



GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

ATTRIBUTION OF COPYRIGHT TO ARTIFICIAL
INTELLIGENCE GENERATED WORKS

MASTER'S THESIS

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Information Technology Law

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Göttingen, Germany
January 2019

PREFACE

This thesis represents the culmination of an enriching academic period: my master's degree at the Georg-August-Universität Göttingen. During this time, I have learned about a wide variety of topics in the fields of information technology law, and I have researched and written about the exciting topic of legal uncertainty in the face of potentially copyrightable artificial intelligence generated works.

I wish to express my gratitude to the University of Göttingen, where I have grown academically and personally over the past year. I am especially indebted to Prof. Balogh and Dr. Stögmüller, as well as to all my teachers, who drew from their academic and professional experience to give me the lessons I needed on intellectual property and information technology law. I would also like to thank Mr. Ilyuk and Prof. Wieber, who chose me as part of the first generation of LIPIT (LL.M. in European and Transnational Intellectual Property and Information Technology Law) students.

Finally, I want to thank my family, for making it possible for me to study in Germany and to my boyfriend for encouraging me to do it. Without them, this project could never have been realized.

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January 2019

ABSTRACT

The rise of artificial intelligence (AI) and the rapid development of its creative abilities, pose the necessary question about of to whom the copyright of these creations is guaranteed should be granted. AI's stand-alone programs perform different creative functions that result in new copyrightable works, such as composing songs, drawing, or creating new paintings. This thesis seeks to answer this question of who the owner of copyright of works created by AI should be, and how to apply the solution considering the legal requirements for allocating copyright.

Part of the research takes a historical approach to the copyright law and AI. Allocating copyright to AI-generated works is a modern challenge faced by legal systems around the world. Copyright law has evolved from the first known disputes, through the protection of publishers and booksellers in the 17th century, to the romantic discourse of the right of author in Europe in the 18th century, to the protection of the right of author and the Statute of Anne. The scientific and academic community has come to recognize the creative potential of AI, and they have begun to request for legislation. Therefore, the thesis employs a qualitative research, that compares and contrasts different contexts and provides an analysis of the challenges of granting copyright to AI generated works under the current copyright requirements of human creativity and provides considerations about algorithm creativity. The legal requirements exclude non-human authorship in most legislations, with exception of the United Kingdom (UK). For this reason, the thesis explores the regulation regarding non-human authorship and accordingly examines treaties, doctrines, statutory copyright laws, and cases that regulate the concept of authorship in the EU, the US, the UK, Germany, Colombia, and the gaps in the regulations.

It concludes, that creativity is not only a human characteristic. The algorithmic creativity is used by AI for creating new works and represents the social change that must be reflected in the law to ensure legal security. Also, the different elements that are part of protectable work legislation can be adapted to include the independent creations of AI. However, the purpose of copyright protection to encourage innovation by authors is an important and exclusively human aspect that goes beyond the technical and ontological aspects of creativity. As AI is not encouraged through recognition to create new works, and programmers are the direct creators of the program and indirect creators of the final work, the fair solution would be to recognize the effort and promote it.

KEY WORDS

Intellectual property; Copyright law; Copyrightability; Authorship; Author's rights; Creativity; Human creativity; Algorithm creativity; Innovation; Originality; Threshold of originality; Artificial intelligence; Computer generated works- AI generated works.

Date of submission: January 7th, 2019.

TABLE OF CONTENTS

PREFACE.....	2
ABSTRACT	3
TABLE OF ABBREVIATIONS	8
1 INTRODUCTION	9
1.1 Artificial Intelligence and Copyright	9
1.2 Hypotheses and Objectives	11
1.3 Methodology	12
1.4 Structure.....	12
2 COPYRIGHT	13
2.1 History.....	13
2.1.1 The first known copyright dispute.....	13
2.1.2 The printing press	14
2.1.3 Feudal regime of printing privileges in Venice	14
2.1.4 The Worshipful Company of Stationers.....	15
2.1.5 Seventeenth and 18 th century.....	16
2.1.6 First Statute.....	17
2.1.7 Author rights (Germany, 18 th century).....	17
2.1.8 Author Rights (France, 16 th to 18 th century).....	18
2.1.9 Multilateral initiatives (19 th century).....	19
2.2 General Requirements for Allocating Copyright Ownership	20
3 THE THRESHOLD STANDARD OF QUALIFICATION FOR COPYRIGHT PROTECTION	22
3.1 Personal and Independent Intellectual Creation by a Human Author.....	22
3.2 Creative Elements	23
3.3 Creation Fixed in a Form of Expression	27
4 ARTIFICIAL INTELLIGENCE	29
4.1 Definition.....	29
4.2 Classification of AI	30
4.3 The Creativity of AI.....	32
4.4 Business of AI generated works	34
5 THEORIES OF OWNERSHIP	36
5.1 The Programmer or Developer	36

5.2	The Program Owner.....	37
5.3	The Program User	39
5.4	Joint Ownership	41
5.4.1	Programmer - Program owner	41
5.4.2	Programmer - User	41
5.4.3	Programmer - AI.....	42
5.5	Special Categories.....	42
5.6	The Algorithm (AI).....	43
5.7	Public domain	45
6	REGULATORY FRAMEWORK	47
6.1	The United Kingdom	47
6.1.1	Legislation	47
6.1.2	Cases.....	48
6.2	The United States of America.....	49
6.2.1	Legislation	49
6.2.2	Cases.....	50
6.3	The European Union	52
6.3.1	Legislation	52
6.3.2	Cases.....	54
6.4	Germany.....	55
6.4.1	Legislation	55
6.4.2	Cases.....	55
6.5	Colombia.....	56
6.5.1	Legislation	56
6.5.2	Cases.....	56
7	CONCLUSION	58
8	BIBLIOGRAPHY	60
	Online journals and magazines.....	60
	Websites and blogs	60
	Symposiums and conferences.....	63
	Thesis.....	63
	Command papers and Law Commission reports	64
	Journalistic Articles	65
	Cases.....	65

Law	67
Books	68
Academic Articles	70
Videos.....	74

LIST OF FIGURES

Figure 1: Russell and Norvig's Four Categories of AI Definitions.....	30
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TABLE OF ABBREVIATIONS

<i>AI</i>	Artificial Intelligence
<i>CAN</i>	Andean Community of Nations
<i>CJEU</i>	Court of Justice of the European Union
<i>CONTU</i>	National Commission on New Technological Uses of Copyrighted Works (US)
<i>ECJ</i>	European Court of Justice
<i>FLOSS</i>	Free/libre software and open-source software
<i>InfoSocD</i>	Information Society Directive
<i>OTA</i>	Office of Technological Assessment
<i>The Berne Convention</i>	The Berne Convention for the Protection of Literary and Artistic Works of 1886
<i>The CDPA</i>	The Copyright, Designs and Patents Act
<i>TRIPS agreement</i>	Agreement on Trade-Related Aspects of Intellectual Property Rights
<i>UrhG</i>	Urheberrechtsgesetz (German Act on Copyright and Related Rights)
<i>WCS</i>	The Worshipful Company of Stationers
<i>WCT</i>	WIPO Copyright Treaty
<i>WIPO</i>	World Intellectual Property Organization

protect this type of works has been a pressing matter.¹¹ Avoiding or postponing regulations could have a significant economic, scientific, and cultural impact.

Artificial intelligence has changed the manner in which society lives. It needs to be regulated by law that takes into account the new conditions: new technology forces a reassessment of intellectual property law,¹² as well as other issues. Copyright is continuously modified, re-evaluated, and reinterpreted to adapt to technological changes.¹³

According to a report of the European Commission about AI, “most developed economies recognize the game-changing nature of AI and have adopted different approaches that reflect their own political, economic, cultural, and social systems.”¹⁴ The Commission affirms that in 2016, the government of the US proposed a strategy for dealing with AI and invested approximately 970 million euros in the investigation of unclassified AI. China hopes as well to have global leadership by 2030, by implementing its “Next Generation Artificial Intelligence Development Plan.”¹⁵ Japan and Canada, have adopted AI strategies as well. The Commission also states that large companies in the US and China have invested significantly in AI, trying to exploit large amounts of data. Europe is behind these countries, with private investments in IA in 2016 totaling between €2.4 and €3.2 billion, compared to €6.5 and €9.7 billion in Asia and between €12.1 and €18.6 billion in North America.¹⁶

It is important to note that civil law jurisdictions use the concept of right of author¹⁷ rather than the copyright approach used by common law systems. Common law conceives of copyright as a unified set of rights.¹⁸ Thus, there is no distinction between author’s rights proper and neighboring rights¹⁹ in this system, and usually offenses to the moral rights of authors would be framed as defamation or malicious falsehood. On the contrary, the right of author includes moral rights, which civil law systems have vigorously protected, as well as economic rights. This allows these systems to grant moral rights to the real creator of the work, while recognizing the economic rights of the same author or third parties.

Economic rights include the crucial right to prevent copying, together with other rights such as adaption and translation rights and the right to distribute or make the works publicly available. There are also rights usually classified as “neighboring rights” because although they may be important economically, they are slightly different conceptually from the more basic economic rights, and they are not directly associated with authors per se. Finally, moral rights include paternity rights, the right of integrity, and the right to withdraw or

¹¹ Annemarie Bridy, “Coding Creativity: Copyright and the Artificially Intelligent Author.” (2012) 2012 Stan Tech Rev 5.

¹² Davis Randall, *Intellectual Property and Software: The Assumptions Are Broken*. No. 1328. A.I. Memo. Cambridge, MA: Massachusetts Institute of Technology, Artificial Intelligence Laboratory, 1991.

¹³ Darin Glasser, “Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?” (2001) Duke L & Tech Rev 0024 1.

¹⁴ Commission, “*Artificial Intelligence for Europe*” COM (2018) 237 final 4.

¹⁵ “Recent announcements include a EUR 1.7 billion AI technology park in Beijing;” Ibid.

¹⁶ “With 1.4 billion mobile phone subscriptions and 800 million internet users – more than the USA and the EU combined – Chinese people generate vast amounts of personal data that are used to develop related AI products”; Ibid.

¹⁷ Germany: *Urhebergesetz*; Colombia: *Derecho de autor*.

¹⁸ However, moral rights are enshrined in U.K copyright law in the Copyright, Designs and Patents Act of 1988 (c IV).

¹⁹ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 332.

disown a work.²⁰ For practical reasons, only the English term, copyright, is used in the current thesis.

1.2 Hypotheses and Objectives

The purpose of the current thesis is to examine the challenges AI poses to intellectual property law, specifically with regard to copyright. This thesis also seeks to determine who should be designated as the copyright holder when AI acts autonomously. Finally, this paper analyzes a number of existing academics positions and legislative approaches.²¹

The key problem that needs to be solved is that one basic requirement for holding copyright is possessing the legal authorship: this is currently only possible for a human being. However, AI is already capable of authoring different artistic works by itself. Starting from this issue, the present thesis summarizes six feasible hypothetical circumstances which could determine the copyright holder. Specifically, this paper suggests that the law provide copyright to one of the following:

- the programmer or developer;
- the program owner;
- the program user;
- both;
- special categories proposed at the WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence
- expert systems as a special and concrete class of computer programs;
- expert systems as a dual category with characteristics of computer programs and databases;
- the algorithm

Attributing copyright to an algorithm is, however, problematic, since only human beings can be copyright holders, not machines. Nevertheless, there is a possibility of a nontraditional solution which would imply a copyleft license in which the copyright has no holder and the work instead is placed in another category: the public domain.

