Promoting Knowledge: A Rationale for the Copyright Protection of Computer-Generated Works

By

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Abstract

Artificial intelligence systems can now produce complex artistic and literary works without human authorial contribution. However, considering the absence of authorship, they are currently not covered by copyright law. In past decades, many scholars argued for their protection but did not thoroughly address their claim under a copyright rationale. Building on this literature, this paper will propose a more comprehensive policy framework for the copyrightability of computer-generated works. It will analyze the Canadian Copyright Act under the foundational principle of the advancement of knowledge, which lies in its economic purpose. This objective focuses primarily on the extrinsic features of works, superseding the ambiguous notion of creativity and thus relegating authorship to a secondary role. Since computer-generated works also share with the public “expressive” knowledge, this paper will suggest allocating exclusive economic rights to the persons who arrange them. It can incentivize these persons to contribute to the promotion of knowledge.
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Chapter 1
Introduction

With new breakthroughs in artificial intelligence (AI) research, AI systems are now able to make decisions and adapt themselves to their environment similarly to human behaviour. Self-driving cars and automated medical diagnoses are both examples of technologies benefiting from the recent progress that will likely permeate our everyday life soon. More than emulating our physical and mental efforts, it appears that some AI systems can also mimic our emotional intelligence, something that deeply relates to our uniqueness as living beings. For instance, without any human creative participation, they can produce complex literary and artistic works such as poetry, short stories, paintings, and music. The quality of some works generated by computers is even comparable to the ones authored by skilled humans. It is not foolish to expect that, in the near future, bestselling novels could be written by trained software, movie soundtracks could be composed by algorithms, and the next

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Chagall could be a droid.\textsuperscript{5} Artificial intelligence definitely challenges the status of artistic works in society.

As this paper will expose by examining the scope of the copyright regime, AI especially destabilizes the very idea of creation, an activity that has always been exclusive to humans’ genius. Despite their extrinsic qualities, it is not clear whether copyright law boundaries can encompass computer-generated works. Copyright protection has been historically granted in creative works authored by humans. For this reason, some scholars are skeptical about the extension of copyright law to these works, while many others advocate for their inclusion due to their perceivable “expressive” features. However, scholars supporting the protection of computer-generated works have not yet managed to thoroughly justify their inclusion under a copyright law rationale. Deciding how to regulate such works may be crucial to clarify the situation for both investors and consumers, but it is even more essential to carefully analyze this issue in the light of the objectives of the copyright law.

In this paper, I will assert that including computer-generated works in the scope of the Canadian Copyright Act is justified, grounding my claim on its founding objective: the advancement of knowledge. For this purpose, I will first demonstrate that works produced by artificial intelligence systems do not include a sufficient human creative contribution to be covered by the current copyright law, though it may be possible to amend the Copyright Act to include them. Over the years, copyright law has been enlarged several times to include new kinds of works and protection rights. The historical flexibility of copyright has arguably animated scholarly debates on the inclusion of computer-generated works which have themselves engendered a substantial literature. Therefore, considering the Canadian

\footnotesize{\textsuperscript{5} See e.David. “Project”, online: \url{http://graphics.uni-konstanz.de/eDavid/?page_id=2}.}
copyright tradition, I will then discuss the articles from Anglo-American jurisdictions, particularly the United States, the United Kingdom, and Australia. Incidentally, since few scholars considered this question under the perspective of Canadian law, this paper is an interesting addition to the existing literature. The review of the literature will mainly reveal its limitation regarding the justification of the protection of computer-generated works under a copyright rationale. Some articles do provide arguments based on a copyright rationale to justify the inclusion of these works in copyright law, but they only explore them very briefly. Hence, to firmly anchor the protection of computer-generated works in copyright objectives, I will propose a more comprehensive policy framework. I will analyze copyright law under the foundational principle of the advancement of knowledge which was recently revived by some scholars, applying their frameworks in the context of computer-generated works. This objective is contained in the economic purpose of the Canadian Copyright Act and was explicitly pursued by its spiritual ancestor, the British Statute of Anne. Under the advancement of knowledge, copyright aims to encourage the production and distribution of

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creative works valuable for the society which allows a more objective analysis of its scope.\textsuperscript{10} In fact, it focuses primarily on the extrinsic features of works, superseding the ambiguous notion of authorial creativity and thus relegating authorship to a secondary role. Since computer-generated works also share with the public “expressive” knowledge, I will thus argue that it may be reasonable to allocate limited economic rights to the persons who organize the generation of works by AI systems, namely the arrangers. There may be a social cost to granting these persons exclusive economic rights, but it would incentivize them to contribute to the promotion of knowledge in distributing such works.\textsuperscript{11} This paper will progress as follows.

In chapter II, I will first survey the history and the evolution of the technologies underlying AI systems, especially the ones producing artistic and literary works, to determine the degree of human contribution in the creative process of computer-generated works. Despite the technical challenges of explaining the detailed functioning of such systems—in fact, even computer scientists cannot explain the whole process—it will provide sufficient insight to conclude that works created by AI systems are not authored by humans.

In chapter III, I will review Canadian copyright law and assert that computer-generated works are still not protected. Under the current regime, only human authors can fulfill the originality criterion required to gain copyright protection.\textsuperscript{12} Nonetheless, the absence of human authorship does not necessarily preclude the expansion of the Copyright Act to works lacking human input. As I will suggest, copyright law has always been flexible to incorporate

\textsuperscript{10} Madison, supra note 8 at 824; Durham 2004, supra note 8 at 124.


works created with the support of the inventions of the time (e.g., photography, sound recordings, and cinematographic works). Moreover, some rights are even allocated to non-authors. For these reasons, it is conceivable that the Copyright Act can encompass computer-generated works, though it has to be justified by its objectives.

In chapter IV, to circumscribe the debate on the copyrightability of these works and clarify the contribution of this paper, I will then survey the Anglo-American literature on this question and its surprising emergence almost forty years ago. Starting in the early 1980s, the first scholarly articles mostly support the inclusion of computer-generated works in copyright law. For many, computers were still considered as tools for assisting humans in their creative endeavours. However, over the years, the understandings of AI technologies and copyright originality have evolved and doubts about the actual human contribution grew amongst scholars. Nevertheless, it did not prevent several scholars from continuing to propose frameworks for their inclusion in copyright law. They mainly rely on their similarities with human-authored ones and claim that such measures have already been taken by some countries such as the United Kingdom. Their arguments may be thoughtful, but

14 Ong, supra note 13 at 255; Vaver, supra note 12 at 97.
15 See Tawfik, supra note 6 at 35 (on Canadian legal tradition).
they only very briefly discuss the justification of their inclusion under copyright law objectives.

In chapter V, building on this literature, I will thus propose a more comprehensive rationale for the protection of computer-generated works based on the advancement of knowledge. First, I will undertake this question by discarding theories ground on the genius of human authors. The labour theory, the personality theory and the communication approach all consider that authors have a natural right in their intellectual creation.19 Human authorship is the touchstone of these theories, so it is clear that they cannot support the inclusion of computer-generated works in the copyright realm. Instead, I will suggest that if computer-generated works have to be included in the copyright scope, it must be under the economic theory.

Furthermore, as supported by many scholars, I will argue that the Canadian Copyright Act is especially based on the economic theory.20 In the past decades, the importance given by the courts to human creativity may have confined in its shadow this main purpose.21 Nonetheless, more than incentivizing human authors to be creative, Canadian copyright law is mainly a collective policy, rooted in the British tradition, striving to enhance public welfare.22 More precisely, I will claim that copyright should aim at the advancement of

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21 See CCH, supra note 12.
22 Bannerman, supra note 6 at 18, 24.; Tawfik, supra note 6 at 35, 43.
knowledge: an objective that can be traced back to the *Statute of Anne*, the first modern copyright law adopted by England in 1710.\textsuperscript{23} It places the “expressive” knowledge shared by creative works in the centre of the copyright analysis.\textsuperscript{24} It focuses on the perceivable original features of creative works, which are the most valued by society. Therefore, since computer-generated works can comprise as much “expressive” knowledge than human-authored ones, their protection may be compatible with this copyright policy.

However, exclusive rights on a work are a social cost and cannot be imposed if they do not bring any benefit to society.\textsuperscript{25} In this sense, some may argue that AI systems can hardly be incentivized by such rights and no human author participates in the creative process. On the other hand, like some scholars, I will claim that, although humans don’t have involvement in their creation, some still have the power to arrange, publish, and distribute them to the public. Thereby, I will suggest the granting of limited economic rights, under a regime akin to neighbouring rights, to the persons who arrange the production of computer-generated works.\textsuperscript{26} These “arranger’s rights” would both acknowledge the absence of authorship and encourage these persons to make them available to the public and thus participate in the advancement of the knowledge.

\begin{flushleft}
\textsuperscript{23} Tawfik, *supra* note 6 at 44-45; Sheridan, *supra* note 9 at 48; Deazley, *supra* note 9 at 13-14.
\textsuperscript{24} Durham 2002, *supra* note 8 at 618; Madison, *supra* note 8 at 851.
\end{flushleft}
Chapter 2
Artificial Intelligence: The Creative Machine

In this chapter, I will discuss the evolution of AI systems in the past decades. It is first essential to understand the nature of artistic and literary works created by computers and thus the technology underlying their existence to determine their copyrightability. It is true that new algorithms are complex and researchers still don’t understand their functioning well, but it would still provide insights on the nature of computer-generated works. It will at least unveil their “expressive” value and the degree of human authorial contribution in their production.

2.1 Artificial Intelligence: Definition and Background

An AI system can be defined as a system that can “make computers, do the sorts of things that minds can do”. To emulate human behaviour, such a system should have the capacity to perform a task by making an adequate analysis of the information it receives. For instance, a machine that can assemble words to produce readable texts can be considered as an AI system since it simulates the skills of a human writer. Nonetheless, replicating the human mind is not something simple to achieve.

Artificial intelligence has a long history of struggles and disenchantments. Many concrete applications of artificial intelligence have been found in the recent years, but it has been a topic of interest for researchers for more than sixty years. In fact, this term was coined back in 1956 by John McCarthy in the proposal for the now famous “Dartmouth Workshop,” a

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28 Boden, supra note 27 at 1.
29 Kaplan, supra note 1 at 5.
conference that had gathered experts of many fields to share their ideas for the development of “intelligent machines”. However, the technology at that time suffered from important limitations. The first “intelligent” systems wisely used symbolic logic in order to translate tasks into a readable form for the computer, but such programs had to generate all possible combinations to find the answer. While it could be efficient to prove simple theorems, it was impossible for such systems to analyze all the possibilities of complex problems.

2.1.1 1970s-1980s: The Expert Systems

It is only in the mid-1970s that researchers developed “expert systems” that could emulate the knowledge and reasoning of a human expert in a precise domain. They can be considered as the first effective AI systems. Based on the same premise of the early systems, researchers still assume that “intelligence” can be reached by depicting a problem with logical rules. The main difference is that, contrary to their predecessors, they rely on a knowledge base that allows them to prospectively exclude some combinations. In addition to the logical rules inserted in the program, their decisions are also construed by the conditional statements in their knowledge base.

32 Bostrom, supra note 30 at 7-8.
34 Russell & Norvig, supra note 33 at 22-24.
Expert systems do not become knowledgeable magically. Programmers have to code all the information that can help them to accomplish their tasks. To make sure that rules in the knowledge base are aligned with the state of art in the domain covered by the system, they need to collaborate with human experts in the area.\(^{37}\) They have to integrate the logic behind the field of expertise into the system. For example, in the building of an expert system that can write short stories, programmers have to include the English vocabulary, the syntax rules, and the narrative rules in the knowledge base. Unless they are experts themselves, they should consult linguistics and English scholars to develop such rules. If successful, this expert system will be able to make deductions from the rules in the database and provide enjoyable stories to the reader.

Such systems have actually been used to generate quite conclusive literary and artistic works. They have notably participated in the creation of books such as “The Policeman's Beard is Half Constructed,” generated by the program RACTER in 1984, and “Just This Once,” created by the software built by the programmer Scott French in 1993.\(^{38}\) While Scott French’s software wrote only a quarter of the novel independently, William Chamberlain, the co-programmer of RACTER, insisted that the book produced by his software “has been proofread for spelling but otherwise is completely unedited”.\(^{39}\) Similarly, Ray Kurzweil built his “Cybernetic Poet” based on this technology. A “language model incorporat[ing]...
computer-based language analysis [...] and a set of parameters” enables his system to generate new poems.

Furthermore, the “genius” of both AARON, a robot that can paint in vivid colour, and Emmy, a music composer that can emulate the style of Mozart, have both been based on expert systems. Developed since the 1970s, AARON has the ability, in its latest version, to draw and add colour to pictures solely by running the program, without any human manipulation. It uses the knowledge of his programmer, Harold Cohen, an artist who has continually improved AARON’s artistic talent by adding new rules to his system. For its part, created in the 1980s, Emmy is a rule-based program that can analyze and break down music to produce new pieces inspired by the style of the greatest composers. In less than an hour, it could independently produce “5 000 original Bach chorales.”

However, despite their outstanding contribution to the advancement of artificial intelligence technology, expert systems have obvious limitations, the main one being the difficulty for programmers to manually code all the rules of the system. It is burdensome to write

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42 Boden, supra note 27 at 71.
43 Garcia, supra note 41.
44 Frida Garza, “The Quest to Teach AI to Write Pop Songs”, Gizmodo (19 April 2018), online: <gizmodo.com/the-quest-to-teach-ai-to-write-pop-songs-1824157220>.
45 Adams, supra note 41.
46 Alpaydin, supra note 37 at 50.
complex tasks using only logical inference and to constantly update the knowledge databases to improve systems’ performances.47

2.1.2 The 2000s: Neural Networks and Machine Learning

At the turn of the century, expert systems constraints were tackled by the development of a new kind of AI system, this time based on neural networks.48 Instead of relying purely on symbolic logic, this approach is inspired by the interaction of animal neurons.49 Neural AI systems comprise a network of artificial neurons into which information is spread and gradually transformed to produce the desired output. It is a simplified emulation of the functioning of our brain. The latest technological advancements only concretized the promises of neural networks as the method of choice for the development of future AI systems.50

Indeed, recent findings offer solutions to the conception of multilayer networks which enable a more powerful technology known as “deep learning”.51 The performance of neural AI systems lies in its number of layers. Neuron from a single layer can only achieve simple tasks, but jointly with neurons from subsequent layers, they can accomplish excessively more complex ones.52 In accumulating the completion of simple tasks, the layers are able to solve difficult problems. For example, researchers can build a neural AI system that has the capacity to recognize great paintings. When performing this task, artificial neurons from the input (first) layer will each analyze a “pixel” of the painting and, then, neurons from the

47 Boden, supra note 31 at 94.
48 Russell & Norvig, supra note 33 at 29.
49 Franklin, supra note 30 at 15.
50 Boden, supra note 27 at 89.
51 Kim, supra note 35 at 53; Boden, supra note 27 at 88-89.
second layer may detect some lines in the pixels. Finally, neurons from the last layers will gradually define the shapes, so the output (last) layer can establish that it is the figure of a young woman that correspond to the “Girl with a Pearl Earring” by Vermeer.\textsuperscript{53}

The great advantage of multilayer neural networks is that they have the ability to learn by themselves.\textsuperscript{54} Such AI systems would be impossible to build if a programmer had to code all the interactions between the artificial neurons. Unlike expert systems, the programmer doesn’t have to carefully determine most of the parameters of the program.\textsuperscript{55} Neural systems learn how to perform a task by being trained with external data on which they will develop their algorithm.\textsuperscript{56} For instance, in 2016, a team of engineers used this method to create an AI system that can generate works in the artistic style of Rembrandt. Their AI system has processed the original works from the famous painter to “learn” from the Dutch master himself. By identifying patterns in the masterpieces, it has produced an algorithm enabling the perfect emulation of Rembrandt’s technique. The painting made by the system at the end of its development, which was titled “The Next Rembrandt”, is astonishing: even the texture of brushstrokes is mimicked.\textsuperscript{57}


\textsuperscript{54} Alpaydin, supra note 37 at 107; Jordan & Mitchell, supra note 53 at 255.

\textsuperscript{55} Alpaydin, supra note 37 at ix, 50.

\textsuperscript{56} Jordan & Mitchell, supra note 53 at 255; Bostrom, supra note 30 at 9.

This process is named machine learning. Its objective is to make an intelligent system capable of inferring by itself “general rules or behaviors from a number of specific concrete experiences”. For instance, by analyzing Rembrandt paintings, the AI system at the source of “The Next Rembrandt” had defined general rules on their visual aspects such as the light, shade, colours, and composition. This technique is particularly useful when programmers seek an output (such as the making of a new Rembrandt) but don’t know how to arrange the data into logical rules (which, in the case of “The Next Rembrandt”, would be the algorithmic translation of the aspects of the original works). At first, the AI system can’t execute the task, but the more it processes information, the more it refines its algorithm. Hence, after having examined a massive amount of data, the system has retrieved enough patterns to build a functional algorithm that can perform the targeted task.

