

Artificial Intelligence Produced Original Work: A New Approach to Copyright Protection and Ownership

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ABSTRACT

The journey of copyright protection that started with the printing press in the 16th century entered a new era of challenges with the technological advancement of the 21st century. Copyright has rights and enforcement that are grounded in legislative enactments. This paper advocates that A. I.-produced work is original and deserves copyright protection. Artificial Intelligence (A. I.) has emerged as a powerful technology that has enabled the creation and assimilation of new and unique authorship. The amount of work that A. I. is producing in the fields of science, medicine, art, law, and literature is increasing dramatically. This paper addresses the question of why A. I. generated work deserves copyright protection and how it correlates with its ownership. A comparative analysis of the existing copyright laws in various jurisdictions is examined. A rundown of current challenges of digital copyright and future developments are discussed. The paper presents the idea of legal personhood and how it correlates with copyright work ownership. Five traditional ownership options are compared and considered. A hybrid ownership model that gives legal personality to the artificial intelligence (AI) system, its programmer, user, and the company under the umbrella of a legal entity like artificial personality (AiLE) is proposed. In most jurisdictions, legislative changes are required to address and provide a new foundation for copyright protection and ownership of AI. -produced original work. Hence, the need to address the current challenges of digital copyright and its rightful owner is essential in unleashing the true potential and further development of A. I.

Keywords: A. I. generated work, AI legal entity, AI work ownership, copyright for A. I., protection of A. I.

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I. INTRODUCTION

Copyright, in simple terms, is the “right to copy” [1]. In other words, it is the right of the owner of copyright material to allow its production or reproduction or to give permission for the same to anyone else [2]. Traditionally, copyright has rights and enforcement that are grounded in legislative enactments. Copyright laws protect the property rights owner in literary and artistic work against copying and using the original work [3].

Copyright laws history can be traced back to the invention of the printing press in Europe [4]. In the United Kingdom, copyright regulation originally started in 1557 with a Royal Charter giving only the Company of Stationers a legal right to print books [5]. In 1709 the Statute of Anne became the first modern copyright legislation [2]. International recognition and understanding of copyrights were reflected in the Berne Convention for the Protection of Literary and Artistic Works [2]. Canada legislated its first Copyright Act, which was enacted in 1924. The origins of Canadian copyright legislation can be traced back to the U.K. Copyright Act of 1911 [6].

Copyright laws face new and emerging challenges in each successive era of technological development [7]. The journey of copyright protection that started with the printing press in the 16th century entered a new era of challenges with the technological advancement of the 21st century. For example, as photocopiers became common, copying paper and literature became easy. With the public availability of Video Compact Recorders (VCR) and later CD/DVD becoming common, multimedia recording became an easy and accessible medium of copying. Finally, all copyright-protected material can be copied, reproduced, transmitted, and shared at a lot cheaper price and unprecedented speed with internet and software programs [4]. Whereas these technologies have assisted in the production and assimilation of copyright material, it has, at the same time, made the enforcement of copyright all the more difficult.

Copyright laws are a creature of Statute [2], and at times legislative response and adaptation to technological development have been slow. Canada managed to modernize its copyright legislation that addressed the most technological developments of the 20th century by enacting the *Copyright Modernization Act* only in 2012 [7]. By this time, Artificial Intelligence (“A. I.”) had already progressed to a point where it was creating music, literature, and paintings without human

input. Hence, A. I. is yet another emerging front in the ever-evolving field of copyright.

Whereas the technology facilitates the creation of a new and unique kind of “authorship,” it possesses new challenges to copyright legislation. A. I., for that matter, is unique from other innovations in human history. All previous technological innovations served as tools in the hands of humans, whereas A. I. is capable of self-learning and intelligent decision-making processes. Certain types of A. I., namely Machine Learning and especially Unsupervised Machine Learning, can improve their performance and self-learn to achieve superhuman performance on their own [8].