This thesis starts with the assumption that the fairest solution is to grant copyright ownership to the AI developer, the person that invested time and effort to create the machine responsible for the creation. This is provided for in the Universal Copyright Convention, the Berne Convention, the Rome Convention, and the World Intellectual Property Organization (WIPO) Copyright Treaty. This legislation protects the innovation purpose of copyright granting and recognizes the labor of authors, including programmers, an important issue since the *Walter v Lane*²² case in 1900.

²⁰ Ibid.

²¹ The thesis will compare legislative positions of USA, the EU, UK, Germany, and Colombia.

²² *Walter v Lane* [1900] AC 539.

1.3 Methodology

The current thesis employs analytical and deductive methodology based on statutory law and cases from five different legal systems, the EU, the UK, the US, Germany, and Colombia, to expose the differences between these systems and their implications. This paper also presents the general conditions for owning copyright in these contexts, which are in general the same, because they are based on international treaties, like the WIPO Copyright Treaty (WCT), the Berne Convention and the Universal Copyright Convention. The research undertaken by relevant academics and institutions on the topic of AI and copyright is also addressed. These papers are used to determine possible recommendations for improving copyright law. The different theories presented in this paper are analyzed from a legal perspective through doctrinal and governmental papers. This makes it possible to examine the viability of each proposed solution.

This thesis also questions specific topics of the protection of copyrightable works generated by AI and discusses different solutions employed by government jurisdiction. As this is a relatively new issue, there is currently very little legal development, with the exception of the UK, which covers AI generated works. Nevertheless, scholars have studied possible bases for the protection and adjudication of copyright for these types of works since the inception of AI: international treaties²³ are principally applied and the WIPO discussed two new possible ways of AI generated works regulation. The first one suggests that these works demand the creation of a special classification and the second one proposes to apply legal statues that regulate computer programs and databases.

1.4 Structure

This thesis is structured in seven chapters. In the first chapter, the introduction identifies the central problem addressed in this research and defines the key objectives. Chapter Two presents the background of copyright legislation and provides a historical overview of the phenomenon. This chapter explores the legal regulation of authorship and how it reflects the specific social and economic circumstances involved. Chapter Three highlights the requirements for obtaining copyright protection of a work, and Chapter Four offers an overview of AI, addressing its creative capacity and performance in the modern economy. Following, Chapter Five analyzes different theories of ownership and presents their advantages and disadvantages. Chapter Six summarizes the copyright protection legislation in the EU, the US, the UK, Germany, Colombia and describes a number of specific judicial cases. These cases primarily concern the topic of originality or disputes about requirements of authorship rather than non-human works (with exception of the Naruto monkey case) or AI generated authorship. Finally, in the last chapter the conclusion summarize the key findings and provide an answer to the questions posed in the first part of this thesis.

²³ WCT, TRIPS Agreement, Berne Convention and the Universal Copyright Convention.

2 COPYRIGHT

2.1 History

Richard Bowker defined Copyright in 1912 as “the right to copy, to make plenty, and to multiply copies of those products of the human brain known as literature and art.”²⁴ However, the concept of copyright, as it is known today, is the result of diverse factors, beginning with the invention of the printing press and continuing with the rise of the middle class.

The development of copyright is connected to the evolution of the profession of a writer. The desire to recognize the profession of writer was the beginning of copyright protection. Although legislation initially protected only literary works, its scope gradually expanded to other artistic works, including translations, adaptations and arrangements and collections.²⁵ Copyright development react as well to a number of political, legal, and cultural factors. More recently, the technological development, computer programming and the rise of enormous databases require a change in the way copyright is defined.

2.1.1 *The first known copyright dispute*

The first known copyright dispute occurred in Ireland between Saint Columba and Saint Finnian, around 560 BC.²⁶ The monk Saint Columba copied a Latin psalter owned by his teacher Finnian at Moville,²⁷ that put considerable value in the book. Finnian demanded the copy, but Columba refused to give it. Finnian then asked Dermott, the King of Ireland, who issued an edict in Finnian's favor by arguing that "to every cow belong its calf, so to every book belong its copy."²⁸ According to Bowker, the decision shows that in ancient times there was a sense of copyright and that different texts of the same work were compared to obtain a standard text. The multiplication of copies of these texts became the basis of a publishing and book trade. Arbitration failed, and Sant Columba's Psalter passed to the O'Donnell's.²⁹

Legend says this dispute gave rise to the battle of Cúl in 561 A.D. (also known as the Battle of the Book),³⁰ that caused the death of more than 3.000 people, after which Columba was

²⁴ Richard R Bowker, *Copyright Its History and Its Law Being A Summary Of The Principles And Practice Of Copyright With Special Reference To The American Code Of 1909 And The British Act Of 1911* (Houghton Mifflin Company 1912).

²⁵ Art 2 of the Berne Convention.

²⁶ Orla O'Donovan, 'The commons, the Battle of the Book and the cracked enclosures of academic publishing' (2014) 49 (1) Oxford University Press and Community Development Journal i21 <<https://doi.org/10.1093/cdj/bsu021>> accessed 7 November 2018.

²⁷ Andrew Ó Baoill, *The True Significance of the World's First Copyright Ruling in Its Context and for Contemporary Debate on Intellectual Property*, <<https://funferal.org/blog/wp-content/uploads/2005/03/firstcopyrightcase.pdf>> accessed 25 December 2018.

²⁸ Every copy of a book belonged to the owner of the original book.

²⁹ “Royal Irish Academy - Acadamh Ríoga Na Héireann: Sciences, Humanities and Social Sciences” (The Cathach / The psalter of St Columba) <<https://web.archive.org/web/20140702153948/http://www.ria.ie/Library/Special-Collections/Manuscripts/Cathach.aspx>> accessed 15 December 2018.

³⁰ No data records were found, which is why it is a legend.

exiled Iona in 563 A.D. He is today recognized as Saint Columcille and a patron saint of bookbinders.³¹

2.1.2 *The printing press*

Although printing had existed for centuries,³² around 1440, Gutenberg invented the printing press. This enabled the quick and cheap proliferation of books across Europe, since more pages could be printed in less time.³³ While it normally used to take three years to produce a copy of the Bible, the printing press produced 180 copies in the same period,³⁴ with fewer mistakes and an easier sharing of publications among scientists with geographical and time constraints.³⁵

This invention caused a detriment in the price of books and a corresponding increase in literacy in the fifteenth century in Europe.³⁶ As a result, interest in protecting publishers and booksellers from piracy increased.³⁷

2.1.3 *Feudal regime of printing privileges in Venice*

The first privileges concerning copyright and patents in Venice were not conceived as inherent rights of the authors. On the contrary, these privileges were considered a municipal favor (*gratiae*) and an exception to the law (*priva lex*).³⁸ As explained by Deazley, Kretschmer, and Bently, two key 15th century incidents set a precedent for granting authorial privileges. In 1484, special privileges were granted to Marc'Antonio Sabellico for the publication of *Decades rerum Venetarum*³⁹ (1486). A decade later, similar legislation was implemented in favor of Pietro Tomai of Ravenna for his work *Phoenix*. Since then, writers began to request such privileges from the Venetian State on a regular basis.⁴⁰

In 1545, the Venetian Council of Ten adopted a statute regulating author-printer relations, and commissioners of the University of Padua made censorial revisions of texts.⁴¹ This prohibited publication of an author's work without his permission. It is traditionally seen as a turning point in the history of authorship, and considered to be "the first public law in

³¹ Andrew Ó Baoill, *The True Significance of the World's First Copyright Ruling in Its Context and for Contemporary Debate on Intellectual Property*, <<https://funferal.org/blog/wp-content/uploads/2005/03/firstcopyrightcase.pdf>> accessed 25 December 2018.

³² Richelle McDaniel, McDaniel R, "History of the Book: Disrupting Society from Tablet to Tablet : The Spread of Knowledge Via Print" (Western Oregon University, 2015) 29 <https://digitalcommons.wou.edu/history_of_book/1/> accessed 25 December 2018.

³³ Ibid.

³⁴ Ibid 30 citing George Parker Winship, *Printing in the Fifteenth Century* (1940) <https://digitalcommons.wou.edu/history_of_book/1/> accessed 25 December 2018.

³⁵ Ibid 34 citing Jones International and Jones Digital Century, "Printing: History and Development" Web (1999) <https://digitalcommons.wou.edu/history_of_book/1/> accessed 25 December 2018.

³⁶ Ibid 30 citing Jared Rubin, "Printing and protestants: an empirical test of the role of printing in the Reformation," MPRA Paper (2012) <https://digitalcommons.wou.edu/history_of_book/1/> accessed 25 December 2018.

³⁷ For example: the petition of Bernardino Rasma (1496), Gabriel of Brasichella (1497).

³⁸ Ronan Deazley, Martin Kretschmer, and Lionel Bently, (ed) *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook 2010) 22.

³⁹ History of Venice.

⁴⁰ Ronan Deazley, Martin Kretschmer and Lionel Bently, (ed) *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook 2010) 22.

⁴¹ Joanna Kostylo, "Commentary on the Venetian decree of 1545 regarding author/printer relations" (*Primary Sources on Copyright (1450-1900)*, eds L. Bently & M. Kretschmer, 2008) <www.copyrighthistory.org> accessed 14 November 2018.

Europe designed specifically to protect authors."⁴² However, four years later, in 1549, the Council of Ten reaffirmed this position in the decree establishing the Guild of Printers and Bookselling, stating that "There is no one who represents the aforesaid art, nor who is responsible for it, so it happens that everyone does as he pleases amidst extreme disorder and confusion,"⁴³ which revealed that the lack of complete regulation caused confusion.

Following 1549, the Venetian guild's policy of excluding non-members posed a problem for individual authors outside the guild to claim privileges and exercise artistic and economic control over their own writings. During this struggle, authors started considering the nature of rights they enjoyed and expressing ideas about their relationships with their publications in a general sense. In the beginning, this understanding was far from our modern ideas of "intellectual property" which also extends beyond publication.⁴⁴

2.1.4 *The Worshipful Company of Stationers*

In 1533 England, Henry VIII banned the importation of foreign publications and ordered that all new books printed in the country had to be approved by the Privy Council before publication. From there began a monopolistic tradition in which publishers had to be loyal to the crown and pay taxes for their business to thrive.

On 4 May 1557 the Worshipful Company of Stationers (WCS) was incorporated by a royal decree of Mary I of England and her husband Phillip II of Spain. This charter was confirmed by Elizabeth in 1559.⁴⁵ This mid-16th century decree meant that stationers enjoyed political and economic advantages in London, which came with a corporate legal status.⁴⁶ According to Deazley, Kretschmer, and Bently, because of the WCS, the Ordinance of 1643⁴⁷ was "focus not on the author - authors were mentioned only once, along with printers, as possible producers of scandalous books - but on the WCS as the guardian of 'ancient custom.'⁴⁸ The goal of the ordinance was to empower the company to suppress 'abuses' and 'disorders' dangerous to religion and government."⁴⁹

The 1643 charter expressly decrees that only members of the WCS and Crown patentees are allowed to practice in the art of printing, and it prescribes severe penalties for infringers. It grants the master and wardens of the Company sweeping powers to search any premises belonging to or used by printers or booksellers; to seize burn or hold any printed matter "[sic] contrary to the form of any Act Ordinance or proclamation made or to be made"; and to imprison any printer, binder, or bookseller acting outside the limits of this or

⁴² Ibid citing "According to Rose, the first English affirmation of authorial interests seems to be a parliamentary edict of 29 January 1642" Mark Rose, *Authors and Owners: The Invention of Copyright*, (Harvard University Press 1993).