The algorithm of the “Next Rembrandt” Project is not the only neural AI system that can produce computer-generated works. In the past years, the use of such systems led to the conception of many literary and artistic works of quality. Amper Music, Jukedeck, Flow Machine, and Google Magenta are all music generators based on such a technology. Amper Music and Jukedeck allow their customers to generate an instrumental song in less than one minute. They only need to select a few parameters such as the style, the length, and the

58 Kim, supra note 35 at 2.
59 Oliveira, supra note 52 at 97.
60 Alpaydin, supra note 37 at 16.
61 Boden, supra note 27 at 79.
speed. As for Flow Machine, it has recently released a pop song, “Daddy’s Car”, inspired by the catalogue of The Beatles. The AI system had generated the chords and the melody, but the lyrics and harmonies remain the creation of the project’s artistic director.\textsuperscript{65} Contrary to the others, Google Magenta’s ambitions go beyond music. It uses learning algorithms not only for the production of new songs but also images and drawings.\textsuperscript{66}

In fact, music is not the sole interest of AI developers. Computer-generated visual art has also attracted their curiosity. For instance, Tom White has built an AI system that can generate, after having analyzed thousands of images, an artistic and interesting “abstract visual representation” of common objects, such as a basketball.\textsuperscript{67} Likewise, Robbie Barrat has conceived an AI system that produces surrealist shapes representing deformed naked bodies.\textsuperscript{68} As regards the e-David robot, it can convincingly paint portraits and landscapes in many different styles (including abstract works as well).\textsuperscript{69} In addition, some AI systems were also trained to produce literary pieces. For example, the software engineer Zack Thoutt built a neural network which had generated five chapters of the “next” Game of Thrones novel based on the previous books. The story is very credible, but the writing style is far from being perfect.\textsuperscript{70}

\begin{footnotesize}
\begin{itemize}
\item 66 Magenta. “About Magenta”, online: <magenta.tensorflow.org/>.
\item 67 Tom White, “Perception Engines”, Medium (4 April 2018), online: <medium.com/artists-and-machine-intelligence/perception-engines-8a46bc598d57>.
\item 69 e.David, supra note 5.
\item 70 Hill, supra note 3.
\end{itemize}
\end{footnotesize}
and its software is based on the expert system technology. It proves that, to this day and despite their limitations, some rules-based software such as Wordsmith (but also Emmy and AARON) can accomplish their tasks in a better (or at least comparable) way than many neural network systems.

Nonetheless, with the recent breakthrough in AI systems technology, it is predictable that, in the years to come, the quality of computer-generated works will continue to improve. Researchers already take advantage of neural networks and machine learning to push the innovation boundaries to another level. Contrary to expert systems, they don’t have to define all the parameters of the system which can make very laborious the programming of complex tasks. Neural AI systems can learn from examples. However, although these new technologies enable the development of powerful tools, researchers still cannot explain the alchemy of the machine learning process, while they can easily explain the architecture of expert systems. Nevertheless, for the purpose of this paper, the general functioning of neural AI systems provide sufficient indications on the nature of the generated works.

2.2 The Nature of Works Produced With Computers

Having defined expert systems and neural networks, I will now examine the nature of works produced with computers. In past decades, computers have been more considered as tools
used by humans to achieve their literary or artistic endeavours. In most cases, similarly to painters with canvas and brushes or photographers with their camera, human artists participate directly in the creation of such works. Nevertheless, as shown in this chapter, computers can now produce artworks and literary pieces with minimal and perhaps absent human creative intervention. Their quality is constantly improving and some works are even comparable to human-authored ones. Although some AI systems, namely the expert systems, require an important contribution of the programmers, the new neural networks do not need to be fully coded by humans. Despite this difference, they both appear more as independent producers of content than mere tools for human creation. In order to determine the nature of such works, I will divide computers’ works into two categories: the ones created by humans in collaboration with computers and the ones generated by an AI system. These categories are not homogenous and more nuances will be made. In fact, technologies are used in various ways, so the level of human authorial intervention fluctuates depending on the creative process.

2.2.1 Works Created in Collaboration with Computers

Works created in collaboration with computers are the most common ones. People use computers to assist them in the creation of their works in their everyday lives. Writers take advantage of word processors to review their texts. Film directors edit and add some effects to their video footage with computers. Visual artists enhance their photographs with image processing software. In all these cases, computers are mere assistants. The degree of the contribution of human artists may vary, but they still have a total control over their creation.

In fact, it is obvious that artists who use any drawing software, such as Adobe Illustrator, are authors of the works they created in cooperation with the computer. They draw the lines,
make the colour choices and select pens in the array offered by the software.\textsuperscript{74} The same logic applies to the users of word processors and editing software. Even a picture automatically modified by an AI system, such as the Google Photos Assistant, after having been taken by a human, can still be considered the work of its originator. The software may reframe it, adjust the light, and modify the colours, but there is still a manifest intellectual effort from a human behind the digital work. These are all examples where the creative process is dominated by human authors and computers are tools for them to achieve their literary and artistic ambitions.

However, when a computer produces most of the artistic or literary work, the situation becomes less clear. In such a case, it is arguable that the computer is not simply instrumental to the creation process. In fact, it depends on the number of creative features decided by humans. On the one hand, an artist may task an AI system like Amper Music or Jukedeck to create a jazz instrumental song proposing a precise short melody. With the amount of information she provides to the AI system, the artist actively participates in the creative process and can be considered as an “author”. She clearly has an “authorial” vision of the final product. On the other hand, the team behind “The Next Rembrandt” chose only some characteristic of the new portrait, such as the age and the style of clothes of the protagonist, and the computer did most of the work.\textsuperscript{75} Thus, the collaboration is far from being obvious. There is no important authorial contribution from the team of engineers. It is a work completely produced by a computer, but with a few non-creative constraints provided by the

\textsuperscript{74} James Grimmelmann, “There’s No Such Thing as a Computer-Authored Work— And It’s a Good Thing, Too” (2016) 39 Colum JL & Arts 403 at 407-409.
\textsuperscript{75} Baraniuk, supra note 57.
It may rather be considered as entirely generated by an AI system. In works created in collaboration with computers, the majority of creative decisions must be taken by humans. Computers are only another means for artists to express themselves, so humans remain the authors of these works.

2.2.2 Works Generated by an AI System

Conversely, human authorial contribution to works generated by an AI system is almost absent, or at least imperceptible. Hence, computers cannot be considered as mere tools since the user’s role is very limited. They should be seen as the “artists”. Margaret Boden describes these works as the “[result] from some computer program being left to run by itself, with minimal or zero interference from a human being”. As in “The Next Rembrandt” project, humans may participate in the selection of some features, but they are not involved in the major authorial decisions. Instead, a computer takes decisions on the final outcomes following the rules of the AI system.

Such systems have become sophisticated enough that many computer-generated works appear as original as human-authored ones. Some may argue that humans behind the conception of AI systems contribute to the originality of the works. However, even for expert systems, for which all the rules are manually coded, the output is unpredictable. It is even

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77 Boden, supra note 41 (“[w]e call this [Computer-Assisted Art], wherein (df.) the computer is used as an aid (in principle, non-essential) in the art making process,” at 137).
78 Cameron Hutchison, Digital Copyright Law (Toronto, ON: Irwin Law, 2016) at 54.
79 Boden, supra note 27 at 71.
80 Boden, supra note 41 at 141.
81 Boden, supra note 41 at 124.
82 Boden, supra note 41 (“[i]n the rule-based approach [expert systems], by contrast, the translation from the specified rules to computer actions is not immediately clear. […] the artist leaves the computer to do its own thing without knowing just what it is which the computer will be doing […] [The outcome is] unpredictable by their programmer” at 129-30).
truer for an AI system based on neural network technology since much of its algorithm has been computed by the system itself. Humans may still choose the specific finality of these AI systems, but they do not have the control over the “expressive” aspects of the generated works.

2.2.2.1 Similarities to Human-Authored Works

In taking into consideration only their extrinsic qualities, it is obvious that computer-generated works may be treated as equivalent to human-authored ones. AI systems have now the ability to create amazing computer-generated works. Some are not perfect: the writing of *Game of Thrones* generated chapters is clearly not comparable to the prose of talented authors. But others are impressive: Emmy can compose music like Mozart and e.David can paint breathtaking portraits. However, it is possible that computer-generated works will always be less enjoyable than ones created by human authors. They may lack an “emotional” aspect. For instance, people are still not interested in watching chess games played by two AI systems even though they are better players than human masters. Despite this fact, in terms of external appearance, the difference is getting slighter. The machine is definitely becoming a skilful artist.

2.2.2.2 Humans “Behind” their Conception

Hence, the keystone of the protection of computer-generated works in the current Copyright Act lies in their production process rather than in the extrinsic artistic merits of the content itself. Reviewing the generation mechanisms is essential to understand their essence. It is thus relevant to determine whether programmers are the creative minds behind the generated

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83 Boden, *supra* note 27 at 68.
84 Hector J. Levesque, *Common Sense, the Turing Test, and the Quest for Real AI* (Cambridge, MA : The MIT Press, 2017) at 133.
works. Humans at the origin of AI systems may be the ones defining the nature of such works.

As presented in this chapter, there are two main AI system architectures: the expert systems and the neural networks. In the case of experts systems, programmers have to code all the rules in the knowledge base. They must translate the creation methods into a set of logical constraints. Such systems can be summarized as a modelization of programmers’ personal knowledge. However, as asserted by Harold Cohen, the father of the robot painter AARON, expert systems’ works are not limited to programmers’ abilities. Even if the complete code is written by programmers-artists, they can generate works that are beyond their programmers’ creative expectations. This view is also shared by Boden, who supports that rule-based experts systems lead to the creation of works that are unpredictable. Because of the complexity of the constraints included in such programs, they usually make associations between rules that are not foreseen by their creators. Therefore, even though they have the control of every aspect of the system, programmers are not defining the final output. As regards to systems based on neural networks, it is obvious that programmers have an absent role in the originality of the final works. Great parts of algorithms are built by the systems themselves through machine learning. Moreover, programmers can hardly explain the complete functioning of such algorithms.

85 Alpaydin, supra note 37 at 50; Boden, supra note 27 at 32.
86 Garcia, supra note 41.
87 Boden, supra note 41 at 129-130.
88 Boden, supra note 41 (“[f]or even when a programmer has written explicit step-by-step code, he or she does not necessarily— or even usually — know the outcome” at 130).
89 Alpaydin, supra note 37 at 155; Hutson, supra note 73 at 478.
Consequently, we cannot attribute any form of originality in computer-generated works to the programmers of any AI systems. For both kinds of systems, programmers only determine their ultimate function. For instance, they decide whether they want a system that produces paintings or one that can generate poetry, but they do not add any creative input in the works created by their system once it is built. They are like parents who train their children to be musicians. The method they used to make their sons and daughters prodigies may be deeply creative, but their creativity does not extend to the works of their children. They are not responsible for the originality of the compositions made by them.

On the other hand, even though no one is responsible for the originality of computer-generated works, a person can still be responsible for their production and distribution. In the case of “The Next Rembrandt”, there is a person who chose the characteristics of the portrait he tasked the AI system to generate. Users of Jukedeck select some features of computer-generated songs. Moreover, to some extent, the Associated Press “employs” Wordsmith for the reporting of sports matches. There is a curating aspect of computer-generated works that might be recognized in the copyright law.
Chapter 3
The Boundaries of Canadian Copyright Law

With the absence of human authorial participation in their production process, computer-generated works currently don’t fall within the boundaries of the Copyright Act. The requirement of originality, which necessitates a minimal intellectual effort, is clearly not fulfilled for copyright protection. However, copyright boundaries are not fixed. Copyright law has undergone numerous transformations over the years. Its domain of application has been redefined and enlarged numerous times to take into account technological developments. Limited only to literary works in the Statute of Anne of 1709, the legal ancestor of Canadian copyright law; it now encompasses artistic works, musical works, photographs, and cinematographic works. It also includes specific rights for makers of sound recordings and broadcasters. Both fix and distribute works but are not properly authors. Hence, the extension of the copyright scope to computer-generated works is definitely an option that can be considered.

3.1 The Current Boundaries

Currently, to benefit from Copyright Act protection, a work must be included in the subject matter of copyright law, fixed and original. Computer-generated works clearly fulfill the two first criteria. Firstly, they can be fixed. A work is fixed if it can be perceived and communicate for a sufficient period of time. The Next Rembrandt painting is fixed, as well as songs generated by Jukedeck when downloaded by users. Secondly, computer-generated

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90 Deazley, supra note 9 at 13; Tawfik, supra note 6 at 43.
91 Vaver, supra note 12 at 55; Copyright Act, RSC 1985, c C-42, ss 18-20 [Copyright Act].
92 Vaver, supra note 12 at 100, 107.
93 Vaver, supra note 12 at 107.
works can easily enter in the categories covered by copyright law which comprise notably literary, dramatic, musical, and artistic works. Melodies composed by an AI system, such as Emmy, are definitely musical works; books written by RACTER are no stranger to literary works as Camus books; and even the poorly written “Game of Thrones” book produced by an AI system is without a doubt a literary work. Basically, any writings, musical works, paintings, to name a few, can enter the realm of copyright law. The general quality of works is of little significance. Copyright law is blind to artistic merit.

Nevertheless, although fixed and included in one of the categories, a work must be original to be protected by copyright law. A work doesn’t need to be novel. It has to be more than a mere copy of another work and also created by a human author. Facts, ideas, and the techniques are not copyrightable. Everybody can make movies of an orphan teenage wizard, but only J. K. Rowling can authorize sequels including the character of Harry Potter. The copyright lies only in the manner in which ideas are expressed in the works, not in the information itself. The means of expression is not important so long there is human original input. Works created in collaboration with a computer, such as photographs modified with an image-processing software or a novel written with a word processor, are copyrightable. On the other hand, the originality criterion is not fulfilled if an AI system produces a work without human authorial intervention such as newspaper articles on baseball games written

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94 Copyright Act, supra note 91, s 5(1).
95 Vaver, supra note 12 at 66.
96 CCH, supra note 12 at para 16.
97 Vaver, supra note 12 at 58, 100; CCH, supra note 12 at para 16.
98 Vaver, supra note 12 at 59.
99 Vaver, supra note 12 at 116.
100 Cameron Hutchison, Digital Copyright Law (Toronto, ON: Irwin Law, 2016) at 54.
by Wordsmith, the automated sports journalist. A person has to participate in the creative process and includes a minimal intellectual effort.\footnote{Hutchison, supra note 100 at 53-54; Cheng-Lim Saw, “The Originality Debate in Copyright Law: The Canadian Perspective” (2004) 63:2 Cambridge LJ 294.}

In \textit{CCH Canadian Ltd v Law Society of Upper Canada}, this minimal intellectual effort had been defined by the Supreme Court as the exercise by the author of both skill and judgment.\footnote{CCH, supra note 12 at para 16.} A mechanical reproduction might require a lot of skills but an author needs to make some choices in the expression of his ideas. He has to use his “capacity for discernment or ability to form an opinion or evaluation by comparing different possible options”.\footnote{Ibid.} A shopping list scribbled on a Post-it may not involve sufficient expression, but a three-line poem in the form of a tweet tends to be original.\footnote{Vaver, supra note 12 at 101; Brian Bilston, “‘How I accidentally became a poet through Twitter’”, \textit{BBC News} (10 September 2016), online: <www.bbc.com/news/magazine-37319526>.} Hence, the originality threshold to qualify for copyright protection remains very low and a lot of works that are far from being masterpieces are included.\footnote{Vaver, supra note 12 at 106.} In this sense, it can be arguable that AI systems can exercise the required judgment as well. After all, it is to make decisions and evaluate options that such systems are built. However, the words used in \textit{CCH} and the context suggest the contrary.\footnote{Perry & Margoni, supra note 7 at 625.} At least until now, AI systems cannot have an “opinion” and exercise a “judgment” in the manner intended by the Supreme Court.\footnote{CCH, supra note 12 at para 16.} They lack the intellectual intention that characterizes human authors. Works they produced are not the fruit of their
“opinion”, but of the rules by which they abide. Therefore, computer-generated works are not original and currently outside the scope of the Canadian *Copyright Act*.\(^{108}\)

### 3.2 Extensible Boundaries: Expansion to New Technologies

Although computer-generated works are still not protected, the history of copyright law shows that its boundaries are extensible. Copyright law has been amended several times to include works created and distributed with the support of the inventions of the time.\(^{109}\)

Originally, the British *Statute of Anne* of 1709, which Canada recognized as the first copyright act, provided rights on the control of books.\(^{110}\) Over the years, the development of new technologies led, notably, to the inclusion of photographs, cinematographic works, sound recordings, and broadcasts. Hence, it is possible to foresee the incorporation of computer-generated works in a near future.

At first glance, the expansion of copyright law to computer-generated works may be reminiscent of the addition of photography in its realm more than 150 years ago. The United Kingdom amended its act to introduce photographs as early as in 1862, followed by the United States in 1865. It was contested in both jurisdictions.\(^{111}\) Similarly to computer-generated works nowadays, the protection of photography pushed the limits of copyright law. At that time, photographs appeared as a mere mechanical process that differentiates them

\(^{108}\) Vaver, *supra* note 12 at 115; Perry & Margoni, *supra* note 7 at 625.

\(^{109}\) Ong, *supra* note 13 at 255.

\(^{110}\) Bannerman, *supra* note 6 ("[i]n 1924, Canada put a new Act into effect, adopting more directly the British legislative model and the wording of the British Copyright Act. The Copyright Act of 1924 has remained the basis for Canadian copyright” at 18); Tawfik, *supra* note 6 at 43. See also Benedict Atkinson & Brian Fitzgerald, *A Short History of Copyright: The Genie of Information* (Cham, Switzerland: Springer, 2014) at 23 (for the limited scope of the Statute of Anne); Deazley, *supra* note 9 at 13 (for the limited scope of the Statute of Anne).

from other artistic works. According to opponents for their protection, they lack the human input that would make them original. This view was dismissed by courts which recognized that photographers can express themselves using a camera as a tool.