The intelligence and self-learning capabilities of A. I. systems have given it the ability to produce original work that is neither a copy nor based on instructions by a human. An excellent example of such a work is the portrait titled “*Edmond de Belamy, from La Famille de Belamy*” (“Edmond de Belamy”) which was the first A. I.-created painting that was auctioned for \$432,500 in 2018 [9].

With the arrival of A. I. and its ever-increasing intellectual capabilities, the question does arise if the A. I.-produced work qualifies for copyright protection. Further, if A. I.’s made work does qualify for copyright protection, who is the rightful owner of such work? Some of the possible owners of the A. I.-produced work can be the programmer of A. I., its user, or the company that owns A. I., or the A. I. itself, or perhaps no one owns it, and it ought to belong in the public domain. Hence, the protection of A. I.-produced work and its rightful ownership poses a challenging question to Intellectual property enthusiasts and jurists alike [10].

This paper will advocate that A. I.-produced work is an original work that deserves copyright protection, and its actual ownership lies with A. I. stakeholders collectively as a legal entity. There are various types of Artificial Intelligence like Machine Learning, Deep Learning, Expert systems, and Natural Language Processing etc. However, for the purpose of scholarly analysis of copyright protection, the “Autonomous A. I.” systems that can learn without human supervision and render output without a human decision-making process are the ones under discussion and consideration in this paper.

A. I. is becoming a dominant technological force. Some authors have dubbed it the 4th industrial revolution [11]. The amount of work that A. I. is producing in the fields of science, medicine, art, law, and literature is increasing dramatically. Hence, the need to address copyright protection and ownership of the A. I.’s produced work is essential in unleashing this intelligent technology’s true potential and further development.

This paper briefly outlines copyright from a historical, legislative, and common law perspective. A synopsis of A. I.’s history, types, and uses are explored. The paper presents the idea of A. I. legal personhood and how it correlates to copyright work ownership. A rundown of current challenges of digital copyright and future developments are discussed. The question of why A. I.-generated work deserves copyright protection is examined with a comparative analysis of the laws in various jurisdictions. Five traditional ownership options for the A. I. produced work are compared and considered. A sixth hybrid option for the ownership of A. I.-produced work is proposed. Finally, a conclusion with

recommendations for future legislative changes is advocated.

II. COPYRIGHT IN THE MIRROR OF HISTORY

Copyright laws come into existence through the enactment of statutes [2]. The history of copyright legislation can be traced back to the 15th and 16th centuries with the invention and widespread use of the printing press in Europe. As the use of the printing press led to the publication of written material at a mass scale, the British Crown deemed it essential to regulate the material that could and could not be legally printed [12]. Hence an early ambition of the government to regulate the right to produce printed material gave birth to the initial copyright regulation.

The first copyright legislation can be traced all the way back to the *Statute of Anne*, which was legislated in 1710. The *Statute of Anne* was the first legislative enactment in Great Britain, giving legal protection to the publisher for a certain period of time [13]. Various legislative amendments led to the Copyright Act of 1911 in the U.K., which formed the basis of the first Canadian Copyright Act of 1924 [6].

On the international stage, the *Berne Convention for the Protection of Liberty, and Artistic Work* (“*Berne Convention*”) in 1887 laid the basis for an international framework for copyright protection [10]. The most significant agreement on Trade-Related Intellectual Property Rights (TRIPs) took effect in 1995 and provides global standards for copyright and other intellectual property protection [10]. Furthermore, World Intellectual Property Organization (WIPO) plays a vital role in copyright agreement and protection globally.

Canada’s *Copyright Act* [13] sets out exclusive rights of the copyright owner to reproduce, perform in public, publish for the first time, and give permission for any act related to their original work [2]. Essentially, there are three overarching principles of copyright protection legislation. They include Originality, Idea-Expression Dichotomy, and fixation. In this context, copyright protects the expression of an idea and not the actual idea. The court in *Peterson J. ULP v UTP* held:

“*Copyright Acts are not concerned with the originality of ideas, but with the expression of thought... The Act does not require that the expression must be in an original or novel form, but that the work must not be copied from another work—that it should originate from the author*” [15].