⁴³ Preamble of the 1549 Decree chartering the Guild.

⁴⁴ Ronan Deazley, Martin Kretschmer and Lionel Bently, *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook 2010) 30.

⁴⁵ AJ Robinson, "The Evolution of Copyright, 1476-1776." (1991) 22 *Cambrian L Rev* 55, 59.

⁴⁶ William Carew Hazlitt, *The Livery Companies of the City of London: their origin, character, development and social and political importance* (London: Sonnenschein & Co, 1892); Ronan Deazley, *Commentary on the Stationers' Royal Charter 1557*, in *Primary Sources on Copyright 1450-1900* (eds L Bently & M Kretschmer, 2008) <www.copyrighthistory.org> accessed 19 October 2018.

⁴⁷ Charles H Firth and Robert S Rait, "Acts and Ordinances of the Interregnum 1642-1660", vol 1 (HM Stationery Office 1911).

⁴⁸ Ibid.

⁴⁹ Mark Rose, "The Public Sphere and the Emergence of Copyright: Areopagitica, the Stationers' Company, and the Statute of Anne." (2009) 12(1) *Tul J Tech & IntellProp* 123, 133.

any further act or proclamation. In this way, the charter effectively either confirmed or extended the powers of the stationers' company.⁵⁰

The Company was empowered to create bylaws for the regulation of its own members. It was through these laws that the Stationers' copyright developed. It was customary (and then obligatory after the company was incorporated) for a bookseller to enter the title of a book he was to publish into the register of the Company, the book having been previously licensed by the wardens. Following the payment of a registration fee, these entries represented a permission to publish and served to establish an exclusive right over the work in question. The requirement of the for granting copyright was to have the license from the Wardens of the Stationers' Company, and the payment of the registration fee was a confirmation of the license.⁵¹

2.1.5 *Seventeenth and 18th century*

In England, the enactment of the Statute of Monopolies by Parliament in 1624 abolished most monopolies, and several laws were enacted to reduce the powers of papermakers. In the last decades of the 17th century the demand for explicit recognition of sources intensified. The worry about the integrity and legitimacy of the original materials reveals a new perception of the connections and affinities between earlier and more recent texts.⁵² According to Frosio, “a new creative paradigm based on autogenous originality and invention emerged from the ashes of imitative practices and erudite borrowing.”⁵³

The protection of copyright was created to safeguard publishers and booksellers, but this idea generated a market monopoly for selling literary works. The need to protect publishers and booksellers can be explained by the fact that, during the Renaissance and until the first half of the 18th centuries, the writer was only thought of as an instrument, a craftsman that preserved traditions and poems by writing them down or a person inspired by an external source, a muse or God. The writer was always working due to an independent force.⁵⁴

Changes in the production, distribution and consumption of art in the 18th century⁵⁵ generated other views about the right of the authors. Blaise Cronin affirmed that in the 17th and 18th centuries, a new conception about scientific texts emerged, accepting merits of the author that wrote with a coherent system with methods of verification.⁵⁶ However, the opposite was happening in literature: the role of the literary author and the effort dedicated to his study and work was not valued as a tangible right.

⁵⁰ AJ Robinson, “The Evolution of Copyright, 1476-1776.” (1991) 22 *Cambrian L Rev* 55, 60.

⁵¹ *Ibid*, 60-61.

⁵² Paulina Kewes, *Authorship and Appropriation: Writing for the Stage in England, 1660-1710* (Clarendon Press 1998).

⁵³ Giancarlo Frosio, *Reconciling Copyright with Cumulative Creativity: The Third Paradigm* (Edward Elgar Publishing 2018).

⁵⁴ Marta Woodmansee, “The Genius And The Copyright: Economic And Legal Conditions Of The ‘Author’ (1984) 17 (4) *Eighteenth-Century Studies* 425 <https://www.jstor.org/stable/2738129?newaccount=true&read-now=1&seq=1#metadata_info_tab_contents> accessed 16 October 2018.

⁵⁵ Marta Woodmansee, “The interests in disinterestedness: Karl Philip Moritz and the emergence of the theory of aesthetic autonomy in eighteenth century Germany” (1984) *MLQ* 22, 35.

⁵⁶ Michel Foucault citing Blaise Cronin, “What is an Author” *Sofia University Press* (1993) 306.

2.1.6 *First Statute*

In 1710, the Statute of Anne (“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”)⁵⁷ came into effect. According to Bridy, it suggests that “the literary notion of the author as originator merged with Locke’s economic theory of possessive individualism to produce the legal construct of the author as proprietor.”⁵⁸ The Statute of Anne signified a change from earlier English laws that had granted monopoly to Stationers’ Company by granting its members the privilege of printing and distributing books. Boyle and Jenkins affirm that if a book remained printed, privileges were perpetual. This system allowed a monopoly and governmental censorship, since the guild received rights in exchange for refusing to print seditious or heretical documents.⁵⁹ Prior to the Statute of Anne, authors were required to deliver their manuscript and any rights they may have had to their bookseller.⁶⁰ The Statute endeavored to change this and ensure that authors benefit from these rights.⁶¹

This law is the first modern law of protection to the author’s rights and “marked the divorce of copyright from censorship and the reestablishment of copyright under the rubric of property rather than regulation.”⁶² It vested authors with a real property right, contrary to the conception of the literary author of the 18th century, and this recognition fostered their creation.⁶³ This can be seen in Section 11 of the Statute of Anne, which provides that, after 14 years of protection, should the author remain alive, the right would be extended for another 14 years.⁶⁴

2.1.7 *Author rights (Germany, 18th century)*

The beginnings of the copyright protection as known today can be found in the Germany of the 18th century. The debate on the concept of the author and the protection of his rights

⁵⁷ Statute of Anne, preamble.

⁵⁸ Annemarie Bridy, “Coding Creativity: Copyright and the Artificially Intelligent Author.” (2012) 2012 Stan Tech L Rev 5) 4 citing Mark Rose, *Authors and Owners: The Invention of Copyright* (1993); “Rose locates the formation of the construct of the author as proprietor at the nexus of three historical phenomena: the emergence in England of a mass market for books; the valorization of the individual genius, as reflected in the writings of Samuel Johnson and others; and the development of Locke’s philosophy of possessive individualism”.

⁵⁹ James Boyle and Jennifer Jenkins, *Intellectual Property: Law and The Information Society, Cases and Materials*, (2nd edn Center for the Study of the Public Domain, Duke Law School 2014) 291.

⁶⁰ Jane C Ginsburg, “‘The Concept of Authorship in Comparative Copyright Law’ for DePaul L Rev Symposium: ‘The Many Faces of Authorship’” (Columbia Law School Research Paper No 03-51 2003) 1092 <<https://ssrn.com/abstract=368481>> accessed 31 October 2018.

⁶¹ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 332, 7.

⁶² Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017) citing Mark Rose, “*Authors and Owners: The Invention of Copyright*”, Harvard University Press (1993).

⁶³ Jane C Ginsburg, “‘The Concept of Authorship in Comparative Copyright Law’ for DePaul L Rev Symposium: ‘The Many Faces of Authorship’” (Columbia Law School Research Paper No 03-51 2003) 1092 <<https://ssrn.com/abstract=368481>> accessed 31 October 2018.

⁶⁴ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 332, 7.

continued for years in Germany, while the country was in a period of transition between the limited aristocratic sponsorship and the democratic sponsorship of the marketplace.⁶⁵

Encouraged by a significant reading public, writers who were living poorly and had a new romantic vision of authorship, demanded better payment for their work and as said by Boyle and Jenkins, “one obvious strategy was to lobby for some kind of legal right to their text - the right that we would call copyright.”⁶⁶

The authors also affirmed that:

“It is the originality of the author, the novelty which he or she adds to the raw materials provided by culture and the common pool, which ‘justifies’ the property right and at the same time offers a strategy for resolving the basic conceptual problem pointed out by Krause - what concept of property would allow the author to retain some property rights in the work but not others? In the German debates, the best answer was provided by the great idealist Fichte. In a manner that is now familiar to lawyers trained in legal realism and Hohfeldian analysis, but that must have seemed remarkable at the time, Fichte disaggregated the concept of property in books. The buyer gets the physical thing and the ideas contained in it. Precisely because the originality of his spirit was converted into an originality of form, the author retains the right to the form in which those ideas were expressed: ‘Each writer must give his own thoughts a certain form, and he can give them no other form than his own because he has no other. But neither can he be willing to hand over this form in making his thoughts public, for no one can appropriate his thoughts without thereby altering their form. This latter thus remains forever his exclusive property.’”⁶⁷

According to Marta Woodmansee, in absolutist Germany, generally petty princes and provincial aristocracy took little interest in the arts, and practically nothing in local literature. However, German absolutism, thanks to the work of civic-minded philosophers and poets, delayed the formation of a middle class and created the very preconditions for an energetic artistic and literary world.⁶⁸

2.1.8 Author Rights (France, 16th to 18th century)

The art 8 of the *Edit de Châteaubriant* in 1551 was the first French legislation to use the concept of “author” as a legal term referring to the compositor of a text, by asking the printers to include the name of the author in the works they published.⁶⁹ This legislation was enacted because the French monarchy wanted to protect itself against the Protestant

⁶⁵ Martha Woodmansee, “The Genius and the Copyright. Economic and Legal Conditions of the Emergence of the ‘Author’” (1984) (17) *Eighteenth-Century Studies* 425, 433.

⁶⁶ James Boyle and Jennifer Jenkins, *Intellectual Property: Law and The Information Society, Cases and Materials*, (2nd edn Center for the Study of the Public Domain, Duke Law School 2014) 273.

⁶⁷ James Boyle and Jennifer Jenkins, *Intellectual Property: Law and The Information Society, Cases and Materials*, (2nd edn Center for the Study of the Public Domain, Duke Law School 2014) 274.

⁶⁸ Martha Woodmansee, “The interests in disinterestedness: Karl Philip Moritz and the emergence of the theory of aesthetic autonomy in eighteenth century Germany” (1984) *MLQ* 22, 56.

⁶⁹ Ronan Deazley, Martin Kretschmer, and Lionel Bently, (ed) *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook, 2010) 120 citing *Edit de Châteaubriant du 27 juin 1551* (Art 8, Bibliothèque nationale de France. Manus. Fçs 22061, n 8).

Reformation, and this was the easiest way to identify who had written a text and to be able to retaliate against them.

