laws about tangible and intellectual property, however, are not the same. The same cannot be true of intellectual property, because the fundamental right safeguarding land, chattels, and real and personal property is the right of exclusive ownership. The law of intellectual property is generally thought to encourage writers and inventors to create works that benefit the public by controlling how the public uses these creations and guaranteeing that the creators and inventors receive credit for their labours.

[17] Intellectual Property, Legal Information Institute, Cornell Law School, https://www.law.cornell.edu/wex/intellectual_property, accessed 18 May 2023.
[18] Ibid.

Intellectual Property means (a) all inventions (whether patentable or unpatentable and whether or not reduced to practice), all improvements thereto, and all patents, patent applications, and patent disclosures, together with all reissuances, continuations, continuations-in-part, revisions, extensions, and reexaminations thereof, (b) all trademarks, service marks, trade dress, logos, trade names, and corporate names, together with all translations, adaptations, derivations, and combinations thereof and including all goodwill associated therewith, and all applications, registrations, and renewals in connection therewith, (c) all copyrightable works, all copyrights, and all applications, registrations, and renewals in connection therewith, (d) all mask works and all applications, registrations, and renewals in connection therewith, (e) all trade secrets and confidential business information (including ideas, research and development, know-how, formulas, compositions, manufacturing and production processes and techniques, technical data, designs, drawings, specifications, customer and supplier lists, pricing and cost information, and business and marketing plans and proposals), (f) all computer software (including data and related documentation), (g) all other proprietary rights, and (h) all copies and tangible embodiments thereof (in whatever form or medium)[19].

1.1.1 History of AI and IP

The first work that is now generally recognized as AI was done by Warren McCulloch and Walter Pitts (1943). They drew on three sources: knowledge of the basic physiology and function of neurons in the brain; a formal analysis of

[19] Intellectual Property Definition, Law Insider, https://www.lawinsider.com/dictionary/intellectual-property, accessed 18 May 2023.

propositional logic due to Russell and Whitehead; and Turing's theory of computation. They proposed a model of artificial neurons in which each neuron is characterized as being "on" or "off," with a switch to "on" occurring in response to stimulation by a sufficient number of neighboring neurons. The state of a neuron was conceived of as "factually equivalent to a proposition which proposed its adequate stimulus." They showed, for example, that any computable function could be computed by some network of connected neurons, and that all the logical connectives (and, or, not, etc.) could be implemented by simple net structures[20].

McCulloch and Pitts also suggested that suitably defined networks could learn. Donald Hebb (1949) demonstrated a simple updating rule for modifying the connection strengths between neurons. His rule, now called Hebbian learning[21], remains an influential model to this day.

Two undergraduate students at Harvard, Marvin Minsky, and Dean Edmonds, built the first neural network computer in 1950. The SNARC, as it was called, used 3000 vacuum tubes and a surplus automatic pilot mechanism from a B-24 bomber to simulate a network of 40 neurons. Later, at Princeton, Minsky studied universal computation in neural networks[22]. His Ph.D. committee was skeptical about whether this kind of work should be considered mathematics, but von Neumann reportedly said, "If it isn't now, it will be someday." Minsky was later to prove influential theorems showing the limitations of neural network research[23].

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[20] Stuart J. Russel and Peter Norvig, Artificial Intelligence : A Modern Approach, Prentice Hall, Third Edition, 2010, p:16.

[21] Hebbian Learning, The Decision Lab, https://thedecisionlab.com/reference-guide/neuroscience/hebbian-learning, accessed 10 May 2023.

[22] Martin Minsky's SNARC : Possibly the First Artificial Self-Learning Machine, Jermy's Norman History of Information, https://www.historyofinformation.com/detail.php?entryid=4343, accessed 12 May 2023.

[23] Artificial Intelligence : A Modern Approach, op.cit, p : 17.

There were several early examples of work that can be characterized as AI, but Alan Turing's vision was perhaps the most influential. He gave lectures on the topic as early as 1947 at the London Mathematical Society and articulated a persuasive agenda in his 1950 article "Computing Machinery and Intelligence." Therein, he introduced the Turing Test, machine learning, genetic algorithms, and reinforcement learning. He proposed the Child Programme idea, explaining "Instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulated the child's[24]?"

The early years of AI were full of successes, in a limited way. Given the primitive computers and programming tools of the time and the fact that only a few years earlier computers were seen as things that could do arithmetic and no more, it was astonishing whenever a computer did anything remotely clever. The intellectual establishment, by and large, preferred to believe that "a machine can never do X." AI researchers naturally responded by demonstrating one X after another. John McCarthy referred to this period as the "Look, Ma, no hands!" era[25].

Newell and Simon's early success was followed up with the General Problem Solver, or GPS. Unlike Logic Theorist, this program was designed from the start to imitate human problem-solving protocols. Within the limited class of puzzles it could handle, it turned out that the order in which the program considered subgoals and possible actions was similar to that in which humans approached the same problems. Thus, GPS was probably the first program to embody the "thinking humanly" approach[26]. The success of GPS and subsequent programs as models of

[24] Andrew Hodges, Alan Turing : The Enigma, Vintage, 1983, p : 68.
[25] Pinar Duygulu, Artificial Intelligence, Bilkint University, 2008, p : 12, http://www.cs.bilkent.edu.tr/~duygulu/Courses/CS461/Notes/Introduction.pdf, accessed 12 May 2023.
[26] General Problem Solver (A. Newell and H. Simon), Instructional Design, https://www.instructionaldesign.org/theories/general-problem-solver/, accessed 12 May 2023.

cognition led Newell and Simon (1976) to formulate the famous physical symbol system hypothesis, which states that “a physical symbol system has the necessary and sufficient means for general intelligent action.” What they meant is that any system (human or machine) exhibiting intelligence must operate by manipulating data structures composed of symbols[27].

Meanwhile, the protection of intellectual property, such as copyrights, trademarks, and patents, has played a vital role in economic growth and development in a world in which innovations in thought, technology, and commerce have flourished.

In the Greek state of Sybaris, approximately 500 BCE, there is the oldest documentation of a patent being granted for an individual's inventions. Any citizen was given a one-year patent by the state for "any new refinement in luxury." The fundamental goal of intellectual property law remains the same, despite significant changes that have occurred since then: to safeguard the rights of creators, artists, and retailers to encourage innovation and reward originality[28].

In order to encourage the orderly conduct of commerce, associations of merchants and artisans emerged, grew in stature, and were recognised by the city-states as trade became the main economic activity in Mediaeval Europe. The guilds held exclusive authority over introducing new innovations in the production of goods and services. However, the consolidation of power and the political and religious agendas of the ruling class were more responsible for the significant advancements in intellectual property law that occurred throughout Europe during this period. Oftentimes, the guilds exploited their authority over intellectual property laws to create monopolies

[27] Nils J. Nilsson, The Physical Symbol Hypothesis : Status and Prospects, Stanford University, https://ai.stanford.edu/~nilsson/OnlinePubs-Nils/PublishedPapers/pssh.pdf, accessed 12 May 2023.
[28] Toshiko Takenaka, Research Handbook on Patent Law and Theory, Second Edition, 26 April 2019, p : 5-6.

that impeded emerging technologies that were seen as a challenge to the status quo, rather than establishing an open forum for the exchange of ideas[29].

In 1623, by Act of Parliament in England, the first real strides toward intellectual property laws as we know them today took place. The " Statute of Monopolies" granted the "true and first inventor" a period of 14 years of exclusive control over any invention he created[30]. Since then, through common law and legislative acts, intellectual property laws have continued to develop. It was another Act of Parliament, the Statute of Anne, almost 100 years later that inventors were granted the possibility of a 14-year renewal based upon the satisfaction of certain conditions[31].

Following the Revolutionary War, the colonies acquired their independence from England, and their rules about intellectual property were largely modeled after those of their mother nation. But before the Constitution's passage, each colony had to enact its own laws to safeguard patents because there was no single, national patent system. Naturally, since rights would not be transferable beyond state lines, this did not foster innovation[32].

The founding fathers realized the shortcomings of such a situation and addressed the problem by endowing upon the federal government the authority to grant patents and copyrights[33].

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[29] Research Handbook on Patent Law and Theory, op.cit.
[30] Anton Howes, Age of Inventions : The Statute of Monopolies, Substack, 22 October 2021, https://antonhowes.substack.com/p/age-of-invention-the-statute-of-monopolies, accessed 18 May 2023.
[31] The Statute of Anne : The First Copy Right Statute, History of Information, https://www.historyofinformation.com/detail.php?entryid=3389#:~:text=It%20was%20enacted%20in%20the,any%20book%20already%20in%20print., accessed 18 May 2023.
[32] Intellectual Property Rights History : Everything to Know, upcounsel, https://www.upcounsel.com/intellectual-property-rights-history, accessed 18 May 2023.
[33] Ibid.

Intellectual property law gained wider protections in Europe throughout the 1800s.

- In 1883, the Paris Convention granted inventors the right to protect their inventions regardless of the country in which they were being used[34].
- In 1886, writers were accorded protection on an international scope for all forms of written content, as well as musical compositions, drawings, artwork, and more as a result of the Berne Convention[35].
- The Madrid Agreement, established in 1891, provided for wider protection for trademarks[36].
- In 1893, the Paris and Berne Conventions combined to become the United International Bureaux for the Protection of Intellectual Property[37].

Today, international intellectual property law is governed by the World Intellectual Property Organization, which is an agency of the United Nations.

1.1.1 AI Becomes an Industry

The first successful commercial expert system, R1, began operation at the Digital Equipment Corporation (McDermott, 1982). The program helped configure orders for new computer systems; by 1986, it was saving the company an estimated $40 million a year. By 1988, DEC's AI group had 40 expert systems deployed, with more on the way. DuPont had 100 in use and 500 in development, saving an estimated $10

[34] Paris Convention for the Protection of Industrial Property, WIPO, https://www.wipo.int/treaties/en/ip/paris/, accessed 18 May 2023.
[35] Berne Convention for the Protection of Literary and Artistic Work, op.cit.
[36] The Madrid Agreement Concerning the International Registration of Marks, WIPO, https://www.wipo.int/treaties/en/registration/madrid/, accessed 18 May 2023.
[37] United International Bureaux for the Protection of Intellectual Property, The IT Law, https://itlaw.fandom.com/wiki/United_International_Bureaux_for_the_Protection_of_Intellectual_Property, accessed 18 May 2023.

million a year. Nearly every major U.S. corporation had its own AI group and was either using or investigating expert systems[38].

The "Fifth Generation" project, a ten-year goal to construct sentient computers running Prologue, was unveiled by the Japanese in 1981. In retaliation, the US established the Microelectronics and Computer Technology Corporation (MCC), a collaboration for research aimed at ensuring US competitiveness. AI was a component of larger initiatives involving human interface research and chip design in both instances. The budget that had been slashed by the Lighthill report was restored in Britain by the Alvey report. However, the programmes never achieved their lofty objectives in any of the three nations. The artificial intelligence (AI) sector, which comprised hundreds of companies developing robotics, expert systems, vision systems, and specialised software and hardware, grew from a few million dollars in 1980 to billions of dollars in 1988. Soon after, there was a time known as the "AI Winter," during which many businesses failed to live up to their ostentatious promises and went out of business[39].

1.1.2 The Rise of Big Data and The Infringement of IP

The concept of big data has been around for decades, but its rise to prominence in the context of artificial intelligence (AI) can be traced back to the early 2000s. Before we dive into how it relates to AI, let's briefly discuss the term Big Data. For data to be termed *big*, it needs to fulfill 3 core attributes: Volume, Velocity, and Variety.

[38] Artificial Intelligence : A Modern Approach, op.cit. , p : 24.
[39] Edem Gold, The History of Artificial Intelligence from the 1950s to Today, April 10, 2023, Free Code Camp, https://www.freecodecamp.org/news/the-history-of-ai/, accessed 12 May 2023.

- Volume refers to the sheer size of the data set, which can range from terabytes to petabytes or even larger.

- Velocity refers to the speed at which the data is generated and needs to be processed. For example, data from social media or IoT devices can be generated in real time and needs to be processed quickly.

- Variety refers to the diverse types of data that are generated, including structured, unstructured, and semi-structured data[40].

AI was constrained by the quantity and caliber of data accessible for machine learning algorithm testing and training before the rise of big data. In the 1990s, artificial intelligence made great strides in two areas: computer vision and natural language processing (NLP), but these fields were still constrained by the volume of data that was available. For instance, the complexity and variety of natural language were difficult for early NLP systems to handle since they relied on manually created rules[41].

The rise of big data changed this by providing access to massive amounts of data from a wide variety of sources, including social media, sensors, and other connected devices. This allowed machine learning algorithms to be trained on much larger datasets, which in turn enabled them to learn more complex patterns and make more accurate predictions. At the same time, advances in data storage and processing technologies, such as Hadoop and Spark, made it possible to process and analyze these large datasets quickly and efficiently. This led to the development of new

[40] Ibid.
[41] The History of Artificial Intelligence from the 1950s to Today, op.cit.

machine learning algorithms, such as deep learning, which are capable of learning from massive amounts of data and making highly accurate predictions[42].

Big data is still the main engine underlying many of the most recent developments in AI today, like recommendation systems, personalised medicine, and driverless cars. The importance of big data in AI will only increase in the next years as the amount of data generated grows dramatically.

Since human ideas and inventions make up the majority of these data, the significance of intellectual property rights and their infringement are called into doubt.

"Intellectual property rights" is the umbrella phrase used to cover a wide range of assets. While they are all intangible and therefore share certain factual and legal particularities, they also differ considerably.

At a general level it is possible to divide intellectual property rights into two categories[43]:

- Industrial property, consisting of, inter alia, inventions (patents), trademarks, and industrial designs; and
- Copyright, which, for example, can be embodied in literary and artistic works such as novels, poems, plays, paintings, sculptures, and architectural designs.

[42] Big Data and Artificial Intelligence : How They Work Together, InData Labs, 29 March 2022, https://indatalabs.com/blog/big-data-tech-and-ai#:~:text=Big%20data%20has%20influenced%20the,of%20data%2C%20at%20least%20initially., accessed 12 May 2023.

[43] Convention Establishing the World Intellectual Property Organization, WIPO, https://www.wipo.int/treaties/en/convention/index.html, accessed 19 May 2023.

Although it has a slightly different interpretation, the territoriality principle is the foundation of both private international law and intellectual property law. The first known instances of exclusive intellectual property dates from the Middle Ages, when individual sovereigns and princes were awarded exclusive monopoly rights[44].

However, as time passed most countries have adopted domestic statutes dealing with intellectual property rights. And in order to protect creators in third countries, bilateral agreements have been adopted[45].

With the development of international trade and speedy exchange of information, more and more countries have recognised that an effective international cooperation system is vital to enhance the protection of intellectual property rights around the world.

Practically all countries of the world grant intellectual property rights that are valid and effective in their respective territory. Thus, arts and literature works, technical inventions, signs, etc. are subject to as many territorial rights as the countries that protect them at a national[46] and regional[47] level.

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[44] Kono Toshiyuki, Basedow Jürgen, Metzger Axel, Intellectual Property in the Global Arena, Mohr Siebeck, 2010, p:30.

[45] J. Ginsburg, The Private International Law of Copyright in an Era of Technological Change, 1998, Recueil des Cours, p : 273.

[46] Directive (EC) 2004/48 on the enforcement of intellectual property rights [2004] OJ L157, recitals 8, 13; Directive (EC) 96/9 on the legal protection of databases, [1996] OJ L 077, recital 4; Regulation (EC) 469/2009 concerning the supplementary protection certificate for medicinal products [2009] OJ L 152/1, Art. 2.