This case law eloquently outlines the interpretation of the originality concept in copyright law.

Various case laws have further refined the definition of originality as “*Sweat of the Brow*,” [15] “*More than a mere scribe*,” [16] and “*Is imagination or “creative spark” essential to a finding of originality*” [17]. It is interesting to note that the *Copyright Act* of Canada while outlining original authorship, suggests that the author be a natural person [9]. Nevertheless, the Act does not clearly define either “originality” or “authorship” [9].

For copyright protection, copyright work must exist in some form, which can be divided into two types. The first type of copyright work is the famous LDMA or Literary, dramatic, musical, and artistic work and the second is entrepreneurial works like films, sound recording and broadcasting. LDMA works protection of copyright is for the benefit of authors, writers, composers, artists, and broadcasters. In contrast, the second type of protection of entrepreneurial work is to secure the interest of people who invest in creativity [18].

The Canadian response to the digital challenge came through the *Copyright Modernization Act* in 2012 only [7]. However, it neither addresses nor contemplates the work produced by A. I.

III. THE EMERGENCE OF ARTIFICIAL INTELLIGENCE

Jacob Turner defined A. I. as a non-natural entity having the ability to make choices through an evaluative process [19]. Contrary to the general perception that A. I. is a recent phenomenon. Its history dates back to the 1950s. In fact, Alan Turing published a landmark paper in 1950 in which he contemplated the prospect of creating machines that would be able to think [20]. In 1955, Professor John McCarty of Dartmouth College coined the term “*Artificial Intelligence*” as a science and engineering of making intelligent machines [8]. MIT established a laboratory in 1959 to lead the research on A. I. [20] By the mid-1980s, the expert systems, an earlier identifier for A. I., were extensively used. The market was already above the billion-dollar mark [21].

Although there was a slowdown and reduced funding in the 1990s, A. I. made a comeback in the 21st century [22]. The present rise of A. I. can be attributed to three factors; a) A large amount of available data; b) Efficient algorithms; and c) An increase in computing power [18].

There are various types of A. I. systems, such as Machine Learning, Deep Learning, Expert systems, Natural Language Processing, and Robotics [18]. With time all Ai systems have become more sophisticated and advanced. For example, Machine Learning systems with new and advanced algorithm systems are now outperforming humans in many tasks [8]. Machine Learning and Deep Learning have become successful because of high computing power, better algorithms, extensive data collection, and investment in development by tech giants like Google, Amazon, and Facebook [22]. Machine Learning is increasingly being utilized in health sciences, music, painting, and even driving cars and flying drones autonomously [8].

Hence, autonomous artificial intelligence does not require continuous human input to learn, think or act [23]. In other words, these are A. I. systems where only the humans are responsible for initial coding and programming, but then the Machine learns and renders outputs on its own.

With the A. I. system becoming more sophisticated, it did not come as a surprise when AlphaGo (google A. I. system) won the Chinese Go game, a much more complex game than chess, from Go’s human world champion in 2017 [24]. A survey conducted in 2017 concluded that one in five companies had incorporated A. I. in some offering or

processes. Presently, the uses of A. I.-based applications and programs number in millions [22].

In recent years, A. I. capabilities have increased significantly in copyright-protected areas like music, pictures, and writing. Numerous A. I. systems like Watson Beat, Jukedeck and WaveNet can compose music without human input. For example, Watson Beat can create new music and tracks independently by listening to music for 20 seconds [23]. This results in the composition of original music at a fraction of the cost of the musician’s work [23]. Similarly, DeepDream is an A. I. system that can create unique photographs just by studying random images [25]. Finally, there are A. I.-based systems that can write narratives without any human input, and their sophistication is increasing significantly. This is why Associated Press uses A. I. systems to produce more than 3000 financial reports per quarter [26].