In France the natural rights justifications for authors were more explicit. They were recognized by two decrees of the French Revolution from 1791 and 1793. These decrees stated the authors' and artists' right to perform and reproduce their works. These thoughts spilled over to the neighboring countries in the beginning of the 19th century.⁷⁰

In France, property and publication were incompatible. The work was considered to be in the public domain after publication and only a privilege called "right of sponsorship" granted by the State on behalf of the public can guarantee remuneration in exchange for such publication.⁷¹

According to Deazley, Kretschmer, and Bently, "during the second half of the seventeenth century, with the support of monarchy, the Parisian booksellers came to monopolize the French book trade and, in attempting to bolster their dominance of the market, they began to articulate the notion of the author as the natural owner of his intellectual work."⁷²

And in addition, the decree of 1778 allowed authors to provide the bookseller with right of printing and sale of his work and retain for himself the property right,⁷³ which are equivalent to the moral rights of the right of author. The concept of the author's right influenced the development of copyright laws in other civil law jurisdictions⁷⁴ and international law.

2.1.9 Multilateral initiatives (19th century)

After problems of free trade of goods in Europe because each country had different conceptions about copyright, bilateral treaties provided safeguards between markets of different countries for authors and publishers. However, the coverage of the treaties was incomplete regarding to the conditions of availability of protection, its level and term.⁷⁵ Hence, according to Gervais, by the second part of the 19th century, the time was ripe for international arrangement. The Vienna International Exhibition in 1873 regarding industrial property,⁷⁶ and the congress dealing with patents, trademarks and designs during the Paris Universal Exhibition of 1878,⁷⁷ led to the drafting and adoption of the Paris Convention

⁷⁰ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 3328 citing Ricketson and Ginsburg.

⁷¹ Roman Deazley, Martin Kretschmer and Lionel Bently, (ed) *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook, 2010) 126.

⁷² Ibid 127.

⁷³ Roman Deazley, Martin Kretschmer and Lionel Bently, (ed) *Privilege and Property: Essays on the History of Copyright* (Cambridge OpenBook, 2010) 135 citing Article 2 of Arrêt du Conseil du 31 juillet 1778, portant règlement sur les privileges en librairie et les contrefaçons, *Isambert*, 25, pp 371 et seq.

⁷⁴ Regarding this thesis, Germany and Colombia.

⁷⁵ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 3328, 333.

⁷⁶ Ibid citing Thomas Webster, "Reports on the Vienna Universal Exhibition 1873" (1874) International Patent Congress in WP Blake and Henry Pettit, pt IV.C.1072-IV (Eyre & Spottiswoode).

⁷⁷ Paris Convention for the Protection of Industrial Property (adopted 20 March. 1883) 828 UNTS 305 art 1.

for the Protection of Industrial Property in 1983 (generally just referred to as the Paris Convention).⁷⁸

2.2 General Requirements for Allocating Copyright Ownership

Copyright protection is autonomous in each country, and regulations only apply within the country where they are passed, in compliance with the principle of territoriality. However, copyright is internationally granted due to the high degree of harmonization through international treaties. A number of aspects are similar across jurisdictions, since they follow the same guidelines contained in the Berne Convention of 1886,⁷⁹ which provides minimum standards of protection related to works; the Universal Copyright Convention of 1952; WIPO (the countries addressed in this thesis are members of this organization); and the 1996 WCT, ratified by the countries under study,⁸⁰ which assures the compliance with the substantive provisions of the 1971 Act of the Berne Convention. Although several concepts about copyright were defined in the Berne Convention, a threshold was not established. The legal development of the requirements, intellectual creation, and creation fixed in a form of expression have been left to discretion of the national legislators.

In the US, originality is the principal requirement to grant copyright protection. The 1976 Copyright Act asserts that copyright covers “original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.”⁸¹ The topic has been deeply elaborated in legal cases such as *Burrow-Giles Lithographic Co. v Sarony*, *Baltimore Orioles v MLB Players Association*, *Bleistein v Donaldson Lithographing Co.*, *Slater v Naruto Monkey*, and *Feist v Rural Telephone*, which have defined the test of originality that allows copyrightability.

On the other hand, Germany, Colombia, and the UK follow the regulations defined in the Berne Convention about protected works.⁸² In the UK, the Copyright, Designs and Patents Act (CDPA) states that “Copyright is a property right which subsists in accordance with this Part in the following descriptions of work—(a)original literary, dramatic, musical or artistic works, (b)sound recordings, films (or broadcasts), and(c)the typographical arrangement of published editions.” The German copyright act, the *Urheberrechtsgesetz* (UrhG), is more specific and mentions the types of works that deserve copyright protection.⁸³ This can also be seen in Colombia in Law No. 23 of 1982.⁸⁴ In the European

⁷⁸ Daniel Gervais (ed), *International Intellectual Property: a handbook of contemporary research* (Edward Elgar Publishing 2015) 332, 339.

⁷⁹ There are 184 member states of the Berne Convention, which indicates there is an international guideline about copyright protection.

⁸⁰ In total, the treaty has 95 contracting parties.

⁸¹ 17 U.S Code § 102(a).

⁸² Berne Convention art 2, Protected works: “1. "Literary and artistic works"; 2. Possible requirement of fixation; 3. Derivative works; 4. Official texts; 5. Collections; 6. Obligation to protect; beneficiaries of protection; 7. Works of applied art and industrial designs; 8. News.

⁸³ Protected works in the literary, scientific and artistic domain include, in particular:

1. Literary works, such as written works, speeches and computer programs;
2. Musical works;
3. Pantomimic works, including works of dance;
4. Artistic works, including works of architecture and of applied art and drafts of such works;
5. Photographic works, including works produced by processes similar to photography;
6. Cinematographic works, including works produced by processes similar to cinematography;

Union⁸⁵ and in the Andean Community of Nations (CAN),⁸⁶ the guidelines of the Berne Convention and WIPO are followed.

It should be noted, for a deeper understanding of the similarities, that Colombia belongs to the CAN,⁸⁷ composed also of Bolivia, Ecuador, and Peru. The Community maintains a cooperative relationship with the European Union.

The following section presents an analysis of each aspect required for a work to be eligible for copyright protection. Although all aspects are necessary, each jurisdiction retains autonomy in its regulation. For this reason, they differ in how they treat these issues, especially those connected to authorship and creativity. This is further explained in the chapter on regulatory framework.

7. Illustrations of a scientific or technical nature, such as drawings, plans, maps, sketches, tables and three-dimensional representations.

⁸⁴ Art. 2 Law 23/82 “Copyright shall be vested in scientific, literary and artistic works which include all the creations of the spirit in the scientific, literary and artistic field, whatever the mode or form of expression and whatever their destination, such as: books, pamphlets and other writings; lectures, speeches, sermons and other works of the same kind; musical drama or drama; choreographic works and pantomimes; musical compositions with or without lyrics; cinematographic works, to which works expressed by a procedure analogous to cinematography, including videograms, are assimilated; works of drawing, painting, architecture, sculpture, engraving, lithography; photographic works to which those expressed by a process analogous to photography are assimilated; works of applied art; illustrations, maps, plans, sketches and plastic works relating to geography, topography, architecture or science and, finally, any production in the scientific, literary or artistic domain which may be reproduced, or defined by any form of printing or reproduction, by phonography, radiotelephony or any other means known or yet to be known.”

⁸⁵ Council Directive (EC) 2001/29 on the harmonization of certain aspects of copyright and related rights in the information society [2001] OJ L 167/10, art 1.

⁸⁶ Decision 351 of the Andean Community of Nations, art 4.

⁸⁷ For its Spanish acronym (Comunidad Andina de Naciones).

3 THE THRESHOLD STANDARD OF QUALIFICATION FOR COPYRIGHT PROTECTION

The requirements of qualification for copyright protection vary depending on the type of work. However, there are general conditions and general exclusions. On the one hand, elements that are generally excluded include ideas, procedures, methods of operation, and mathematical concepts.⁸⁸ On the other hand, the works that represent a personal and independent intellectual creation (by a human author), a certain degree of originality (creative elements), and a fixation of the creation in a form of expression are considered eligible.

3.1 Personal and Independent Intellectual Creation by a Human Author

In one possible etymological origin, “author” could derive from the ancient Greek word *αὐτοῦς*, meaning “self.” Based on this reasoning, authorship appears to represent the means to express the human self.⁸⁹ Thus, to be eligible for copyright and for intellectual property, being human is in general a requisite. In this conception, creative and individual works have been a parameter in the case of civil law countries, like Colombia and Germany, where the law supposes, that the author of a work is the copyright owner.⁹⁰ Likewise, in the US, case law permits only humans to be considered as authors.⁹¹ On the contrary, UK legislation⁹² contemplates computer-generated works.⁹³ The consideration of computer-generated works is discussed in depth throughout the thesis.

Although European law seems to harmonize the regulation of authorship, it ultimately leaves substantial freedom to member states with regard to implementation. Article 2 (1) of the Computer Programs Directive and Article 4 (1) of the Database Directive define the author of a computer program or database as either the natural person or group of natural persons who have created the program/database or the legal person designated as the right holder by the specific legislation of each state. The Court of Justice of the European Union (CJEU) has ruled that copyright only applies to original works. In the *Infopaq International A/S v Danske Dagbaldes Forening* case,⁹⁴ the Court stated that originality must reflect the

⁸⁸ WIPO Copyright Treaty (adopted 20 December 1996, entered into force 6 March 2002) 2186 UNTS 121 (WCT); US Circular 1, *Copyright Basics* (1996) section “What Works Are Protected”.

⁸⁹ Giancarlo Frosio, *Reconciling Copyright with Cumulative Creativity: The Third Paradigm* (Edward Elgar Publishing 2018).

⁹⁰ John M Garon and Elaine D Ziff, “The Work Made for Hire Doctrine Revisited: Startup and Technology Employees and the Use of Contracts in a Hiring Relationship” (2011) 12 Minn JL Sci & Tech 489 <HTTPs://scholarship.law.umn.edu/mjlst/vol12/iss2/5> accessed 2 November 2018.

⁹¹ US Copyright Office, *Compendium II of Copyright Office Practices* (entered into force on January 2, 1978) The Library of Congress Washington, D C 20559.

Section 202.02(b) “Human author: The term ‘authorship’ implies that, for a work to be copyrightable, it must owe its origin to a human being. Materials produced solely by nature, by plants, or by animals are not copyrightable.”

⁹² Copyright, Designs and Patents Act, section 9(3).

⁹³ However, UK legislation grants copyright of computer-generated works to a human author. See chapter 5, Theories of Ownership.

⁹⁴ C-5/08 *Infopaq International A/S v Danske Dagbaldes Forening* (Infopaq case).

“author’s own intellectual creation.”⁹⁵ Apart from these provisions, EU law does not comment on copyright authorship.⁹⁶

The European Court of Justice (ECJ) has ruled that copyright only applies to original works. In the *Infopaq* case (C-5/08 *Infopaq International A/S/Danske Dagbaldes Forening*), the Court stated that originality must reflect the expression of the author.

An exception to the requisite of human characteristic of the author and to the general concept of copyright is present in the UK and the US: works made for hire.⁹⁷ In the UK, the employer has the first claim to the copyright of the work produced in such circumstances (subject to any agreement to the contrary).⁹⁸ In the US, the law does not presume the existence of the figure. On the contrary, the parties should sign a written agreement of work made for hire.⁹⁹ In this way, the law protects companies and business with a different perspective on creation that unites the effort, creativity, knowledge, and economic investment of several people.

The figure of works made for hire is inclined towards the protection of the economic rights of the companies or contracting parties. It is mainly an economic objective that moves the possible allocation of copyright to the machines or to the corresponding parties. However, as stated by Glasser, “it is unlikely that a court would find that the work made for hire doctrine applies in situations where the programmer is not in the position of an employer and the user is not considered an employee.”¹⁰⁰ Thus, this does not apply to the specific topic (AI) of this paper.