The history of photographs’ protection demonstrates that copyright evolves with society. It is not because works produced by a new technology are not part of the copyright framework that it is not justified to include them. Furthermore, it is interesting to note that it is only recently that copyright law has totally embraced authorship in photography. In Canada, before 2012, the copyright was still allocated to the owner of the negative of the photograph who was also the deemed author. Since this amendment, photographs are under the copyright general regime and photographers are considered as their authors. Their treatment has changed following the acceptance of this medium in social culture. However, although they are both innovations that challenge copyright law, an analogy with photographs is not completely applicable to computer-generated works due to their lack of authorial intention.

The inclusion of computer-generated works may rather be inspired by an alternative regime in the *Canadian Copyright Act*: the neighbouring rights. These provisions were enacted, following the ratification of the Rome Convention, to take into account the changes in the

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112 Hughes, *supra* note 111 at 15.
114 Vaver, *supra* note 12 at 122, 146.
115 *Copyright Modernization Act*, SC 2012, c 20 [*Modernization Act*] (“[t]his enactment amends the Copyright Act to […] give photographers the same rights as other creators” at Summary).
entertainment industry. They comprise rights of performers, makers of sound recordings, and broadcasters. Their aim is to protect investments in such works, more particularly for makers of sound recordings and broadcasters, in order to encourage their dissemination. These rights are not based on traditional originality and authorial criteria. They are granted for the communication of works, rather than for the works themselves. They are allocated to people who are not authors, but arrangers and disseminators. This regime shows that, although copyright is usually granted to works with sufficient human originality in their creation, the purpose of the Copyright Act is flexible enough to be expanded to new kind works and protection rights. Therefore, it is conceivable that a right may be granted to people who arrange computer-generated works. It can encourage their dissemination and thus contribute to social knowledge. However, before discussing the inclusion of computer-generated works in the Copyright Act, it is first relevant to clarify the scope of the debate and situate the contribution of this paper.

116 World Intellectual Property Organization, Guide to the Rome Convention and to the Phonograms Convention (Geneva: WIPO, 1981) (“[t]he invention of the gramophone, cinematography and radio, and their spread to an ever-wider public at the beginning of the 20th century, revolutionized the ways in which authors were able to publicize their works” [...] “It produced a profound upset of the legal and social order” at 9-10).
117 Vaver, supra note 12 at 55; Copyright Act, supra note 94 at s. 18-20, International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, 9 October 1961, 496 UNTS 43 (entered into force 18 May 1964) at Preamble [Rome Convention].
118 Vaver, supra note 12 (on the broadcasters, Vaver affirms that they “do nothing original in transmitting or carrying a signal: it is their investment in distribution that is being protected.” at 63).
119 Ong, 2010, supra note 13 (“[t]he copyright has extended its reach beyond the realm of ‘authorial’ works [...] to encompass the products of ‘entrepreneurial’ investment as well, including sound recordings, cinematographic films, broadcasts and published editions of printed materials.” at 255).
120 Vaver, supra note 12 (“[s]ound recordings, performances, and broadcasts are non-traditional items that communicate rather than constitute ‘works’” at 97).
121 Vaver, supra note 12 at 63, 109-10.
Chapter 4
A Review of Literature in Anglo-American Jurisdictions

In this chapter, I will thus review the copyright literature on artificial intelligence. While the concepts of authorship and originality have been extensively argued by scholars, few have comprehensively supported their protection under copyright policy objectives. I will first examine the early literature written in the 1980s and early 1990s in the United States. It was published at a time when computer science was still in its infancy and, although high expectations were put on the development of expert systems, the generation of interesting creative works by these systems was still speculative. Some scholars already recognized the absence of authorship in computer-generated works, but, for many, computers were still seen as mere tools.\footnote{122} However, most agree with their inclusion in copyright law. With the decline of expert systems, this series of articles ended in the early 1990s. The revival of this scholarship emerged only a decade later, likely encouraged by the promises of neural networks. Several scholars continued to argue for the inclusion of computer-generated works but the debate became more contentious. In the light of the recent landmark decisions on the human aspect in originality, many questioned the nature of such works and remain skeptical about their copyrightability.\footnote{123} Although the recent literature on the protection of computer-generated came from many countries, I will mainly focus on Anglo-American jurisdictions since they share similar roots with Canada’s copyright tradition.\footnote{124}

\footnote{122} CONTU Final Report, supra note 16 at 44, Miller, supra note 36 at 1049.
\footnote{123} See CCH, supra note 12 (on the originality requirement in Canada); Feist, supra note 17 (on the originality requirement in the United States); IceTV, supra note 17; Telstra, supra note 17; Telstra Appeal, supra note 17 (IceTV and Telstra cases defined originality requirement in Australia).
\footnote{124} Tawfik, supra note 6 at 35.
4.1 1980s-1990s: The Early Literature in the United States

Copyright scholarship on artificial intelligence first appeared at the beginning of the 1980s, which coincided with the development of “expert systems”. Only a few computer-generated works were produced during this period, but the contagious excitement toward artificial intelligence encouraged scholars to envision great possibilities. Scholarly interest in the copyright protection of works produced by AI systems mostly came from the United States. American scholars might have been inspired by the work of the National Commission on New Technological Uses of Copyrighted Works (CONTU). In the wake of the modernization of the U.S. Copyright Act, the Congress established CONTU to determine whether computer programs and computer-related works should be included in the scope of copyright. From 1974 to 1978, the commissioners reviewed the computing industry and concluded in their final report that a creative work generated by a computer should be protected. According to them, a computer does not participate in the creative process. A “computer, like a camera or typewriter, is [rather] an inert instrument, capable of functioning only when activated either directly or indirectly by a human”.

Even at that time, this view was controversial. Indeed, less than five years after the CONTU final report, Timothy L. Butler argued, in one of the first articles on computer-generated works, that CONTU commissioners “did not adequately address the looming onslaught of

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125 Bostrom, supra note 30 at 8.
127 Con Diaz, supra note 126 at 753-54; CONTU Final Report, supra note 16 at 5.
128 Miller, supra note 36 at 1068; CONTU Final Report, supra note 16 at 1.
129 CONTU Final Report, supra note 16 at 44.
AI-based products and creations”.\textsuperscript{130} He considers that these works have “no human ‘author’ within the bounds of common usage of the term”\textsuperscript{131}, though he further advocates for their inclusion into copyright law. He claims that it would be inconsistent with copyright law past amendments not protecting computer-generated works. Its scope has been constantly widened following the technological progress.\textsuperscript{132} Thus, a legal fiction that would consider the works produced by computers as the ones created by humans should be included in the copyright law, and rights should be distributed between the user of the computer, the owner of the program, and the programmer.\textsuperscript{133} Moreover, Butler mentions that this measure, in ensuring investors a “legal security”, would both encourage the development of new AI systems and, more convincingly, the dissemination of computer-generated works in accordance with copyright social policy.\textsuperscript{134} This latter claim is particularly interesting. It raises the economic role of copyright law and thus suggests the importance of promoting the circulation of expressive information. Unfortunately, Butler does not provide a more detailed support to this assertion.

Some years later, Pamela Samuelson, one of the current leading figures in copyright law, came to a slightly different outcome.\textsuperscript{135} In her 1985 article, she argues that only users of AI systems should own the copyright on works produced by machines.\textsuperscript{136} Users are in the best position to appreciate the quality of the works and make some modifications to them, so they

\begin{footnotesize}
\begin{enumerate}
\item\textsuperscript{130} Timothy L. Butler, “Can a Computer be an Author: Copyright Aspects of Artificial Intelligence” (1981) 4 Comm/Ent LS 707 at 747.
\item\textsuperscript{131} Butler, supra note 130 at 733.
\item\textsuperscript{132} Butler, supra note 130 at 735.
\item\textsuperscript{133} Butler, supra note 130 at 744, 746.
\item\textsuperscript{134} Butler, supra note 130 at 735.
\item\textsuperscript{135} Pamela Samuelson, “Allocating Ownership Rights in Computer-Generated Works” (1985) 47 U Pitt L Rev 1185.
\item\textsuperscript{136} Samuelson, supra note 135 at 1192.
\end{enumerate}
\end{footnotesize}
should have the power to commercially exploit them.\textsuperscript{137} It would incentivize them to produce, modify, and distribute computer-generated works.\textsuperscript{138} As she notes, such a measure would be comparable to the work made for hire provision which provides employers with the copyright on works made by their employees in the course of their employment.\textsuperscript{139} Similarly to users of AI systems, employers may not participate in the creative process, but they are at the origin of their production. Conversely, granting rights to programmers would overcompensate their effort since they already own the copyright on AI systems.\textsuperscript{140} One may argue that she overestimates the role of the user in the shaping of works produced autonomously by an AI system, but Samuelson still proposes a sensible insight for the justification of protected computer-generated works. Based on the economic theory as Butler, she recognizes that users might not need to be incentivized to click on a button to generate a work, but allocating them copyright may encourage them to put such works into circulation which can be beneficial to the society.\textsuperscript{141}

However, as argued by Arthur Miller, deciding on the protection of computer-generated works in the 1980s was very speculative.\textsuperscript{142} According to him, “expert systems” could not really produce computer-generated works. Since their functions were limited to the rules dictated by programmers and users, it was possible to identify a human author.\textsuperscript{143} Granting a copyright on these works to the programmers and users was not departing much from the human authorship requirement in the copyright law because they participate in their

\textsuperscript{137} Samuelson, \textit{supra} note 135 at 1192 and 1203.
\textsuperscript{138} Samuelson, \textit{supra} note 135 at 1225.
\textsuperscript{139} Samuelson, \textit{supra} note 135 at 1203; \textit{Copyright Act of 1976}, 17 USC §101, §201(b), §203(a) (2012) [\textit{U.S. Copyright Act}] (the work made for hire doctrine is in the US copyright law, but a similar approach is also included in Canadian copyright law).
\textsuperscript{140} Samuelson, \textit{supra} note 135 at 1208.
\textsuperscript{141} Samuelson, \textit{supra} note 135 at 1226.
\textsuperscript{142} Miller, \textit{supra} note 36 at 1038.
\textsuperscript{143} Miller, \textit{supra} note 36 at 1049.
creation.\textsuperscript{144} Similarly, Evan Farr affirms, in his 1989 article, that the programmer is an author since he directly contributes to the expression of valuable ideas.\textsuperscript{145} Nonetheless, such claims on expert systems are contestable. As noted in chapter II, expert systems are perhaps manually programmed, but the works they generated cannot be predicted by the programmer nor by the user.\textsuperscript{146} There is hardly any authorial contribution in a work when no one can predict its “expressive” features. Several years earlier, even Butler and Samuelson both had recognized the absence of human authorship in the output of such systems.\textsuperscript{147}

On the other hand, Miller’s position may simply reflect a reality of this era: it was difficult to detach human contribution from computers’ output.\textsuperscript{148} Even for scholars who acknowledged the lack of “authorship” in the creation of works, almost thirty years ago, the production of enjoyable works by computers without any human creative subsequent modifications was hard to imagine. The prose of RACTER was not particularly compelling. For instance, in her article, Samuelson qualifies several times computer-generated works as “raw output” to be modified by human authors (like the book “Just This Once” produced by a software and then co-written by its user).\textsuperscript{149} Although she mentions the possibility of the production of “flawless works” by AI systems, it seems more like a hypothetical perspective to support her

\textsuperscript{144} Miller, supra note 36 at 1066.


\textsuperscript{146} Boden, supra note 41 at 129-130; Garcia, supra note 41.

\textsuperscript{147} Butler, supra note 130 (“the program supplies the specific words, plot, characters and apparent "expression" of an idea. The story has no human "author" within the bounds of common usage of the term and, within the meaning of the Act, is possibly not copyrightable material under present law.” at 733); Samuelson, supra note 135 (“[i]f a flawless work has been created by use of a computer program, and the law deems the work incapable of being owned because of the lack of a human author” at 1226).

\textsuperscript{148} Miller, supra note 36 at 1053.

\textsuperscript{149} See Samuelson, supra note 135 at 1201, 1203-04, 1224-26 (throughout the paper, Samuelson discusses “raw output” of AI systems).
point.\textsuperscript{150} Hence, these first articles may not fully represent AI systems as we conceive of them today. The understanding of computing and artificial intelligence technologies has evolved greatly since then.\textsuperscript{151} However, Butler and Samuelson have raised an interesting economic insight for the protection of computer-generated works – namely, the encouragement of the dissemination of expressive works – and paved the way for the rebirth of the scholarship some years later.\textsuperscript{152}

4.2 The 2000s: A Revival in Computer-Generated Works Literature

At the dawn of the 21st century, probably stimulated by the progress in artificial neural networks and the possible arrival on the market of AI systems, scholars became interested again in copyright issues related to computer-generated works. Contrary to the first string of articles, the recent literature is less homogenous. While many still advocate for the inclusion of computer-generated works in the realm of copyright law, some express concerns on the relevance of such an extension.\textsuperscript{153} This growing dissension may be explained by the confirmation by higher courts, after the publication of the early articles, of the human authorship requirement in the analysis of originality.\textsuperscript{154} Furthermore, with the technological improvements and the changes in the digital culture, the absence of human expression in

\textsuperscript{150} See Samuelson, \textit{supra} note 135 at 1226 (only one time she mentions the possibility of a “flawless work” and she uses “if” a conditional clause).

\textsuperscript{151} Colin R. Davies, “An Evolutionary Step in Intellectual Property Rights: Artificial Intelligence and Intellectual Property” (2011) 27 Computer L & Sec R 601 (“considering the enormous developments in AI technology since 1985 [...] while this deals with the situations envisaged at the time, as we shall see later the current generation of AI programs are capable of producing works without the input of a “human “ user and bearing no relationship at all to the original program so we are still left with a lacuna in authorship of such AI generated works.” at 610).

\textsuperscript{152} See Butler, \textit{supra} note 130 at 735; See also Samuelson, \textit{supra} note 135 at 1226.

\textsuperscript{153} Ramalho, \textit{supra} note 26; Boyden, \textit{supra} note 76; Clifford, \textit{supra} note 39 at 1701-02.; Grimmelmann, \textit{supra} note 74; Perry & Margoni, \textit{supra} note 7.

\textsuperscript{154} See \textit{CCH}, \textit{supra} note 12 (on the originality requirement in Canada); \textit{Feist}, \textit{supra} note 17 (on the originality requirement in the United States); \textit{IceTV}, \textit{supra} note 17; \textit{Telstra}, \textit{supra} note 17; \textit{Telstra Appeal}, \textit{supra} note 17 (\textit{IceTV} and \textit{Telstra} cases defined originality requirement in Australia).
works produced by AI systems became more obvious. This new reality forces defenders of computer-generated works’ copyrightability to support more comprehensively their position under a copyright theory, which they may have until now neglected to tackle.

4.2.1 Advocating the Protection of Computer-Generated Works

The argumentation of scholars who advocate for the copyright protection of computer-generated works can be summarized in two steps. First, they maintain that copyright originality should not be limited to human authorship. If computer-generated works look as original as human-authored ones, they should be protected. Secondly, rights on them should be attributed to a deemed author such as the user or the programmer.

4.2.1.1 Originality and Human Authorship

Human authorship is still a central requirement for a work to be considered original under copyright law, but these scholars consider that the presence of a human author should not be essential to gain copyright protection. In fact, AI systems are now able to generate astonishing creative works that would certainly be copyrightable if they were produced by humans. This question was not that important in the American articles of the 1980s and early 1990s. Most of them predate Feist, the 1991 landmark decision confirming the human aspect

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of originality in the United States. Some years later, a similar approach was also taken by Canadian and Australian high courts. In fact, as mentioned in chapter III, the Supreme Court of Canada determined in CCH that, though a mechanical reproduction might require a lot of skill, the author has to include in his work a minimal amount of intellectual effort to gain copyright protection. This intellectual effort can only be achieved by humans. The review of the nature of computer-generated works showed that neither programmers nor users include a sufficient amount of their personal expression into them.

However, many argue that copyright law should depart from this conception of authorship. Bridy first points out that the human requirement is not explicitly mentioned in the U.S. Copyright Act, which is also the case in Canadian copyright law. Moreover, the assumption of the special character of human authors does not reflect the actual collective creative process. Few authors enshrine their genius and personality in their artistic and literary works. Bridy rather suggests that human creativity is algorithmic. Like computers, humans would not be able to create without rules and constraints. It is only when using the knowledge, codes, and rules cultivated by humanity over the centuries that authors can express their ideas. In this sense, there is a lot in common between computer-generated works and human-authored ones. As regards McCutcheon, she underlines that the threshold

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158 See CCH, supra note 12 at para 16 (the Supreme Court of Canada affirmed that an intellectual effort is required to fulfill originality criterion); See IceTV, supra note 17 at paras 33, 47-48; Telstra, supra note 17 at paras 5, 20; Telstra Appeal, supra note 17 at para 3, 8 (in Australia, a string of cases established that, since the originality criterion requires an intellectual effort, only human authorship can produce original works and thus exclude computer-generated works from the application of this criterion).
159 Vaver, supra note 12 at 100; CCH, supra note 12 at para 16.
160 Bridy, supra note 18 at 399.
161 Bridy, supra note 156 at para 7.
162 Bridy, supra note 156 at para 27.
163 Ibid.
164 Ibid.
of originality for works, and thus the requirement for human intellectual contribution, is so low that computer-generated works can easily be considered originals.  A lot of works created by humans are protected even if they don’t really encompass the personal expression of their authors. The personal expression in a blurred picture taken by an untalented photographer is doubtful. More controversially, Fitzgerald and Seidenspinner even consider that excluding computer-generated works from copyright protection is a form of discrimination that is against the principle of technological neutrality. In short, if an AI system produces a work that is not a copy of another one, it should be protected.