With AI becoming more capable with each passing day, the question naturally arises regarding granting legal personhood to A. I. Although every natural person is a legal personality, every legal personality is not necessarily a natural person. An excellent example of this is the legal person status of a corporation. A corporation is a creation of a statute with similar rights and obligations as of the legal person. It can own, buy, and sell the property. It can be sued and be sued [27]. Similarly, Artificial Intelligence Legal Entity (AiLE) can be given a legal personality status that incorporates various stakeholders of the A. I. system as a stakeholder with authority and liability like those of directors of the corporation [27]. For the purpose of this paper, copyright ownership of A. I.-produced original work by AiLE will be examined.

IV. A. I. PRODUCED ORIGINAL WORK AND COPYRIGHTS

The initial question in the analysis of copyright protection is to ascertain if the A. I.-produced work merits copyright protection. In this context, originality can be considered a universal test for protecting literary and artistic work [11]. If the A. I. produced work is an original expression of an idea, it would merit copyright protection. Canadian Supreme Court addressed the originality issue in the case of *CCH Canadian Ltd. v. Law Society of Upper Canada* (“CCH”) as McLachlin C.J. held:

“The corrects position falls between these extremes. For a work to be “original,” ...it must be more than a mere copy of another work. At the same time, it need not be creative, in the sense of being novel or unique. What is required to attract copyright protection in the expression of an idea is an exercise of skill and judgment...[which] must not be so trivial that it could be characterized as a purely mechanical exercise” [28].

If the CCH definition is applied to the famous A. I.-generated portrait of *Edmond de Belamy*, from *La Famille de Belamy* it may be inferred that this work meets the originality definition outlined in CCH [11]. The A. I. system used its

intelligent learning and decision process to develop this work that sold for almost a half-million-dollar. It is interesting to note that many present-day advanced algorithms and neural network technologies share with humans the following ten characteristics: (1) Innovative, (2) Autonomous, (3) Unpredictable, (4) Independent, (5) Rational-intelligent, (6) Evolving and capable of learning (7) Efficient, 8) Accurate, (9) Goal-oriented, and (10) Capable of processing free choice [11]. The GAN Algorithm used to create *Emond de Belamy* has exactly those very characteristics, and it resulted in a painting that was created by A. I.'s independent learning and decision process. Thus, through the lens of *CHH*, this painting may pass the bar of being more than a mere copy. Further, as it was independent work, it demonstrated A. I.'s exercise of skill and judgment [11].

Consequently, it may be assumed that A. I.-generated work meets the requirement of copyright protection. Nevertheless, Canadian Copyright statutory provisions do require an author to be a "natural person" or "Citizen" [11]. This requirement is essential in many jurisdictions and needs to be addressed because if the expression does not attract copyright protection due to the requirement of human authorship, then the creativity and originality of A. I. work do not matter. Although human authorship may be necessary in the current Canadian Copyright Law, that is not the case in some other jurisdictions.

Oren Bracha has eloquently expressed the contrary view to the notion and requirement of human authorship. He wrote:

"We may sometimes still be talking about originality as the essence of authorship, and about authorial ownership. But all accept that in 'real' copyright law, originality is a minimal requirement that has little to do with the romantic vision and that 'author' is a technical legal term that may mean some legal entity who is not the actual creator" [29].

There are already jurisdictions like the United Kingdom, New Zealand and Ireland that give special ownership provisions for computer-generated work [23]. And the computer-generated work in these instances is work generated by a computer without a human author [23]. In UAE, the Copyright Act does not require the original expression authored by humans to deserve copyright protection [30].

Internationally the *Berne Convention* that came into force in 1887 is an international landmark agreement on copyright protection. It does not explicitly define "author," nor prohibits a non-human expression from copyright protection [30]. Further, the *Berne Convention* guide explains that there is no explicit definition of the author because certain jurisdiction regards natural persons as authors while others do not. Most jurisdictions where copyright laws are applicable consider legal entities as the owners of the copyright-produced work [30].