[47] European Union intellectual property rights: See Treaty (EC) 2008/C Consolidated versions of the Treaty on European Union [2008] OJ L115/01, Art. 118; Council Regulation (EC) 6/2002 on Community designs [2002] OJ LEC L 3, Art. 1(3), recital 2; Council Regulation (EC) 207/2009 on the Community trade mark [2009] OJ L 78/1, Art. 1(2); Council Regulation (EC) 2100/94 on Community plant variety rights [1994] OJ L 227, Art. 2; Council Regulation (EC) 510/2006 on the protection of geographical indications and designations of origin for agricultural products and foodstuffs [2006] OJ L 93/12, recital 6.

These national rights are independent from each other so that granting protection in one country does not create an obligation for another state to grant protection concerning the same asset. In particular, Article 5(2) of the Berne Convention establishes the principle of the independence of literary and artistic works: "The enjoyment and the exercise of authors' rights shall be independent of the existence of protection in the country of origin of the work[48]".

Article 4 bis (1) of the Paris Convention enshrines the principle of the independence of patents: "Patents applied for in the various countries of the Union by nationals of countries of the Union shall be independent of patents obtained for the same invention in other countries, whether members of the Union or not"[49].

Finally, Article 6(3) of the Paris Convention establishes the principle of the independence of trademarks: "A mark duly registered in a country of the Union shall be regarded as independent of marks registered in the other countries of the Union, including the country of origin[50]".

As a result, a trademark asset may be protected by intellectual property law in one country, but unprotected in another[51]. Intellectual property rights are a "creation" of national legal orders[52]. Unregistered intellectual property rights (copyright, unregistered design rights, rights in unregistered trademarks, and confidential information) are protected from the moment the work or sign is created or used,

[48] Berne Convention for the Protection of Literary and Artistic Work, op.cit.
[49] Paris Convention for the Protection of Industrial Property, op.cit.
[50] Ibid.
[51] *Barcelona.com v. Excelentisimo Ayuntamiento*, 330 F.3d 617 (4th Cir. 2003), https://casetext.com/case/barcelonacom-v-excelentisimo-ayuntamiento-2, accessed 19 May 2023.
[52] Markus Perkams, James M. Hosking, The Protection of Intellectual Property Rights Through International Investment Agreements: Only a Romance or True Love?, 2009, http://sandbox.chaffetzlindsey.com/wp-content/uploads/2009/09/000074743.PDF, accessed 19 May 2023.

whereas registered intellectual property rights (patents, trademarks, and registered industrial designs) grant exclusive rights upon application to an official body such as the UK Intellectual Property Office.

Intellectual property rights holders are able to prohibit third parties from making use of, duplicating, selling, or distributing their creations. Nonetheless, the territoriality concept lost significance in the second half of the 20th century due to regional and global economic integration, which also caused regulation to move from the national to the supranational level.

Indeed, the principle of national treatment and the substantive provisions of the Paris and Berne Conventions do not guarantee an appropriate level of protection; other subsequent international treaties have focused on establishing and imposing on national legislation minimum standards of protection[53]. In particular, the TRIPS Agreement contemplates "effective and appropriate means for the enforcement of trade-related intellectual property rights, taking into account differences in national legal systems"[54]. Yet the above mentioned international conventions do not address private international law issues. For example, when a copyright infringement dispute arises in one State that is a signatory to the Berne Convention (State X) concerning an author who hails from another signatory state (State Y), on hearing the case the court in State X would still apply and interpret national law[55].

TRIPS do not change this scenario. This means that Intellectual property rights remain territorial. The effect of such intellectual property rights is limited to the

[53] Pedro A. De Miguel Asensio, 'The Networked information society: Territoriality and beyond, 2010, http://www.law.kyushu-u.ac.jp/programsinenglish/conference2010/draft12.pdf, accessed 19 May 2023.
[54] Agreement on Trade-Related Aspects of Intellectual Property Rights, WTO, https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm, accessed 19 May 2023.
[55] Hector MacQueen, Charlotte Waelde, Graeme Laurie, Contemporary Intellectual Property Law and Policy, Oxford University Press, 2008, p : 991.

territory of the state granting them. This occurs in almost all countries including EU Member States[56], common law countries around the globe[57] and the US[58].

In the UK these concerns were reflected in rules which made it particularly difficult for an English and Scottish court to hear a case concerning an infringement of a "foreign" intellectual property right[59]. The first was the public policy rule concerning jurisdiction, enunciated in the old case of British South Africa Co v Companhia de Mocambique[60](the Mocambique rule). According to this rule torts occurring in foreign lands were classified as local in the sense that they had a particular connection with the territory on which they occurred. It was held that any action in respect of this tort was to be heard in the place where the wrong occurred.

Accordingly, English and Scottish courts refused to entertain actions concerning "foreign" intellectual property rights. The second rule concerned a choice of law rule, i.e. the "double actionability rule"[61]. Under this rule an act committed in a foreign country is a tort and actionable as such in a domestic court only if it is actionable as a tort under both the national and foreign law. This meant that the laws of two different territories had to be applied to determine whether the act in question

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[56] Case C-192/04 Lagardère v. SPRE [2005] ECR I-7199, para. 46 ('…the principle of the territoriality of those rights, which is recognised in international law and also in the EC Treaty. Those rights are therefore of a territorial nature and, moreover, domestic law can only penalise conduct engaged in within national territory, file:///C:/Users/Hp/Downloads/_book_edcoll_9789004227095_B9789004227095-s009-preview.pdf, accessed 19 May 2023.

[57] Graeme Austin, 'Private International Law and Intellectual Property Rights: A Common Law Overview" (paper presented at the WIPO forum on Private International Law and Intellectual Property on January 30 and 31, 2001), https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_pil_01/wipo_pil_01_5.doc, accessed 19 May 2023.

[58] Subafilms v. MGM-Pathe Communications [1994] 24 F.3d 1088 1091 (U.S. Court of Appeals 9th Cir.); Barcelona.com v. Excelentisimo Ayuntamiento de Barcelona [2003] 330 F.3d 617 (U.S. Court of Appeals 4th Cir.); NTP v. Research in Motion [2005] 418 F.3d 1282, 1313 (U.S. Court of Appeals Fed. Cir.,); Microsoft v. AT&T (2007) 550 U.S. 437 (U.S. Supreme Court).

[59] Contemporary Intellectual Property Law and Policy, op.cit.

[60] British South Africa Co v Companhia de Mocambique [1893] AC 602.

[61] Philips v Eyre [1870] LR 6 QB1.

was unlawful. Still now, there is a strict adherence to such old rules when it comes to deciding intellectual property rights cases. Indeed both the European and US courts hold that local courts lack jurisdiction to adjudicate the infringement of "foreign intellectual property rights"[62].

1.1.1 What is Intelligence

Despite substantial interest in the subject, there still isn't a consensus among experts about the components of intelligence or whether accurate measurements of intelligence are even possible.

Psychologists generally do not characterize human intelligence by just one trait but by the combination of many diverse abilities. Research in AI has focused chiefly on the following components of intelligence: learning, reasoning, problem solving, perception, and using language[63].

A. Learning

Artificial intelligence employs various learning methods, including trial and error, rote learning, and memorization. For instance, a computer program solving mate-in-one chess problems can memorize individual items and procedures, making it easy to implement on a computer.[64]. More challenging is the problem of implementing what is called generalization.

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[62] Tyburn Productions Ltd v Conan Doyle [1991] Ch 75; Jan K. Voda M.D. v. Cordis Corp. [2007] 476 F. 3d 887 (Fed. Cir.). 43 Phi.

[63] Kendra Cherry, Theories of Intelligence in Phycology, Verywell Mind, 3 November 2022, https://www.verywellmind.com/theories-of-intelligence-2795035, accessed 12 May 2023.

[64] The Five Basic Components of AI : New Software Development, CaseGuard, 18 March 2022, https://caseguard.com/articles/the-five-basic-components-of-ai-new-software-development/#:~:text=As%20such%2C%20the%20five%20basic,%2C%20perception%2C%20and%20language%20understanding, accessed 12 May 2023.

Generalization involves applying past experience to analogous new situations. For example, a program that learns the past tense of regular English verbs by rote will not be able to produce the past tense of a word such as *jump* unless it previously had been presented with *jumped*, whereas a program that is able to generalize can learn the "add *ed*" rule and so form the past tense of *jump* based on experience with similar verbs[65].

B. Reasoning

Reasoning involves drawing inferences based on situations, classified as deductive or inductive. Deductive reasoning guarantees the truth of the conclusion, while inductive reasoning supports the conclusion without absolute assurance. Examples include Fred's location in a museum and previous accidents caused by instrument failure.[66].

Inductive reasoning in science involves collecting data and developing models, while deductive reasoning in mathematics and logic involves building irrefutable theorems from basic axioms and rules[67].

C. Problem Solving

Problem-solving in artificial intelligence involves systematic search for a predefined goal or solution. Methods are categorized into special purpose and general purpose. Special purpose methods are tailored to specific

[65] Artificial Intelligence, B.J. Copeland, op.cit.
[66] Components of AI, TechBlogMU, https://techblogmu.blogspot.com/2018/09/components-of-ai.html, accessed 12 May 2023.
[67] Ibid.

problems, while general-purpose methods apply to various problems. One general-purpose technique is means-end analysis, which reduces the difference between current state and final goal. The program selects actions from a list of means, in the case of a simple robot this might consist of PICKUP, PUTDOWN, MOVEFORWARD, MOVEBACK, MOVELEFT, and MOVERIGHT, until the goal is reached[68].

D. Perception

Perception scans environment using sensory organs, decomposing scenes into objects. Analysis is complicated by object appearances influenced by angle, illumination intensity, and contrast with surrounding field[69].

FREDDY, a stationary robot with a moving television eye and pincer hand, was one of the earliest systems to integrate perception and action, built at the University of Edinburgh in 1966-73. It recognized various objects and could assemble simple artifacts[70].

E. Language

Language is a system of signs with convention-based meaning, not limited to spoken words. Traffic signs form a minilanguage, contrasting with natural meaning. Full-fledged human languages are productive, capable of

[68] Components of AI, op.cit.
[69] What Are The Components of AI?, Digital Analytics, Adservio, https://www.adservio.fr/post/what-are-the-components-of-ai, accessed 12 May 2023.
[70] Freddy The Robot, National Museums Scotland, https://www.nms.ac.uk/explore-our-collections/stories/science-and-technology/freddy-the-robot/, accessed 12 May 2023.

forming an unlimited variety of sentences, unlike birdcalls and traffic signs[71].

Computer programs can fluently respond to human language in limited contexts, but their language understanding is not universally agreed upon. One theory suggests that genuine understanding depends on one's behavior and history, as one must have learned the language and been trained to interact with other language users to be considered a true human[72].

1.2 Berne Convention for the Protection of Literary and Artistic Work

The Berne Convention, adopted in 1886, deals with the protection of literary and artistic work and the rights of their authors. It provides creators such as authors, musicians, poets, painters etc. with the means to control how their works are used, by whom, and on what terms. It is based on three basic principles and contains a series of provisions determining the minimum protection to be granted, as well as special provisions available to developing countries that want to make use of them[73].

The agreement was first signed in Switzerland and today it has spread to regulate laws in more than 177 countries across the world. Lebanon is a member of the Berne Convention since 1947. France is also a member of the Berne Convention, it ratified it on 5 September 1887 along with Belguim, Germany, Haiti, Italy, Liberia, Spain, Switzerland, Tunisia, and the United Kingdom. The basic focus of the Berne

[71]Components of AI, op.cit.
[72] Artificial Intelligence, B.J. Copeland, op.cit.
[73] WIPO, Berne Convention for the Protection of Literary and Artistic Work, https://www.wipo.int/treaties/en/ip/berne/#:~:text=The%20Berne%20Convention%2C%20adopted%20in,whom%2C%20and%20on%20what%20terms., accessed 20 August 2023.

Convention is to extend the scope of security of the artists' and authors' creations beyond the territories of their native land. If you are an Arab who publishes a book in the UK, then the Berne Convention will cover you as an author. Article 2 of the treaty endeavors to guard the originality of all literary works.

The Berne Convention has defined a minimum protection period of 50 years after the demise of the author for all tangible works. The only exception to the protection term is for the works of photography and cinematography. In this case, the minimum protection period for a photograph is 25 years from the year the picture was clicked and for cinematography, 50 years from the date of creation or publication.

The treaty ensures that the rights of these creative individuals remain intact with them. Berne Convention also assures artists and authors of legitimate flexibility to exercise control over their masterwork in terms of adapting, disseminating, and reproducing it. Apart from laying the foundation for a unified and unbiased approach to recognizing the copyright of works from other countries, the international enactment expects its adherent countries to also deliver a set of minimum standards and to seek special provisions when it comes to enforcing copyright laws[74].

[74] The Berne Convention for the Protection of Literary and Artistic Work, ABOU NAJA Intellectual Property, 3/1/2021, https://www.abounaja.com/blogs/berne-convention, accessed 23 August 2023.

Fundamental Principles of the Berne Convention

1. The first and basic principle stated in the Berne Convention speaks of equitable status on the protection of literary and artistic creations that come into being from a contracting state.
2. The second principle of the Berne Convention upholds automatic protection of all works, regardless of any legal formalities for protection. This means that there are no prerequisites or conditions for authors and publishers to use the © symbol. However, it would be best to get a copyright registered for protection and enforcement purposes and to avoid the fear of being infringed upon. Of course, this would also bring to your table a host of distinct advantages.
3. The final principle of the treaty guarantees protection to artistic and literary works and is independent of the protection terms in the country where the work originated, with limited exceptions[75].

2. Types of AI and IP

2.1 Types of AI

Learning in AI can fall under the types "narrow," "general," and "super." These categories demonstrate AI's capabilities as it evolves—performing narrowly defined sets of tasks, performing the same ability to think like humans (general), and performing beyond human capability.

[75] The Berne Convention for the Protection of Literary and Artistic Work, ABOU NAJA Intellectual Property, op.cit.

AI can be divided into four categories, based on the type and complexity of the tasks a system is able to perform. They are: reactive machines, limited memory, theory of mind and self-awareness.

A. Reactive Machines

A reactive machine follows the most basic of AI principles and, as its name implies, is capable of only using its intelligence to perceive and react to the world in front of it. A reactive machine cannot store a memory and, as a result, cannot rely on past experiences to inform decision making in real time[76].

Reactive machines are made to do a restricted range of specialised tasks because they see the world immediately. There are advantages to purposefully limiting a reactive machine's perspective, though: This kind of AI will respond consistently to the same stimuli and will be more dependable and trustworthy.

Reactive Machine Examples

- **Deep Blue** was designed by IBM in the 1990s as a chess-playing supercomputer and defeated international grandmaster Gary Kasparov in a game. Deep Blue was only capable of identifying the pieces on a chess board and knowing how each moves based on the rules of chess, acknowledging each piece's present position and determining what the most logical move would be at that moment. The computer was not pursuing future potential moves by its opponent or trying to put its own pieces in better position. Every turn was viewed

[76] What is Artificial Intelligence, Alyssa Schroer, op.cit.

as its own reality, separate from any other movement that was made beforehand[77].

- Google's **AlphaGo** is also incapable of evaluating future moves but relies on its own neural network to evaluate developments of the present game, giving it an edge over Deep Blue in a more complex game. AlphaGo also bested world-class competitors of the game, defeating champion Go player Lee Sedol in 2016[78].

B. Limited Memory

Limited memory AI has the ability to store previous data and predictions when gathering information and weighing potential decisions, essentially looking into the past for clues on what may come next. Limited memory AI is more complex and presents greater possibilities than reactive machines.

Limited memory AI is created when a team continuously trains a model in how to analyze and utilize new data or an AI environment is built so models can be automatically trained and renewed[79].

When utilizing limited memory AI in ML, six steps must be followed:

1. Establish training data.
2. Create the machine learning model.

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[77] Deep Blue, IBM 100, https://www.ibm.com/ibm/history/ibm100/us/en/icons/deepblue/, accessed 12 May 2023.
[78] AlphaGo, Google DeepMind, https://www.deepmind.com/research/highlighted-research/alphago, accessed 12 May 2023.
[79] Limited Memory, HyperSense, 27 December 2021, https://www.hypersenseai.com/aiglossary/limited-memory/#:~:text=Limited%20memory%20is%20a%20type,data%20to%20make%20better%20predictions., accessed 12 May 2023.