In this vein, Yanisky-Ravid and Velez argue that originality of literary and artistic works should instead be evaluated by their extrinsic qualities rather than by the creative process at the origin of their production. The criterion for originality has to be more objective. It should be based on the perception of the audience rather than the motivations of the author which are almost impossible to identify. An artist can have no intent. This proposition does not provide an answer for the protection of works that are solely grounded on the intention of the artist, such as conceptual art (for example the artwork “Fountain” by Marcel Duchamp), but clearly advocates against the necessity of human authorship for a work to qualify for copyright protection. Once computer-generated works’ external features are qualified as original works, they should be included in the scope of copyright law.

165 McCutcheon, supra note 18 at 954; Darin Glasser, “Copyright in Computer-Generated Works: Whom, If Anyone, Do We Reward?” (2001) 1:1 Duke L & Tech Rev 0024 at para 44.
166 Fitzgerald & Seidenspinner, supra note 155 at 63-64.
167 Yanisky-Ravid & Moorhead, supra note 156 at 21, McCutcheon, supra note 18 at 954.
170 Tate. “‘Fountain’, Marcel Duchamp”, online: <www.tate.org.uk/art/artworks/duchamp-fountain-t07573>.
4.2.1.2 The Fictionalization of the Author: A Framework of Protection

The principal copyright framework for their inclusion suggested by these scholars remains the fictionalization of the author, as Butler suggested in the early 1980s. Some, such as Wu and Davies, propose to recognize AI systems as the “fictional authors” and then assigned their right to humans. It would acknowledge the fact that works are created by a computer, but also allow a deserving person to own and manage the rights on them. However, most of them, including Denicola, support that the persons arranging the production of these works should be both the “fictional authors” and the owners of the rights.

The popularity of this latter suggestion may be explained by the adoption of a similar provision by many jurisdictions including the United Kingdom. Under section 9(3) of the United Kingdom Copyright, Designs and Patents Act, the author of a computer-generated work is “the person by whom the arrangements necessary for the creation of the work are undertaken.” Therefore, depending on the context, the programmer or the user will be the owner of such work, without having to include any personal input in it. If a user runs an AI program with the intent to produce a computer-generated work, he will be the owner. Conversely, if a program, such as a video game, generates a new “world” automatically when the user plays, the programmer will be the owner of this “world.” Nonetheless, it is relevant to note that the section 9(3) adopted in 1988 was based on the 1977 Whitford

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171 Denicola, supra note 156 at 286-87; Wu, supra note 156 at 159.
172 Davies, supra note 151 at 612, 618; Wu, supra note 156 at 159.
173 Denicola, supra note 156 at 286-87.
174 Copyright, Designs and Patents Act 1988 (UK), c 48, s 9(3) [U.K. Copyright Act]; Guadamuz, supra note 18 (“note 52: Besides the UK, such protection exists only in Ireland, New Zealand, India, and Hong Kong.” at 175).
175 U.K. Copyright Act, supra note 178, s 9(3).
176 Guadamuz, supra note 18 at 177.
177 Ibid.
178 Ibid.
Committee report, which similarly to the CONTU report in the United States, concluded that computers are only mere tools assisting humans in their creative endeavours.\textsuperscript{179} Hence, misled by this vision of the nascent artificial intelligence programs, the U.K. legislator might not intend to enlarge copyright law to include all computer-generated works as we define them today. At the time of the adoption, humans seemed to still be considered as active creative contributors in the production of such works.

Regardless of the origin of this provision, for Guadamuz and many others, it would be desirable and not a significant change to follow the U.K. approach in other Anglo-American jurisdictions.\textsuperscript{180} The threshold of originality is low and the works created by AI systems may be equivalently “original” to human-authored ones. In the spirit of the U.K. provision, scholars such as Bridy, Hristov, McCutcheon, Yanisky-Ravid, and Moorhead all advocate for the adoption of a provision inspired by the work made for hire doctrine.\textsuperscript{181} Following this doctrine included in the \textit{U.S. Copyright Act}, corporations are considered the authors of the works created by their employees as part of their employment.\textsuperscript{182} Thus, a similar legal fiction to include works created by computers can solve legal concerns surrounding them that and would have similar effects to the U.K. provision. The owner of these works would be the person who makes the arrangement to produce computer-generated works.\textsuperscript{183} For example, it can be the company that developed the AI system or financed the development of such a project or the users of such systems. The protection would last for a fixed period of time.

\textsuperscript{179} Davies, \textit{supra} note 151 at 601, 610-11; UK, Committee to Consider the Law on Copyright and Designs, \textit{Copyright and designs law : Report of the Committee to Consider the Law on Copyright and Designs} by the Honourable Mr Justice Whitford (London: Her Majesty’s Stationery Office, 1977) [Whitford Report].
\textsuperscript{180} Guadamuz, \textit{supra} note 18 at 186.
\textsuperscript{181} Hristov, \textit{supra} note 156 at 442; Bridy, \textit{supra} note 156 at para 63; Yanisky-Ravid & Moorhead, \textit{supra} note 156 at 55; McCutcheon, \textit{supra} note 18 at 960; Samuelson, \textit{supra} note 135 at 1203 (Samuelson also mentions this option in her 1985 article).
\textsuperscript{182} \textit{U.S. Copyright Act}, \textit{supra} note 139, §101, §201(b), §203(a); Nimmer, \textit{supra} note 157 at § 1.06[C].
\textsuperscript{183} Guadamuz, \textit{supra} note 18 at 185.
from their publication or creation.\textsuperscript{184} Moreover, it would be in accordance with copyright law because, though works are produced by a computer, the authorship will be granted to a legal person.\textsuperscript{185} As noted by Hristov, it can be as simple as extending the definition of employee to AI systems.\textsuperscript{186} Although this proposition was made considering the United States copyright framework, it can be equally applied to the Canadian copyright law since it contains a similar provision for the “work[s] made in the course of employment”\textsuperscript{187}

### 4.2.2 A More Skeptical Perspective

On the other side of the debate, many scholars remain doubtful about the protection of computer-generated works. Although not fiercely against their inclusion in the copyright law, they have concerns about the granting of rights in creative works produced by mechanical algorithms. It appears to them that extending copyright law would be in contradiction with the human aspect of authorship and can have, more generally, adverse effects on the copyright law regime.

For scholars, such as Ramalho, Clifford, and Boyden, human contribution is asserted as an essential element for copyright protection.\textsuperscript{188} In support of her claim, Ramalho relies on the definition of authorship provided by Jane Ginsburg in her 2003 seminal article. After having analyzed copyright laws of different jurisdictions, Ginsburg construed the author as “a human being who exercises subjective judgment in composing the work and who controls

\begin{footnotes}
\footnote{\textit{U.S. Copyright Act}, supra note 139, §302(c).}
\footnote{Hristov, \textit{supra} note 156 at 449; Yanisky-Ravid & Moorhead, \textit{supra} note 156 at 61.}
\footnote{Hristov, \textit{supra} note 156 at 447.}
\footnote{\textit{Copyright Act}, supra note 91, s 13(3).}
\footnote{Ramalho, \textit{supra} note 26 at 14, 21; Boyden, \textit{supra} note 76 at 394; Clifford, \textit{supra} note 39 at 1681, 1695.}
\end{footnotes}
the execution”. 189 Although she herself recognizes that it is not an exhaustive definition, she insists that it shows the centrality of human authorship and the subjectivity of creativity. 190 Thereby, under this perspective, the premise of the human nature of copyright law should be considered when determining whether computer-generated works should be included in its scope. 191 Similarly, Clifford supports that human participation in the creation of works is crucial for copyright protection since only humans can be positively affected by such provisions. 192 Hence, it will not be beneficial for society to restrict the use of computers’ output. 193

For its part, Boyden claims that authorship specifically requires the presence of a “meaning or message [...] embodied in [the] work” 194 and solely human creators can include it. Copyright on computer-generated works can only be granted to the person who has communicated a message in such works. 195 Therefore, if no one can predict the nature of AI systems works, they should not be protected. 196 The audience may find them expressive and interesting, but, as Boyden supports, no person deserves rights in such works. Neither the programmer nor the user participates in the creative process. 197 Notwithstanding this conclusion, Perry and Margoni contend that it would be simply too speculative to decide

190 Ginsburg, supra note 189 at 1066.
191 Ginsburg, supra note 189 at 1067.
192 Clifford, supra note 39 at 1701-02.
193 Ibid.
194 Boyden, supra note 76 at 385.
195 Boyden, supra note 76 at 394.
196 Boyden, supra note 76 at 389.
197 Ibid.
whether to allocate rights to the user or the programmer since both had made an insignificant contribution.\textsuperscript{198}

However, in spite of her assertion about the human nature of authorship, Ramalho suggests that, in some circumstances, exclusive rights in computer-generated works may be justified to encourage a person to publish and disseminate them.\textsuperscript{199} It relates to Butler and Samuelson’s take on incentivizing the circulation of works.\textsuperscript{200} She notes that the adoption of a limited right for disseminators of computer-generated works might be desirable.\textsuperscript{201} It is not because such works are authorless that they should necessarily fall in the public domain.\textsuperscript{202} Nonetheless, Grimmelmann warns that the adoption of new provisions to extend copyright protection to computer-generated works may lead to unwanted consequences.\textsuperscript{203} It might be preferable not to modify the current framework. Implementing a general rule for computer-generated works might make it worse. Copyright law already covers most of the situations involving the production of works with computers. The only works that are not comprised are the ones produced by AI systems. Beyond the novelty of computer-generated works, there is maybe a good reason explaining this omission.

In fact, there is a possibility that a too-extensive provision can cause undesirable outcomes, while a too-narrow one may have little effect. In the former scenario, copyright protection may be allocated to all works produced by an AI system including the ones automatically

\textsuperscript{198} Perry and Margoni, \textit{supra} note 7 at 627; Grimmelmann, \textit{supra} note 74 at 414.
\textsuperscript{199} Ramalho, \textit{supra} note 26 at 22.
\textsuperscript{200} Butler, \textit{supra} note 130 at 735; Samuelson, \textit{supra} note 135 at 1226.
\textsuperscript{201} \textit{Ibid.}
\textsuperscript{202} Ramalho, \textit{supra} note 26 at 21-22.
\textsuperscript{203} Grimmelmann, \textit{supra} note 75 at 415.
stocked in a database following their creation.\textsuperscript{204} As asserted by Niebla Zatarain, it would not be logical that owners or users of such systems can gain exclusive rights in these stocked works without participating in their creation or at least in selecting them.\textsuperscript{205} They do not have any control over them. Thus, it can be very risky to unduly enlarge copyright law when establishing a framework for computer-generated works. The legislator should be cautious.\textsuperscript{206} It must, prior to any changes, thoroughly determine whether additional protection for computer-generated works would really be beneficial for society and, more importantly, achieve copyright law objectives.\textsuperscript{207}

In short, skeptical scholars don’t see any convincing justification for the extension of copyright protection to computer-generated works. Copyright seems to require human authorship and, even if we depart from this conception, there is a danger that extending protection would have adverse effects. Until now, supporters of the copyrightability of computer-generated works did not persuade them of the opposite.

\section*{4.3 The Importance of a Policy Justification}

Indeed, scholars advocating for copyright protection of computer-generated works may have convincingly argued that originality should not be exclusive to human creativity.\textsuperscript{208} In fact, it may be much more relevant to acknowledge the extrinsic features expressive works rather

\textsuperscript{204} See Quentis. Art Marcovici. “Quentis”, online: <www.artmarcovici.com/qentis> (an artist raises this possibility in one of his artworks).

\textsuperscript{205} Jesus Manuel Niebla Zatarain, “The Role of Automated Technology in the Creation of Copyright Works: the Challenges of Artificial Intelligence” (2017) 31:1 Int'l Rev L Comp & Tech 91 at 92.

\textsuperscript{206} Niebla Zatarain, \textit{supra} note 205 at 102.


\textsuperscript{208} Bridy, \textit{supra} note 18 at 399; Bridy, \textit{supra} note 156 at para 7; McCutcheon, \textit{supra} note 18 at 954.
than the internal intention of authors for the purpose of originality.\textsuperscript{209} They may also have proposed great solutions to include computer-generated works in the scope of the copyright law. They ground their argumentation on analogies to other provisions, mainly the work made for hire doctrine.\textsuperscript{210} However, the apparent originality of computer-generated works does not mean that they should be included in the scope of copyright law. Computer-generated works can perfectly fit into a theory of copyright originality, but their protection must be justified by the objectives of the law. Not all “original” works are protected. For instance, there are public policy reasons supporting that masterpieces of long-dead authors, such as Shakespeare and Molière, are not protected. Nonetheless, while some articles do not directly consider the protection of computer-generated works under a copyright rationale, except by distant analogies with human-authored works, others only briefly explore a justification for their inclusion.

Two main trends concerning copyright justification emerge from these latter articles. First, all agree that there is no justification to grant rights to the machine.\textsuperscript{211} They don’t have legal personality and it is still hypothetical whether robots will one day have any rights. Secondly, in both recent articles and the early literature, notably in the articles of Butler and Samuelson, scholars constantly rely on economic arguments to allocate of rights in

\textsuperscript{209} Yanisky-Ravid & Velez-Hernandez, \textit{supra} note 168 at 33.
\textsuperscript{210} Hristov, \textit{supra} note 156 at 442 (see analogy with “Work Made For Hire” doctrine); Bridy, \textit{supra} note 156 at para 63 (see analogy with “Work Made For Hire” doctrine); Yanisky-Ravid & Moorhead, \textit{supra} note 156 at 55 (see analogy with “Work Made For Hire” doctrine); Samuelson, \textit{supra} note 135 at 1203 (Samuelson also mentions the analogy with the “work made for hire” doctrine in her 1985 article).
\textsuperscript{211} Perry & Margoni, \textit{supra} note 7 (“If we give an incentive to a computer program, which as it is not human has no need of incentives in order to produce more works (unless it has been instructed to behave that way) who are we actually benefiting? The answer is nobody.” at 627); Davies, \textit{supra} note 151 at 612, 618; Wu, \textit{supra} note 156 at 159; Clifford, \textit{supra} note 39 at 1702.
computer-generated works. Indeed, some argue that in denying protection, investment in innovation will not be compensated. If computer-generated works are not protected, there will be no incentive to create new AI systems and thus valuable works for society. Nonetheless, this view is very debatable. The role of copyright law is not to strive for artificial intelligence growth in rewarding the development of the machine itself. As I will mention in chapter V, it is generally described as a policy providing incentives to produce and disseminate new works. More satisfactorily, others ground their reasoning precisely on this objective. They claim that copyright protection can encourage human beings to disseminate works valuable for public welfare. For Samuelson, it is simply the best argument to grant a right in computer-generated works. Without such protection, people might not want to adequately disseminate such works which may increase the social welfare. This is a view even shared by Ramalho, one of the skeptical scholars. This economic argument may be a good starting point to anchor the inclusion of computer-generated works in copyright law. However, it is only succinctly discussed by these scholars. For ensuring a stronger foundation for the justification of such a measure, it should be addressed and explained more comprehensively in copyright policy.

212 Butler, supra note 130 at 735; Farr, supra note 145 at 80; Samuelson, supra note 135 at 1126; Hristov, supra note 156 at 437; Davies, supra note 151 at 617; Yanisky-Ravid & Moorhead, supra note 156 at 56; Denicola, supra note 156 at 273, 283.
213 McCutcheon, supra note 18 (“Leaving works in which copyright may otherwise subsist in an authorless void leaves potentially expensive or valuable works in the public domain and it leaves investment unrewarded.” at 956).
214 Hristov, supra note 156 at 439; Davies, supra note 151 at 616-17.
215 Samuelson, supra note 135 at 1209.
216 Yanisky-Ravid & Moorhead, supra note 156 at 56; Samuelson, supra note 135 at 1226; Glasser, supra note 165 at para 42.; Denicola, supra note 156 at 273, 283.
217 Denicola, supra note 156 at 273, 283.
218 Samuelson, supra note 135 at 1227-28.
219 Ramalho, supra note 26 at 22.
4.4 The Necessity of a Comprehensive Framework

In sum, the review of the literature reveals that the questions recently raised about the status of computer-generated works in copyright law are not new. Almost forty years ago, at the dawn of the democratization of computers, similar preoccupations were first exposed by scholars. The new cycle of literary articles on computer-generated works, which was stimulated by the recent progress in artificial intelligence research, only continues to explore these issues relying on the previous literature.

Nonetheless, the discussion has evolved over the years. While in the first string of articles most scholars agree to extend copyright law to encompass computer-generated works, the new ones are much more contentious. Several scholars remain skeptical about their protection because they lack the human input still requires in many jurisdictions including Canada. Some even claim that there is a real danger to broaden copyright law to such works. Human authorship seems to be the safeguard justifying protection. Conversely, others scholars still envision the inclusion of these works in the scope of copyright law as a sound option. They argue that computer-generated works are in many instances comparable for their extrinsic quality to the ones produced by human authors. Furthermore, their protection would likely favour their dissemination to the targeted public and spur investments in AI systems which will enable the generation even better works. As regard to the framework of their inclusion, many of them propose to assimilate computer-generated

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220 Ramalho, supra note 26 at 14; Boyden, supra note 76 at 394; Clifford, supra note 39 at 1681, 1695.
221 Grimmelmann, supra note 74 at 415; Niebla Zatarain, supra note 205 at 102.
222 Bridy, supra note 18 at 399; Bridy, supra note 156 at para 7; Yanisky-Ravid & Velez-Hernandez, supra note 168 at 33.
223 McCutcheon, supra note 18 at 956; Hristov, supra note 156 at 439.
works to the ones created in the course of the employment and thus grant rights to the person who “employs” the AI system for the production of the work.224

These scholars offer interesting suggestions for the incorporation of computer-generated works in copyright law. I agree with them for the most part. As I will assert in the next chapter, human authorship does not impede the inclusion of other works in copyright law. Nevertheless, I also understand the apprehension expressed by some on the extension of the copyright protection. Scholars advocating for the inclusion of computer-generated works may have proposed thoughtful claims supporting the expansion of copyright law, but, before reaching such a conclusion, it is first essential to justify their protection in a more comprehensive policy framework.