Further, TRIPs (The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) are an international legal agreement between all the member nations of the World Trade Organization) that establish global copyright protection standards neither explicitly authorizes nor

prohibits non-human or Artificial entity as an author [10]. Similarly, most E.U. member states do not have laws explicitly allowing or forbidding copyright protection for A. I.-generated work. However, in some European countries, including Germany and France, the current legislation alludes to only a natural person being the author of the copyright-protected work [10].

It is important to note that authorship being someone other than a natural person is an evolving concept. There is already sufficient room in international conventions and laws of certain jurisdictions to accommodate non-humans, as the author says, but more clarity is still required.

Hence, A. I.-generated work is not merely a copy but an original work resulting from an articulated and intelligent output process driven by non-humans. If the actual work that A. I. produces results from its self-learning capabilities, then such work cannot have a human author. Hence, AI-generated work may be classified as an original work that attracts copyright protection, though the next question is to whom the copyrights of such work belong.

V. COPYRIGHT OWNERSHIP FOR THE A. I. SYSTEM PRODUCED ORIGINAL WORK

Several options have been discussed in various scholarly articles and books to understand better the proper entitlement of the ownership of A. I. system-produced work. Nevertheless, five options [23] are the most obvious and discussed. These options are:

- 1) A. I. system-A. I. system by itself is the owner of the A. I. generated work.
- 2) Programmer-the programmer or programmers of the A. I. system should be the owner of the A. I. generated work.
- 3) User-the user of the A. I. system.
- 4) Company/Owner-the company that produces or owns the A. I. system; &
- 5) Public domain-A. I. system-produced work belongs in the public domain [23].

This paper advances to the sixth option.

- 6) Hybrid Ownership-Ownership by an Artificial Intelligence Legal Entity, AiLE, embodying the A. I. system, its programmer, user and the company under the umbrella of a legal entity like an artificial personality.

All the options are discussed in detail, as follows:

A. A. I. System

The first option is the most obvious one but the most difficult to comprehend. A. I. systems are intelligent and capable of learning and rendering output without human intervention. Nonetheless, they are not conscious beings. In essence, A. I. can mimic certain operational processes of the human mind, but it does not have the capability of natural subjective consciousness [31]. Therein lies the problem with the ownership of the A. I. system produced original work solely by A. I. itself.

Copyright protection laws are deeply rooted in, among others, the economic, reward and moral theories. These foundational theories do not sit well with the ownership of copyright work by the A. I. system.

The economic theory contemplates that for new work to be created, the expected return must equal or exceed expected expression costs [2]. Or read in another way, it means that the author of the original work should be able to recoup the reward for their work. Understandably, economic rights are a significant driving and motivating force for humans. Nevertheless, the A. I. system at the current level of technological development can neither understand the economic theory nor be incentivized to produce more or better work. Hence the economic incentive in its true sense will be meaningless to A. I. [32].

Further, the moral rights of copyrightable work are deeply embodied in the *Berne Convention*. This is the reason moral rights exist in civil and common law internationally [9]. Moral rights give the authors proper credit and the right not to change their work to prejudice their honor or reputation [33]. An important distinction between economic and moral rights is that moral rights are not assignable [9]. Moral rights remain with the author for a lifetime due to their intrinsic value to the author unless waived. Here again, the A. I. system cannot value the moral rights that are so important to humans.

Another high bar is to amend the statutory requirement of the author to include non-humans. In the U.S., the famous “monkey selfie” case [34] highlights the caselaw development. The U.S. Court of Appeals of the Ninth Circuit upheld the lower court ruling that a non-human does not have standing in case of copyright infringement. Following this case law, the U.S. Copyright Office used the Monkey case analogy to A. I.; its Compendium states that it will not register works created by a “machine or mere mechanical process” that operates independently without human author’s creative participation or intervention [35].

As such granting ownership rights to the A. I. system does not necessarily rhyme with the statutory requirement or the foundational concept of copyright protection. Until autonomous A. I. is developed to an advanced stage of consciousness, giving ownership of copyright work to the A. I. system will be contrary to the goal of copyright origins.