3. Ensure the model can make predictions.
4. Ensure the model can receive human or environmental feedback.
5. Store human and environmental feedback as data.
6. Reiterate the steps above as a cycle[80].

C. Theory of Mind

A theory of mind is merely that—a theory. The idea is grounded in the psychological theory that other living creatures have feelings and thoughts that influence human behaviour. This would imply that AI robots may use introspection and determination to understand the emotions and decision-making processes of people, animals, and other machines, and then use that understanding to make decisions of their own. In order to establish a two-way dialogue between humans and AI, robots would essentially need to be able to understand and interpret the idea of "mind," the fluctuations of emotions in decision-making, and a long list of other psychological concepts in real time[81].

D. Self Awareness

Once theory of mind can be established, sometime well into the future of AI, the final step will be for AI to become self-aware. This kind of AI possesses human-level consciousness and understands its own existence in the world, as well as the presence and emotional state of others. It would be able to understand what others may need based on not just what they

[80] Ibid.
[81] Theory of Mind, Internet Encyclopedia of Philosophy, https://iep.utm.edu/theomind/, accessed 12 May 2023.

communicate to them but how they communicate it. Self-awareness in AI relies both on human researchers understanding the premise of consciousness and then learning how to replicate that so it can be built into machines[82].

2.2 Types of IP

It is helpful to separate the realm of creations into two categories before discussing intellectual property: artistic and utilitarian. Books, essays, films, music compositions, and photos are examples of artistic creations. Biotechnology, computer hardware, mechanical equipment, and industrial techniques are examples of utilitarian inventions. By definition, copyrights protect artistic compositions, whereas patents protect practical inventions. Both practical and creative inventions can be protected by trademarks and trade secrets.

Patents and copyrights are diametrically opposite forms of protection that apply to useful and artistic works respectively. Trade secrets and trademarks might protect some of the same creations that patents and copyrights do, but not the same types of creations. Trademark law applies to “marks” used publicly in commerce to indicate the origin of goods or services. In contrast, trade secret law provides protection to inventions or assets that are held in secret and not available to the public. The overlap between trade secrets and the other types of IP have an important conflict because at some point

[82] Bernard Marr, What Are The Four Types of AI?, Bernard Marr and Co., https://bernardmarr.com/what-are-the-four-types-of-ai/#:~:text=The%20final%20type%20of%20AI,same%20needs%2C%20desires%20and%20emotions., accessed 12 May 2023.

obtaining other IP protection makes these inventions public and therefore negates any protection as a secret.

A. Trademarks

A trademark is a "word, name, symbol, device or any combination thereof, which is used to distinguish goods of one person from goods manufactured or sold by others, and to indicate the source of the goods, even if the source is unknown[83]."

Simply put, trademark law protects identifying "marks" used in association with goods and services. The most common trademarks are brand or product names, logos, slogans, and combinations of such marks.

Trademarks are not limited to words and designs. Sounds, colors, smells, textures, shapes, motions, and the appearance of products, packaging, or places of business can also be protectable by trademark law. For example, Owens Corning has a trademark on the color pink in relation to fiberglass insulation. Metro-Goldwyn-Mayer (MGM) has a trademark on the sound of a roaring lion that is part of the company graphic it presents at the beginning of MGM films.

Trademarks are provided protection under the "Regulations and Systems of Commercial, Industrial, Literary, Artistic and Musical

[83] Lanham Act, 45, https://h2o.law.harvard.edu/text_blocks/5915#:~:text=15%20U.S.C.-,%C2%A7%201127%20(Lanham%20Act%20%C2%A7%2045)%E2%80%94Construction,and%20definitions%3B%20intent%20of%20chapter&text=The%20United%20States%20includes%20and,lawfully%20be%20regulated%20by%20Congress., accessed 20 May 2023.

Property in Lebanon" (the 1924 law). The 1924 Law does not explicitly protect notorious trademarks and geographical indications. However, those are provided protection via Lebanon`s membership to the Paris Convention and the Madrid Agreement respectively[84].

To obtain trademark protection in France, one can either file a local application or a European Union trademark. Local applications are filed through the Institut National de la Propriété Industrielle (INPI), and automatically grant protection in Martinique, Guadeloupe, St. Barthélemy, French Saint-Martin, French Guiana, Reunion Island, New Caledonia, Wallis and Futuna Islands, Mayotte, Saint-Pierre and Miquelon and the French Southern and Antarctic Lands. The trademarks may be extended to the French Polynesia[85].

European Union Trademarks (EUTM) offer protection in France as well as all the other member countries of the European Union. A trademark is registered for an initial period of 10 years starting from the date of filing of the application, after which it can be renewed for periods of 10 years. The renewal request can be filed starting 6 months before the expiration date, and until 6 months after the expiration date. In case the renewal is filed after the expiration date, extra costs will apply[86].

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[84] Trademarks, Ministry of Economy and Trade, https://www.economy.gov.lb/en/what-we-provide/intellectual-property-right/trademark/, accessed 30 September 2023.
[85] Trademarks in France, https://igerent.com/trademark-registration-france#:~:text=A%20trademark%20is%20registered%20for,months%20after%20the%20expiration%20date., accessed 30 September 2023.
[86] Trademarks in France, op.cit.

Trademark law seeks to prevent consumer confusion by assuring that they know who made a given product when making buying decisions. On the other hand, lack of confusion allows the same exact trademark to be used by many companies simultaneously. For example, a search for "EAGLE" at the United States Patent & Trademark Office (USPTO) returns nearly 1,700 active registered trademarks with the vast majority of them being owned by completely separate companies or individuals. These trademarks can be used at the same time because consumers are not likely to be confused between any given mark. Consider that the goods and services of these "EAGLE" marks range from potato chips, to shirts, to insurance. If buyers pick up a bag of Eagle brand potato chips, they are not likely to assume that the chips were produced by Eagle shirt company or Eagle insurance company. Each of these "EAGLE" marks is equally viable because the goods and services are not overlapping to the point that consumer confusion will occur[87].

B. Trade Secrets

In stark contrast to trademarks that are used publicly in commerce, trade secret laws protect certain inventions and assets that a business decides to keep secret. Unlike patents, copyrights, and trademarks, there is no official registration process for trade secrets and the laws related to trade secret protection may be different from state to state.

[87] Types of Intellectual Property, Americanbar, https://www.americanbar.org/content/dam/aba-cms-dotorg/products/inv/book/225676286/Chapter%201.pdf, accessed 19 May 2023.

By simply keeping certain things secret in the right way, a company can be afforded the protections of trade secret laws. Despite some jurisdictional differences, trade secret laws almost universally require protectable trade secrets to

(1) not be generally known to the public;

(2) have economic value derived from being nonpublic; and

(3) be the subject of reasonable efforts to maintain their secrecy[88].

If the technology or information is not widely known to the public, then neither the party attempting to keep it secret nor any other source should be able to obtain it. A unique combination of existing knowledge or technologies, however, may nonetheless be considered nonpublic. For instance, even when the individual components of customer lists are known, their compilation may not be widely known, hence trade secret protection may still apply to such proprietary lists. Additionally, a business must take reasonable steps to protect its trade secrets from prying eyes. States and cases differ on whether or not secrecy tactics are deemed acceptable[89].

Nonetheless, there are a few fundamental guidelines for safeguarding trade secrets, such as labelling materials as secret and requiring employees who handle them to sign nondisclosure or noncompete agreements, password-protecting computers containing sensitive data, and storing confidential items in locked rooms or other places inaccessible to outsiders. Manufacturing processes, formulas, client

[88] What is a Trade Secret, WIPO, https://www.wipo.int/tradesecrets/en/, accessed 19 May 2023.

[89] Types of Intellectual Property, op.cit.

lists, business plans, financial records, and positive or negative know-how are a few examples of innovations that usually stay trade secrets. Products that you probably use on a regular basis contain some of the most valuable trade secrets.

For example, the formula for making Coca-Cola has been a closely guarded secret for more than 125 years, since it was invented by Dr. John S. Pemberton in 1886. The formula was initially shared exclusively with a small core group within the business and was purportedly written down for the first time in 1919 when the company was bought by Ernest Woodruff and a group of investors. This single written copy was housed in the same Atlanta bank vault from 1925 to 2012, when it was transferred to a new state-of-the-art vault at the World of CocaCola museum. Other famous product formulas protected by trade secrets include WD-40 lubricant, Listerine mouthwash, Bush's Baked Beans, KFC chicken, and even the method of determining the New York Times best sellers list[90].

Protection of innovations that will eventually be the focus of applications for patents, trademarks, or copyrights can also be achieved through trade secret protection. Trade secret protection, for instance, can bridge the gap until patent applications are filed and will continue to be a workable protection option until the patent application is published and made publicly available when developing patentable

[90] Types of Intellectual Property, op.cit.

technology in its early stages and while the invention is kept a secret within the company[91].

On the other hand, a company may choose to choose trade secret protection above patent protection in some situations, even while an invention qualifies for both. Patents have a 20-year duration, after which the innovation enters the public domain; trade secret protection is perpetual. But if something is kept a trade secret for an extended period of time, patent rights may be forfeited, and all protection will be lost if the secret is later made public or disclosed in another way[92].

The Lebanese law No. 240 issued 7 August 2000 for the protection of trade secrets, stated that it shall be considered among secret information, the methods of manufacture as well as the experimental and testing results. The secret information that the public administration requires its disclosure in order to authorize the marketing of pharmaceutical preparations and chemical products used in agriculture should not be used for commercial purposes without legal reason, and shall not be disclosed unless the protection of the public so dictates[93].

Criteria for enforcement: the provisions of the Law shall be applicable provided that: (1) the owner of such information has acquired the subject matter through legal means; (2) the industrial or commercial

[91] Frequently Asked Questions : Trade Secrets, WIPO, https://www.wipo.int/tradesecrets/en/tradesecrets_faqs.html#:~:text=In%20general%2C%20trade%20secret%20protection,contrary%20to%20honest%20commercial%20practice., accessed 19 May 2023.
[92] Frequently Asked Questions : Trade Secrets, op.cit.
[93] Mohammed El Said, Intellectual Property Law in Lebanon, 2012.

value of such information is due to it being secret; (3) the owner of such information has taken appropriate measures to keep such information secret[94].

On 30 July 2018, the French legislature enacted Law No. 2018-670 on the protection of trade secrets (the 'Law'), transposing the European Union Directive 2016/943 of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure.

The Law protects trade secrets, which it defines as information that: (1) is not generally known among, or readily accessible to, persons within the circles that normally deal with the kind of information in question; (2) has commercial value, either actual or potential; and (3) has been subject (by its holder) to reasonable measures, given the circumstances, to keep it secret. The broad terms of this definition leave plenty of room for interpretation by both parties and the courts.

The requirements claimants must meet to demonstrate that they have taken "reasonable" measures to preserve their trade secrets is one point that is sure to spark discussion. French courts are likely to consider the industry, size, financial resources, and human resources of enterprises since holders of trade secrets are required to take reasonable actions "given the circumstances[95]."

[94] Ibid.

[95] Law No. 2018-670 of July 30, 2018, on the Protection of Trade Secrets, WIPO, https://www.wipo.int/wipolex/en/legislation/details/18278, accessed 20 October 2023.

C. Copyrights

Copyrights protect “original works of authorship fixed in any tangible medium of expression”. Such works include literary works; musical works; dramatic works; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; and architectural works[96]. This covers a wide variety of artistic and expressive works, including books, blog posts, movies, songs, paintings, and even the code for software.

However, an important limitation is that copyrights only protect expression and not an underlying idea, product, or invention hat is described or shown in the work of authorship and will not protect useful products or articles[97].

When creating a customised intellectual property protection strategy, it is crucial to comprehend how copyrights should be used and how they complement other types of protection. Copyrights can make up a significant portion of an intellectual property portfolio.

Despite not being a WTO member, Lebanon's intellectual property rights (IPR) laws mostly adhere to the principles of Trade-Related Intellectual Property Rights (TRIPS). IPR is not well enforced. The Intellectual Property Protection Office (IPPO) of the Ministry of

[96] Stina Teilmann-Lock, British and French Copyright : A Historical Study of Aesthetic Implications, DJOF Publishing, 2009.
[97] Ibid.

Economy and Trade (MOET) has spearheaded efforts to enhance the IPR framework; nonetheless, it has constraints in terms of funding and manpower, as well as inadequate political backing.

The understanding of IPR within the Lebanese judiciary has improved somewhat in recent years but gaps remain with regards to the negative economic impact that IPR violations have on the economy. The MOET's new draft laws and amendments to existing laws (as well as key IPR treaties) aimed at improving the IPR environment, notably for industrial design, trademark, geographical indications, as well as amendments to the copyright law, await approval from both Lebanon's Cabinet and Parliament[98].

Existing IPR laws cover copyright, patent, trademarks, and geographical elements. Lebanon's 1999 Copyright Law largely complies with WTO regulations and needs only minor amendments to become fully compatible. Copyright registration in Lebanon is not mandatory, and copyright protection is granted without the need for registration[99].

Copyright in France is mainly governed by two laws: the Law of 11 March 1957 and the Law of 3 July 1985. These laws and all other relevant legislation are codified in the first part of the French Intellectual Property Code (from articles L 111-1 to L 343-7) (IPC)[100].

[98] Intellectual Property Law in Lebanon, op.cit.
[99] Ibid.
[100] Brad Spitz, Guide to Copyrights in France, Wolters Kluwer Laws and Business, 2014.

The copyright law applicable in France also derives from international conventions to which France is a party, such as:

- the Berne Convention for the Protection of Literary and Artistic Works of 1886;
- the Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations of 1961;
- the World Intellectual Property Organization (WIPO) Performances and Phonograms Treaty of 20 December 1996 (WPPT);
- the 1995 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), notably on copyright and related rights; and
- the WIPO Copyright Treaty of 1996.

As long as they are unique, all works of art are inherently protected by copyright. It is irrelevant to take into account factors like the author's merit, the work's goal, the kind of work, or the mode of expression.

French case law defines "originality" as the author's individuality being expressed. This term complies with European case law, which supports the French notion of originality, which is quite broad. Therefore, the author's creativity is needed; the simple demonstration of talent, work, and judgement is insufficient[101].

[101] Guide to Copyrights in France, op.cit.

D. Patents

A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. To get a patent, technical information about the invention must be disclosed to the public in a patent application[102].

In principle, the patent owner has the exclusive right to prevent or stop others from commercially exploiting the patented invention. In other words, patent protection means that the invention cannot be commercially made, used, distributed, imported or sold by others without the patent owner's consent[103].

Patents are territorial rights. In general, the exclusive rights are only applicable in the country or region in which a patent has been filed and granted, in accordance with the law of that country or region. The protection is granted for a limited period, generally 20 years from the filing date of the application[104].

Patent law is the branch of intellectual property law that deals with new inventions. Traditional patents protect tangible scientific inventions, such as circuit boards, car engines, heating coils, or zippers. However,

[102] Patents , WIPO, https://www.wipo.int/patents/en/, accessed 20 May 2023.
[103] Ibid.
[104] Ibid.

over time patents have been used to protect a broader variety of inventions, such as coding algorithms, business practices, or genetically modified organisms[105].

In general, a patent can be granted if an invention is :

- not a natural object or process;
- new;
- useful; and
- not obvious[106].

E. Industrial Design

An industrial design is an original creation of an ornamental nature, which, when incorporated in or applied to a product, lends a special appearance to it. These characteristics may result from its shape, lines, outline, configuration, colour, texture or material[107].

Designs can be protected by different means: through a registration system, through a system of non-registration and through copyright. Registration can be obtained at three different levels: national, regional and international. The best route usually depends on the markets in which the applicant intends to operate[108].