224 Hristov, supra note 156 at 442; Bridy, supra note 156 at para 63; Yanisky-Ravid & Moorhead, supra note 156 at 55; McCutcheon, supra note 18 at 960; Samuelson, supra note 135 at 1203.
Chapter 5
Promoting Knowledge: A Copyright Rationale for Computer-Generated Works

In this chapter, building on the Anglo-American literature, I will propose that the inclusion of computer-generated works in copyright law can be justified under the economic framework of the advancement of knowledge. I will first claim that theories based on the personality, labour, and communication of authors cannot support the protection of such works. To be extended to these works, copyright law objective should be wider than merely recognizing the efforts of individual authors. It is precisely this larger framework, ground on the collective objective of the public welfare’s maximization that the economic theory offers.\(^{225}\) This theory maintains that copyright policy certainly encourages authors’ intellectual creation, but it is to incentivize their production and dissemination for the benefit of the public.\(^{226}\) Rooted in the Anglo-American copyright tradition, many regard this approach as the central purpose of Canadian copyright law.\(^{227}\)

More precisely, I will suggest that copyright law should aim at the promotion of a specific goal embedded in this economic justification: the advancement of knowledge. This objective was fundamental to the Statute of Anne, the first modern copyright law and the British legal ancestor of the Canadian Copyright Act.\(^{228}\) The primary purpose of the advancement of knowledge is to stimulate the production and dissemination of extrinsically valuable works

\(^{225}\) Towse, Handke & Stepan, supra note 11 at 4; Zemer, supra note 11 at 10-11.

\(^{226}\) Zemer, supra note 11 (“The incentive structure in utilitarian arguments focuses on promoting the general public good, not placing the individual creator as an independent object entitled to a right” at 12); William M Landes & Richard A Posner. “An Economic Analysis of Copyright Law” (1989) 18:2 J Leg Stud 325 at 326; Vaver, supra note 12 at 57.

\(^{227}\) Sam Ricketson, supra note 20 at 221-22; Bannerman, supra note 6 at 18, 24.

\(^{228}\) Statute of Anne, supra note 9 (first copyright act adopted by Great Britain in 1709); See Zemer, supra note 11 at 36-37 (the Statute of Anne is at the origin of the Anglo-American tradition); See Tawfik, supra note 6 at 44-45 (the encouragement of learning is recognized as the objective of the Statute of Anne); See also Ricketson, supra note 20 at 221-22 (Canada is in the British tradition).
for the social interest. Some scholars have recently taken this approach to establish frameworks that depart from the analysis of authorial intentions in originality and are thus more consistent with the economic theory. In applying their frameworks in the context of computer-generated works, I will assert that, under this foundational objective, it seems reasonable to consider their inclusion in copyright law. AI systems are equally able to produce valuable works for the public.

Nonetheless, before leaping to such conclusions, it is crucial to determine whether granting rights in computer-generated works would effectively participate in the advancement of knowledge. It may be a social cost with no further benefits. Copyright provisions cannot encourage AI systems to generate more works. Moreover, programmers, owners, and users are not authors contributing to the creative process of computer-generated works. However, although they don’t take part in their production, some persons can still arrange and distribute them. Hence, I will propose that copyright may incentivize them to perform these actions. For this reason, granting an “arranger’s right” to the persons who request the production of computer-generated works may thus be justified.

I recognize that these economic assumptions underlying the justification of copyright have some limitations. They may overestimate the importance of incentives provided by copyright law to creators and disseminators. Copyright protection alone does not encourage the

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229 Madison, supra note 8 at 824; Durham 2004, supra note 8 at 124.
230 Durham 2002, supra note 8 at 618; Madison, supra note 8 at 851.
231 Durham 2002, supra note 8 at 617-18; Durham 2004, supra note 8 at 125; Madison, supra note 8 at 818, 824; Fromer, supra note 8 at 106-107; (although these scholars apply this approach from an American perspective, it can also be applicable in Canadian copyright law since it seeks the promotion of public welfare).
232 Boyle, supra note 25 at 11.
233 Davies, supra note 151 at 612; Perry & Margoni, supra note 7 at 627.
234 Samuelson, supra note 135 at 1227; McCutcheon, supra note 18 at 952.
production and dissemination of works. In fact, recent studies revealed that it does not really foster creativity; many other factors are at play. However, broad assumptions are also at the heart of competing theories supporting that copyright is an author’s natural right. They overestimate the act of authorship accomplished by individuals in the expression of their ideas. As above-mentioned, authors do not need to create groundbreaking works to gain protection. They usually rely on previous ones and, in some cases, merely arrange knowledge.

Hence, in this chapter, I aim to adopt a more balanced view of copyright. I will justify the “arranger’s right” in computer-generated works under the economic principle of the advancement of knowledge, but I will also assess that the role of copyright incentives is more general than directly influencing creation. In fact, I will support that the establishment of a stable economic framework for the marketing of creative works can be the incentive that encourages people to invest time and money in structured production and distribution processes. Moreover, although I will argue for the extension of copyright law to include computer-generated works, I will also acknowledge that the particularity of human authorship should still have a special place in copyright policy. In sum, I will claim that, due to their different rationale of production, computer-generated works should fall under a

236 Vaver, supra note 12 at 106 (the threshold of originality to gain protection is very low); See also McCutcheon, supra note 18 at 954; See also Section 3.2, above.
239 Zimmerman, supra note 235 at 57-58.
240 Tawfik, supra note 6 at 44.
separate regime than human-authored ones. I would thus suggest that the rights granted to
arrangers of computer-generated works should be limited in scope, similarly to neighbouring
rights, and only covers those having extrinsic “original” features.

5.1 Copyright Theories and Computer-Generated Works

Over the years, numerous copyright theories have been proposed by scholars to justify the
protection of creative works. Some support that the protection of works are sustained by the
acknowledgment of authorial rights, while others take copyright, in a more utilitarian
perspective, as a tool to strive production and social access to works. These theories can be
separated into two main categories: the individualistic and collective rationales. This tension
between the importance of the collective benefits of copyright and the recognition of the
“autonomous individuals” has always been part of copyright history.\(^\text{241}\)

On the one hand, the individualistic rationale for copyright protection comprises, notably, the
labour justification, the personality approach and the communication approach. The labour
theory sees copyright as a circumscribed property right to creators on their intellectual
labour.\(^\text{242}\) It is grounded on Locke’s assertion that “every man has a property in his own
person”, and thus “the labour of his body, and the work of his hands” are his property.\(^\text{243}\)
Although the Lockean notion of labour seems limited to the transformation of tangible
resources, the statement that “man has property in his own person” suggests that it can be

\(^{242}\) Zemer, supra note 11 at 13-14; Biron, supra note 19 at 22.
\(^{243}\) John Locke, “Two Treatises of Government” in Ian Shapiro, ed, Two Treatises of Government and A Letter Concerning Toleration (New Haven, CT: Yale University Press, 2003) 1 at 111-12 (book II, sec. 27); Biron, supra note 19 at 22.
understood broadly and includes man’s property in his intellectual activity.\textsuperscript{244} In this sense, it relates very much to the personality approach.\textsuperscript{245} Under the personality theory, copyright protection is giving to authors of works because they incorporated a part of themselves into them.\textsuperscript{246} Works share the personality of their authors and copyright seeks that authors’ personality is not “expropriate” by the free riding of others.\textsuperscript{247} The communication approach is slightly different from the first two. Works are not perceived as property goods but as communicative acts.\textsuperscript{248} Copyright’s role is thus to ensure that authors’ speech (expression) is not appropriated by others.\textsuperscript{249} Obviously, there is some limit to authors’ exclusivity on their speech. Since works are communicative acts, authors are in a dialogue with their audience and thus must expect public responses to their works.\textsuperscript{250} In sum, all these individualistic rationales consider copyright law as a natural right for authors to control the exploitation of their works, more precisely the use of their expression. Authorship is clearly the central justification of these theories. Under this view, ‘authorless’ works should not be protected since nobody can request a right in them.

On the other hand, the collective rationale of copyright law is based on a different premise. It mainly relies on the economic theory and the search for the maximization of social welfare. It assumes that the \textit{Copyright Act} has been enacted to encourage the production and distribution of works for the interest of the public in allocating to their authors exclusive

\textsuperscript{244} Biron, \textit{supra} note 19 at 24.
\textsuperscript{245} Biron, \textit{supra} note 19 at 24.
\textsuperscript{246} Zemer, \textit{supra} note 11 at 16.
\textsuperscript{247} Biron, \textit{supra} note 19 at 26; Zemer, \textit{supra} note 11 at 16.
\textsuperscript{248} Biron, \textit{supra} note 19 at 29; Bently, \textit{supra} note 19 at 20.
\textsuperscript{249} Bently, \textit{supra} note 19 at 20; Drassinower, \textit{supra} note 19 at 8.
\textsuperscript{250} Drassinower, \textit{supra} note 19 at 8.
rights in them.\textsuperscript{251} In other words, authors can restrict the access to their works for a limited period of time because it is overall beneficial for the society; they make available to the public new creative works.\textsuperscript{252} Without protection, it would be difficult for them to gain back time and money they have invested and may thus be discouraged from producing more works. Creative works have the characteristics of public goods.\textsuperscript{253} Once published, nothing prevents their free flow. Especially in the digital era, works are not as scarce a resource as other commodities. For instance, if I send a digital photograph (that I am particularly proud of) to a friend, it does not diminish my enjoyment of the work since I will keep a copy. My friend, the receiver, can equally appreciate the work and share it with others. The photograph can be easily propagated and everyone can access it without reducing others enjoyment. The same logic can be applied to books, songs, and most of the works covered by copyright law. I may not mind sharing my photograph, but the free flow of works can affect the production of creators. Hence, in order to tackle this issue, the Copyright Act gives copyright holders exclusivity on the exploitation of their works, so the market price of creative works can be above their marginal cost of reproduction.\textsuperscript{254} Copyright holders may have a monopoly on the circulation of their works for a limited period of time, but it is favourable to social welfare since it incentivizes them to share works with the public.\textsuperscript{255} The social cost of providing them

\textsuperscript{251} Vaver, \textit{supra} note 12 at 57.
\textsuperscript{252} Zemer, \textit{supra} note 11 at 11; Landes & Posner, \textit{supra} note 226 at 326; Vaver, \textit{supra} note 12 at 57.
rights in works is balanced by the social benefits their production brings to the public.\textsuperscript{256} Contrary to the individualistic rationale, the collective rationale seeks to encourage the public good.\textsuperscript{257} Rights are not granted to authors because they have a natural right on the works they produced, but because it is a manner to promote creative knowledge.

In brief, this survey of the main copyright theories shows that one of the important differences between individualistic and collective rationales is the role of authorship in copyright law. While it is central to the individualistic justification, under the collective rationale, authorship appears as a means to benefit social welfare. Therefore, due to the absence of authors, the copyrightability of computer-generated works cannot rely on the individualistic theories. The inclusion of such works into the scope of copyright law can solely be justified by the collective rationale. It is true that AI systems cannot be incentivized to create and produce works and granting rights in them might not be justified under the economic theory as well. However, it is conceivable that some people behind the generation of these works can be encouraged by copyright protection.

5.2 The Advancement of Knowledge: A Copyright Rationale

As part of the Anglo-American tradition, Canadian copyright law enters in the collective rationale.\textsuperscript{258} Therefore, it is possible to envision the incorporation of computer-generated works into its scope. Its role is not merely to recognize authors’ “property” in their works, but to pursue the promotion of the public good.\textsuperscript{259} To this day, the Copyright Act has always

\begin{footnotesize}
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\item \textsuperscript{256} Towse, Handke & Stepan, \textit{supra} note 11 at 4; Zemer, \textit{supra} note 11 at 10.
\item \textsuperscript{257} Zemer, \textit{supra} note 11 at 12.
\item \textsuperscript{258} Tawfik, \textit{supra} note 6 at 35; Ricketson, \textit{supra} note 20 at 221-22.
\item \textsuperscript{259} \textit{Ibid.}
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provided incentives to human authors to produce new creative works for the benefit of society, but we were the sole producers of content. With AI systems that can now produce content that participates in the creative knowledge similarly to human-authored works, we should review the authorial approach of the copyright law system. Consequently, I will propose that Canadian copyright law’s social welfare purpose should return to its foundational premises and be defined as a policy for the advancement of knowledge. It would clarify its economic primary objective, which is still buried under the notion of authorship and creativity. In addition, it will facilitate the determination of computer-generated works’ status under copyright law.

5.2.1 The Nature of Canadian Copyright Law

Like many common law jurisdictions, the Canadian Copyright Act justification relates to the British copyright history. In 1924, Canada incorporated, almost word for word, the 1911 U.K. Copyright Act into its legislation and embraced its copyright culture. It has remained the Canadian copyright framework ever since. Therefore, as in the United Kingdom (and other jurisdictions such as the United States), “it is generally accepted [...] that [Canadian] copyright law attempts to address the interests of creators, industry and the greater good in public access to knowledge”. In Théberge, the Supreme Court of Canada confirmed the

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260 Hutchison, supra note 100 (“[c]opyright is best understood as a policy tool whose overarching purpose is to promote the generation of knowledge and culture in society” at 1); See also Patricia Aufderheide & Peter Jaszi. Reclaiming Fair Use : How to Put Balance Back in Copyright (Chicago, IL : University of Chicago Press, 2011) at 16; Sheridan, supra note 9 at 44-45; see Benjamin Kaplan, An Unhurried View of Copyright (New York, NY: Columbia University Press, 1967) at 75-76.

261 Ricketson, supra note 20 (“[t]here is a common statutory thread that links these countries [which includes Canada] to the United Kingdom, namely the Copyright Act 1911 (UK)” at 221-22).

262 Bannerman, supra note 6 at 18, 24; Tawfik, supra note 6 at 43.

263 Tawfik, supra note 6 at 35.
collective rationale of copyright law.\textsuperscript{264} The majority asserted that the dynamic between these stakeholders “is usually presented as a balance between promoting the public interest in the encouragement and dissemination of works of the arts and intellect and obtaining a just reward for the creator”.\textsuperscript{265} As an economic policy, Canadian copyright law seeks to increase social welfare, more precisely, in providing sufficient incentives for the promotion of cultural knowledge.\textsuperscript{266} Thereby, it appears that copyright law strives to achieve a project beyond the mere recognition of authorship. Authors are certainly part of the copyright rationale, but protection is allocated to them for the increase of the public good.\textsuperscript{267}

On the other hand, it is relevant to note that the Copyright Act also incorporates rights based on the individualistic conception of copyright law. Following its adhesion to the Berne Convention\textsuperscript{268}, Canada adopted moral rights recognizing the natural entitlement of authors for the integrity of their works.\textsuperscript{269} Nonetheless, as pointed out by Tawfik, although it could have enacted more extensive provisions, Canada has implemented only the minimum requirements imposed by the Berne Convention.\textsuperscript{270} It thus suggests that Canada did not want to change its copyright rationale, and only complied with its international obligations.

\textsuperscript{264} Vaver, supra note 12 at 60; Théberge v Galerie d’Art du Petit Champlain Inc, 2002 SCC 34 at paras 30-31, [2002] 2 SCR 336 [Théberge].

\textsuperscript{265} Théberge, supra note 264 at 30. See also Zemer, supra note 11 at 11; Landes & Posner, supra note 226 at 326; Vaver, supra note 12 at 57.

\textsuperscript{266} Théberge, supra note 264 at 31.

\textsuperscript{267} Madison, supra note 8 (“although creativity should not be excluded from copyright, copyright should be conceived primarily as a system for producing, distributing, conserving, sharing, and ensuring access to knowledge.” at 824 ); Durham 2004, supra note 8 (“Copyright law, intended to reflect the interests of the public rather than the natural rights of the author/genius, may be best served by a less-romantic, more text-oriented model of originality.” at 124).

\textsuperscript{268} Berne Convention for the Protection of Literary and Artistic Works, 9 September 1886, as revised at Paris on 24 July 24 1971 and as amended 28 September 28, 1979, 1161 UNTS 3 (entered into force 5 December 1887) [Berne Convention] (the Berne Convention is the main international treaty regulating copyright. 176 states are parties to this convention).

\textsuperscript{269} Copyright Act, supra note 91, ss 14.1, 14.2, 28.2; Sam Ricketson, “The 1992 Horace S. Manges Lecture: People or Machines: The Berne Convention and the Changing Concept of Authorship” (1991) 16 Colum-VLA JL & Arts 1 at 5; Biron, supra note 19 at 27; Zemer, supra note 11 at 16.

\textsuperscript{270} Tawfik, supra note 6 at 44.
Despite the undisputable place of authors in its realm, Canadian copyright law’s main purpose is still the promotion of the public good. The individualistic rationale only supplements the copyright regime based on economic theory.

5.2.2 A Tradition to Rekindle

Therefore, as shown by its origins, Canadian copyright law seeks the maximization of social welfare in the production and dissemination of more creative knowledge. Granting rights to authors to create and publish more works can participate in the achievement of this objective, but it is not the sole means to attain it. Indeed, it is less the creative process, or the person, behind the production of works than their extrinsic quality that is important for society. With the development of AI systems, computer-generated works are now another manner to produce and distribute expressive knowledge that can benefit the public good. I do not suggest that they necessarily should gain copyright protection. I simply point out that human authorship does not seem essential to promote this goal. For this reason, rather than being described only as a policy encouraging authors to produce works, I suggest that copyright should, more generally, strive for the advancement of knowledge.