3.2 Creative Elements

The second requirement for allocating copyright is that the work be the intellectual creation of the author. This means that it must represent some degree of creativity, or to put it in academic terms, originality. The threshold of originality is the major concept used to assess whether a particular work can be copyrighted or not, and it is also the major obstacle to the user’s claim to copyright protection. However, the threshold for originality is low.¹⁰¹ It contains, for example, the notions of “purpose,” “contribution,” “novelty,” “aesthetic merit,” “labor and effort,”¹⁰² and “personality.”¹⁰³ The regulations¹⁰⁴ establish, that

⁹⁵Andres Guadamuz, “Artificial intelligence and copyright” (*WIPO Magazine*, October 2017) <http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html> accessed 9 November 2018.

⁹⁶ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018).

⁹⁷ John M Garon and Elaine D. Ziff, “The Work Made for Hire Doctrine Revisited: Startup and Technology Employees and the Use of Contracts in a Hiring Relationship” (2011) 12 *Minn JL Sci & Tech* 489 <[HTTPS://scholarship.law.umn.edu/mjlst/vol12/iss2/5](https://scholarship.law.umn.edu/mjlst/vol12/iss2/5)> accessed 2 November 2018; title 17 US Code.

⁹⁸ UK Intellectual Property Office, *Guidance: Ownership of copyright works* (19 August 2014).

⁹⁹ This figure gives a direct copyright interest to employers for the works made by their employees; US Copyright Office, Circular 9: *Work-Made-For-Hire Under the 1976 Copyright Act*.

¹⁰⁰ Darin Glasser, “Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?” (2001) *Duke L & Tech Rev* 24 1

¹⁰¹ Commission, “*Artificial Intelligence for Europe*” COM (2018) 237, 4.

¹⁰¹ Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) *AIPLA Q J* 131, 152.

¹⁰² “For Rudolf Monta, labor and effort are part of originality.” Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017) citing Rudolf Monta, “*The Concept of ‘Copyright’ Versus The ‘Droit D’Auteur’ Doctrine*” (1959) 32 (177) *Southern California Law Review*.

¹⁰³ Howard B Abrams, “Originality and creativity in copyright law” (1992) 55 (2) *Law and Contemporary Problems* 3 citing Justice Holmes in the Case *Bleistein v Donaldson Lithographing Co*, 188 U.S. 239 (1903) <<https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=4136&context=lcp>> accessed 24 September 2018.

copyright protects expressions and not ideas and leaves it to the national legislator to evaluate the originality and creativity of individual works. However, they do not mention originality.¹⁰⁵ Creativity is one of the recurrent elements that appears in the different jurisdictions' thresholds of copyright protection. Referred to as intellectual creation or personality,¹⁰⁶ the concept of creativity involves attributes such as learning, valuing, feeling, innovating, and expressing, all of which are (historically considered)¹⁰⁷ exclusive to humans.¹⁰⁸

There are three considered positions about the threshold of originality for authors:

- 1) Originality represents the absence of plagiarism. This is the perception of Howard B. Abrams,¹⁰⁹ based on the US position and the analysis of a number of court cases, especially *Bleistein v Donaldson Lithographing*.¹¹⁰
- 2) Originality is characterized by the elements of effort and labor. This is the conception of Rudolf Monta.¹¹¹
- 3) Originality only has to reflect a certain degree of creativity, as can be deduced from copyright legislation.

There is a clear difference between the threshold of originality in the US and the UK, and Colombia and Germany. In common law jurisdictions, originality is accepted as the unique requirement for passing the threshold of copyrightability (apart from the concept of author), since common law gives more value to the economic aspects of copyright.¹¹² Originality in common law jurisdictions means that the work is not a copy of an earlier work. On the other hand, civil law delves into the personal aspects of authors or the process of creation. Consequently, civil law requires not only that the work not be a copy, but also that elements of the author's personality be included, that is, that the author express himself individually through his work. Thus, Howard B. Abrams' position can be said to be applicable in common law jurisdictions and positions two (Rudolf Monta) and three would easily apply to civil law jurisdictions.

In EU law, the definition of originality is left to the Courts criteria.¹¹³ Authorship is attributed based, inter alia, the author's personal imprint on his work, but the measurement of creativity in a work is subjective and is left to the national copyright systems. For example, the UK require originality and an unspecified degree of creativity.¹¹⁴ In general,

¹⁰⁴ Berne and WIPO Copyright Treaty.

¹⁰⁵ Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017).

¹⁰⁶ In different laws and conventions.

¹⁰⁷ Added by the writer.

¹⁰⁸ Alfredo Vega Jaramillo, "Manual De Derecho De Autor" (2010) Dirección Nacional De Derecho De Autor.

¹⁰⁹ Howard B. Abrams, "Originality and creativity in copyright law" (1992) 55 (2) *Law and Contemporary Problems* 3 <<https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=4136&context=lcp>> accessed 24 September 2018.

¹¹⁰ *Bleistein v Donaldson Lithographing Co*, 188 U.S. 239 (1903).

¹¹¹ Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017) 16 citing Rudolf Monta, "*The Concept of 'Copyright' Versus The 'Droit D'Auteur' Doctrine*" (1959) 32 (177) *Southern California Law Review*.

¹¹² Mabel Goldstein, *Derecho de autor*, Ediciones la Rocca, Buenos Aires, 1995, 33.

¹¹³ Karl-Nikolaus Peifer, *Individualität or Originality- Core concepts in German Copyright Law*. Universität zu Köln, 2.

¹¹⁴ Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017).

the originality requirement appears in EU legislation in three directives: EU Software Directive,¹¹⁵ which provides that a computer program shall receive copyright protection if “it is original in the sense that it is the author’s own intellectual creation,” EU Term Directive¹¹⁶ that provides a similar provision with regard to the copyrightability of photographs and EU Database Directive,¹¹⁷ that extends copyright protection to databases that “by reason of the selection or arrangement of their contents, constitute the author’s own intellectual creation.”¹¹⁸ These directives state that, to merit copyright protection, “work must be original in the sense that it is the author’s own intellectual creation.”¹¹⁹

Since no EU directive has established a general standard for originality applicable to all copyrightable works, in recent years, the European Court of Justice (ECJ) has begun to harmonize the originality requirement through judicial interpretation.¹²⁰ The first such case was *Infopaq International A/S vs Danske Dagblades Forening* (C-5/08), in which the ECJ held that it was for the national courts to decide when a reproduction constitutes an expression of intellectual creation. This case interprets Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society, notably the rights of reproduction, distribution, and communication to the public. It constitutes a ratification of the WCT. Other cases handled by the ECJ that attempt to harmonize originality standards include the decision of the cases *Bezpečnostní softwarová asociace - Svaz softwarové ochrany* (C-393/09), joint cases *Football Association Premier League Ltd and other v QC Leisure and other* (C-403/08), the case *Karen Murphy v Media Protection Services Ltd* (C-429/08) and the case *Eva-Maria Painer v Standard Verlags GmbH and Others* (C-145/10). In the case *Bezpečnostní softwarová asociace – Svaz softwarové ochrany* (C-393/09), after the Ministry of Culture denied the *Bezpečnostní softwarová asociace* authorization to exercise collective management of copyright rights linked to computer programs. The Tribunal of Justice concluded that “any form of expression of a computer program must be protected from the moment when its reproduction would engender the reproduction of the computer program itself, thus enabling the computer to perform its task.”¹²¹ In the same way in the joint cases *Football Association Premier League Ltd and other v QC Leisure and other* (C-403/08) state that the sequences of digital video and audio recordings are part of the original intellectual creation of the author of the broadcast. In the case *Karen Murphy v Media Protection Services Ltd* (C-429/08), Karen Murphy, manager of a Portsmouth bar, purchased a NOVA decoder card to screen Premier League matches without any fee payment. Agents from Media Protection Services Ltd discovered that Mrs. Murphy was receiving Premier League match broadcasts from NOVA at her bar. Accordingly, the Portsmouth Court convicted her of infringing the Copyright, Designs and Patents Act claiming she received a programme of a broadcasting service in a dishonest manner with the intention of avoiding the fee applicable to the reception of the programme, and in the case C-145/10 *Eva-Maria Painer v Standard Verlags*

¹¹⁵ Art 1 (3) Directive 2009/24/ EC.

¹¹⁶ Art 6 Directive 2006/110/EC.

¹¹⁷ Art 3 (1) Directive 96/9/EC.

¹¹⁸ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 308.

¹¹⁹ Candidate number: 183, “EU copyright protection of works created by artificial intelligence systems” (JUS399 Master’s thesis, University of Bergen June 1st, 2017) 14.

¹²⁰ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 308-309.

¹²¹ Case *Bezpečnostní softwarová asociace – Svaz softwarové ochrany* (C-393/09).

GmbH and Others deals with the originality standard as applied to a portrait photograph of an Austrian child who was later kidnapped for eight years and made worldwide news after her escape in 2006. The decision in this case notes that an intellectual creation should reflect the author's personality, and his capability to express his creative ability requires him to make free choices.¹²²

German courts used to require a substantial degree of originality, especially for works of applied art: only objects whose artistic quality was substantially higher than what the ordinary designer was able to produce were considered copyrightable. In the decision of the Geburtstagszug (The Birthday Train) case, the German Bundesgerichtshof left this standard because its purpose was to distinguish copyright from design protection, while the new European Directive separates design rights.¹²³

In Colombia and in the Andean Community of Nations (CAN), the authorship concept is, as well as in the EU, based on the author's personal imprint on the work. And the originality or individuality is concretized in the work by expressing what is proper to its author, which bears the imprint of his personality,¹²⁴ involving a creative contribution to inventive works.¹²⁵

During Trade-Mark Cases,¹²⁶ the US Supreme Court stated that "the writings which are to be protected are the fruits of intellectual labor... founded in the creative powers of the mind."¹²⁷ Congress clarified the standard of originality in the *Bleistein v Donaldson Lithographing* case of 1903, stating: "The phrase 'original works of authorship,' which is purposely left undefined, is intended to incorporate without change the standard of originality established by the courts under the present copyright statute. This standard does not include requirements of novelty, ingenuity, or esthetic merit, and there is no intention to enlarge the standard of copyright protection to require them."¹²⁸ However, in the 1991 *Feist Publication Inc. v Rural Telephone Service Company Inc.* case of 1991, the US Supreme Court changed its decision and ruled that compilations with a degree of creativity should be considered original works and hence be copyright protected. *Goldstein v California*¹²⁹ provides that the original authorship of a work requires an element of interpretation or psychological translation to the fruit of intellectual creativity or aesthetic labor.

¹²² Case *Bezpečnostní softwarová asociace – Svaz softwarové ochrany* (C-393/09).

¹²³ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 320.

¹²⁴ Delia Lipszyc, *Derecho de Autor y Derechos Conexos* (Editorial Unesco 1993) 65.

¹²⁵ Decision 351/93 art 1 and Law 23/82 art 2.

¹²⁶ Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) *AIPLA Q J* 131, 157 citing *The Trade-Mark Cases* 100 U.S.82 (1879).

¹²⁷ *Ibid.*

¹²⁸ Howard B Abrams, "Originality and creativity in copyright law" (1992) 55 (2) *Law and Contemporary Problems*.