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[105] What is Patent Law, FindLaw, https://www.findlaw.com/hirealawyer/choosing-the-right-lawyer/patents.html#:~:text=Patent%20law%20is%20the%20branch,%2C%20heating%20coils%2C%20or%20zippers., accessed 19 May 2023.
[106] What is Patent Law, op.cit.
[107] European Commission, Industrial Designs, https://intellectual-property-helpdesk.ec.europa.eu/industrial-designs_en#:~:text=Definition,%2C%20colour%2C%20texture%20or%20material., accessed 23 August 2023.
[108] Ibid.

Industrial and handicraft designs are used on a vast range of products: from watches and jewellery to luxury goods and technical and medical devices; from housewares and electrical appliances to automobiles and architectural constructions; from textile designs to recreational goods.

An industrial design must be visually appealing in order to be protected under the majority of national laws. This indicates that an industrial design does not safeguard any technical aspects of the object to which it is applied; rather, it is essentially of an aesthetic nature.

According to the Lebanese Law: Any inventor of a drawing or a design, or those who have rights thereto, shall alone have the right of usufruct thereto, and to sell, or offer it for sale, and to authorize its sale, provided that such drawing or design is, previously filed[109].

The general appearance of any industrial or handcrafted item produced by its contours, colours, shapes, textures, as well as the material of which it is manufactured or its decoration, can be protected by a registered design, according to French law. Additionally, typographic typefaces, packaging, and graphic symbols could all be protected.

The general appearance of any industrial or handcrafted item produced by its contours, colours, shapes, textures, as well as the material of which it is manufactured or its decoration, can be protected by a registered design, according to

[109] Industrial Design, Republic of Lebanon Ministry of Economy and Trade, https://www.economy.gov.lb/en/what-we-provide/intellectual-property-right/industrial-design/ , accessed 20 October 20, 2023.

French law. Additionally, typographic typefaces, packaging, and graphic symbols could all be protected[110].

1. Impact and Role of AI in the world of IPR

The main purpose of granting IP rights is to encourage 'creations.' It balances the owner's right towards claiming an invention but at the same time also ensures that it doesn't prevent its widespread use. IP as a segment is expanding, in IP Trend Monitor's Annual Survey 2019 Edition, 71% of the respondents revealed that the industry has started receiving more work in just a span of a year. In the next 5-10 years IPR will grow continuously along with the world and with the advancement in technologies and computational knowledge, the rate of inventions is set to grow at a rapid pace[111].

The management of an IP portfolio will grow enormous, and in order to find patents, researchers will need to sift through the available data using intricate word searches and lengthy Boolean expressions. By using machine learning techniques, artificial intelligence (AI) may expedite this process, eliminate all possibility of error, and eliminate inherent ambiguities that beset conventional keyword searches[112].

3.1 Impact of AI in the World of IP

AI has a huge scope in administrating monotonous and dull jobs like patent searching, trademark clearance and can also reduce costs for customers who can't afford access to costly legal services and databases. It can also introduce greater

[110] Julien Scicluna, Protecting and Forcing Design Rights : France, WTR, 24 November 2016, https://www.worldtrademarkreview.com/global-guide/designs/2017/article/protecting-and-enforcing-design-rights-france , accessed 20 October 2023.
[111] Artificial Intelligence in The World of IP, op.cit.
[112] Ibid.

transparency towards granting patents and can create a system where accountability can be established.

A. Impact on Work Distribution

AI is able to manage data-analytic tasks such as clearing trademarks, managing IP profiles, and finding patents. These operations are carried very frequently and are rather basic. With the introduction of algorithms, artificial intelligence (AI) can replace lengthy, inefficient, and expensive workdays with a single step. AI is also capable of performing more tasks, including as filing for patents and trademarks, making agreements, and conducting discovery, although these will call for a certain degree of skill. At the moment, AI can draught agreements.

The one area where the involvement of AI is highly doubtful would be in court proceedings, gathering evidence and compiling opposition views. These are all complex tasks and cannot be performed by algorithms or computer programs, such skills are inherent to humans and cannot be generated[113].

B. Impact on Law and Procedure

The laws and legislation pertaining to intellectual property will alter as artificial intelligence (AI) becomes more prevalent in the field. These laws may introduce a new dimension wherein AI is capable of holding intellectual property and may redefine ideas of creator, ownership, and creation. For example, DABUS was recently granted the title of inventor in South Africa. The modifications that these additional dimensions would bring forth are still unknown, though. The validity of

[113] The Impact of AI on the Job Market and The Future of Work, Intellect Data, 23 February 2023, https://intellectdata.com/the-impact-of-ai-on-the-job-market-and-the-future-of-work/#:~:text=AI%20is%20having%20a%20significant,create%2097%20million%20new%20roles., accessed 28 May 2023.

AI and its autonomy when it comes to creating generations is contested by nations like Australia, India, North America, and the European Union, which adhere to rigorous evaluation procedures before giving an intellectual property right[114].

There is also a contention that AI would have to come under regulation systems while administrating the field of IP but this discussion is still under talk and not very significant.

C. Future of AI in IP

It is crucial to understand AI's significance because it is anticipated to have a significant impact on intellectual property. In an effort to integrate AI into their everyday operations, some IP offices have already started making significant investments in the field. The World Intellectual Property Organisation, or WIPO, has already begun utilising artificial intelligence (AI) programmes, such as WIPO Translate and WIPO Brand Image, to manage helpdesk services, machine translation, search engine optimisation, and automated classification, inspection, and formality check. But before these systems can carry out sophisticated tasks, they still need to go through a number of development stages[115].

In future, AI will be most useful in developing practical working tools and will develop new trends and open up new market segments.

Here are just a few examples of how AI is already impacting work.

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[114] John Villasenor, How AI Will Revolutionize the Practice of Law, Brookings, 20 March 2023, https://www.brookings.edu/blog/techtank/2023/03/20/how-ai-will-revolutionize-the-practice-of-law/#:~:text=AI%20can%20be%20used%20to,be%20much%20faster%20with%20AI., accessed 28 May 2023.
[115] Artificial Intelligence in The World of IP, op.cit.

Virtual assistants in the workplace – As AI-powered virtual assistants like Siri and Alexa become more advanced, they will become increasingly common. These virtual assistants can help employees to schedule meetings, prioritize tasks, and even manage their email inboxes. By automating these time-consuming tasks, employees will have more time to focus on higher-value work that requires human skills such as creativity and problem-solving[116].

Predictive analytics for hiring – AI-powered predictive analytics is transforming how companies approach hiring. By analyzing data on job candidates, AI helps recruiters to identify the best candidates for a given role based on factors such as their education, work experience, and skills. This makes the hiring process more efficient and effective while reducing the potential for bias and discrimination[117].

Collaborative robots (cobots) – Collaborative robots, or cobots, are designed to work alongside humans, automating dangerous or physically taxing tasks for humans, such as lifting heavy objects or working in hazardous environments. By working alongside cobots, humans can focus on tasks that require human skills, such as critical thinking and decision-making. AI will

[116] Will Kenton, What is a Virtual Assistant and What Does One Do ?, Investopedia, https://www.investopedia.com/terms/v/virtual-assistant.asp#:~:text=A%20virtual%20assistant%20is%20a,arrangements%2C%20and%20managing%20email%20accounts, accessed 29 May 2023.

[117] Rhian Davies, How Recruiters Can Use Predictive Analytics To Improve Hiring, Software Advice, https://www.softwareadvice.com/resources/predictive-analytics-recruitment-hiring/, accessed 29 May 2023.

help to create a safer, more efficient, and more productive work environment[118].

3.2 Role of AI in IPR

The main goal of granting IP rights is to encourage "creations." It finds a middle ground between the inventor's right to keep their creation private and the requirement to restrict widespread use. According to 71% of participants in IP Trend Monitor's Annual Survey 2019 Edition, the industry has started to receive more business in just a year, suggesting that IP is growing as a category. IPR will continue to expand over the next five to ten years in tandem with global developments. As technology and computational knowledge increase, the rate of inventions is expected to rise quickly[119].

Management of IP Portfolio will become a mammoth task, for patent searching, researchers will have to use long Booleans and complex word searches to sort through the available data. AI can make this entire process easier, faster and remove the possibilities of error all by applying machine learning methods, modern search can resolve the inherent ambiguities that plague traditional keyword searches[120].

Artificial Intelligence (AI) holds great promise for streamlining tedious and repetitive tasks such as patent searches and trademark clearance. It can also lower expenses for clients unable to pay for expensive legal services and databases. It can

[118] What are Collaborative Robots, A3 Robotics, https://www.automate.org/a3-content/what-are-collaborative-robots, accessed 29 May 2023.
[119] Artificial Intelligence in the World of IP, IIPRD Blog, https://iiprd.wordpress.com/2021/11/16/artificial-intelligence-in-the-world-of-ip/?utm_source=mondaq&utm_medium=syndication&utm_term=Intellectual-Property&utm_content=articleoriginal&utm_campaign=article, accessed 27 May 2023.
[120] Artificial Intelligence in the World of IP, op.cit.

also develop a framework that allows for accountability and bring about more openness in the patent-granting process.

The effect of widespread digitalization is not limited to the IP sector. Document identification and evaluation is an important element where technology has already been decreasing the demand for human intervention which has been a productive testing ground for AI technologies in the past. Administrative duties are some of the most time-consuming and difficult and dangerous in legal firms, patent offices, and sometimes even legal tribunals, and also have historically been fueled by paperwork, laborious searches, or complex decision-making procedures, wherein a single input mistake might put huge amounts of money at risk. With the automation revolution, enterprises and firms will be able to tackle a number of major issues, including a lack of staff and a limited budget, while also improving job precision and reliability, lowering risks, and expanding market rivalry. In 2017, the world's first online court heard its first lawsuit, employing face and speech identification to compile trial recordings digitally and AI to prepare judgments[121].

Moreover, AI is projected to be responsible for deciding cases independently in the near future, since studies suggest that lawsuit forecasting now has reached a high degree of accuracy. Computer programmers at UCL even created an algorithm that looked through English language statistics for 584 instances, analyzing the data and making its own court conclusion[122]. The AI judgment was identical to the court verdict in 79 percent of the cases studied. The notion that IP lawsuits may be readily

[121] Changqing Shi, Tania Sourdin and Bin Li, 'The Smart Court – A New Pathway to Justice in China?' (2021) 12(1) International Journal for Court Administration 4. DOI: https://doi.org/10.36745/ijca.367, accessed 27 May 2023.
[122] C. JOHNSTON, Artificial Intelligence 'judge' developed by University College London computer scientists, https://is.gd/article_law_UCL_AI_judge, accessed 27 May 2023.

computerized must have a significant impact on how lawyers interact with their customers[123].

Patent and copyright laws, among other IP regulations, need to be changed to account for AI-driven innovations, which include data security, ethics, and protection. The patentability of AI technologies ought to be decided by the IP policy. Most people agree that AI is capable of creation. Shared inventorship is another matter to take into account. Artificial Intelligence is pervasive in technology. The inventor should logically acknowledge using artificial intelligence software[124].

3.2.1 AI and Copyright Protection

The ambiguity regarding the stance on AI is not recent and dates back to 1974, wherein the National Commission on New Technological Uses of Copyrighted Works (CONTU) in one of its report stated that, the development of an AI with the capacity of creating an independent work is theoretical and not practical[125]. The Office of Technology Assessment (OTA) again revisited the issue in 1986 when it evaluated the implications of rapid advancements in interactive computing on IP. OTA disagreed with CONTU and suggested AIs be considered as legitimate co-authors of copyrighted works[126]. Thirty years from then, the debate surrounding AIs

[123] E. Chikhaoui, S. Mehar, Artificial intelligence (AI) Collides with Patent Law, Journal of Legal, Ethical and Regulatory Issues, 2020, https://www.semanticscholar.org/paper/Artificial-Intelligence-(AI)-Collides-with-Patent-Chikhaoui-Mehar/a6a69222ba01f327ade11e343cec176994359a69, accessed 27 May 2023.

[124] Ibid.

[125] National Commission on New Technological Uses of Copyrighted Works, 13 July 1978, https://files.eric.ed.gov/fulltext/ED160122.pdf, accessed 27 May 2023.

[126] Intellectual Property Rights in an Age of Electronics and Information, U.S. Office of Technological Assessment, April 1986, https://www.princeton.edu/~ota/disk2/1986/8610/8610.PDF, accessed 27 May 2023.

is at its prime, wherein one side argues the inability of computers to be as creative as humans, whereas the other disagrees on the pretext of defining creativity[127].
One of the sharp critics against AIs being granted protection is, Lovelace. She states that a machine lacks creativity due to its rule bound behavior. The logic behind her theory being that, creativity is the ability to do the unpredictable, i.e., not following the usual routine, unlike something machines and computers always do[128]. The same is countered by authors terming writers as machines themselves, as they process existing works and deduce most of their works from pre-existing ideas. For instance, there exist multiple copyrights on movies based on the premise of 'Romeo and Juliet'. Similar instances exist in the music industry too[129]. They rely on judgments like Cummins v. Bond[130], wherein the Court was faced with an author inquiring whether a work can be registered in the name of Jesus. The Court held that, the non-human nature of the source of a work should not be a bar to copyright, regardless of any independent editorial judgment being exercised in the process. This judgment is stretched by the ones in favor of AIs, to include registration of the work done by AI, which is also non-human in nature.

Even if countries admitted to granting copyrights to the works of an AI, the question of who gets that copyright remains cryptic and difficult to fathom. This is because the current status of law requires a legal personhood of a right holder, something which an AI lacks, unless its creator is granted that on its behalf[131]. However, there

[127] David Gelernter, The Muse in The Machine 83, Free Press, 1994.
[128] The Muse in The Machine, op.cit.
[129] Ray Kurzweil, The Age of Intelligent Machines, MIT Press, 1990.
[130] Wendy Mathers, Cummins v Bond : 1927 1 Ch. 167, RadCliff Chambers, 21 August 2020, https://radcliffechambers.com/wp-content/uploads/2020/08/Favourite-Cases-Cummins-v-Bond-Article-by-Wendy-Mathers.pdf, accessed 27 May 2023.
[131] James Boyle, Endowed By Their Creator? : The Future of Constitutional Personhood, The Brookings Institution Future of The Constitution Series, 9 March 2011, https://www.brookings.edu/research/endowed-by-their-creator-the-future-of-constitutional-personhood/, accessed 27 May 2023.

does exist a loophole in the same, which is with respect to what happens if the AI system was a purchase, whether the copyright will be granted to the creator or the buyer. This answer lies in favor of the creator, in countries like England and New Zealand, where the copyright in works authored by AI is given to the programmer, through legal fiction. Legal backing to the same is provided in the form of expanding the definition of copyright, to include computer generated works (the ones that lack a human author, i.e., AIs)[132].

3.2.2 Patent Law and Artificial Intelligence

In today's technological environment, there is an increasing amount of interplay between AI and patent regulations. Artificial Intelligence has been widely applied to streamline routine tasks and minimise human involvement. AI-enabled technologies appear to operate similarly to basic calculators and similar devices at first glance. On the other hand, its operation is far more intricate. These days, AI-enabled systems have the ability to carry out activities based on their own important insights, which opens the door to potential inventions. Although this is a significant scientific advancement, from a legal one, that is, from the perspective of patent law, it raises additional difficult concerns.

A patent can be understood as the exclusive right over an invention. This ‘invention’ has been understood to cover any product or process, which provides to users a novel way of performing a certain action, including that which offers a new solution to an

[132] Copyright, Designs and Patents Act, § 178, 1988 (UK); Copyright Act, § 2, 1994 (New Zealand).

existing technical problem[133]. The holder of such a right is entitled by law to exclude others from making, selling, or even using the patented invention for a limited term. Therefore, it can be said that the right guaranteed in such an instance legitimizes the creation of a monopoly for the benefit of the original inventor[134]. AI enabled systems are equipped to perform functions and even create inventions, which ordinarily results as an outcome of the application of human cognitive processes. In fact, these machines are producing results which could qualify as patentable inventions[135].