B. The Programmer

The second option can be to grant the ownership right of the copyrighted work to the programmer of the A. I. system. After all, it is the programmer who coded the A. I. system. There are two problems with this proposition. First, just like a parent or a teacher cannot claim copyright ownership of their child or student’s original work, by the same token, a programmer cannot claim the copyright ownership of A. I.-created original work [36]. The programmer may have coded the initial program, but it is the self-learning of the Machine and its ability to apply intellectual capabilities that enable it to produce creative, original work. In this context, Lindsay Paquette, while analyzing the case *Millar v. Taylor* [37], gives an analogy and writes:

“That the “labour” of artificial intelligence cannot be said to be the labor of the A. I. programmer; because it is the application of the autonomous operation of the A. I., not the intellectual efforts of the A. I. programmer, to the effecting of something” [9].

Further, an A. I. system, especially the more sophisticated one, that produces original copyrightable material has numerous programmers doing different types of programming. It is essentially not possible to decide who would own what percentage of copyrightable work, primarily because, in a true sense, none of them directed a specific outcome or result.

A programmer of an A. I. system is not the person who determines the final output of the A. I. system. As such, it would be contrary to copyright principles to attribute ownership to anyone who has not determined the outcome of the work.

C. The User

The third option is for the user of the A. I. system to be granted ownership of the copyright. This option is based on the thought process that the A. I. system is like a tool in the hands of the creator of the original work. The argument is that the user of the A. I. producing the painting is akin to the paintbrush or other tools in the traditional painting of the original work. However, the biggest problem with this premise is that there is a huge difference between the conventional paintbrush and the A. I. system creating the painting. In the first instance, a paintbrush is a tool without the capacity to act on its own, whereas the A. I. systems, like those driven by the GAN algorithm for creating photos and paintings, are capable of independent learning and creation [9]. The users of the A. I. system may have aided in the conception of the work rather than the creation of the work itself [23]. In this scenario, the user would be rewarded for the creation of the work that they did not intellectually contribute. Further, it is possible that the user can let the A. I. system run indefinitely without any creative input and thus be overcompensated or rewarded [23]. Hence, granting the ownership right to the user will be to reward someone who is not an actual producer of that work and contrary to copyright protection laws.

D. The Company/Owner

The fourth option is to grant ownership rights to the owner or company/corporation that owns the A. I. system. The argument in favor of this option is based on the theory of employee and employer relationship and resulting work produced in the course of employment. Traditionally, the “work made for hire” is the doctrine driving support for this option. According to the U.S. Copyright Act, the work made for hire is first owned by the author till the ownership is transferred to the employer [35].

This option may be plausible, but it can monopolize the A. I.-based algorithms in the hands of big corporations with deep pockets [9]. As a result, companies may employ cost-effective A. I. systems to do the work instead of actual human artists. This is precisely the opposite of what copyright law aims to protect and instill [9]. It is also contrary to the public interest doctrine of copyright laws. Consequently, giving exclusive ownership to the corporations that own the A. I.-based original work will ostracise creativity and consolidate the process of creativity and originality in the hands of big corporations.

E. The Public Domain

The fifth option is to have the A. I. system-produced work be made open to the public. Thus, making the public the true owner of the fruits of A. I.-related original work. Lindsay Paquette, while furthering this idea, writes in her paper:

"If the precondition for originality to endure in work is human authorship, and, in the absence of human authorship originality does not exist in such work, and, without the element of originality, copyright is determined to not subsist therein, then it follows that AI-generated works are free of copyright and belong to the intellectual commons or public domain." She further adds, *"doing so could encourage human creativity by bolstering the materials available to human creators in the public domain to use, reuse, incorporate into and mix with, their own intellectual labor and personal expression"* [9].