¹²⁹ *Goldstein v California*, 412 US 546 (1973).

3.3 Creation Fixed in a Form of Expression

The foundation of copyright, in addition to creativity, is the artistic stimulus.¹³⁰ Therefore, in principle, copyright is automatically obtained once a work has been created and embodied in a tangible form of expression. However, the Berne Convention leaves the power to prescribe that works in general or any specific category of works shall only be protected if they have been fixed in some material form.¹³¹ The explanation is that copyright does not protect ideas, but the expressions of these ideas.¹³² As stated by Brown, “the key is that the expression is preserved in some persistent communicative medium, some useable vehicle for later communication.”¹³³

The EU has not harmonized the requirements for a work to be considered as “fixed”: as with the other factors discussed in this section, this is left to the member states to decide. In the UK, “copyright does not subsist in a literary, dramatic or musical work unless and until it is recorded, in writing or otherwise,”¹³⁴ And some types of works (sound recordings, films, broadcasts, typographical arrangements) can generally only exist in a material form, although they are not bound by the requisite fixation.¹³⁵ In The US, fixation is also a requirement for obtaining copyright: “a work is ‘created’ when it is fixed in a copy or phonorecord for the first time.”¹³⁶

By contrast, German and Colombian copyright law does not impose a fixation requirement as a prerequisite of copyright protection.¹³⁷ In countries with a civil law system, the prevailing position is that the granting of copyright does not depend on fixation.¹³⁸ Instead, works are protected with copyright when the works is perceptible¹³⁹ in a form of expression, regardless of whether they have a material support or not. However, in Germany, the five-step-test to allocate copyright failed in the case of *Eva & Adele* because the Hamburg District Court (Landgericht) ruled that artist and work are identical and therefore there is no fixation which can be separated from the person of the author “Wherever we are is Museum.”¹⁴⁰ As stated by Elizabeth Adeney, “For example, protection in Germany is afforded to authored ‘language works,’ including unfixed speeches, and to unfixed musical works expressed solely in the form of sound.”¹⁴¹ In the same way, Law No.

¹³⁰ Evan Brown, “Fixed Perspectives: The Evolving Contours of The Fixation Requirement in Copyright Law” (2014) 10 (1) Wash JL Tech & Arts 18, 18.

¹³¹ Berne Convention Art 2 (2).

¹³² TRIPS Agreement Art 9 (2).

¹³³ Evan Brown, “Fixed Perspectives: The Evolving Contours of The Fixation Requirement In Copyright Law” (2014) 10 (1) Wash JL Tech & Arts 18, 20.

¹³⁴ Section 3 (2) CDPA.

¹³⁵ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018), 327.

¹³⁶ Title 17 of the United States Code, Ch 1.

¹³⁷ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018), 327.

¹³⁸ Elizabeth Adeney, “Authorship and Fixation in Copyright Law: A Comparative Comment” (2011) 35 Melbourne University Law Review 677, 682.

¹³⁹ Megan Carpenter and Steven Hetcher, “Function over Form: Bringing the Fixation Requirement into the Modern Era” (2014) 82 Fordham L Rev 2221 <<http://ir.lawnet.fordham.edu/flr/vol82/iss5/11>> accessed 25 December 2018.

¹⁴⁰ Karl-Nikolaus Peifer, *Individualität or Originality- Core concepts in German Copyright Law*. Universität zu Köln, 5.

¹⁴¹ Elizabeth Adeney, “Authorship and Fixation in Copyright Law: A Comparative Comment” (2011) 35 Melbourne University Law Review 677, 682.

23 of 1982 in Colombia only requires that the creation can be reproduced in any form of expression.

4 ARTIFICIAL INTELLIGENCE

4.1 Definition

The genesis of artificial intelligence took place in 1943, with the proposal of Warren McCulloch and Walter Pitts of a model of artificial neurons in which each neuron is “on” or “off,” the former occurring in response to stimulation by neighboring neurons.¹⁴² This later inspired the works of John McCarthy, who coined the term artificial intelligence in 1955.¹⁴³ He presented this concept at the Dartmouth Conference¹⁴⁴ in 1956 and developed AI during a two-month workshop at Dartmouth College, marking the beginning of AI as an area of knowledge. His work was continued by other researchers at the Massachusetts Institute of Technology.¹⁴⁵ McCarthy defines AI as “the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.”¹⁴⁶ Artificial intelligence shares many concepts with philosophy,¹⁴⁷ and it is, in fact, based on some philosophical and scientific presuppositions.¹⁴⁸

Russell and Norvig¹⁴⁹ analyze eight theories of different scholars and organized them into four categories of definitions of AI.¹⁵⁰ These categories are presented in Figure 1, Russell and Norvig’s Four Categories of AI Definitions.

¹⁴² Stuart Russell, Peter Norvig, and Ernest Davis, *Artificial Intelligence: A Modern Approach* (Prentice Hall 2010), 21.

¹⁴³ Nils Nilsson, *The Quest for Artificial Intelligence* (Cambridge University Press 2010).

¹⁴⁴ John McCarthy and others, C.E. *Conference Announcement: A proposal for the Dartmouth summer conference on artificial intelligence* (Stanford University 1955) <<http://stanford.io/1bqrAR1>> accessed 15 October 2018.

¹⁴⁵ Eg

- 1958 Definition of the high-level language Lisp (McCarthy)
- 1958 Paper “programs with common sense (McCarthy)
- 1963 Supervision of microworlds (Marvin Minsky)
- 1963 James Slagle’s SAINT program to solve closed form calculus integration problems
- 1967 Daniel Bobrow’s STUDENT program to solve algebra story problems
- 1968 Tom Evan’s Analogy program to solve geometric analogy problems
- 1969 Cordell Green’s question-answering and planning systems.

¹⁴⁶ John McCarthy, “What is Artificial Intelligence?” (2007) Stanford University <<http://www-formal.stanford.edu/jmc/whatisai/>> accessed 2 November 2018.

¹⁴⁷ John McCarthy, “The philosophy of AI and the AI of philosophy” (2006) Stanford University <<http://jmc.stanford.edu/articles/aiphil2/aiphil2.pdf>> accessed 2 November 2018.

¹⁴⁸ Ibid.

¹⁴⁹ Stuart Russell, Peter Norvig, and Ernest Davis, *Artificial Intelligence: A Modern Approach* (Prentice Hall 2010).

¹⁵⁰ Ibid.

<p>Thinking Humanly</p> <p>“The exciting new effort to make computers think . . . <i>machines with minds</i>, in the full and literal sense.” (Haugeland, 1985)</p> <p>“[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning . . .” (Bellman, 1978)</p>	<p>Thinking Rationally</p> <p>“The study of mental faculties through the use of computational models.” (Charniak and McDermott, 1985)</p> <p>“The study of the computations that make it possible to perceive, reason, and act.” (Winston, 1992)</p>
<p>Acting Humanly</p> <p>“The art of creating machines that perform functions that require intelligence when performed by people.” (Kurzweil, 1990)</p> <p>“The study of how to make computers do things at which, at the moment, people are better.” (Rich and Knight, 1991)</p>	<p>Acting Rationally</p> <p>“Computational Intelligence is the study of the design of intelligent agents.” (Poole <i>et al.</i>, 1998)</p> <p>“AI . . . is concerned with intelligent behavior in artifacts.” (Nilsson, 1998)</p>
<p>Figure 1.1 Some definitions of artificial intelligence, organized into four categories.</p>	

Figure 1: Russell and Norvig’s Four Categories of AI Definitions.

Figure 1 highlights the division of ideas of different AI scholars. On the one hand, there are those who understand AI as systems that imitate the actions of humans, while on the other hand, there are a number of academics who believe that these systems are rational in themselves. Russell and Norvig provide a more global approach through the concept of machine learning, which “refers to a subfield of computer science concerned with computer programs that are able to learn from experience and thus improve their performance over time.”¹⁵¹ Thus, AI becomes better and more efficient via reinforcement learning, which happens without further programming.¹⁵²

4.2 Classification of AI

Classifying AI is not an easy task, because it is a concept with no clear definition and multiple possible functions.¹⁵³ The WIPO program notes provide descriptions of three categories of AI: perception systems, natural-language systems, and expert systems.¹⁵⁴

Perception systems (i.e. “computer vision”) are systems that permit a computer to “perceive” the world, typically by providing it with a “sense” of “sight” or “hearing.”¹⁵⁵

¹⁵¹ Stuart Russell, Peter Norvig, and Ernest Davis, *Artificial Intelligence: A Modern Approach* (Prentice Hall 2010).

¹⁵² Peter Stone and others, “Artificial Intelligence and Life in 2030” *One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel*, (Research Report, Stanford University 2016) <<http://ai100.stanford.edu/2016-report>> accessed 15 October 2018.

¹⁵³ The Professor of Computer Science at Stanford University, Terry Winograd said, at the WIPO Worldwide Symposium of 1991 “When people ask me what artificial intelligence is, my immediate response is ‘That depends on why you are asking’”.

¹⁵⁴ *WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence, Stanford University, Stanford (California), United States of America, March 25 to 27, 1991*(World Intellectual Property Organization 1991) 55.

¹⁵⁵ *Ibid.*, 56.

Natural- language systems are computers programmed to understand natural human languages. The program applies the AI technology of semantic analysis and must understand the rules of syntax. A technique called pragmatic analysis utilizes knowledge about the real world to assist these programs in making choices about the meaning of words and sentences.¹⁵⁶

Expert systems consist of an ordinary form of a database that allows for storing specific knowledge and following a series of instructions to solve a problem according to the logical rules that this data implies. The databases are managed through a program that allows the combination and recombination of pre-established situations.¹⁵⁷

There are also other types of AI that are not mentioned in the WIPO program notes, such as the **neural networks or connectionist systems**. A neural network is a system in which machine learning algorithms work together and process complex data entries.¹⁵⁸ The software learns to perform tasks by considering examples, without being programmed with specific rules.¹⁵⁹

Machine learning is a subset of AI that can produce systems capable of learning independently without further human programming.¹⁶⁰ It can be accomplished in a supervised or an unsupervised way.¹⁶¹ When it is unsupervised, the system acts and observes the consequences of its actions without referring to any predefined type cases other than those previously observed.¹⁶² These systems are capable of learning and self-supplying data. This occurs with through the combination of neural networks, the parameters given by the programmer, and trial-and-error, self-supplied data. As stated by Guadamuz, a remarkable characteristic of this type of artificial intelligence is that the work is generated by the computer program¹⁶³ in a process similar to the thought processes of human beings, although programmers can also establish parameters.¹⁶⁴

This thesis uses the two major branches of AI described by Hristov in “Artificial Intelligence and the Copyright Dilemma.” Artificial intelligence is thus divided into programs which work with intervention of human beings (supervised) and those that act autonomously, without human intervention (unsupervised). The latter category is the one addressed in the current thesis. However, in addition to the supervised and unsupervised categories of machine learning, there are semi-supervised and reinforcement categories.

¹⁵⁶ WIPO *Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence, Stanford University, Stanford (California), United States of America, March 25 to 27, 1991* (World Intellectual Property Organization 1991), 57.

¹⁵⁷ Wilson Ríos Ruiz, “Los sistemas de inteligencia artificial y la propiedad intelectual de las obras creadas, producidas o generadas mediante ordenador” (2001) *Revista La Propiedad Inmaterial* (3) 5, 6.