Under U.S Patent Law, an 'inventor' is defined as an individual or a set of individuals who invented or discovered the subject matter of the invention[136]. This eliminates any inference which supports the premise that legislative intention in the United States sought to include inventions or rather the possibility of inventions being made by anyone besides humans[137]. But as AI systems get more and more involved in the invention process, these issues need to be examined from a legal perspective. A hint of this examination can be seen in the European Union's endeavor to persuade countries to broaden their national legal frameworks in order to include copyright-protected works created by computers and other devices under the heading of "own intellectual creation[138]. While this is a progressive step in the direction of acknowledging creativity exhibited by these systems, while producing poetry,

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[133] Patents, WIPO, op.cit.
[134] Patent Protection, University of New Hampshire, https://innovation.unh.edu/patent-protection, accessed 28 May 2023.
[135] Liza Vertinsky, Todd M. Rice, Thinking About Thinking Machines: Implications for Machine Inventors For Patent Law, Trustees of Boston University, 2002, https://www.bu.edu/law/journals-archive/scitech/volume82/vertinsky%26rice.pdf, accessed 28 May 2023.
[136] Consolidated Patent Laws, § 100 (f), U.S.C 35, www.uspto.gov/web/offices/pac/mpep/consolidated_laws.pdf , accessed 28 May 2023.
[137] Jason Lohr, Artificial Intelligence Drives New Thinking on Patent rights, LIME GREEN IP, http://www.limegreenipnews.com/2016/07/artificialintelligence-drives-new-thinking-on-patent-rights/ , accessed 28 May 2023.
[138] Draft Report with recommendations to the Commission on Civil Law Rules on Robotics, EUROPEAN PARLIAMENT (2014-2019), https://www.europarl.europa.eu/doceo/document/A-8-2017-0005_EN.html, accessed 28 May 2023.

artwork etc., due regard must also be paid to include inventions and application of patents by AI systems and robotics.

The European Parliamentary Committee has noted how, in a matter of a couple of decades, AI systems could surpass human intelligence in terms of performing functions, which uncontrolled, could pose challenges as to the manner in which these AI systems control and manage their own destiny[139]. Given the great degree of autonomy enjoyed by AI systems, consideration of patent rights is necessary when discussing these systems. Because of their autonomy, AI-enabled systems may carry out tasks without requiring a lot of human involvement. Consequently, because of their growing capability, these devices or programmes can be used in the early phases of research, which may ultimately result in some sort of "discovery" based on the capabilities of the device[140].

A crucial factor for any invention to be granted a patent is, whether or not it can pass the patentability criteria satisfactorily. This calls for it to possess novelty, an inventive step, and be capable of industrial application[141]. In the case of inventions by AI enabled systems/technologies, the biggest challenge toward obtaining of a patent is satisfying this three steps test. For indicating novelty, it becomes necessary for the invention to be different from whatever exists in the prior art.

Generally, in order to correctly identify at the invention stage whether or not his innovation may be easily expected or is the result of extra research and a creative mental component, the inventor must conduct a thorough review of the existing prior

[139] Ibid.
[140] Thinking About Thinking Machines: Implications for Machine Inventors For Patent Law, op.cit.
[141] The Patents Act, § 2(I), 1970 (India); The Patents Act, § 2(ja), 1970 (India); The Patents Act, § 2(ac), 1970 (India).

art. Due to human scientists supervising it and providing it information, an AI system will undoubtedly have access to prior art, but can it really be considered independent, much alone able to determine whether or not its innovation can account for something novel? Regarding the subject of an inventive step, it is difficult for an AI system to identify uniqueness on its own, therefore the likelihood of creating innovations on preexisting models or concepts that are not immediately apparent to a person with expertise in the field is difficult to achieve[142].

Artificial intelligence is currently fed pre-existing goals that it is programmed to accomplish. Technology must first progress to give these systems an intelligence like to that of humans so that they can make decisions about novel situations. Additionally, it is evident from reading through judgements pertaining to the patentability of computer programmes, etc., that the Court has refused to grant patents to programmes for the sole reason that the work they do is mechanical rather than inventive[143]. This is a critical factor to take into account because artificial intelligence (AI) is mainly based on computer programmes that are designed to carry out specific tasks, with modifications made by their human creators. This contrast between human and robot inventors will be clarified in the section that follows. It emphasises how challenging it is to give patents to AI-generated software.

[142] Ronald Yu, Should an Artificial Intelligence be allowed to Get a Patent?, ROBOHUB, https://robohub.org/should-an-artificial-intelligence-be-allowed-to-get-a-patent/, accessed 28 May 2023.
[143] Bilsk v. Kappos, 561 U.S. 593 (2010), https://supreme.justia.com/cases/federal/us/561/593/, accessed 28 May 2023.

Section Two : AI an Owner of Intellectual Property ?

When artificial intelligence (AI) technologies are used to generate technical inventions (e.g. using evolutionary algorithms to design antennas)[144], or to make creative works (e.g. using IBM Watson to generate songs), intellectual property (IP) law comes into play. Patents are granted for novel technical solutions and copyright is available for original creative works. With AI technologies permeating almost all sectors of our economy, more and more inventive and creative activities are being influenced by these technologies.

Because inventions and creative works benefit society, intellectual property rights are intended to encourage and reward actions that result in imaginative or creative output. However, in the case when AI technologies are primarily utilised in the conception and production of new works of art, robots can function without the requirement for incentives or rewards because they are programmed to do so. The economic argument for intellectual property rights states that without payment, people might not devote the time and resources necessary to conduct original research, produce new works, or make them available to the public[145].

[144] William Samore, 'Artificial intelligence and the patent system: can a new tool render a once patentable idea obvious?' in Woodrow Barfield and Ugo Pagallo (eds), Research Handbook on the Law of Artificial Intelligence (Edward Elgar Publishing 2018), p : 481, https://lawcat.berkeley.edu/record/667247?ln=en, accessed 31 May 2023.
[145] Ibid.

Some believe that AI or the rise of machines that are capable of independent problem solving and— even—acts of independent creation, represents the most complex and potent threat to the IP order that has ever occurred[146].

AI technologies are used for designing new materials, optimizing manufacturing processes, drug discovery and other processes[147]. However, AI technologies are also increasingly used in processes relevant to registering, administering and enforcing IP rights. IP offices use machine learning tools to categorize incoming applications according to the technical area of the invention or type of trade mark, classify goods or services for which a mark is applied, translate prior art documents, search prior art or earlier rights, or perform formality checks[148]. IP right holders are equally offered several commercial AI-based tools to search for protected signs[149] or products infringing trademarks, copyright or design rights[150], or to assist in patent licensing and prosecution, and competitor mapping[151].

Since AI is influencing nearly every facet of IP law, numerous IP offices and organisations have started holding discussions with a wide range of stakeholders about how IP and AI interact. WIPO produced two Issues Papers on the influence of

[146]Jeremy Cubert, Richard Bone, 'The Law of Intellectual Property Created by Artificial Intelligence', Barfield and Pagallo, 28 December 2018, https://www.semanticscholar.org/paper/The-law-of-intellectual-property-created-by-Cubert-Bone/bf0d16aa0bc27941ee3b0773f17f06730360f0b8, accessed31 May 2023.
[147] Liza Vertinsky, 'Thinking Machines and Patent Law', Edward Elgar Publishing, 9 October 2017.
[148] Anke Moerland and Conrado Freitas, 'Artificial Intelligence and Trademark Assessment' in Jyh-An Lee, Reto Hilty, and Kung-Chung Liu, Artificial Intelligence and Intellectual Property (OUP 2021); WIPO, 'WIPO Index of AI initiatives in IP offices, 2021, www.wipo.int/about-ip/en/artificial_intelligence/search.jsp, accessed 31 May 2023.
[149] Eg. Coresearch, Combining AI-powered technology and decades of industry expertise, Corsearch is revolutionizing how companies establish and protect their brands, https://corsearch.com/, accessed 31 May 2023.
[150] Eg. Shipglobalip.com, Ship Global IP Offers its Clients Comprehensive Intellectual Property Portfolio Management.
[151] Eg. Cipher, Cipher's mission is to enable patent owners to make rational decisions by providing strategic patent intelligence, powered by machine learning, https://cipher.ai/about-us/, accessed 31 May 2023.

AI on IP policy and hosted three Conversations on Intellectual Property and Artificial Intelligence between September 2019 and November 2020[152].

Complex ownership disputes may arise, and there may even be situations in which several parties involved in AI attempt to obtain copyright for its creations. While the software code that makes up the agent may be protected by copyright, certain technologies used in the agent may be patentable by one party. Other third parties may be entitled to certain claims regarding the agent's personal or private information. Additionally, there is an end-user who has paid money to get access to the agent. Last but not least, there's probably an investor who helped develop the intelligent agent in the first place. Which of these parties is the rightful owner of the copyright to the works created by intelligent agents[153]?

1. AI as Inventor and Author of IP Rights

The most general solution for copyright problems is that the author, the one who has created the piece of work, is the owner of copyright. It would be simple to say, then, that since AI created the work, it should also be entitled to copyright if this course of action is taken. Sadly, there is more to the answer than meets the eye. Since AI is capable of being acknowledged as the author of its own work, the issue does not lie in the authorship aspect by itself, at least not in a legal sense[154].

The concept of giving AI small portions of specific rights is novel and progressive, and it may prove helpful in the future when discussing AI's potential rights.

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[152] The WIPO Conversation on Intellectual Property and Artificial Intelligence, WIPO, 2020, https://www.wipo.int/about-ip/en/artificial_intelligence/conversation.html, accessed 31 May 2023.
[153] Rex M. Shomaya, Intelligent Agents: Authors, Makers, and Owners of Computer Generated Works in Canadian Copyright Law, Canadian Journal of Law and Technology, 2005, p:130.
[154] Ibid.

It follows that it is not unusual for the public and academic community to have significant reservations about the concept of giving artificial intelligence (AI) legal personhood. When this time comes, AI may have advanced to a level that is nearly human. The concept of extending rights to beings other than humans is not new, but AI as a reality is relatively recent[155].

The prerequisite for acquiring or possessing rights in the first place is legal personhood, which is absent from anything that is not a human being. Everything revolves around legal personhood; without it, there are no duties or rights.

As we can see, there is a continuous dialogue on legal personhood, at least inside the same state. In reality, academics from all over the world are beginning to accept the theory that as AI technology develops and even in its current form, it will eventually lead to the recognition of AI as a potential possessor of legal personality with its own rights and obligations. This can be supported by two ideas: AI shares many characteristics with humans and has the potential to integrate into businesses, which have their own set of rights and obligations[156].

The question of whether output created entirely by AI or with significant AI aid can be protected by IP rights is one of the most contentious parts of AI's impact on IP. These are AI-generated inventions, in which the AI independently creates an invention and no human is deemed to be the creator, and AI-assisted inventions, in which AI is utilised as a tool[157]. It is particularly the latter that pose important challenges to the IP system.

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[155] Kaarlo Tuori, Kriittinen oikeuspositivismi, 2000, p: 55.

[156] Shlomit Yanisky-Ravid, Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era-The Human-Like Authors Are Already Here – A New Model, p. 684.

[157] Josef Drexl et al., 'Comments of the Max Planck Institute for Innovation and Competition of 11 February 2020 on the Draft Issues Paper of the World Intellectual Property Organization on Intellectual Property Policy ad Artificial

However, researchers in the field of automatic programming are of the opinion that at this stage and for the foreseeable future, AI-generated inventions remain out of reach[158]. According to a survey among industry experts from 2012, high-level artificial general intelligence is only achievable by 2075[159]; general artificial intelligence or superintelligence is only predicted for 2099[160].

In other words, the state of technology today and in the middle of the future does not suggest that machines can function without a human giving instructions on how to carry out a specific activity[161]. When it comes to the analysis and formal representation of a problem so that it can be solved through computational modelling, input data selection, objective function definition, algorithm design or modification, computational outcome interpretation, and other processes, human designers are still heavily involved[162].

Therefore, the focus should be on how copyright and patent law relate to human-assisted AI-produced works. Simultaneously, suggestions and queries on the IP protection of works created by AI will be discussed.

As long as AI technologies or machines are used as tools to solve a problem, the IP system is not challenged when it comes to the question of who should be named as

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Intelligence, https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/2020-02-11_WIPO_AI_Draft_Issue_Paper__Comments_Max_Planck.pdf, accessed 31 May 2023.

[158] Kim Daria, ''AI-Generated Inventions': Time to Get the Record Straight?, Grur International, Volume 69, Issue 5, 2020, p : 443-456, https://academic.oup.com/grurint/article/69/5/443/5854752, accessed 31 May 2023.

[159] Vincent Müller and Nick Bostrom, 'Future progress in Artificial Intelligence: A Survey of Expert Opinion', in Vincent Müller (ed.), Fundamental Issues of Artificial Intelligence, Springer, 2016, https://nickbostrom.com/papers/survey.pdf, accessed 31 May 2023.

[160] Martin Ford, Architects of Intelligence: The Truth About AI From the People Building it, Packt Publishing, 2018.

[161] AI Generated Inventions': Time to Get the Record Straight, op.cit.

[162] 'Comments of the Max Planck Institute for Innovation and Competition of 11 February 2020 on the Draft Issues Paper of the World Intellectual Property Organization on Intellectual Property Policy ad Artificial Intelligence, op.cit.

inventor or author. Generally, the human involved in the intelligent and creative conception of the invention is the inventor; equally, the person who makes free and creative choices for a work is the author of a copyright work. This is even where the inventor uses tools that surpass human capabilities (e.g. optical instruments), or which are self-organizing (e.g. biological organisms)[163].

Another way to determine the ownership of AI is to propose a framework. This paper proposes that the law and courts should (1) recognize sufficiently creative AIs as authors and inventors matched with (2) AI IP rights assignment to natural or legal persons (i.e., business or government entities). First, the law must put in place a test to determine if or when an AI might be granted such a status. Second, in such a case, the law must put in place an assignment regime that recognizes ownership by the appropriate party, including default rules and conditions of assignment.

Determining when an AI has fulfilled the requirements to be referred to as an author or inventor is the first component of the framework. The first step in this examination, similar to that of natural people, is to determine if the subject matter is appropriate for legal protection. An appraisal of the autonomous creativity connected to AI constitutes the second section of the analysis. This analysis should take a strong cue from well-established case law in both processes.

1. Independence of the Work

The suggested method would use a standard that is comparable to what common law now offers. Original, inventive, and innovative works are what qualify as qualifying

[163] AI Generated Inventions': Time to Get the Record Straight, op.cit.

subject matter under both copyright and patent law. Literary, musical, theatrical, choreographic, photographic, sculpture, audio-visual, sound recording, and architectural works are all considered qualifying subject matter under copyright law. Copyrighted works, however, have to be more than just copies; they have to be independently created from the original. On the patent front, "anything under the sun" refers to techniques, machinery, products, or material compositions, provided there is adequate "inventiveness."

Additionally, inventions must be useful and non-obvious according to patent law, and patents must deviate from prior research or clear advancements. Because copyrights and patents need to be independent of earlier works, the criteria for determining whether an AI is eligible for a subject matter are essentially the same as those used for natural beings under common law[164]. It must be demonstrated that the AI can operate as a standalone creator. To put it another way, an AI that performs a series of sequential tasks or an algorithm would not pass this criteria, but an AI that gains new skills via education or experience would. Examples:

- Push Button Bertha: the subject matter would be ineligible since the music was developed as the output of a simple, mathematical algorithm (i.e., the work was developed by the programmers with the AI providing mere variations)[165].
- AP Stories Using Automated Insights: the subject matter would be ineligible since the AI uses templates and pre-generated phrases supplied by the AP

[164] Meshwerks v. Toyota Motor Sales U.S.A.,528 F.3d 1258, 1263(10th Cir. 2008) (a 3-dimensional model of a Toyota vehicle was merely a copy of the originally designed car and thus ineligible for copyright), https://casetext.com/case/meshwerks-inc-v-toyota-motor-sales-usa-inc-2, accessed 20 October 2023.