It is a strong argument, but the biggest drawback with this option is that it is against the incentive and the labor theory of copyright laws. If the public owns the original work produced by the A. I. system, there is little to no incentive or reward for programmers to program or the investors to invest in the A. I.-based technologies. Traditionally, the copyright protection doctrine protects the author's original work so that the author may reap the fruit of his or her labor [10]. An absence of copyright protection may enhance the availability of such work in the short term. Still, it may reduce the incentive of investment, financially and intellectually, in such A. I. systems in the long term and may hamper innovation. Therefore, leaving the A. I. original work in the public domain may be a self-defeating prophecy.

F. The Hybrid Option-Artificial Intelligence Legal Entity

The solution may be combining the strengths while minimizing the traditional models' weaknesses. Hence, a hybrid option preserves the author's right to the original work in a meaningful manner while attributing it to its rightful owners. An option that can address the reward, incentive and ongoing accountability concerns attribution of the copyrightable work. A choice that can address both the problems of intellectual labor and personal expression.

The main problem is that we are mostly trying to answer copyright protection of A. I. system-generated work through the lens of traditional options. The reality is that breakthroughs in digital technologies have brought about a dramatic shift and new challenges to the existing legal regimes [7]. This requires a dynamic approach to evolving technology.

The hybrid option proposes, first and foremost, giving a legal personality to the A. I. system stakeholders under the Artificial Intelligence Legal Entity (the "AiLE"). The AiLE may include programmers, users, companies/owners, and A. I. itself as stakeholders cum shareholders in the AiLE. First of all, this option will address the issue of ownership of the original work. This can be articulated through a unique Stakeholders Agreement that can serve as the governing document of the AiLE. Each of the stakeholders can be granted ownership in the AiLE according to their contribution

to the original work. This option will comply with the international copyright laws of those jurisdictions that allow artificial personalities to have ownership of the original work. Additionally, it will pave the way for legislative reform for the jurisdictions that are still stuck with humans as the owner of work protected by copyright.

Further, it will address the issue of liability and accountability. It is vital to have an identifiable personality to address the legal retribution issue in case of copyright infringement [9]. Assigning the ownership to AiLE for the work produced by A. I. will allow for accountability in case of infringement of any copyrighted material during its programming, training, deployment, use and output stages. This process will bring the A. I.-produced work into the mainstream of work and serve as building blocks for the further development of art, music, and literature.

The foundational theory of economic incentives and rewards will be addressed in this model as well. Since A. I.-produced work will be protected, AiLE will continue to benefit from the work it created, just like human authors. As AiLE will have humans as programmers and users, unlike A. I. alone, AiLE collectively will have the desire and incentive to produce more original work.

When an AiLE is formed collectively by the programmers, users, and companies, it may as well include the artists, writers, musicians, etc., as stakeholders due to their involvement in the training process of the A. I. system. Such a collective entity will provide a mechanism for an equitable monetization of the A. I.-produced work. Further, as it has stakeholders other than a company, the probability of companies monopolizing the A. I. technology will be minimized.

An artificial entity or personality is a concept invented by humans, just like the concept of property itself [38]. A hybrid model that gives legal personality to A. I. systems, users, programmers, and companies such as AiLE may readily address the modern-day dilemma of who should own A. I.-produced copyrightable original work.

VI. CONTRARY VIEW OF A. I. AND A. I. PRODUCED WORK

Renowned scientist Stephen Hawking views the full development of A. I. as an end to the human race [23]. On the other hand, a businessman like Elon Musk has equated the A. I. to that of summoning demons [23]. Nevertheless, the current era of the 4th Industrial Revolution is here whether we like it or not. The age of data-driven technological development where machines can independently learn and intelligently process outcomes is here. Today's most valuable item is the data itself [9], and A. I. is the biggest consumer and utilizer of data.

If warnings by Stephen Hawking and others teach us anything, it is a greater need to regulate A. I. Their warnings highlight their apprehension about the lack of responsibility and accountability related to A. I. systems. These apprehensions are based on the extreme view of A. I. but may very well present a potent argument for not allowing the development of A. I. without regulations. Regardless of the fears, A. I. is proving its usefulness in many spheres of

technological development, including but not limited to music, art, and literature.