¹⁵⁸ “Build with AI” (DeepAI) <<https://deepai.org/machine-learning-glossary-and-terms/neural-network>> accessed October 6, 2018.

¹⁵⁹ “Artificial Neural Networks Explained” (mc.ai, 24 Jul 2018) <<https://mc.ai/artificial-neural-networks-explained/>> accessed 13 October 2018.

¹⁶⁰ Andres Guadamuz, “Artificial intelligence and copyright” (*WIPO Magazine*, October 2017) <http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html> accessed 9 November 2018.

¹⁶¹ Jonas Thulin, “Machine learning-based classifiers in the Direkt Profil grammatical profiling system” Master's Thesis in Computer Science (Lund University, 2007), 17.

¹⁶² Ibid.

¹⁶³ The computer program network is called neural network.

¹⁶⁴ Andres Guadamuz, “Artificial intelligence and copyright” (*WIPO Magazine*, October 2017) <http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html> accessed 9 November 2018.

4.3 The Creativity of AI

As researches discovered new possible applications of AI to real world problems, the demand for a workable knowledge representation scheme increased and many representations and reasoning languages were therefore developed.¹⁶⁵

Since the digital revolution of the 1970s, computers have produced works of art. Although most of these works were initially actually produced by humans, specifically by programmers, with the machine learning system, the computer program actually makes decisions in the creative process without human intervention,¹⁶⁶ uses verbal or visual vocabulary and composes distinct works by independently applying a system of rules.¹⁶⁷ Thus, algorithmic logic can be considered as a form of creativity.

The different branches of AI and their similarity with the characteristics of human intelligence have made it common for many to compare computer processors with the human brain, establishing a close simile in their functioning. There is a debate among AI scholars about the presence or lack of creativity in computers, and whether this creativity functions the same way as it does in humans.¹⁶⁸ However, just as the concept of intelligence is not limited to biologically observable criteria, so the concept of creativity need not be limited in this way. Artificial intelligence has been significantly developed in recent years, and by using its machine learning system, it has almost eliminated human participation in the creation of copyrightable works. However, AI lacks the capacity to break the rules that is has been provided by the programmers: this is Ada Lovelace's key argument in favor of AI being unable to create.¹⁶⁹ Yet people, especially children, also often create different kinds of works without departing from set instructions, and these works are still considered to have been realized with intellectual effort. Thus, the programmers set parameters, but the work is autonomously generated by the program.¹⁷⁰

According to Bridy, "Avant-gardists¹⁷¹ like Calvino raise the possibility that humans and machines, if we consider the rulebound nature of their respective outputs and the pre-existing models they are wont to emulate, are really not as different as we are conditioned to believe.¹⁷² Calvino's figure of the author as a writing machine is about as radical a deconstruction of the figure of the romantic author¹⁷³ as a good post-modernist could wish for, and it is arguably one whose time has come in the discourse on copyright law."¹⁷⁴

¹⁶⁵ Stuart Russell, Peter Norwig, Ernest Davis, *Artificial Intelligence: A Modern Approach* (Prentice Hall 2010), 21.

¹⁶⁶ *Ibid.*

¹⁶⁷ Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5).

¹⁶⁸ *Ibid* 56, AI researchers generally fall into two camps: those who believe in "strong AI" and those who believe in only "weak AI".

¹⁶⁹ *Ibid* 10.

¹⁷⁰ Andres Guadamuz, "Artificial intelligence and copyright" (*WIPO Magazine*, October 2017) <http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html> accessed 9 November 2018.

¹⁷¹ Avant-garde is defined by the Cambridge dictionary as "ideas, styles, and methods are very original or modern in comparison to the period in which they happen".

¹⁷² Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5).

¹⁷³ The romantic author is a conception of a creator-genius emerged in the beginning of the nineteenth century. It states that the author is the unique individual, a creative personality, "*Who creates something original and is entitled to reap a profit*". Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017), 12 citing Mark Rose, "*Authors and Owners: The Invention of Copyright*", Harvard University Press (1993).

¹⁷⁴ Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5), 12.

Today, AI is used in a number of different fields, such as robotic vehicles, speech recognition, autonomous planning and scheduling, game playing, spam fighting, logistics planning, robotics, and machine translation.¹⁷⁵ In the context of this thesis, the most important functions of AI are those that result in intellectual creation. One example of this is “The Next Rembrandt” project,¹⁷⁶ a facial-recognition algorithm that learned Rembrandt’s techniques by studying 346 paintings and created a portrait using these techniques.¹⁷⁷ This project proves that machines can paint, by creating a piece of art that resembles Rembrandt’s style, and it exposes the difficulty of identifying the creator of the production.¹⁷⁸

In 1983, the book *The Policeman's Beard Is Half Constructed*, was composed by RACTER, a computer program that writes semi-coherent stories using the vocabulary stored in its memory and applying grammatical rules.¹⁷⁹ Another program of this type is the WaveNet project, a deep generative model of audio data which generates multi-speaker speech (not conditioned on text), Text-to-speech and music audio modelling.¹⁸⁰ It is not possible to comprehend how the output sounds made by this program, which works with a deep neural network, were made. The programmers or users can only control the input and see the output, but there is no way to understand what happens in-between.¹⁸¹

Due to its ability to play an intuition game, the development of Google DeepMind, AlphaGo, is perhaps the most interesting AI achievement to date. AlphaGo was the first software that defeated a world champion in the game of Go,¹⁸² Lee Sedol, by 100 games to 0. The most recent version of this program is AlphaGo Zero. Unlike previous versions, AlphaGo Zero does not train with human players: it is its own teacher and learns by playing games against itself.¹⁸³

According to Hristov, “as computers become faster and more capable, creativity machines and other forms of AI will likely take center stage in the creative process, becoming the main drivers of creativity and innovation.”¹⁸⁴ Machines use a neural architecture that involves making connections subject to disturbances (random or systematic), to produce patterns that represent ideas or plans of action. These notions are communicated to the

¹⁷⁵ Stuart Russell, Peter Norwig, Ernest Davis, *Artificial Intelligence: A Modern Approach* (Prentice Hall 2010), 30.

¹⁷⁶ J Walter Thompson Amsterdam (*Unpacking Gender Bias In Advertising - J. Walter Thompson Worldwide*) <<https://www.jwt.com/en/work/thenextrembrandt>> accessed 28 November 2018.

¹⁷⁷ Rembrandt Harmenszoon van Rijn was one of the greatest visual artists in the history of art.

¹⁷⁸ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 27.

¹⁷⁹ Timothy Butler, “Can a Computer be an Author - Copyright Aspects of Artificial Intelligence.” (1981) 4(4) *Comm/Ent LS* 707, 715.

¹⁸⁰ Aron van den Oord and others “*WaveNet: A Generative Model for Raw Audio*,” (Google 2016), 5.

¹⁸¹ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 27.

¹⁸² Go is the oldest game still played in its original form, created between 2.500 – 4.000 years ago, Peter Shotwell, “A Brief History of Go” (What Is Go? | American Go Association) <<http://www.usgo.org/brief-history-go>> accessed 22 December 2018.

¹⁸³ “The system starts off with a neural network that knows nothing about the game of Go. It then plays games against itself, by combining this neural network with a powerful search algorithm. As it plays, the neural network is tuned and updated to predict moves, as well as the eventual winner of the games.” from Hassabis D and Silver D, “AlphaGo Zero: Learning from Scratch” (DeepMind October 18, 2017) <<https://deepmind.com/blog/alphago-zero-learning-scratch/>> accessed 22 December 2018.

¹⁸⁴ Petar Hristov, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg university 2017).

algorithm and the algorithm evaluates novelty, utility, value, or attractiveness to finally create the creative product.¹⁸⁵

4.4 Business of AI generated works

The main question to answer about business of AI-generated works is to what extent can copyright law be explained as a means for allocating efficient allocation of resources.¹⁸⁶ Further research on the economic impact is necessary after answering the question of whom to allocate copyright for works made by AI.

As stated by the WIPO in The Guide on Surveying the Economic Contribution of the Copyright Industries “Copyright law is designed to establish the right balance between different economic effects, investing the necessary time in cultural creations, their proper distribution, and the protection and enforcement of the rights involved. This balance is manifested through the law’s main functions and consequences.”¹⁸⁷ In this way, in the future, copyright law must adapt its design to fit the faster changing circumstances and development of “thinking” computer programs, so the resources can be allocated efficiently. However, at the moment it is hard to estimate and predict the speed in which AI-generated works will have impact.

Robert Hurt and Robert Schuchman group the various justifications offered in favor of copyrights under two headings: “those which are based on the rights of the creator of the protected object or on the obligation of society to reward him, and those which are based on the promotion of the general well-being of society.”¹⁸⁸ The AI does not benefit from rights of a creator, and the AI itself can already be copyrighted by its programmer. Thus, the argument about promotion of well-being of the society must become more prominent in future legal discussion and law-making, especially in the case of granting copyright to AI. AI-generated works have, in most countries, no copyright, because it is not created by a human author. It has a negative effect for the companies creating these AI, because they need to invest a lot for creating the machines. Therefore, no copyright protection may have a devastating impact on automated systems development. Programmers would feel discouraged from creating if they doubt that copyright would be guaranteed to them and that they would therefore not receive financial compensation.¹⁸⁹ For promoting the general well-being of the society, it must be assured that the programmer reaps the benefit from AI-generated works to have the motivation to invest time and money in creating these programs. In broader terms, copyright law should be created so it improves well-being, growth, and development by encouraging creativity and progress. In addition, copyright legislation should facilitate trade that would not otherwise take place.¹⁹⁰

¹⁸⁵ Elias G. Carayannis, *Encyclopedia of Creativity, Inventions and Entrepreneurship* (Springer 2013), 451.

¹⁸⁶ William M Landes and Richard a Posner, “An Economic Analysis of Copyright Law” (1989) 18 *The Journal of Legal Studies* 325 www.jstor.org/stable/3085624 accessed 25 December 2018.

¹⁸⁷ “Guide on Surveying the Economic Contribution of the Copyright Industries” (WIPO) publication 33.

¹⁸⁸ Robert M Hurt and Robert M Schuchman, “The Economic Rationale of Copyright” (1966) 56 (*The American Economic Review* 421) <www.jstor.org/stable/1821305> accessed 25 December 2018.

¹⁸⁹ Andres Guadamuz, “Artificial Intelligence and Copyright” [2017] *WIPO Magazine* 14.

¹⁹⁰ “Guide on Surveying the Economic Contribution of the Copyright Industries” (WIPO) publication 35.

It is important to judge the copyright protection by the welfare it offers. This subject certainly deserves more investigation.¹⁹¹ This opinion is still relevant, especially because of the rise of works created by non-human authors. There need to be studies on how to maximize the welfare with the adequate copyright regulations. According to Watt Richard,

“In summary, copyright law is designed to allow for the creation of the optimal amount of cultural assets and to allow for the efficient distribution via market transactions of the underlying intellectual property so that it can be consumed by those who most value it. In order for intellectual property to exist and content to be created, creators must be sufficiently compensated, or they will find alternative employment. Creation implies an initial fixed cost to the creator (opportunity costs, effort, etc.), and production implies a variable cost whenever the underlying intellectual property is attached to the chosen delivery goods and a unit of the delivery goods is produced and marketed. If intellectual property is not protected, it will be easily reproduced. (..) This would undermine profits and could lead to insufficient compensation for the creator. Under a system of legal protection, the marginal cost of reproduction is increased, and the market price does not fall as far as when originals and copies compete. Creators can thus enjoy compensation.”¹⁹²

This opinion of Watt is also applicable for AI-generated works. In this case, the production has high cost and the outputs are uncertain. Thus, it is even more important to legally protect the possible outcomes of these investments.