[165] Charles Ames, *Automated Composition in Retrospect: 1956-1986*, in 20 Leonardo 169, 170,1987.

editorial team in the step-by-step construction of stories (i.e., the core of the subject matter was developed by the AP)[166].

- Google's Project Magenta: the subject matter would be eligible since Google's AI relies on deep-learning and neural networks to create original pieces of music[167].
- IBM's Chef Watson: the subject matter would be eligible since Watson relies on inductive reasoning to develop non-obvious recipes and food items[168].

2. Independence of the Creativity

The second component of the test is that AI be the source of creativity rather than just a machine that the author or inventor controls mechanically. The introduction of cameras to take pictures presented the Supreme Court with a decision in 1884: are pictures that are just copies of real-world objects protected by copyright? The Court responded in the affirmative, ruling that an image could be protected by copyright because the photographer's "mental conception" of choosing and setting up the subject's attire, choosing the lighting, and setting up the scene was adequate to establish authorship. But in that scenario, the photographer is more creative than the camera because authorship is determined by the originator, or source of causation[169].

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[166] Natural Language Generation-Associated Press*, Automated Insights*, https://automatedinsights.com/customer-stories/associated-press/, accessed 20 October 2023.
[167] Abhishek Meshra, Understanding Google Magenta: An Overview of Google's Open Source Music and Art Project, Medium, March 13, 2023, https://medium.com/@abhishekmishra13k/understanding-google-magenta-an-overview-of-googles-open-source-music-and-art-project-48ea9ee80024, accessed 20 October 2023.
[168] Rochelle Bilow, How IBM's Chef Watson Actually Works,June 30, 2014, https://www.bonappetit.com/entertaining-style/trends-news/article/how-ibm-chef-watson-works, accessed 20 October 2023.
[169] Rebecca Marrone, Creativity and Artificial Intelligence, Journal of Intelligence, 6 September 2022.

For instance, the Third Circuit made it clear in the Andrien v. Southern Ocean County Chamber of Commerce case that authorship does not lie with the final attempt to embody a work if it is merely "rote or mechanical," noting that there is a "fundamental distinction" between an original work of authorship and the various ways in which it can be embodied[170].

It is also evident that employing technology in the process of coming up with an invention—for example, using a contemporary word processor to organise lab notes—does not qualify as using technology to become an inventor. When a human's de minimums contribution is considered, the true question for an AI is raised. Should an AI choose the outfit, modify the lighting, set up the setting, and produce a photo, would the court rule that this kind of "mental conception" was adequate for copyright protection? Consequently, the AI's function as rote/mechanical or creative determines whether there is a causal relationship.

3. Passing the Test

When a work passes both test prongs—that is, when an AI independently creates relevant content using its own power—the AI will be awarded intellectual property rights in the capacity of either an author or an inventor. For instance, Automated Insights may claim authorship of the stories if it developed a neural-network AI that was trained and continuously taught to produce highly styled material and stories. But since an AI isn't now regarded as a natural or legal person, such a suggestion

[170] Andrien v. Southern Ocean County Chamber of Commerce, https://www.quimbee.com/cases/andrien-v-southern-ocean-county-chamber-of-commerce#, accessed 20 October 2023.

raises concerns about who is actually legally entitled to such rights. Such a conundrum can be handled by assigning those privileges through a mechanism[171].

1.1 AI Authorship

The Berne Convention[172] does not define the concept of an author, but its text and historical embedding strongly indicate that an author of a creative work is a natural person[173]. This anthropocentric focus on human authorship is also evident in other aspects of EU law[174]. According to EU case law, the human who makes free and creative choices for a work and expresses their personality in the work is the author of a copyright work. AG Trstenjak stated that only human creations are protected, including those created with the help of a technical aid[175]. In other words, AI systems currently cannot be authors of copyright works.

Where works are created by an AI, the question arises whether there is a human author behind the AI who makes creative choices and expresses their personality. Hugenholtz and Quintais distinguish between three stages in which creative choices by a human can take place: the conception, execution and redaction of the work. For

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[171] Russ Pearlman, Recognizing Artificial Intelligence (AI) as Authors and Inventors Under U.S. Intellectual Property Law, Pearlman Publications, 2018.
[172] Berne Convention for the Protection of Literary and Artistic Works of September 9, 1886, completed at Paris on May 4, 1896, https://www.wipo.int/treaties/en/ip/berne/, accessed 31 May 2023.
[173] Bernt Hugenholtz, Joao Pedro Quintais, 'Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?, University of Amsterdam, 2021, https://pure.uva.nl/ws/files/65585680/Hugenholtz_Quintais2021_Article_CopyrightAndArtificialCreation.pdf, accessed 31 May 2023.
[174] Ana Quintela Ribeiro Neves Ramalho, 'Originality Redux: An Analysis of the Originality Requirement in AI Generated Works, Maastricht University, 2019, https://cris.maastrichtuniversity.nl/en/publications/originality-redux-an-analysis-of-the-originality-requirement-in-a, accessed 31 May 2023.
[175] Case C-145/10 Eva-Maria Painer v Standard VerlagsGmbH and Others [2011] ECR I-1253, Opinion of AG Trstenjak, para 121, https://studfile.net/preview/16573456/page:4/, accessed 31 May 2023.

general-purpose AIs[176], like text-generation programs or Google's Deep Dream Generator, a user may only push a button and the AI carries out the process it was programmed to do. Arguably, in such situations, no creative choices are made by the user. Where users determine the input data, select and possibly redact the output, creative choices are likely to occur during the conception and redaction of the work, but less so during execution, which is usually dominated by the AI system. The developer of the AI system may qualify as (co)-author where (s)he collaborated with the user in generating a specific creative output; in the case of general-purpose AI, however, it is unlikely that developers will make creative choices regarding the specific output[177].

Another solution found by countries with a British tradition (UK, Ireland, New Zealand, South Africa) is to grant authorship to "the person by whom the arrangements necessary for the creation of the work are undertaken"[178], in situations where a human author cannot be identified. However, it is doubtful whether this standard also present in Irish legislation[179] is in accordance with EU law[180]. The work is deemed "authorless" if the identity of the human author cannot be determined. However, works that are not human-created are not covered by copyright under EU law. The assignment of authorship to the party making the required arrangements may result in a monopoly over works created by AI in the case of general-purpose AI, regardless of whether or not it complies with EU law.

It could be argued that a programmer or company that creates an AI [..] that can, for example, create musical works based on a few parameters set by the user is making

[176] Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output, op.cit.
[177] Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output, op.cit.
[178] UK Copyright, Designs and Patents Act 1988, s 9.3.
[179] Irish Copyright and Related Rights Act 2000, Art 21.
[180] After Brexit, the UK is not anymore bound by EU law.

the "arrangements necessary" for the creation of those works, and that they may acquire the rights to an almost infinite number of musical works that are copyright protected[181].

The businesses that create these machine learning and artificial intelligence tools are quite transparent about the moral and legal status of their offerings. According to Bloom's specs, "using the model in high-stakes settings is out of scope. "The model is not intended to be used for making important decisions or for applications that could materially affect someone's well-being or means of subsistence. These include circumstances involving health care, court decisions, finances, or individual evaluations; these are fields that are covered in the portfolios of numerous academic publishers. "Indirect users should be made aware when the content they're working with, is created by the LLM," continues Bloom's corporate disclaimer[182].

In fact, in January 2023 WAME released an early response to the use of LLMs in scholarly publishing which made precisely the same recommendation. In response to a journalist, ChatGPT said, "There is no inherent ethical issue with using AI in research or writing, as long as the AI is used appropriately and ethically." This shows that ChatGPT is aware of its own limitations. It once again produced an error message stating that it did not meet all of the ICMJE authorship requirements. As AI bots lack legal standing and cannot retain copyright, be sued, or certify a piece of research as original, they should not be allowed to act as authors, according to both the WAME guidance and

[181] Jani Ihalainen, 'Computer Creativity: Artificial Intelligence and Copyright, Journal of Intellectual Property Law and Practice, Volume 13, No. 9, 2018, https://www.deepdyve.com/lp/ou_press/computer-creativity-artificial-intelligence-and-copyright-JRkCZgveDO, accessed 31 May 2023.
[182] Cobus Greyling, BLOOM — BigScience Large Open-science Open-Access Multilingual Language Model, Medium, July 29, 2022.

COPE's own position statement. Similar comments have been released by Taylor & Francis and Springer Nature, requesting that writers describe any interactions with AI in the methods or acknowledgement sections[183].

AI tools can benefit academic writers, journals, and publishers in a variety of ways; in fact, many of them are currently in use. They are able to design unique but pertinent cover art, detect duplicate photos and gels, find appropriate peer reviewers, and summarise material. They could undoubtedly be useful in the kinds of cases that are presented before COPE's member forum when the originality or veracity of the photos in question are questioned. These kinds of instruments might be especially useful for tracking down paper mill operations. However, that experience already demonstrates that ChatGPT doesn't always respond to the same query repeatedly[184].

This is due to the fact that AI bots have no concept of dependability, reproducibility, or "truth"; instead, they merely return the assertion or fact from their repository that makes probabilistic sense in light of their training data. While there may occasionally be just one solution to a query, more often than not there will be several viable answers that are all equally - in the bot's words - likely. It can assert several distinct answers to the same query in this way. Being outraged or side-swiped by this is a very human response. An AI merely cares about plausibility; it doesn't care if the data it returns is “true”[185].

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[183] WAME Revised Recommendations on Chatbots and Generative AI, WAME, June 2, 2023, wame.org , accessed 20 October 2023.

[184] Nikita Duggal, Advantages and Disadvantages of Artificial Intelligence, SimpliLearn, October 17, 2023, https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article, accessed 20 October 2023.

[185] Advantages and Disadvantages of Artificial Intelligence, op.cit.

At this moment in time AI looks like an amazing tool - when used ethically – for certain purposes. It's highly likely already one which can't be ignored. But there are a whole host of wider considerations which need to be thought through carefully on how and when it should be used in the scholarly literature, and that's not even touching on the issues of potential bias and unsavoury material in its training material which will, in turn affect what it produces. Overall, as the law stands, AI systems are not recognized as authors under any copyright system. Where developers or users of AI have made creative choices in the conception and/or redaction of creative work, they qualify for authorship.

1.1 AI Inventorship

In a recent study carried out for the EPO, all jurisdictions analyzed therein do not currently foresee an AI system as inventor[186]. This has been further supported before the EPO refusal of two patent applications for inventions in which DABUS, "a type of connectionist artificial intelligence", was indicated as inventor[187]. Accordingly, Art. 91 and Rule 19(1) EPC require that an inventor designated in the application is a human being, not a machine. In addition, machines cannot be employed, nor can they exercise rights[188], as they lack legal personality.

If currently machines cannot be named inventors, how do we determine

1) whether a human should still be able to legitimately claim inventorship rights, and

2) which human behind the machine that is?

[186] Future progress in Artificial Intelligence: A Survey of Expert Opinion, op.cit.

[187] Grounds of the EPO decision of 27 January 2020 on EP 18275163 and EP 18275174, in EPO, 'EPO publishes grounds for its decision to refuse two patent applications naming a machine as inventor, 28 January 2020, https://www.epo.org/news-events/news/2020/20200128.html, accessed 31 May 2023.

[188] According to Art. 60 EPC, the right to a patent belongs to the inventor.

While the EPC does not define the concept of 'inventor', it is left to national legislations to determine inventorship. Looking at various jurisdictions worldwide, the general criterion used in national patent laws is that an inventor should contribute substantially to the intelligent and creative conception of the invention[189]. Conception entails "forming or devising an idea or plan in the mind"[190]. The focus lies on the result, so here the idea or plan, not the process in a human's mind[191].

Therefore, even in cases when an AI system may have provided the technical answer, a human who significantly contributes to the conceptualization of an invention is still considered the inventor. Therefore, in order to determine inventorship, one must differentiate between innovations that are AI-assisted (where a human contributes significantly to the original notion) and those that are AI-generated (where a human does not qualify for inventorship).

It is clear that various persons may contribute substantially to the conception of an AI-assisted invention. Heath and Bengi argue that one needs to inquire which human intervention is most closely attributable to the invention[192]. The closest human behind the AI machine could be the owner of the AI system, the programmer who defines the problem and formulates the algorithm[193], those who provide the training or the data, the manufacturer of the machine, or the user who recognizes the importance and utility of the output to solve a particular problem[194].

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[189] Future progress in Artificial Intelligence: A Survey of Expert Opinion, op.cit.
[190] Ibid.
[191] Ibid.
[192] Kemal Bengi and Christopher Heath, 'Patents and Artificial Intelligence Inventions' in: Christopher Heath, Anselm Kamperman Sanders and Anke Moerland (eds), Intellectual Property and the Fourth Industrial Revolution, Wolters Kluwer, 2020, p : 147.
[193] AI Generated Inventions': Time to Get the Record Straight, op.cit.
[194] Future progress in Artificial Intelligence: A Survey of Expert Opinion, op.cit.

The latter approach is supported by patent law's focus on the result rather than the nature of the inventive process: no matter whether the inventor had a flash of genius, sheer luck or undertook long laborious efforts, (s)he is still considered the inventor[195]. Overall, as Vertinsky argues, there is considerable uncertainty about who can legitimately claim rights of inventorship[196], and whether these would be the best persons to exploit the invention from an economic perspective[197].

The situation becomes even more complicated where in the future, automation of problem-solving through machines reaches a degree that would no longer fit the concept of human inventorship[198]. For example, this could be the case where computers, in the future, could deviate from the algorithm provided by a human, or relate inputs and outputs without instructions from a human[199]. Then the question arises whether it is desirable to allow a) an AI system to be named as an inventor, or b) patents to be granted without the mentioning of an inventor in cases where a machine created it.

Regarding option a), there are important reasons not to allow AI-inventorship as long as AI systems 1) do not possess legal personality, and 2) can be the holder of rights. This is currently not the case and would require a change of the law that goes fundamentally beyond IP law questions. But if such changes were effectuated, the same criteria as for human inventors could apply for determining inventorship: if the AI system's contribution to the invention was substantial, it should be recognised as

[195] Ibid.
[196] Thinking Machines and Patent Law, op.cit.
[197] Is Intellectual Property Law Ready for Artificial Intelligence?, op.cit.
[198] AI Generated Inventions': Time to Get the Record Straight, op.cit.
[199] Ibid.

inventor[200]. Option b) suggests that there could be patents that do not refer to an inventor[201]. In fact, there is no good reason for the patent system to require the mentioning of the inventor where the inventor is a machine and is not receptive of incentives to invent[202]. If national procedural rules allow for a patent application without mentioning an inventor, patent protection could be available for inventions generated by AI without AI obtaining legal personality.

Regardless of which option is pursued, it is entirely doubtful whether the purpose of patent law of incentivizing innovation is still needed for AI-generated inventions[203], questioning the usefulness of granting patents for AI-generated inventions in the first place[204]. Some argue that AI inventorship would incentivize research in the field of AI[205]; to promote AI research, UKIPO is considering legislative possibilities like recognising AI as an inventor. Former WIPO Director General Francis Gurry said: "There is no reason why we shouldn't use IP to reward AI-generated inventions or creations, from a purely economic perspective, if we set aside other goals of the IP system, such as "fair reward" and moral rights." However, this still needs some consideration[206].

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[200] Future progress in Artificial Intelligence: A Survey of Expert Opinion, op.cit.

[201] Discussed by Noam Shemtov during a presentation on 'Who's the inventor: Could and should AI systems be designated as inventors on patent applications?' at Oxford intellectual Property Research Centre Invited Speaker Series, 18 November 2021, https://www.law.ox.ac.uk/events/whos-inventor-could-and-should-ai-systems-be-designated-inventors-patent-applications, accessed 31 May 2023.