Copyright laws are set to protect the author while allowing the progress of science in the public domain [2]. A. I. is already producing and will be creating even more original work that will require copyright protection. The progress of science in the next era may depend on A. I.-produced work. One of the cornerstones of copyright laws is the progress and promotion of knowledge [3]. Realigning the current copyright laws to allow space for the next period of A. I.-produced original work is essential to address the warnings while ensuring the development of science, literature, music, and art.

VII. CONCLUSION

The original work produced by A. I. is everywhere and will be increasing beyond imagination in the future [39]. Whether one recognizes it or not, A. I. will overlap and, at times, replace some of the creative work that humans traditionally did. Copyright protection laws are created and enforced under the provisions of statutes [2]. Nonetheless, current copyright laws in many jurisdictions need to address the new phenomena of A. I. At times, the progression of copyright laws is left to legislation that cannot keep pace with the ever-evolving A. I. technology.

For modernizing copyright legislation, two key questions need to be addressed. First, is the work produced by A. I. an original work and deserves copyright protection? Second, if the work produced by A. I. does deserve copyright protection, then who is the rightful owner of that work? This paper has endeavored to answer both critical questions.

A. I. technology has developed into a system that is capable of self-learning. More specifically, non-supervised Machine learning whereby an A. I. system can learn from the data independently. Like a child who learns over a period by observing, the A. I. system learns by absorbing and assimilating data. Eventually, like a child who may grow up and learn to be an impressionist artist and paint unique works of art, an A. I. system can do the same. Thus, autonomous A. I. systems self-learn and can produce creative and intelligent output without human intervention.

Copyright law jurisprudence emphasizes the importance of the original work for copyright protection. In other words, it should not be a mere copy, and there should be new or creative input in the new work to qualify as original work. A. I.'s ability to self-learn and generate creative, unique output precisely meets the originality test of copyright protection. Hence, the original work created by the autonomous A. I. system ought to have copyright protection.

Most Jurisdictions, including Canada, allow copyright protection for the work produced by a natural person. Some jurisdictions do not specifically define the author, thereby creating room for ownership by an artificial entity. Further, certain jurisdictions specifically give ownership rights to legal entities like corporations. As A. I. is an evolving technology, most jurisdictions will have to update their existing legislation.

Once a conclusion is drawn that A. I.-produced work is an original expression worthy of copyright protection, the

ownership question is the logical next question. The five traditional options for giving ownership of copyright work are the A. I. itself, the user, the programmer, the company, or the public. Each of the conventional five options has some pros and some cons. Yet, these options are considered due to the historical approach to viewing copyright legislation and protection. It is an approach from a time when all new and unique work was created by humans only.

As the A. I. system presents a unique challenge to copyright legislation, it requires a dynamic definition of author and ownership. Creating an artificial entity that amalgamates all the stakeholders involved in crafting A. I.-produced work may answer the ownership question very well. A hybrid option that allows for the creation of the AiLE, an artificial entity, with the programmers, users, the companies and the A. I. itself as its stakeholders, is the key to the puzzle. It is similar but unique to the current artificial personality structure of a corporation that can own property.

Granting ownership rights to a hybrid entity like the AiLE will be a step in the right direction as it will identify the creators of the A. I.-produced work. The AiLE includes everyone to whom the copyrightable work can be attributed. It will also address the liability issue as the human component is present in the ownership. Further, it aligns with the copyright's foundational theories of economics and incentives by assimilating companies, users, and programmers, all of whom will be motivated by these foundational doctrines.

A. I. systems are not another tool in the hands of artists and performers. They are self-learning, self-driven intelligent systems capable of creating original unique expressions, thereby attracting copyright protection. Since copyright is a creature of legislation, new and dynamic legislation is required. In most jurisdictions, legislative changes are needed to address and provide a new foundation for copyright protection and ownership of A. I.-produced original work.

CONFLICT OF INTEREST

Author declares that he does not have any conflict of interest.

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