This objective of promoting knowledge can be even traced back to the Statute of Anne which Canada “recognises [...] as the first copyright law, and the original, specific, and concrete template to follow”. The initial aim of this law, enacted in 1710 in England, was not

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271 Ibid.
272 Tawfik, supra note 6 at 35.
273 Durham 2002, supra note 8 at 618; Madison, supra note 8 at 851.
274 Madison, supra note 8 at 824, 851.
275 Statute of Anne, supra note 9; Zemer, supra note 11 at 36-37.
merely to foster the authorial creation, but, more generally, to encourage learning. The focus was on the production and the access to knowledge, the recognition of authorship serving this specific objective. More than 300 years later, the preamble of the Copyright Modernization Act offers a similar view of copyright law. The Canadian legislature affirmed that “the Copyright Act is an important marketplace framework law and cultural policy instrument that [...] supports creativity and innovation and affects many sectors of the knowledge economy”. This statement reveals the wider ambitions of copyright law. More than merely providing authors exclusive rights to exploit their works, it aims to establish a structure of rights to support knowledge production and dissemination.

Moreover, the knowledge approach is deeply enshrined in copyright law’s social welfare purpose. The advancement of public knowledge does not lie in the creative process, but in the resulting works. As supported by Durham and Madison, under this objective, it is the...
perceivable features of the works that are important for the public good. Indeed, when copyright’s emphasis is put on authorship, it “becomes a way of thinking about motivations, influence, and power, rather than a way of thinking about what sorts of things society wants to produce, preserve, share and have access to”. The hard labour of the author of a textbook is essential in the making of a work of quality, but the most valuable for the society is that the textbook exists and is accessible. If an AI system can produce a similar work, the textbook itself will provide a similar knowledge to people. In that respect, since they also comprise valuable knowledge that can be shared with the public, computer-generated works should not be, at first glance, distinguished by copyright law. They can equally contribute to social knowledge.

It is true that this approach may contradict the current jurisprudence. Since CCH, in Canadian copyright law, a minimal intellectual effort is necessary to gain protection. In recognizing such an intellectual effort, copyright law protects works not only for their extrinsic qualities but also for the intrinsic process of creation of their human author. In this sense, the implicit requirement of human authorship from CCH might appear futile for the

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281 Durham 2002, supra note 8 (“[t]he satisfaction of public needs — including the need to “promote the progress” of knowledge — depends upon the content of the works available to the public. Whether a work took great effort or no effort to produce, whether it is personal or impersonal, whether it is the product of genius or incompetence is of little consequence to the consuming public, however important it might be to the author. Genius, personality, and effort may produce superior works, but it is the product that is important to the society” at 618); Madison, supra note 8 (“[c]opyright as knowledge law should direct policymakers and analysts to focus on the external manifestations of human behavior, both individually and collectively, rather than on internal questions of motivation and belief” at 851); It is relevant to note that in his analysis of copyright law, Madison implicitly recognizes that copyright protects only works of human authors. Durham agrees that copyright is limited to human authorship, but he claims that it may also “include situations where the author employs an external agency, which could include […] a computer program […]. Any agency introduces an element beyond the control of the author, but it is sufficient to satisfy condition (1) that the author is ultimately responsible for the work being made.” (Durham, supra note 8 at 636-37). Notwithstanding the limitations of their theories, this paper suggests that we can apply a similar conception of copyright law to the study of works produced by AI systems without human creative intervention.

282 Madison, supra note 8 at 824.

283 CCH, supra note 12 at para 16.
advancement of knowledge. However, as supported by Madison, “creativity [and authorship] should not be excluded from copyright [...] [although we should conceive copyright] primarily as a system for producing, distributing, conserving, sharing, and ensuring access to knowledge.”284 Hence, the analysis of authors’ skill and judgment may still be useful to differentiate them from human-authored works. If computer-generated works are included in the realm of copyright law, they should probably not fall under the general regime. It is difficult to conceive how moral rights can be allocated to such works. Moreover, if there is no person to incentivize, computer-generated works should simply not be protected. The advancement of knowledge approach simply offers a framework taking into account copyright concrete objectives and thus facilitating the decision on the inclusion of computer-generated works in its scope. It focuses less “on outcomes that are internal to individuals and [...] [more] on outcomes that are external to society”.285

On another note, this framework can be useful to review the scope of rights on human-authored works. The knowledge conception of copyright law recognizes the collective aspect of creation. It might thus help the adoption of provisions more representative of the nature of authorship. Throughout copyright history, there was this romantic vision that works are “original product[s] of the intellection of [...] unique individual[s]”286 called authors. Some rights could have been allocated to authors based on this assumption. However, in reality, creation is mainly a collaborative process and authors constantly use previous works of other creators.287 In fact, “works of authorship” can be better described as “selections from an

284 Madison, supra note 8 at 824.
285 Madison, supra note 8 at 851.
287 Woodmansee, supra note 237 at 68.
array of alternatives”.\textsuperscript{288} To some extent, authors are “instruments” who arrange knowledge in an expressive way.\textsuperscript{289} Under the “advancement of knowledge” framework, copyright, more than promoting authorship, seeks to establish the perfect conditions to encourage production and dissemination of knowledge so people can learn from works, enjoy them, and create new ones inspired by them.\textsuperscript{290}

5.2.3 Defining Knowledge in Copyrightable Works

In the context of this copyright policy, knowledge should be understood in a broad sense. It is not restricted to student textbooks and scholarly articles, though it does not include all kind of information. The scope of copyright law is circumscribed to “original literary, dramatic, musical and artistic work”.\textsuperscript{291} Facts, methods, and ideas are not protected. It is the manner in which they are arranged (i.e. their expression) that is copyrightable.\textsuperscript{292} For instance, the method for baking sourdough bread represents certainly a precious knowledge for society, but it is not covered by copyright law. It is possible that the text of the bread recipe can be sufficiently original to be considered as a literary work, but the method itself remains free to use by any baker (unless patented). Similarly, new groundbreaking technologies, such as AI systems, may be essential knowledge for the development of useful tools but are not copyrightable.

\textsuperscript{288} Durham 2004, supra note 8 at 119.
\textsuperscript{289} Durham 2004, supra note 8 at 110; Bridy, supra note 156 at para 27.
\textsuperscript{290} Zemer, supra note 11 at 98; Hughes, supra note 111 at 77; Sheridan, supra note 6 at 51; Fromer, supra note 8 at 117-18.
\textsuperscript{291} Copyright Act, supra note 91, ss 2, 5(1); Vaver, supra note 12 at 64.
\textsuperscript{292} CCH, supra note 12; Fromer, supra note 8 (“c]opyright law does not allow the propertization of these basic components, and we tend not to see such to-the-point authored works, as they are unprotectable” at 88).
As asserted by Jeanne C. Fromer, copyright law only includes works conveying expressive information that can be valuable for society. First, it comprises expressive works containing factual or cultural knowledge. Factual knowledge “helps [to] advance societal knowledge of the facts contained therein”. For example, newspaper articles share factual knowledge in summarizing to readers political and social events. Journalists do not merely list the facts; they insert them in a narrative and thus an expressive structure to facilitate their communication. As regards to cultural knowledge, it covers “fictional works [which] typically convey various themes — be they emotional or intellectual [...] [R]eaders will locate knowledge within them”. In fact, a novel about social inequality, such as *To Kill a Mockingbird*, indirectly transfers knowledge about this specific theme through its storyline.

Secondly, still according to Fromer, copyright also encompasses works that do not include knowledge but share an expression that is enjoyable to the public. “Given that society frequently values expression for its own sake—be it beautifully expressed, poignantly communicated, or otherwise—copyright law ought to be encouraging that form of expression in the first place”. Artistic works, such as paintings, music, and even poetry generally do

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293 Fromer, *supra* note 8 at 73. Fromer supports that works are valued because they promote knowledge (Fromer, *supra* note 8 at 86-87). She defines valuable knowledge in the information theory of copyright law she proposes. The “[i]nformation theory [...] suggests that noise in a message can be reduced, if not entirely overcome, by introducing redundancy into the message. [...] These redundancies make it more likely that consumers will gain access to the transmitted knowledge. [It can be applied to literary and artistic works.] In fact, oral cultures absorbed this lesson centuries ago by realizing the need to encode works, such as Homer’s Odyssey, with redundancy so that they could be remembered and transmitted without loss of the encoded information.” (Fromer, *supra* note 8 at 90). Noise and redundancy can be seen as the expression of facts and ideas that compose the message. Redundancies are the codes and practices that help consumers to access the message through the noise. “Information theory and its notion of redundancy to cut through noise are helpful to explain what about copyrightable works is valuable and how law ought to encourage these valuable aspects.” (Fromer, *supra* note 8 at 127).

294 Fromer, *supra* note 8 at 73, 84.

295 Fromer, *supra* note 8 at 86.

296 Fromer, *supra* note 8 at 86.

297 Fromer, *supra* note 8 at 86.

298 Fromer, *supra* note 8 at 92.
not necessarily convey any specific facts and ideas. A painting can factually depict a
historical event and a poem can evoke a political conflict, but their interest resides mainly in
their aesthetical expression. Viewers pleasingly find meanings in them.\textsuperscript{299} However, contrary
to Fromer, I consider that such works can also be included in the wide definition of
knowledge. As affirmed by Madison, knowledge comprises “various forms and practices of
art [...] [...] [It] embodies and encodes meaning which can come and be understood at multiple
layers. [...] Knowledge may be distinguished from [...] data, which typically lacks inflection
via meaning”.\textsuperscript{300} Artistic works are definitely not mere data. Otherwise, it would be difficult
to explain why, for two centuries, orchestras around the world have played the ninth
symphony of Beethoven. Symphonies are certainly not meaningless works. In this sense,
since artistic works have meanings, we can assume that they also include some knowledge.
Obviously, this artistic knowledge, which may be a subcategory of cultural knowledge, is
much more abstract than factual knowledge. It might be defined as an ineffable aesthetic
truth that relates to listeners’ and viewers’ emotions.

Furthermore, it does not matter whether the authors had intended to include knowledge in
their works. Factual, cultural, and artistic knowledge all emanate from the works themselves.
Facts are in the text of newspaper articles, fictional works contain intellectual and emotional
themes, and people construe meanings from the elements inside artistic works. It is the
information received by the audience when consuming these works that provides social
value.\textsuperscript{301} For example, it does not diminish the value of a fiction book if its author doesn’t
understand what he wrote or didn’t want his writings to be a novel. As claimed by Yanisky-

\textsuperscript{299} Fromer, \textit{supra} note 8 at 92, 94.
\textsuperscript{300} Michael J. Madison, “Notes on a Geography of Knowledge” (2009) 77 Fordham L Rev 2039 at 2043-44.
\textsuperscript{301} Madison, \textit{supra} note 300 (“[k]nowledge may arise in origins and sources, but it may be understood only or
largely by the practices of recipients, interpreters, and users” at 2061).
Ravid and Velez-Hernandez, works are better described by their features perceivable by the audience rather than by their underlying process of creation.302

In summary, the “advancement of knowledge” approach to copyright law focuses on the works rather than on the authors’ intents.303 This framework suggests that the creative process of creators is not the crux of copyright. Creativity is something hardly observable for the public. The real value resides in the extrinsic qualities of the works themselves.304 Thus, taken to its logical extreme, if copyright protection is granted for the acknowledgement of external originality, it is irrelevant whether a work was created by a human, an animal, a machine, or even a ghost. However, grounding the allocation of rights solely on the externalities of works can lead to unwanted outcomes. There is a social cost associated to such rights and, if the work would have been created and distributed in any circumstances, without the copyright regime, imposing this cost on the society will bring no further benefit.

5.3 Granting Rights for the Advancement of Knowledge

Therefore, although computer-generated works seem to fit in the knowledge conception of copyright law, it is not clear whether granting rights on such works would increase social welfare. Regardless of the context of their creation, it is undeniable that works produced by AI systems and human-authored ones are equivalent. They both display original features and share to the public comparable knowledge. If copyright law objective were to protect all works featuring valuable qualities for the advancement of knowledge, computer-generated works would be included without any doubt. Nevertheless, copyright’s economic objective is

302 Yanisky-Ravid & Velez-Hernandez, supra note 168 at 33; Hughes, supra note 111 at 70.
303 Durham 2004, supra note 8 at 119; Madison, supra note 8 at 851.
304 Madison, supra note 300 at 2044.
different. It does not grant protection to all works that include interesting knowledge in an expressive way. Copyright should influence positively the creation and distribution of works. If it does not incentivize anyone to produce and disseminate more works, then such a policy is not justified. Therefore, before extending copyright law to include them, it is crucial to ensure that it would participate in the advancement of knowledge. In this section, I will review, under the advancement of knowledge framework, the basis for rights currently provided by the Copyright Act and suggest that it may be reasonable to extend protection to computer-generated works.

5.3.1 The Notion of Incentive

Since the advancement of knowledge is based on the economic theory, it is important to first circumscribe the nature of copyright incentives and their influence on authors, arrangers and disseminators. The application of this notion as the justifying premise for the protection of works is highly contestable. Indeed, it is arguable that authors have other motivations than monetary rewards that encourage them to create. Studies revealed that the act of creation happens more likely under the impulse of passion rather than following a rational calculated plan. Aiming at box office hits, Hollywood creators may respond to incentives to create movies, but most authors create works motivated by their intrinsic desire for creation.

306 Elkin-Koren & Salzberger, supra note 235 (“[v]arious scholars in recent years have been paying more attention to the non-monetary incentives that motivate creators, thus challenging the dominant view that monetary rewards are necessary and sufficient for inducing human creativity. [...] There are many non-monetary benefits that people gain from creative activity; there is a natural drive to create, creative passion, the need to express oneself and to communicate one’s ideas” at 65).
307 Zimmerman, supra note 235 (“the expression of human creativity is primarily driven by intrinsic rather than extrinsic factors” at 43); Elkin-Koren & Salzberger, supra note 235 at 65.
308 Handke, supra note 253 at 11; Rebecca Tushnet, “Economies of Desire: Fair Use and Marketplace Assumptions” (2009) 51 Wm & Mary L Rev 513 (“[c]reators speak of compulsion, joy, and other emotions and impulses that have little to do with monetary incentives” at 546).
Hence, it is understandable that, when incentives are defined as promoting the creation, it raises concerns about the economic relevance of copyright law.

However, I suggest that the concept of incentive can be construed differently. Rather than influencing creators directly, Julie Cohen submits that incentives reside in the predictable and stable market provided by the copyright framework. As public goods, without copyright protection, nothing would impede the free flow of works and everybody could unrestrictedly market copies of them. Copyright law precludes such free riding by granting copyright holders exclusivity, for a limited time, in the exploitation of their works.

Therefore, this “economic fixity” can encourage the production and distribution of creative works in offering to authors, arrangers, and disseminators of works the opportunity to recover their investment.

Obviously, not all works will be successful enough to be profitable. Nonetheless, the possibility to market them at a supra-competitive price can be a motivation to put more time

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309 Cohen, supra note 238 (“[c]opyright fulfills some important economic functions (of which more shortly), and therefore plays an important role in organizing cultural production, but it is hardly ever the direct cause of a representational shift in creative practice” at 1193).
311 Handke, supra note 253 at 3.
312 Cohen, supra note 238 (“copyright is a means of creating economic fixity, and thus predictability, in the organization of cultural production. [...] Those are desirable goods; a society characterized by complete lack of economic certainty would be unstable, state control of cultural production would be undesirable, and a culture without shared expressive referents would be far less enjoyable. [...] [However,] copyright's goal of creating economic fixity must accommodate its mission to foster cultural play.” at 1195-96); Zimmerman, supra note 235 (“[a]n exclusive right to license or vend the work for a limited time period permits markets for public goods to form. In that purely business sense, intellectual property clearly acts as a kind of incentive” at 30);
313 Zimmerman, supra note 235 (“[t]he copyright "incentive" notwithstanding, it is more credible to understand their devotion to the production of expressive works more as a product of love than as a response to the promise of money, because they are unlikely ever to see much of the latter.” at 38); Tushnet, supra note 308 at 517-18.
and money into their production and dissemination. Although rights are mainly granted to creators, Jonathan Barnett claims that such incentives target and affect, more particularly, arrangers and disseminators of content, whose role is crucial in the sharing of knowledge. Indeed, they are the ones that take the most risks and invest the most capital in creative works. Briefly, copyright might not incentivize creativity itself which is a more personal process. Instead, it encourages investments in works by establishing a market for their distribution and production, its “predictability [...] ensuring] that its ultimate purpose of promoting cultural progress [ie, the advancement of knowledge] is achieved”.