[202] The right of the inventor to be mentioned in the patent in Art. 62 EPC is considered a moral right, which only has meaning for humans, encouraging their inventive activities.

[203] Jozefien Vanherpe, 'AI and IP: a Tale of Two Acronyms' in Jan De Bruyne and Cedric Vanleenhove (eds), Artificial Intelligence and the Law, Intersentia, 2021, p : 229.

[204] Is Intellectual Property Law Ready for Artificial Intelligence?, op.cit.

[205] AI and IP: a Tale of Two Acronyms, op.cit.

[206] 'Artificial intelligence and intellectual property: an interview with Francis Gurry, WIPO Magazine, 2018, https://www.wipo.int/wipo_magazine/en/2018/05/article_0001.html, accessed 31 May 2023.

However, it's unclear if granting more property rights will actually spur greater innovation. Samore worries that when inventions that needed little to no human labour receive widespread patent protection, this could result in patent tangles that prevent competitors, especially smaller ones, from creating novel technical solutions; resources could be diverted from creating to looking for solutions[207].
Not allowing patent protection for AI-generated inventions and thereby allotting their output generated to the public domain may again lead to other problems, such as misleading statements about AI inventorship in a patent application[208].

To conclude, as long as AI-generated inventions are not yet at the horizon, research into the likely effects of patent protection for AI generated inventions should enable policy-makers to determine the way forward.

2. Involvement of The Laws Related to AI

The artificial intelligence sector is expanding incredibly quickly. Countries from all across the world are vying to win the "AI race." Businesses are shelling out billions of dollars to get the biggest piece of the market. According to simulations, over 70% of businesses will use AI technology by 2030. Artificial intelligence (AI) can replace humans and make more judgements more quickly and cheaply, whether it's forecasting climate change, choosing job candidates, or determining whether someone will commit a crime[209].

[207] Artificial intelligence and the patent system: can a new tool render a once patentable idea obvious?, op.cit.
[208] Ryan Abbott, 'I Think, Therefore I Invent: Creative Computers and the Future of Patent Law, SSRN, Vol. 57, No. 4, 2016, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2727884, accessed 31 May 2023.
[209] Sujeet Katiyar, Laws and Regulations-Artificial Intelligence, linkedin, November 7, 2022, https://www.linkedin.com/pulse/laws-regulations-artificial-intelligence-sujeet-katiyar, accessed 10 September 2023.

Artificial intelligence and automation are responsible for a growing number of decisions by public authorities in areas like criminal justice, security and policing and public administration, despite having proven flaws and biases. Facial recognition systems are entering public spaces without any clear accountability or oversight. Lawyers must play a greater role in ensuring the safety and accountability of advanced data and analytics technologies.

AI regulation is necessary for two reasons. First, because AI is used by businesses and governments to make decisions that could significantly affect our lives. Second, because we have the right to hold someone accountable for any action they make that has an impact on us. The minimum standards of treatment that everyone is entitled to are outlined in human rights law. Everyone has the right to redress in cases where those requirements are not fulfilled and they cause them harm. Governments are responsible for ensuring that these standards are followed and that those who violate them face consequences, which typically take the form of administrative, civil, or criminal laws[210].

The use of facial recognition in public and the ways that various AI systems rely on the gathering and processing of personal data also threaten the right to privacy, which is protected by the European Convention on Human Rights. These systems must make sure that they uphold fundamental rights to data protection. Many of these technologies have the potential to enhance both the welfare of the individual and the group, but data privacy regulations must be carefully followed. For example, when developing and testing an app for the NHS, Google's AI division DeepMind broke UK data protection laws and patient privacy regulations[211].

[210] Thomas Wischmeyer, Timo Rademacher, Regulating Artificial Intelligence, Springer, 2019.
[211] Karen Yeung, How Has The Law Been Pushed Aside in the Age of AI, University of Bermingham,

NGOs are doing important work illuminating AI's risks to human rights and liberties, including Amnesty International, Access Now, Human Rights Watch, Privacy International, Liberty, the American Civil Liberties Union (ACLU), and the Electronic Freedom Foundation (EFF). Tech companies are also responding to real and hypothesized risks of their inventions. DeepMind has created an 'independent advisory panel'. Microsoft has published ethical guidelines to which it claims it will adhere[212].

There is a capacity deficit, but universities and civil society can play a significant role in holding the digital industry accountable and subjecting it to the proper legal scrutiny. Scholarly authorities ought to preserve their autonomy. To ensure that the legal foundations underlying the infrastructures that shape our daily lives are securely moored to fundamental commitments to democracy and individual freedom, public lawyers and academic legal researchers must collaborate with algorithm developers, computer and data scientists, and electronic engineers in order to translate public law principles into the AI age.

Businesses that offer AI-based goods and services should be aware of the regulatory environment's constant evolution. The formal AI policies that Google, Microsoft, BMW, and Deutsche Telekom are creating make guarantees to privacy, safety, fairness, and diversity. Companies will require new procedures and equipment in order to comply with the stricter AI standards that are soon to be implemented (mostly in Europe and the US): system audits, documentation and data protocols (for traceability), AI monitoring, and diversity awareness training[213].

[212] Ibid.
[213] Laws and Regulations-Artificial Intelligence, op.cit.

2.1 The Legality of AI Generated Art

At the moment, works created solely by artificial intelligence — even if produced from a text prompt written by a human — are not protected by copyright.

When it comes to training AI models, however, the use of copyrighted materials is fair game. That's because of a fair use law that permits the use of copyrighted material under certain conditions without needing the permission of the owner. But pending lawsuits could change this[214].

In just a few months, generative AI has drastically changed the way we work, live, and create. Consequently, a number of intricate legal issues have been raised by the flood of writing, photos, and music produced by AI as well as the method by which it was created. Furthermore, they are casting doubt on our conceptions of justice, ownership, and the fundamental essence of creativity.

In 2022, an AI-generated work of art won the Colorado State Fair's art competition. The artist, Jason Allen, had used Midjourney – a generative AI system trained on art scraped from the internet – to create the piece. The process was far from fully automated: Allen went through some 900 iterations over 80 hours to create and refine his submission[215].

Copyright laws were created to promote the arts and creative thinking. But the rise of generative AI has complicated existing notions of authorship.

[214] Ellen Glover, AI-Generated Content and Copywrite Law : What We Know, BuiltIn, August 23, 2023.
[215] Robert Mahari, Jessica Fjeld, Generative AI is Minefield for Copywrite Law, June 15, 2023.

Generative AI might seem unprecedented, but history can act as a guide.

Consider the 1800s, when photography first appeared. Prior to its creation, the only ways for artists to attempt to depict the world were through sculpture, painting, or sketching. Suddenly, a camera and some chemicals could capture reality in an instant[216].

As with generative AI, many argued that photography lacked artistic merit. In 1884, the U.S. Supreme Court weighed in on the issue and found that cameras served as tools that an artist could use to give an idea visible form; the "masterminds" behind the cameras, the court ruled, should own the photographs they create[217].

Unlike inanimate cameras, AI possesses capabilities – like the ability to convert basic instructions into impressive artistic works – that make it prone to anthropomorphization. Even the term "artificial intelligence" encourages people to think that these systems have humanlike intent or even self-awareness[218].

While artists draw obliquely from past works that have educated and inspired them in order to create, generative AI relies on training data to produce outputs.

This training data consists of prior artworks, many of which are protected by copyright law and which have been collected without artists' knowledge or consent. Using art in this way might violate copyright law even before the AI generates a new work[219].

[216] Ibid.
[217] Ibid.
[218] Generative AI is Minefield for Copywrite Law, op.cit.
[219] Olga Megorskaya, Training Data : The Overlooked Problem of Modern AI, Forbes, June 27, 2022.

Training data, however, is only part of the process. Frequently, artists who use generative AI tools go through many rounds of revision to refine their prompts, which suggests a degree of originality[220].

Answering the question of who should own the outputs requires looking into the contributions of all those involved in the generative AI supply chain.

The legal analysis is easier when an output is different from works in the training data. In this case, whoever prompted the AI to produce the output appears to be the default owner.

But copyright law demands original creative work, and pressing a camera's shutter button does not meet this requirement. How courts will interpret this for the use of generative AI is still up in the air. Is writing and editing a prompt sufficient?

Matters are more complicated when outputs resemble works in the training data. If the resemblance is based only on general style or content, it is unlikely to violate copyright, because style is not copyrightable[221].

The illustrator Hollie Mengert encountered this issue firsthand when her unique style was mimicked by generative AI engines in a way that did not capture what, in her eyes, made her work unique. Meanwhile, the singer Grimes embraced the tech, "open-sourcing" her voice and encouraging fans to create songs in her style using generative AI[222].

[220] Ibid.
[221] Ibid.
[222] Generative AI is Minefield for Copywrite Law, op.cit.

An output may violate a work's copyright if it includes significant portions of that work from the training data. The Supreme Court recently decided that fair usage did not apply to Andy Warhol's drawing of a photograph. Thus, merely applying AI to transform a piece of art—from, example, a photo to an illustration—does not grant the creator ownership of the altered product[223].

Like cameras, paintbrushes, or Adobe Photoshop, generative AI is really simply another creative tool that opens up the process of creating images to a new audience. However, a significant distinction is that since this new collection of technologies specifically depends on training data, it is difficult to attribute creative contributions to a single artist[224].

On September 12, several French lawmakers from the *Assemblée nationale* presented a law proposal to the Presidency which has the objective of reform some norms in existing copyright law. The preamble outlines the objective of the law, which is to *"*protect authors and artists of creation and interpretation based on a humanist principle, in legal harmony with the Intellectual Property Code[225]. *"*

Art. L321-2, which deals with collective management groups, is modified by Article 2. For those who are not familiar with the word, these are organizations—like PRS for Music or ASCAP—that manage rights on behalf of rightsholders collectively. This article gives the impression that the entire legislation is an attempt at territorial control by collective societies, which might even make some of the most fervent AI opponent's recoil. The first part of the article reads:

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[223] Anthony Sarkis, Training Data for Machine Learning, O'Reilly Media, 2023.
[224] Ibid.
[225] Andre Guadamuz, French Lawmakers Propose New Copyright Law About Generative AI, Techno Lama, September 24, 2023.

“When the work is created by artificial intelligence without direct human intervention, the only rights holders are the authors or assignees of the works that made it possible to conceive the said artificial work[226].”

First off, there is power in the phrase "work" in copyright. Throughout the legislation, copyrighted works are designated with "l'oeuvre" in French. By providing them with protection, its inclusion here tacitly acknowledges that AI outputs are copyrighted works. This exceeds even UK authoring guidelines. The definition of AI as works produced "without direct human intervention" is the second noteworthy point. This is an odd way to put it because almost every work has some human involvement at some point. The third and most difficult part of this paragraph is when it transfers ownership of the work (which is currently copyright protected) to the authors or assignees of the works that made it possible to create the artificial work in question[227].

The ways in which existing laws are interpreted or reformed – and whether generative AI is appropriately treated as the tool it is – will have real consequences for the future of creative expression.

2.2 Recent Cases on AI Generated Work

[226] French Lawmakers Propose New Copyright Law About Generative AI, op.cit.
[227] Ibid.

Some creators and companies believe their content has been stolen by generative AI companies, and are now seeking to strip these companies of the protective shield of fair use in a series of pending lawsuits.

One such company is Getty Images, which is suing Stability AI (the company behind Stable Diffusion) for copying and processing millions of images that are protected by copyright, as well as their associated metadata owned by Getty Images, without getting permission or providing compensation[228]. TikTok recently settled a lawsuit with voice actress Bev Standing, who claims the company used her voice without permission for its text-to-speech feature[229].

Artists Sarah Anderson, Kelly McKernan, and Karla Ortiz, who employ Stable Diffusion to create their images, are the targets of a class-action lawsuit alleging copyright infringement against Stability AI and Midjourney. A crucial element in the debate about fair use is raised by the lawsuit, which contends that the works of these artists were improperly used to educate Stable Diffusion and that pictures created in their likenesses directly compete with their own creations[230].

"Until now, when a purchaser seeks a new image 'in the style' of a given artist, they must pay to commission or license an original image from that artist. Now, those purchasers can use the artist's works contained in Stable Diffusion along with the artist's name to generate new works in the artist's style without compensating the

[228] Blake Brittain, Getty Images Lawsuit Says Stability AI Misused Photos to Train AI, Euro News, 6 February 2023, https://www.euronews.com/next/2023/02/06/getty-images-ai-lawsuit, accessed 10 September 2023.
[229] Jacob Kastrenakes, Tiktok Settles Lawsuit With Actress Over its Original Text-to-speech Voice, The Verge, 30 September 2021.
[230] Jocelyn Noveck and Matt O'Brien, Visual Artists Fights Back Against AI Companies For Repurposing Their Work, The Press Democrate, August 31, 2023, https://www.pressdemocrat.com/article/entertainment/visual-artists-fight-back-against-ai-companies-for-repurposing-their-work/#:~:text=The%20case%20was%20filed%20in,and%20the%20online%20gallery%20DeviantArt., accessed 10 September 2023.

artist at all," the complaint reads. "The harm to artists is not hypothetical — works generated by AI image products 'in the style' of a particular artist are already sold on the internet, siphoning commissions from the artist's themselves[231]."

AI businesses are being sued by people for copyright. ChatGPT uses data from the internet for training, but it does so without the creators' consent. For instance, among other resources, Reddit and Wikipedia were used to train the GPT-3. Nonetheless, discussions on and excerpts from copyrighted works may be included in the training material, providing big language models with sufficient context to effectively summarise those copyrighted works[232].

On a bigger scale, lawsuits are being filed because AI is an opaque system, making it hard to understand its inner workings. There is concern that individuals may utilise AI as a means of evading accountability for their choices or the outcomes it generates.

Numerous cases have been brought against generative AI companies regarding copyright and misuse. Here are some of the companies being sued.

GitHub, Microsoft and OpenAI

A class-action suit was filed against these companies involving GitHub's Copilot tool. The tool predictively generates code based on what the programmer has already written. The plaintiffs allege that Copilot copies and republishes code from GitHub without abiding by the requirements of GitHub's open source license,

[231] Ibid.
[232] Ben Lutkevich, AI Lawsuits Explained : Who's Getting Sued?, 4 August 2023, https://www.techtarget.com/whatis/feature/AI-lawsuits-explained-Whos-getting-sued, accessed 10 September 2023.

such as failing to provide attribution. The complaint also includes claims related to GitHub's mishandling of personal data and information, as well as claims of fraud. The complaint was filed in November 2022. Microsoft and GitHub have repeatedly tried to get the case dismissed[233].

Stability AI, Midjourney and DeviantArt

In January 2023, a complaint was made against these vendors of AI picture generators. The plaintiffs claimed that by using their own works as teaching material and producing unapproved derivative works, the systems directly violated their copyrights. The instruments' ability to produce art in the manner of artists is another point of contention in the case. William Orrick, the case's judge, stated he was leaning towards dismissing the complaint[234].

Stability AI

In January 2023, Getty Images issued a complaint against Stability AI for allegedly copying and processing millions of images and associated metadata owned by Getty in the U.K. Getty filed another lawsuit against Stability AI in the U.S. District Court for the District of Delaware days later, which raised many copyright- and trademark-related claims, and pointed to "bizarre or grotesque" generated images that contained the Getty Images watermark and, therefore, damaged Getty's reputation[235].

OpenAI

[233] Thomas Claburn, GitHub, Microsoft, OpenAI Fail to Wriggle Out of Copilot Copyright Lawsuit, The Register, 12 May 2023.

[234] Katyanna Quach, Judge Lets Art Trio Take Another Crack at Suing AI Over Copyright, The Register, 21 July 2023.

[235] Ridhhi Setty, Getty Images Sues Stability AI Over Art Generator IP Violations, Bloomberg Law, 2 February 2023.

Authors Paul Tremblay and Mona Awad are suing OpenAI for allegedly infringing on authors' copyrights. Butterick is one of the attorneys representing the authors. The complaint estimated that more than 300,000 books were copied in OpenAI's training data. The suit seeks an unspecified amount of money. The case was filed in June 2023[236].

Meta and OpenAI

In her complaint against Meta and OpenAI, Sarah Silverman claimed that ChatGPT and Large Language Model Meta AI (Llama) had been trained using her work that had been obtained illegally. According to the lawsuit, the books were obtained through torrenting them from shadow libraries like Bibliotek, Z-Library, and Library Genesis. One popular way to get files without the required legal authorization is through torrenting. According to a publication from EleutherAI, the company that put together the Pile, Meta's language model, Llama, was specifically trained on a data collection called the Pile, which contains data from Bibliotek. July 2023 saw the filing of the lawsuit[237].

Google

A class-action lawsuit is being brought against Google for alleged misuse of personal information and copyright infringement. Some of the data specified in the lawsuit includes photos from dating websites, Spotify playlists, TikTok videos and books

[236] Alexandra Tremayne Pengelly, Mona Awad and Paul Tremblay are the Latest Creatives to Sue Over A.I., Observer, 7 July 2023.

[237] Winston Cho, Authors Sue Meta, OpenAI in Lawsuits Alleging Infringement of Hundreds of Thousands of Novels, 12 September 2023.

used to train Bard. The lawsuit, filed in July 2023, said Google could owe at least $5 billion. The plaintiffs have elected to remain anonymous[238].

These copyright cases against big tech companies aren't the first of their kind. In 2015, the Author's Guild sued Google for making digital copies of millions of books and providing snippets of them to the public. The court ultimately favored Google, saying the works were transformative and did not provide a market substitute for the books[239].

3. Copyright Ownership if AI Was The Author

Who owns copyright to a work produced by AI assuming that AI is the "author". Ownership issues might be complex and there might even be cases where multiple parties are associated with AI and try to claim copyright for its work.

Assuming the 'originality' requirement is satisfied in respect of an AI-produced work, can the intelligent agent, a non-human being, be regarded as the 'author'? The Romantic theory of authorship holds that authors imbue a part of their personality into their creative works, and thus if a work is attacked or modified, it aggrieves the author's soul. The Lockean theory of copyright, on the other hand, is premised on the view that authors should be rewarded for their efforts spent in creating works. Both theories are based on the assumption that authors are human beings[240].

[238] AI Lawsuits Explained : Who's Getting Sued?, op.cit.
[239] AI Lawsuits Explained : Who's Getting Sued?, op.cit.

[240] Margot E Kaminski, 'Authorship, Disrupted: AI Authors in Copyright and First Amendment Law, 2017, UC Davis Law Review, Vol 51, 589.

In other words, the question to be considered is whether ‘originality’ of a work must be traced back to a human entity.

AI is not only a novel tool in the IT industry, but it has also demonstrated the ability to perform tasks that, until recently, only humans could perform. Now, when AI is involved in the invention, regulations that have long protected humans and their intellectual property are showing to be insufficient. Copyright issues pertaining to writings, photographs, and other types of art produced by AI models with human input are a hot topic in the legal community[241].

The ambiguity surrounding human involvement and intents, the training data the AI tool could have utilised to develop the output, and the numerous ownership-related concerns are the key reasons why copyrighting AI-generated content is difficult[242].

Numerous creative works that are shielded by copyright restrictions are among the data used to train generative AI. In most cases, these works were added to the AI system's training without the creators' knowledge or approval.

3.1 Programmer of the AI as The Owner

AI systems are often designed and trained by human programmers or developers. The foundational algorithms, data sets, and parameters that allow the AI to produce works on its own are supplied by these programmers. In these cases, copyright law

[241] Aviv Gaon, The Future Of AI In The Age of Artificial Intelligence, Edward Elgar Publishing, 2021.
[242] Ibid.

typically recognises the human creator as the proprietor and views the AI as an adjunct or tool for their artistic expression.

Sometimes contracts are used to handle copyright ownership of works created by AI. The parties engaged in the creation and application of AI systems may agree on particular conditions pertaining to copyright ownership. These contracts may specify shared ownership, ownership passed to the AI system, or ownership retained by the human programmer. Additionally, licencing models may be used to compensate both the AI system and the human creator for the commercial use of AI-generated works. Naturally, the situation has changed after it has been created and is subject to the writers' chosen legal system[243].

The programmer of the AI and the user of the program/AI are the two most obvious and strongest options for the ownership of copyright. When a programmer creates an AI/program, he/she then has the copyright for that AI as computer programs are protected by copyright. The given AI is the programmer's creative work. Now, it could be considered that everything the AI creates is just an extension of the programmer's individual and creative work[244].

The end-user as the owner of the copyright might be ruled out only if the work created is repeatable and the required user input is limited, like it was mentioned above[245]. This point of view is not without problems. Even if the fictional AI would only be a creative work of its programmer and everything it creates would only be an extension of the programmer's individual and creative work, the only think the

[243] The Future Of AI In The Age of Artificial Intelligence, op.cit.
[244] Pamela Samuelson, Allocating Ownership Rights in Computer-Generated Works, Berkeley Law, Volume 47, 26-11-2019.
[245] Andrew J. Wu, From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs, Volume 27, 1997.

programmer does is to breathe life on to the AI e.g. writing the code, algorithm, the DNA of the AI.

AI as it exists today would not be a unique, self-aware, self-thinking construct. But when the so-called genuine AI materialises, it will exist independently of both its programmer and the potential end user. All of it is undoubtedly the result of programming, but who could claim authorship over creations made by a sentient, intelligent entity when that could be illegal?[246]

In the end, the question is whether AI is merely a tool, regardless of how sophisticated it may be. By comparing AI to a pen, brush, or guitar, it would be clear that it is merely a tool. Being a tool would contradict the programmer's ownership of the copyright, as the programmer is merely an enabler—through their effort, creation is made possible. However, if artificial intelligence (AI) is to be viewed as something far more than a tool, then it must be endowed with certain rights and responsibilities, such as legal personality.

Currently it would be the most obvious answer that it is the programmer who owns the copyright. He/she has invested massive amounts of time, money and dedication to the creation of AI. In the end copyright is meant to protect innovative new works that have been created. Protecting the works of a programmer does encourage programmers to continue creating new inventions and coding new possibilities[247]. Therefore, it should be the programmer who should own the copyright for the work done by the AI.

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[246] Ibid.

[247] Pierre-Luc Racine, Fostering Expressive Knowledge: The Copyrightability of Computer Generated Works In CANADA, Volume 60, p 80.

3.2 User of The Program as The Owner

Who owns the copyright when a programmer creates an AI for a customer? Is it the programmer or the end-user of the product? A plaint example could be that an AI program has been designed for a certain customer. Said customer then uses this AI to create a new work, maybe just by pushing a button or inputting certain instructions etc. Is it not the user in this example who has created the work even though via AI? Programmer might still own the copyright to the AI-program itself, but that copyright does not extend to the works created by the program.

Here, the user assumes the role of the instructor, and the AI programme is merely an instrument or subordinate that carries out commands to produce new work. The source of the issue is whether the user's expression of creativity justifies their ownership of the copyright. Insufficient user input may even make it insignificant who ultimately presses the button to start a new piece of work[248].

A user like this could be likened to Naruto's monkey, who used the remote triggers to take the infamous monkey selfie. It's also possible that the user applies the programme in ways that neither he nor anyone else could have imagined, so the user employs his imagination to produce something entirely new. At that point, the program's use ought to surpass the level of inventiveness necessary to qualify for copyright[249].

On the economical side this option could be seen and even encourage freeriding at the expense of the programmer. This would then be demoralizing for programmers

[248] From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs, op.cit.
[249] Allocating Ownership Rights in Computer-Generated Works, op.cit.

and even for investors in a larger scale[250]. Even so, the programmer and end-user or the joint authorship of these parties can be seen to have the strongest claims for copyright in the current state of legislation.

3.3 Joint Authorship

Since there would be no disagreement between the parties, joint authorship might resolve a number of copyright issues. Joint authorship is not restricted to two authors; theoretically, an infinite number of authors may be involved provided their combined creativity, intention, and somewhat similar contributions resulted in the development of the work in question. In the arena where romance writers are still prevalent, joint authorship appears to be a novel concept. Collaborative writing also seems like a democratic solution to the entire copyright issue, with each person being judged on their own merits[251].

The contribution is the issue; each person's role should be apparent from the task or from the procedure. It is not always sufficient for one person to communicate a concept or idea that eventually inspires another to create a new work of art. This kind of circumstance typically doesn't result in joint authorship[252].

By giving copyright to the programmer, the end user, and the AI collectively or to a combination of two of these three potential owners, joint authorship could resolve the issue. It couldn't possible have intention, at least not in its current state, as was

[250] Tim Dornis, Reap The Benefits and Avoid the Legal Uncertainty: Who Owns the Creations of Artificial Intelligence?, January 2021.
[251] Miika Kekola, AI, Author and Copyright, University of Lapland 2020, p 46-47.
[252] Allocating Ownership Rights in Computer-Generated Works, op.cit.

noted in the AI section. Thus, in theory only, but more likely in practice, may AI be one of the parties to a joint authorship[253].

Is it possible to incorporate AI into a joint authorship even if it lacks intention, legal personality, and is merely a tool? Global legislation would need to be changed for this to happen; AI might contribute as a secondary author. A secondary author might be a writer, but only on a smaller scale. In a hypothetical future where secondary authors exist, copyright might also be allocated similarly to stocks: the largest contributor would logically own the largest share, and the remaining copyright would be distributed among side writers according to their individual merits[254].

The entire field of intellectual property rights would be revolutionised by this kind of copyright arrangement. The current concept of the solitary author would persist, but joint authorship would develop into something far more adaptable. This would lessen the incentive to participate in the creation process even with a small input because even the smallest additions could benefit the contributor.

Because of this divisible copyright, each author would also be entitled to a portion of each related right. The issue with this arrangement is how much each side contributes. Should the secondary author be allowed to make new copies either on their own or with permission from the main author, or should the main author provide 90% of the finished work? Ultimately, this may be the update that copyright needs to keep up with the major changes in order to continue evolving.

[253] Ibid.
[254] Allocating Ownership Rights in Computer-Generated Works, op.cit.

Joint authorship is not without flaws as it is sometimes hard to define who should be rewarded and who should not. This problem can lead you into a never-ending spiral of reasoning.

It has been made abundantly evident throughout this thesis that AI is not permitted to possess copyright, even in cases where AI independently produces a work without assistance from humans. Why should a person have the right to hold a copyright while artificial intelligence isn't allowed to own one for its creations? Since humans are not allowed to claim authorship over the works of other humans, why should an AI be any different?

Grimmelmann observes that works created by computers are not fundamentally different from those created by humans, and he suggests that there is no need to establish a copyright theory for computer-generated works at this time. One of his views is that while there is no law governing personal jurisdiction on the Internet, technological advancement may cause new issues, but those issues can be resolved with the resources available today[255].

Is it appropriate to exclude all computer-generated works from the copyright system?

If there will be no author for those works produced by AI, why would anyone create anything with it? This issue produces a contradiction because it appears wrong to provide rights when none are due, and doing so could cause the system to come to a standstill. Given the aforementioned example, it makes sense to provide a right even if it is not justified rather than not to. One could contend that copyrights are a

[255] James Grimmelmann, There's No Such Thing as a Computer-Created work – And It's a Good Thing, Too, Cornell Law Faculty Publications, 2016, p: 415-416.

necessary component of the economy and therefore it is illogical to issue AI copyrights.

A given work should be made public domain as soon as it is created if no one can legally claim copyright to an AI-generated piece. This might be the most sensible and straightforward course of action to follow in order to address the issue with AI-generated works. Making AI-created works public would not undermine the concept of copyright as much as granting copyright to AI or be as inconsistent as granting copyright to a human, as the copyright system is primarily based on the desire to receive financial compensation and security on created works[256].

One could argue that a fictional human author too could be useful in these situations. Timothy Butler is behind this theory of the fictional human author, which states that when a product is created by machine, it should be presumed that behind this creation is a fictional human author. Copyright should in these cases be assigned to the owner of the AI, user, or the owner of the computer or jointly[257].

[256] Intelligent Agents: Authors, Makers, and Owners of Computer-Generated Works in Canadian Copyright Law, op.cit, p. 136.
[257] Timothy L. Butler, Can a Computer be an Author? Copyright Aspects of Artificial Intelligence, Hastings Communications and Entertainment Law Journal, 1982, p: 744.

Conclusion

Comparable to a technology trend that has the potential to reinvigorate the entire world is artificial intelligence. It is therefore nearly hard to establish the existence of intellectual property rights without utilising the concept of artificial intelligence. When recognised AI advances and intellectual property (IP) come together, there are a lot of problems to be handled with regard to disclosure, copyright laws, inventor and owner definitions, and infractions. Most of the models in use today are insufficient to adequately address these kinds of questions. The exponential growth of artificial intelligence (AI) is making systems more complicated, and the current legal framework cannot keep up with the rapid pace of technological development.

Nevertheless, increasing knowledge and recent revelations have breathed new life into this challenging process. Since the world is going to keep changing and getting more complex, established norms need to acknowledge technology as soon as possible. In light of the complex nature of artificial intelligence (AI), the World Intellectual Property Organisation (WIPO) and other organisations are having talks to support intellectual property (IP) legislation. It is obvious that in order for technology to progress, intellectual property (IP) laws that can protect advancements in machine learning and artificial intelligence (AI) are needed.

The interaction between artificial intelligence (AI) and intellectual property rights (IPRs) is one of the key areas of development in intellectual property law. After much, albeit selective, debate, it seems to be gaining increasing practical relevance through intense AI-related market activity, an initial set of case law on the matter, and policy initiatives by international organizations (e.g. WIPO, EPO) and lawmakers.

After stating an overview of the thesis, the following recommendations were made:

A clear legal definition should be made for AI as it should be covered in laws because AI tools are developing and are a part of our daily routine at both personal and work levels.

At the very least in the droit d'auteur regimes, copyright law ought to be based on the notion of human authorship. Therefore, even though literary and artistic creations produced by AI systems devoid of human input qualify as creations under copyright law, copyright protection should not be granted to them. The recognised standards of human creation are applied in order to reach this outcome. In addition, as long as the human contribution to the work is sufficiently original, copyright protection can be granted for content that has been jointly produced by an AI system and a human.

The law should consider allowing corporations and other legal entities to acquire initial ownership of (AI-generated) patents and patentrelated IPRs (e.g. utility patents, but not copyrights), at least in cases of AI inventorship.

Future studies should provide a revolutionary software IP protection framework that could take the place of the two-tiered system in use today. Software is not sufficiently protected under the present IP system. Its primary tools, copyright and patent protection, do not work together perfectly. Over time, the regime has changed as a result of efforts to somehow integrate software protection into the established intellectual property system.

Future studies should provide a thorough grid for allocating rights derived from advancements made by AI systems. One important effect of severing the links between AI systems' production of innovative output and natural or legal entities'

ownership of the resulting IPRs is that research needs to develop a more thorough grid for the equitable distribution of intellectual property rights resulting from AI systems' innovations. This pertains to a wide spectrum of intellectual property rights (IPRs) (such as patents, utility patents, design rights, and novel software protection mechanisms), as well as contexts in which AI systems and human individuals or teams engage in complementary innovative activity.

Innovative AI output cannot be automatically rewarded with the same incentives as traditional AI output under the IPR system. AI systems don't need to be rewarded in and of themselves. It is not necessary for effective and efficient incentives to be similar to traditional IPR incentives for human inventiveness in order to encourage natural or legal people to build and employ high-quality AI systems, as well as to execute and transact over their innovative output. It might be necessary to reconsider traditional ideas of ownership, and protection might need to be focused more on obtaining financial benefits and operational freedom than on noneconomic ownership rights.

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