5.3.2 Rights to Authors: Creators of Knowledge

As mentioned, the Copyright Act principally grants rights to creators of expressive knowledge as part of its general regime. It provides to the author of a work the exclusive privilege to reproduce, communicate, and publish it. Though it is not explicitly included in the Copyright Act, it is assumed that authors are limited to humans who create the expressive work. This presumption is hard to deny. In fact, in its literal sense, an author is “an

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314 Zimmerman, supra note 235 (“[i]f copyright is really about incentives to invest time and capital in the production of works by providing a mechanism to recover the investment if the product is successful, rather than the tool that incentivizes creativity, then it is a lot easier to be unsentimental, and a bit more stingy, in evaluating how to provide fair compensation for authorship through a copyright system.” at 57-58).
315 Jonathan M. Barnett, “Copyright without Creators” (2013) 9 Rev L & Econ 389 (“copyright is a precondition for enabling markets to select the most efficient set of intermediation structures for delivering content” at 433, See also at 404).
316 Ibid.
317 Julie E. Cohen, “Copyright as Property in the Post-Industrial Economy: A Research Agenda” (2011) Wis L Rev 141 at 143-44; See also Cohen, supra note 238 at 1195.
318 Copyright Act, supra note 91, s. 3(1).
319 Hutchison, supra note 100 ([t]he requirement of authorship means that original expression must emanate from a human being. [...] If skill and judgment are shown in the making of the work, the use of computer assistance is not a barrier to copyright protection. The critical factor is human originality, not the means through which originality is expressed.” at 77); Boyden, supra note 76 at 380.
originator of a plan or idea” which refers to “a person who creates or initiates something.” 320 This is also a view shared by Sam Ricketson who asserts that human-centred authorship is in the heart of the Berne Convention in which Canada is a member. 321 Thus, human authorship may not be the principal objective of copyright law, but it still has an important place in its pursuit. 322

Indeed, until the arrival of artificial intelligence, only human authors could produce knowledge. Still today, only human authors can be encouraged to create new expressive knowledge. AI systems still cannot be incentivized by external factors. 323 In addition, as previously mentioned, no human includes their expression in the production of the computer-generated works. 324 They may contribute to the knowledge of software design, but they don’t directly participate in the expressive conception of the resulting works. One can argue that humans may arrange their production, but it is not sufficient to extend protection to computer-generated works on the basis of authorship. Hence, authorial rights can only be granted to human-authored works.

5.3.3 Rights to Non-Authors: Arrangers and Disseminators of Knowledge

In parallel to the prevailing copyright regime, there are also some rights allocated to non-authors whose role is to arrange and distribute works. Copyright law seeks to incentivize

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321 Ricketson, supra note 269 (“[t]he human-centered notion of authorship presently enshrined in the Berne Convention embodies a fundamental human right, namely that of the creator over the work he or she creates.” at 34).
322 Tawfik, supra note 6 at 35; Madison, supra note 8 at 824, 851.
323 Davies, supra note 151 at 612; Perry & Margoni, supra note 7 at 627.
324 Boden, supra note 27 at 71; Boden, supra note 41 at 141.
them to market works and thus share their knowledge to a wider public.\textsuperscript{325} Some, such as Wendy J. Gordon, consider that these rights granted to “noncreative disseminators” merely depend on authorial incentives.\textsuperscript{326} They are justified solely because they help the diffusion of works of authorship.\textsuperscript{327} If there is no author to encourage, such rights should be void.\textsuperscript{328} I concur with Gordon that the relevance of rights to non-authors depends on the existence of creative works. On the contrary, under the “advancement of knowledge” approach, the value of works for the public does not depend on authorship but resides in their extrinsic qualities.\textsuperscript{329} Therefore, the rationale for rights allocated to “noncreative disseminators” may be different from the ones granted for the creation of works, but they can stand by themselves. In fact, some people can directly be incentivized by them.\textsuperscript{330}

For instance, in the case of neighbouring rights, an alternative regime in the \textit{Copyright Act}, the maker of a sound recording has an exclusive right on its publication and distribution.\textsuperscript{331} The maker is the one who pays for and organizes the production of the recording.\textsuperscript{332} He is not the author.\textsuperscript{333} He fixes the sound on a medium that facilitates the propagation of the work and he has a right in the record even if its content is not copyrightable, such as bird calls.\textsuperscript{334} Moreover, the work made in the course of the employment is another example of rights

\begin{itemize}
\item \textsuperscript{325} Denicola, \textit{supra} note 156 (“maintaining incentives for humans to disseminate works is also critical in insuring the ultimate public benefits sought by copyright” at 283); Samuelson, \textit{supra} note 135 at 1227.
\item \textsuperscript{326} Wendy J. Gordon, “The Core of Copyright: Authors, Not Publishers” (2014) 52:2 Houston L Rev 613 at 631.
\item \textsuperscript{327} \textit{Ibid}.
\item \textsuperscript{328} Gordon, \textit{supra} note 326 at 619.
\item \textsuperscript{329} Durham 2002, \textit{supra} note 8 at 618; Madison, \textit{supra} note 8 at 851.
\item \textsuperscript{330} Denicola, \textit{supra} note 156 at 273.
\item \textsuperscript{331} Vaver, \textit{supra} note 12 at 110; \textit{Copyright Act}, \textit{supra} note 91, s 18.
\item \textsuperscript{332} Vaver, \textit{supra} note 12 at 110; \textit{Copyright Act}, \textit{supra} note 91, s 2.
\item \textsuperscript{333} Vaver, \textit{supra} note 12 at 109-10.
\item \textsuperscript{334} Vaver, \textit{supra} note 12 at 98.
\end{itemize}
granted to an arranger and disseminator.\textsuperscript{335} In this situation, the copyright on the work of the employee is directly allocated to the employer.\textsuperscript{336} The copyrightability of such works does not encourage employees to produce them and the employer does not really participate in the creative process. Instead, granting the copyright to employers seeks to incentivize them to arrange the creation of new works and disseminate them.\textsuperscript{337}

Hence, the person who arranges, and thus organizes, the production of a computer-generated work fulfills an equivalent role than sound recording makers and employers. Unless intelligent agents act independently to produce them, the presence of a market and a stable framework may similarly incentivize people to arrange and then disseminate works produced by AI systems. Economic rights may encourage them to make investments in the use of computer-generated works and share their valuable expressive knowledge.\textsuperscript{338} Under this basis, it seems logical to include computer-generated works in the realm of copyright law.

5.4 Allocating Rights in Computer-Generated Works

In this chapter, I argued that, as a social welfare policy, copyright law’s main objective is to promote knowledge. Since knowledge can usually be found in the extrinsic expression of works, computer-generated works’ original features are comparable to the ones conventionally authored by humans. Nonetheless, I also recognized that including these works in the scope of copyright must be justified by the public interest. Granting copyright to works that would have been produced and distributed without any protection would incur a

\textsuperscript{335} Copyright Act, supra note 91, s 13(3).
\textsuperscript{336} Vaver, supra note 12 at 58; Copyright Act, supra note 91, s 13(3).
\textsuperscript{337} Vaver, supra note 12 (“[a] person hired to produce material as part of her work normally expects copyright to be her employer’s; for, without the hire, the works would probably not have been produced at all.” at 125).
\textsuperscript{338} McCutcheon, supra note 18 (“[w]ithout that reward, the [computer-generated] work may not be made, or made as well, or disseminated; or its dissemination may be limited by technological or contractual locks, thus counteracting the policy objective of ‘making a work available to the reading public’.” at 952).
cost and carry no benefit for society. Copyright should encourage authors, arrangers and disseminators of works to produce and make more works available to the public. Consequently, I asserted that although no one participates creatively in the production of computer-generated works, it appears that persons may still be incentivized by a copyright regime for the arrangement and distribution of these works. It would thus be reasonable to incorporate them in the Copyright Act.

In this section, I will discuss the inclusion of computer-generated works in copyright law. Though some may argue that, in the public interest, they should remain in the public domain, I will rather suggest that they should be protected, but under a separate regime than human-authored ones. An “arranger’s right” should be allocated to persons who request and computer-generated works. It would encourage them to use new technologies for the production of artistic and literary works and share them with the public, contributing in this way to the advancement of knowledge.

5.4.1 A Justification for the Social Interest

The baseline of copyright law, as a social welfare policy tool, is the public interest.\textsuperscript{339} Therefore, the advancement of knowledge cannot be achieved if too extensive copyright provisions impede public efficient access. Copyright is, after all, a bargain in which rights holders can exclusively exploit their works for a limited period by making them available to the public.\textsuperscript{340} If there is no one to incentivize for the production and dissemination of works,

\textsuperscript{339} Zemer, \textit{supra} note 11 (“[t]he incentive structure in utilitarian arguments focuses on promoting the general public good, not placing the individual creator as an independent object entitled to a right” at 12).
\textsuperscript{340} Zemer, \textit{supra} note 11 at 11; Landes & Posner, \textit{supra} note 226 at 326.
a monopoly on them is not justified.\textsuperscript{341} These works would have been created under any circumstances, so they should fall in the public domain. The public domain comprises works “that are not protected by copyright or whose protection has lapsed, due to the expiration of the duration of protection”.\textsuperscript{342} It, more importantly, encompasses elements in protected works that are not copyrightable, such as facts and general ideas.\textsuperscript{343} In limiting the scope of protection, the public domain ensures the availability of knowledge for use by creators and the public in general.\textsuperscript{344} Therefore, it is crucial that elements excluded from the public domain are guided by social interest.\textsuperscript{345}

In this respect, some argue that leaving computer-generated works in the public domain is the best option.\textsuperscript{346} Their production does not involve sufficient human input in the creative process, so, without authors to encourage, restricting access to works does not seem justified. Even in acknowledging the participation of humans in their arrangement, several scholars consider that is not clear enough whom to recognize as the owner of such rights.\textsuperscript{347} Many people, such as the owner of the AI system, the programmer, and the end-user, contribute to different parts of the process. Moreover, as argued by Elkin-Koren and Salzberger, with new technologies, distributors’ contribution to the advancement of knowledge might be less

\textsuperscript{341} Boyle, \textit{supra} note 25 (“the goal of the system ought to be to give the monopoly only for as long as necessary to provide an incentive.” at 11).
\textsuperscript{342} WIPO, Committee on Development and Intellectual Property, \textit{Scoping Study on Copyright and Related Rights and the Public Domain} (prepared by Severine Dusollier), WIPO Doc CDIP/7/INF/2 (2011) at 5, online: WIPO \texttt{<http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_7/cdip_7_inf_2.pdf>} [Dusollier Study].
\textsuperscript{343} Vaver, \textit{supra} note 12 at 59; Jessica D. Litman, “The Public Domain” (1990) 39 Emory LJ 967 at 976; Dusollier Study, \textit{supra} note 342 at 5.
\textsuperscript{344} Ramalho, \textit{supra} note 26 at 21.
\textsuperscript{345} Litman, \textit{supra} note 343 at 968; Boyle, \textit{supra} note 25 (“[o]ur markets, our democracy, our science, our traditions of free speech, and our art all depend heavily on a public domain of freely available material” at 40).
\textsuperscript{346} Perry & Margoni, \textit{supra} note 7 at 627; Clifford, \textit{supra} note 39 at 1702.
\textsuperscript{347} Perry & Margoni, \textit{supra} note 7 at 627; Grimmelmann, \textit{supra} note 74 at 414.
important.\textsuperscript{348} For instance, it takes less organization and structure to publish a book. The publication can occur with the uploading of the file on a server. It is even possible, in a few clicks, to self-publish printed books with online services such as Amazon.\textsuperscript{349} Distributors may be no longer essential for making available content to a wider audience and thus less financially incentivized by copyright protection mainly to disseminate works they arranged.\textsuperscript{350} Under this view, the inclusion of computer-generated works in copyright law is unjustified.

However, the “advancement of knowledge” framework proposed in this paper suggests the opposite. The public interest may be better served by allocating some rights in computer-generated works. First, it is relevant to reiterate that it does not matter whether factual, cultural, and artistic knowledge comes from the mind of a human or the algorithm of a machine. The knowledge included in all kinds of works is of equivalent nature. Computer-generated works may not be of equal value to the public, but this is also the case with human-authored works. A generic superhero movie can make a billion dollars at the box office, while an independent documentary praised for its qualities by the industry can be seen by only a few thousand people. The notion of value is very relative. Hence, computer-generated works should not be distinguished because of the knowledge they contain.

More importantly, the fundamental point for the justification of the protection of these works lies in the incentives generated by copyright. If nobody can be encouraged by copyright, granting rights in such works would not justify the cost of the monopoly. As defined in a

\textsuperscript{348} Elkin-Koren & Salzberger, supra note 235 (“[w]hile in the past incentives might have been necessary for carrying on an invention or creation to wide distribution, the technological tools of today significantly decrease this rationale” at 86).


\textsuperscript{350} Elkin-Koren & Salzberger, supra note 235 at 83.
previous section, copyright does not directly encourage the creation of works, but it, more generally, incentivizes their production and dissemination in establishing a stable and predictable framework to market them at a supra-competitive price.\textsuperscript{351} This economic certainty clearly participates in the advancement of knowledge.\textsuperscript{352} Moreover, as claimed by Barnett, such incentives seek particularly to encourage the arrangers and disseminators, the ones who “incur significant capital costs and risks in funding cultural production and distribution”.\textsuperscript{353} Contrary to Elkin-Koren and Salzberger’s apprehension, he also underlines that “[e]ven in markets where production and distribution costs have fallen significantly, there is no decline [...] in the screening and marketing costs required to identify high-value content”.\textsuperscript{354} Therefore, despite the disruption of the knowledge market by new technologies, the role of arrangers and disseminators may still be pertinent. In spite of the lack of empirical evidence supporting these economic justifications, it can thus be desirable to grant a copyright to persons who request and disseminate computer-generated works.\textsuperscript{355}

In sum, the extension of copyright law to computer-generated works is in line with its goal of the advancement of knowledge. Works don’t have to be authored for the pursuit of this purpose. Furthermore, computer-generated works might not be arranged and distributed if a minimal protection is not allocated to them.\textsuperscript{356} Hence, exclusive rights on them can encourage their production and the sharing of more knowledge with the public, which can be overall beneficial for the society. The use AI systems may push expressive knowledge toward paths still unexplored by authors.

\textsuperscript{351} Cohen, \textit{supra} note 238 at 1193; Zimmerman, \textit{supra} note 235 at 57-58. See Section 5.3.1, \textit{above}. 

\textsuperscript{352} Cohen, \textit{supra} note 317 at 143-44; See also Cohen, \textit{supra} note 238 at 1195.

\textsuperscript{353} Barnett, \textit{supra} note 315 at 404, See also at 433.

\textsuperscript{354} Barnett, \textit{supra} note 315 at 415.

\textsuperscript{355} Hutchison, \textit{supra} note 100 at 2; Litman, \textit{supra} note 343 at 998.

\textsuperscript{356} McCutcheon, \textit{supra} note 18 at 952.
5.4.2 A Regime for “Authorless” Works

Although I support that computer-generated works should enter the realm of copyright law, I hardly see how they can be included under the general regime. Many computer-generated works offer similar knowledge to human-authored ones, but their rationales for production are different.\textsuperscript{357} Hence, they cannot be equally treated by copyright law. The main difference is that, despite their artistic or literary qualities, there is simply no author in computer-generated works.\textsuperscript{358} They are completely produced by an AI system.

Indeed, as argued in a previous chapter, no person in the conception and utilization of an AI system can be considered as an author.\textsuperscript{359} They do not participate in the expressive aspects of the works generated by AI systems. To some extent, the production of computer-generated works by AI systems can be compared to the achievements of young adults. The entourage of young adults has certainly played a crucial role throughout their life, but they cannot directly benefit from their work. Programmers and owners, as teachers and parents, assist in the development of the AI system, especially in the case of the machine learning process. Parents and teachers can be proud of their children and students but don’t have any rights in their realizations, nor do programmers of AI systems have rights in the output of their systems. Once young adults enter the job market, their employers can ask them to produce works in the course of their employment. Employers are not creators of these works.\textsuperscript{360} They are, in most circumstances, not taking part in the creative process, especially if they are legal entities. Nonetheless, they have the control over these works. Likewise, the person who

\begin{footnotes}
\item[357] Ramalho, \textit{supra} note 26 at 21.
\item[358] Boyden, \textit{supra} note 76 at 392.
\item[359] See Section 2.2.2.2, \textit{above}.
\item[360] \textit{Copyright Act, supra} note 91, s 13(3); \textit{U.S. Copyright Act, supra} note 139, §101, §201(b) (in Canada, an employer is “the first owner of the copyright”, but in the United States an employer “is considered the author”).
\end{footnotes}
requests the production of a work by an AI system can seek control over it, but cannot be qualified as the author. A person may arrange the generation of works and disseminate them but does not participate in the production process. Only AI systems can assume the role of the author, but authorship is restricted to humans.361 Therefore, computer-generated works are “authorless”.

It may be odd that “authorless” works are introduced in an act titled “Loi sur le droit d’auteur” in its French version. However, as proposed in this chapter, copyright law should be seen as a tool to advance knowledge which can comprise both works of authorship and computer-generated works. Authorship is an important aspect of the law, but it only serves this main objective.362 Furthermore, copyright law already encompasses a parallel regime for non-authors: the neighbouring rights.363 Performers, makers of sound recordings, and broadcasters are not considered as authors, but some exclusive rights are still granted to them.364 Such rights are more limited than the ones provided by the general regime. It is particularly the case for makers of sound recordings and broadcasters who, for instance, don’t benefit from any moral right, which is logical since they don’t create any works. It can serve as an example for the inclusion of computer-generated works in the Copyright Act. Applying similar provisions to works produced by AI systems would protect the commercial aspect of their distribution without recognizing authorship in them and, thus, unduly widening the array of rights.

361 Hutchison, supra note 100 at 54; Boyden, supra note 76 at 380.
362 Tawfik, supra note 6 at 35; Madison, supra note 8 at 824, 851.
363 Copyright Act, supra note 91, ss 15-26.
364 Vaver, supra note 12 (“[s]ound recordings, performances, and broadcasts have different copyrightability criteria from traditional works [...] There is no need to isolate authorship or find any originality” at 109-10).
It is interesting to note that this solution is envisioned by two ardent opponents to the extension of copyright law to these works. Ricketson, who argues that human authorship is enshrined in the *Berne Convention*, is surprisingly open to the idea that countries may extend their neighbouring rights in the copyright law since it is a parallel regime.\(^{365}\) Similarly, Ginsburg, who also supports the human aspect in copyright law, suggests that allocating rights on computer-generated works without considering the owner of such rights as the author may be a possible option.\(^{366}\) Considering the absence of authorship, she adds that these rights should be limited.\(^{367}\) I agree with them that computer-generated works should not take the same place as human-authored works. The nature of authorship should be recognized. Although Canadian copyright law can be described as a social welfare policy, personality rights related to the human character of the creation of works, mainly moral rights, supplement its scope of application.\(^{368}\) Hence, the rationales of production for human-authored works and computer-generated works are different and should thus be considered on a distinct basis.\(^{369}\) Nonetheless, there is space for more than one regime in the *Copyright Act*.

\(^{365}\) Ricketson, *supra* note 269 (”[including computer-generated works,] from the point of doctrinal purity, this is a sensible decision, leaving member states free to deal with such subject matter under their neighboring rights laws.” at 30).

\(^{366}\) Ginsburg, *supra* note 189 (“It is unfortunate, as well as confusing, that the U.K. law here conflates authorship with vesting of copyright ownership. [...] But it is possible to vest ownership in productions whose human input is uncertain, without tricking out the owner in the garb of an author. For example, the Australian law distinguishes works of authorship (whose creators are, implicitly, human beings) from ‘subject matter other than works’.” at 1070).

\(^{367}\) Ginsburg, *supra* note 189 at 1092.

\(^{368}\) Tawfik, *supra* note 6 at 44 (Canada has implemented moral rights); *Copyright Act, supra* note 91, ss 14.1, 14.2, 28.2.

\(^{369}\) Ramalho, *supra* note 26 at 21.
5.4.3 Toward an “Arranger’s Right”

Therefore, I propose the adoption of a provision granting rights to the persons who arrange computer-generated works as part of a regime of protection similar to neighbouring rights. I could have favoured a provision inspired by the United Kingdom regime or by the “work made for hire” doctrine as suggested by many scholars, but it does not sufficiently reflect the absence of authorship in computer-generated works.\textsuperscript{370} To more firmly distinguish this regime from the general one, nobody should be recognized as their “deemed author” and only exclusive economic rights should be granted in such works. Since they organize the production of computer-generated works, I consider that arrangers are in the best position to receive these economic rights. As illustrated by the “young adult” analogy, programmers and owners may be at the origin of the AI system but are not responsible for the generation of works. Although arrangers are non-authors, copyright can encourage them to request computer-generated works, distribute them and, more generally, participate in the flourishing of knowledge.\textsuperscript{371} It gives them a predictable and stable framework for the production and distribution of computer-generated works.\textsuperscript{372}

However, one can argue that the rationale for allocating a right in computer-generated works requested by an arranger is similar to the one for unpublished works created by long-dead authors. Although culturally valuable, no protection would be granted in a newly found work

\textsuperscript{370} Hristov, \textit{supra} note 156 at 442; Bridy, \textit{supra} note 156 at para 63; Yanisky-Ravid & Moorhead, \textit{supra} note 156 at 55; McCutcheon, \textit{supra} note 18 at 960; \textit{U.K. Copyright Act}, \textit{supra} note 174, s 9(3) (the author of a computer-generated work is “the person by whom the arrangements necessary for the creation of the work are undertaken”).

\textsuperscript{371} Ramalho, \textit{supra} note 26 (“[i]t is however possible that someone who disseminates AIs creations (thus bringing them to the public) needs to be incentivized or rewarded for doing so” at 22); Samuelson, \textit{supra} note 135 at 1227; See also Ginsburg, \textit{supra} note 207 at 134 (there should be some incentives to justify the copyright protection of computer-generated works).

\textsuperscript{372} Cohen, \textit{supra} note 317 at 143-44; See also Cohen, \textit{supra} note 238 at 1195.
of Da Vinci or Shakespeare. In both cases, the role of the persons who possess such works is to distribute them, so there is little justification to extend copyright law to computer-generated works. Nevertheless, there is an important difference separating these situations. Contrary to the discoverers of unpublished works, it is possible to request the generation of computer-generated works. The person arranging their production expects that a certain type of works will be produced by the machine. It is outside the scope of this paper to provide a framework establishing to what extent the “arranger” should predict the resulting work, but he should at least have some control on the nature of the work. It can be a newspaper editor using computers to generate articles, a director requesting an AI system to produce the soundtrack to her latest movie, a publisher asking an algorithm to produce new stories for a popular children’s series, or simply an art aficionado who desires a new painting in his living room.

Furthermore, an “arranger’s right” may have a positive effect on human creation. Throughout this paper, computer-generated works have often been opposed to human-authored ones. However, it is more probable that, in the next years, they will mainly serve human authorship endeavours. Authors pushing the boundaries of creation may include them in their works. Hence, issues will more likely concern hybrid works in which the role of the author is hardly discernible. It will not be obvious to determine what part of originality emanates from human authors. A right for arrangers may thus ensure some protection to works in which human authorship is not clear. It would prevent courts from applying too largely the notion

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373 Vaver, supra note 12 at 145; Copyright Act, supra note 91, s 7 (there was no copyright at the time of Da Vinci and Shakespeare. However, even for authors who recently died, there is a limitation for the protection of their unpublished works. In Canada, their unpublished works are copyrighted up to 50 years following their death).

374 Denicola, supra note 156 at 269-70.
of intellectual effort, given that a more limited and reasonable protection is also granted to computer-generated works.  

Ultimately, this reasoning on the importance of human arrangers leads to the conclusion that works produced, selected and published by an intelligent agent should not be copyrighted. For instance, an intelligent agent can take the form of a web bot that is active on a social media platform, on which it posts its new creations on a regular basis. This can also include works autonomously produced by an AI system and stocked in a public or private database. In both cases, there are no people to incentivize for the production and distribution of such works. Their generation is irrelevant to the scope of regulation protecting them. Copyright law may influence the development of such technology but does not influence the production of works by these autonomous AI systems. Humans are completely absent from the process of creation and distribution, so we should not allocate them any rights. Moreover, we cannot grant copyright to the intelligent agent itself. Again, a machine is still not a legal person and still can’t be incentivized. The exclusion of such works from copyright protection may address the concerns expressed by skeptical scholars.

5.4.4 A Limited Scope of Protection

Finally, in this last section, I consider that it is pertinent to describe the general aspects of the suggested “arranger’s right”. The aim of this paper is not to propose a detailed framework of protection, but it will illustrate my main assertions. As above-mentioned, the “arranger’s

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375 Hughes, supra note 111 (“[he proposes a similar reasoning concerning the originality of photographs arguing that recognizing non-original expressions] can help keep lawyers and policymakers from distorting the originality standard. Without this system, courts may continue to stretch originality to include in the realm of copyright many arguably uncreative photographs and videos” at 60-61).

376 Boyle, supra note 25 (“the goal of the system ought to be to give the monopoly only for as long as necessary to provide an incentive.” at 11).

377 Davies, supra note 151 at 612; Perry & Margoni, supra note 7 at 627.

378 Niebla Zatarain, supra note 205 at 92, 102; Grimmelmann, supra note 74 at 415.
right” should be circumscribed to reflect the nature of computer-generated works. Hence, as non-authors, arrangers of these works should enjoy a limited array of rights. Moreover, the subject-matter of such rights should not include all works generated by an AI system. Works must contain a sufficient extrinsic originality to participate in the promotion of knowledge. Lastly, it is essential to note that an “arranger’s right” would not ensure the profitability of computer-generated works. It would only give the opportunity to arrangers to market them at the exclusion of others.

5.4.4.1 Limited Economic Rights

Similarly to makers of sound recordings, arrangers should solely have economic rights in the publication and reproduction of computer-generated to allow them to market these works. Since they are not their authors, they must not be recognized as the creators of the original elements in them. For instance, they should not have the privilege of authors regarding moral rights and the integrity of their works. In addition, these economic rights should last for a short time. Such rights should encourage arrangers to request and publish computer-generated works, but they should also take into consideration the public interest. The purpose of the “arranger’s right” is to make valuable knowledge widely available. Once published, the public interest for protecting computer-generated works diminishes quickly.

Consequently, the protection should logically begin at the publication date and end after a brief period of time. Moreover, the duration of such rights should be limited to a definite

379 Copyright Act, supra note 91, ss 14.1, 14.2, 28.2.
380 Ramalho, supra note 26 (he suggests that “the EU Term of Protection Directive, could be a solution. [...] This right is exactly intended to stimulate publication of works.” at 22).
period from the production date to avoid the “perpetual” protection of unpublished computer-generated works. It can be translated into this suggested provision:

“The person who arranges the production of a computer-generated work gains exclusive rights over its publication and reproduction from the publication date. Rights shall expire 15 years [only as an indication] from the publication or 25 years [only as an indication] from the production of the computer-generated works, whichever comes first.”

5.4.4.2 Limited Subject-Matter

Furthermore, the “arranger’s right” should not be granted to all computer-generated works. Works must fall under the subject-matter of copyright law. In other words, they have to be literary or artistic works with sufficient extrinsic original features. The purpose of including them in the scope of copyright law is not to protect each word, picture, and musical note produced by computers. As human-authored works, computer-generated works must provide expressive knowledge to the public. For example, many photographs do not contain original features.\(^{381}\) Satellite pictures or images that are taken by surveillance camera do not entail any original element.\(^{382}\) They are only depicting mere factual reality.\(^{383}\) Photography is only a medium through which works embodying a copyrightable expression of knowledge can be achieved.\(^{384}\) Likewise, if computer-generated works do not encompass extrinsic original features, they should not be included in the Copyright Act.

\(^{381}\) Hughes, supra note 111 at 36.
\(^{382}\) Hughes, supra note 111 at 42; Perry & Margoni, supra note 7 at 622.
\(^{383}\) Hughes, supra note 111 at 46, 48.
\(^{384}\) Hughes, supra note 111 at 87.
5.4.4.3 Limited in Commercial Value

Ultimately, the “arranger’s right” would probably be limited in its application. First, important parts of these works will be in the public domain.\textsuperscript{385} Copyright protection does not mean that works are the exclusive private property of the right holder.\textsuperscript{386} Only substantial features comprised in them are restricted from copying.\textsuperscript{387} Moreover, these features can be freely used by consumers under the fair dealing provision and other users’ rights which allow the reasonable utilization of copyrighted works without requiring the permission of copyright holders.\textsuperscript{388} Therefore, despite the exclusive economic rights in them, the public would still have the opportunity to have a convenient access to them.

Secondly, allocating exclusive rights to the arranger of computer-generated works does not necessarily signify that they will be valuable on the market. It is consumers who will determine the value of computer-generated works.\textsuperscript{389} It is quite likely that the demand for computer-generated works may be different from human-authored ones.\textsuperscript{390} They are not perfect substitutes. Computer-generated works may offer amazing possibilities, but chances are that human creation will always have a special place.\textsuperscript{391} In the end, maybe solely the ineffable emotion immanent to human-authored works can move us. Beyond its perceivable qualities, an artistic or literary work is also the creation of a unique relationship between the mind of an artist and the audience.

\begin{footnotesize}
\textsuperscript{385} Litman, \textit{supra} note 343 at 976.
\textsuperscript{386} Zemer, \textit{supra} note 11 at 138.
\textsuperscript{387} Litman, \textit{supra} note 343 at 974.
\textsuperscript{388} \textit{Copyright Act}, \textit{supra} note 91, ss 29-29.21.
\textsuperscript{389} Durham 2004, \textit{supra} note 8 (“once those rights are secured, the marketplace can determine what is and is not valuable.” at 125).
\textsuperscript{390} Yanisky-Ravid & Moorhead, \textit{supra} note 156 at 46.
\textsuperscript{391} Levesque, \textit{supra} note 84 at 133.
\end{footnotesize}
Chapter 6
Conclusion

In this paper, I explored the possibility of including computer-generated works in the scope of copyright protection. More particularly, I questioned whether copyright policy objectives justify such an extension. At first sight, creative works produced by AI systems are comparable to the ones created by skilled human artists. This observation applies both to good old expert systems and promising neural networks. For instance, Emmy, an expert system, can compose marvellous symphonies emulating Bach’s and Mozart’s genius while, using neural networks, a team of scientists have built a system that can generate astonishing new Rembrandt paintings. However, contrary to works traditionally authored, no human intervenes in the creative decisions of the output generated by these AI systems. Programmers still choose the aim of the system and users may select some features of the generated work. For example, a programmer may decide to make a system that produces movie soundtrack, while a user may request a Hitchcockian soundtrack. Nonetheless, in most cases, they do not have any control over the “expressive” features and thus cannot predict the generated works.

Thereby, although extrinsically similar to human-authored ones, computer-generated works are currently not covered by Canadian copyright law. Nobody exercises the minimal authorial intellectual effort required to gain copyright protection, though it is not impossible to amend the Copyright Act to include them. In fact, I pointed out that copyright boundaries have always been flexible to accommodate new technologies. Photographs, musical works, and cinematographic works have all enlarge copyright scope over the years. Rights to non-authors have even been incorporated to facilitate the arrangement and distribution of creative
works. However, to extend copyright law to computer-generated works, it is important to ensure that they fall under its rationale as well. As I underlined, the literature on the copyrightability of these works has not thoroughly considered this question yet. Many scholars suggest frameworks for their protection but do not refute concerns about the justification and the effects of such a measure. Although some briefly relied on thoughtful claims based on copyright rationales, such as the economic theory, they did not develop further their argumentation. Computer-generated works may be as enjoyable as the ones created by humans. Nonetheless, we have to ensure that their inclusion reflects copyright objectives.

It is precisely this shortcoming I attempted to tackle in this paper. Building on the arguments discussed by scholars supporting the inclusion of computer-generated works, I proposed a more comprehensive policy framework taking into account the nature of such works. First, I claimed that granting rights in computer-generated works complies with Canadian copyright law economic rationale. As part of the British tradition, its historical development suggests that the maximization of social welfare should be its central justification. Under this view, the role of copyright law is to incentivize the production and dissemination of literary and artistic works for the benefit of the society. Like some scholars, I further argued that this collective objective should, more specifically, strive for the advancement of knowledge, as originally intended in the Statute of Anne.\textsuperscript{392} It is under this approach that I analyzed copyright law. The pursuit of this objective relies more on the extrinsic features of works, which are the most valuable social contribution than the production process of these works.

\textsuperscript{392} Durham 2002, \textit{supra} note 8 at 617-18; Durham 2004, \textit{supra} note 8 at 94; Madison, \textit{supra} note 8 at 824, 832; Fromer, \textit{supra} note 8 at 86-87.
Therefore, since computer-generated works also include valuable “expressive” knowledge, it seems equitable to grant copyright in these works as well.

However, the extension of the copyright scope to these works must be justified. As an economic policy, copyright law should balance the cost of protection with the benefits brought to the public. On the one hand, it may not seem beneficial for society to grant exclusive rights in these works. AI systems cannot be incentivized to produce more works. Moreover, no person participates in their creative process, so there is no author that copyright can encourage. On the other hand, I noted that some persons organize and distribute computer-generated works to AI systems. In arranging them and offering them to the public, they also participate in the advancement of knowledge. Therefore, I have asserted that it may be reasonable to grant these persons an “arranger’s right”; which consists of a limited economic exclusivity in the marketing of computer-generated works. This predictable framework of protection may provide them incentives to produce and disseminate computer-generated works.

The application of the advancement of knowledge as an economic principle justifying the copyrightability of computer-generated works is the main contribution of this paper. This assertion implies that, although authorship is an important part of copyright law, it is not its central purpose. Providing rights to authors certainly participates in the fulfillment of copyright objectives, but it is only a means to achieve them. Computer-generated works can also share expressive knowledge with the public. Nonetheless, we should not deny the uniqueness and the particularity of human authorship. Theories recognizing copyright as authors’ natural rights still supplement the main collective rationale. Therefore, I also supported that arrangers of computer-generated works don’t need the same protection than
human authors. Indeed, arrangers’ rights in these works should fall under a separate regime. In this vein, although this paper’s purpose is not to design a framework for the protection of computer-generated works, I considered it relevant to define some characteristics of this “arranger’s right” to clarify my main claims. For instance, I proposed that it should be very limited in time and cover works that display extrinsic “originals” features. Moreover, it should include only works for which a person has participated in their arrangement and dissemination. It is not suitable to protect every iteration of colours, letters, or notes produced by computers.

In sum, this paper suggests that the inclusion of computer-generated works in the Copyright Act is in line with its economic objective, more precisely the advancement of knowledge. Its focus on Canadian copyright law also provides an additional perspective to an Anglo-American literature mostly composed of articles from the United States, United Kingdom, and Australia. In this period of technological changes, it is intriguing whether Canada will follow this path, as some jurisdictions have already done. Such an amendment would acknowledge arrangers’ contributions to the production and distribution of computer-generated works and thus take into account the role of artificial intelligence in the development of knowledge. In mimicking the human mind, machines can now create “expressive” information, though they might never replace a beating heart pumping its dreams through brushstrokes, piano chords, and words.

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393 See Perry & Margoni, supra note 7; Wagner, supra note 7; Shoyama, supra note 7 (these three articles focus on Canadian copyright law, though their scope remains limited).
Legislation

An Act for the Encouragement of Learning by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned, 1709, 8 Anne, c 19 [Statute of Anne].
Copyright Act, RSC 1985, c C-42 [Copyright Act].
Copyright Act of 1976, 17 USC (2012) [U.S. Copyright Act].
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