¹⁹¹ Robert M Hurt and Robert M Schuchman, “The Economic Rationale of Copyright” (1966) 56 (The American Economic Review 421) <www.jstor.org/stable/1821305> accessed 25 December 2018.

¹⁹² Watt Richard, *Copyright and Economic Theory: Friends or Foes?* (Edward Elgar Publishing Ltd 2000) 2.

5 THEORIES OF OWNERSHIP

5.1 The Programmer or Developer

Attributing rights to the programmer makes sense with the current required element of human creativity in the threshold of copyrightability. The programmer has invested time and effort in creating the AI responsible for the final work, and he alone understands the algorithm and the creative process behind the output.¹⁹³ Because of the ideas of the programmer to create the AI, there are given visible expressions of a work, indirectly created by the programmer.¹⁹⁴ The programmer also deserves recognition because, as stated by Pamela Samuelson, “creating an excellent generator program is intellectually demanding, as well as time-consuming and expensive for the programmer.”¹⁹⁵

Andrew Wu posits that the programmer should be the copyright owner if the output of the program is repeatable, and if the user input is limited. In this case, the generated work does not meet the minimum degree of creativity.¹⁹⁶

Statutorily, the central argument that leads the programmer to be recognized as an author is his familiarity with and understanding of the creative process. Although the programmer is not the direct creator of the work, he is the one who understands how the algorithm works and who can explain the creative process. As Sorjamaa explains, because the programmer is the creator of the algorithm, he has the right to benefit from it.¹⁹⁷

The first country to recognize AI's creative capacity to generate works was the UK, which assigns the copyright of computer-generated works to humans in its legislation.¹⁹⁸ The CDPA states that “In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.”¹⁹⁹ The law allocates ownership to the programmer for these type of works, since he is responsible for the setting under which they were created. Like the photographer standing behind a camera, an intelligent programmer or team of programmers stands behind every AI.²⁰⁰ In the U.K, the *Nova Productions Ltd. v Mazooma Games Ltd.* case,²⁰¹ and in the U.S the cases *Atari Inc. v North American Philips Consumer Elec. Corp.*²⁰² and *Williams Elec. Inc. v Arctic Int'l.*

¹⁹³ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017) citing Margoni T and Perry M, *Scientific and Critical Editions of Public Domain Works: An Example of European Copyright Law (Dis)harmonization*, (27th edition Canadian Intellectual Property Review 2011).

¹⁹⁴ *Burrow-Giles Lithographic Co v Sarony*, 111 U.S. 53 (3-17-1884) author’s definition “he to whom anything owes its origin...”.

¹⁹⁵ Pamela Samuelson, “Allocating Ownership Rights in Computer-Generated Works” (1985) U Pitt L Rev 1185, 1205.

¹⁹⁶ Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) AIPLA Q J 131, 152.

¹⁹⁷ *Ibid* 31 citing Tuomas Sorjamaa, “Authorship and Copyright in the Age of Artificial Intelligence” (Thesis, Hanken School of Economics 2016).

¹⁹⁸ Kalin Hristov, 'Artificial Intelligence and the Copyright Dilemma.' (2017) 57(3) IDEA 431, 442.

¹⁹⁹ Article 9 numeral 3 Copyright, Designs and Patents Act of 1998.

²⁰⁰ Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5, 10.

²⁰¹ *Nova Productions Ltd v Mazooma Games Ltd.*, [2007] EWCA Civ 219, Royal Courts of Justice, Court of Appeal, London;

²⁰² *Atari Inc. v North American Philips Consumer Elec. Corp.*, Case 672 F.2d 607 (7th Cir. 1982), U.S. Court of Appeals for the Seventh Circuit.

Inc.,²⁰³ are cases that examined the allocation of authorship for copyrightable works created by algorithms in video games. There, the Courts decided based on the programmer's understanding and explanation of the product.²⁰⁴

The consideration of granting copyright to the programmer for works created by the artificial intelligence he programmed is feasible in cases where there is a logical connection between the programmer and the machine can be understood. This theory is based on well-founded logic and long-standing legal traditions such as Lockean ethics and the doctrine of "forehead sweat" and would be an example of Ada Lovelace's understanding that a machine "can (only) do what we know how to command it to do."²⁰⁵

Following this line of reasoning, in cases where the computer-generated work clearly contains the original work fixed in a tangible medium of expression that should qualify it for copyright protection, it seems fair to award the copyright to the programmer.²⁰⁶ However, granting the programmer authorship over the creations of his creation would give him two rewards. One for his original work in creating the AI and another unfair reward for the work of the machine.²⁰⁷ Copyright would thus be granted based on questionable origins, contradicting the principle of intellectual property that searches for protection of products created with human intellectual labor.²⁰⁸

5.2 The Program Owner

According to Wu,²⁰⁹ the owner²¹⁰ of the AI should own the copyright under the following circumstances:

- The program output is not repetitive or predictable (fixation requirement).
- There is no significant user contribution.
- Joint authorship between the programmer and user is not possible.
- The program output clearly "owes its origin" to the program itself.²¹¹
- Awarding copyright protection to the owner would encourage the fictional human author to create future works.

Companies and other investors in AI provide technological and financial resources for the creation of new AI. When they hire programmers or commission works, the works are created by employees following set instructions. In this case, copyright can be granted to

²⁰³ Williams Elec. Inc. v Arctic Int'l. Inc., Case 685 F.2d 870 (1982), U.S. Court of Appeals for the Third Circuit.

²⁰⁴ Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017), 31.

²⁰⁵ Hristov Manolakev (n 59) 32 citing Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5).

²⁰⁶ Andrew Wu, 'From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.' (1997) 25(1) AIPLA Q J 131, 148 citing Raymond T. Nimmer, *The law of Computer Technology* 1.14, at 1-88 (1989).

²⁰⁷ Petar Hristov Manolakev, "Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship" (Master Thesis, Tilburg University, 2017) 34 citing Samuelson, P "Allocating Ownership Rights in Computer-Generated Works" (1985) U Pitt L Rev 1185.

²⁰⁸ Ibid 34.

²⁰⁹ Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) AIPLA Q J 131, 177.

²¹⁰ In Andrew Wu's words, it is the theory of "Fictional Human Author".

²¹¹ Ie Racter, *The Policemans Beard Is Half-Constructed: Computer Prose and Poetry* (Warner Software/Warner Books 1984).

the employer. However, this possibility is only clearly legislated in countries which recognize the notion of works made for hire, the US,²¹² the UK,²¹³ Australia,²¹⁴ and Japan.²¹⁵

In the US, when a work is “made for hire,” the authorship is attributed to the employer or commissioner and not to the actual creator.²¹⁶ This authorship carries all of the vested rights of copyright: the actual creator of the work is never attributed not retains any residual rights. The employer or commissioner is, strictly speaking, the original creator of the work.²¹⁷

In the UK, when the work is made in the course of employment, copyright is granted either to the employer or the author depending on the specific circumstances.²¹⁸ Copyright is fully granted to the commissioning party only when there is a preexisting agreement to this effect.²¹⁹

Legislation in the EU, Colombia, and Germany contains a concept that is similar to the notion of works made for hire.²²⁰ It distinguishes between the attribution of moral and economic rights.²²¹ In these cases, the person who created the work is the owner of copyright, but the employer is entitled to all the economic rights associated with the work.

Section V, “dealing with Rights in Copyright” of the UrhG states, in the subsection II, “Exploitation rights,” article 43, that “The provisions of this subsection shall also apply if the author has created the work in execution of his duties under a contract of employment or service provided nothing to the contrary transpires from the terms or nature of the contract of employment or service.” This means that the author continues to retain, in addition to moral rights, economic rights, unless otherwise stipulated.

In Germany, as a general rule, all rights are guaranteed to the author. However, exceptionally, Article 89 UrhG creates the presumption that all authors of an audiovisual work have granted exclusive exploitation rights to the producer and Article 69b establishes a situation in which a similar presumption is made in the interest of the employer or the commissioner of the part of the creator of a computer program.²²²

²¹² 17 US Code § 201(b) (2000).

²¹³ Copyright, Designs, and Patents Act, 1988, c. 48 § 11 and c. 48 § 90.

²¹⁴ Copyright Act, 1968, § 35.

²¹⁵ Japan is the only country that has no common law system and recognizes works made for hire.

²¹⁶ 17 USC § 201(b) (2000).

²¹⁷ Analysis of International Work-for-Hire Laws (Sutherland Asbill & Brennan LLP, 2004) 2 <<https://us.eversheds-sutherland.com/portalresource/lookup/poid/Z1tOI9NPluKPtDNIqLMRV56Pab6TfzcRXncKbDtRr9tObDdEuS3Dr0!/fileUpload.name=/WorkforHireLaws.pdf>> accessed 20 December 2018.

²¹⁸ Copyright, Designs, and Patents Act, 1988, c. 48 § 11.

²¹⁹ Copyright, Designs, and Patents Act, 1988 c. 48 § 90.

²²⁰ Colombia art 20 law 23/82, mod Law 1450/2011; Germany art 43 UrhG.

²²¹ As mentioned, civil law jurisdiction use Right of Author instead of Copyright, but for practical reasons, in the thesis only Copyright is expressed.

²²² Analysis of International Work-for-Hire Laws (Sutherland Asbill & Brennan LLP, 2004) 11 <<https://us.eversheds-sutherland.com/portalresource/lookup/poid/Z1tOI9NPluKPtDNIqLMRV56Pab6TfzcRXncKbDtRr9tObDdEuS3Dr0!/fileUpload.name=/WorkforHireLaws.pdf>> accessed 20 December 2018.

In Colombia, the employee retains the moral rights, but in principle it is presumed that the employer holds the economic rights. Article 20 of the 1982 Law 23 regulates this issue as follows:

"In works created for a natural or legal person in compliance with a contract for the provision of services or an employment contract, the author is the original owner of the economic and moral rights; but it is presumed, unless otherwise agreed, that the economic rights over the work have been transferred to the commissioner or to the employer, as the case may be, to the extent necessary for the exercise of their usual activities at the time of creation of the work. For this presumption to operate, the contract must be in writing. The owner of the works according to this article may attempt directly or through a person preservative actions against acts violating moral rights previously informing the author or authors to avoid duplicity of actions."

The problem with this ownership theory is that there is no working relationship between the programmer and the owner or between the AI and the owner. If the programmer is considered to be an employer, the most logical solution would be to avoid creating a legal exception and guarantee copyright to the programmer. However, AI cannot be considered to be an employee because it is a machine: it cannot sign contracts and lacks the element of will.

5.3 The Program User

The theory of granting copyright to the user responds to the impression that the user employs the AI as a tool to create the final work, which is thus a product of the user's creativity.

In consonance with this position, in the US, a 1978 National Commission on New Technological Uses of Copyrighted Works (CONTU) report states that program users should hold copyright,²²³ arguing that the machine lacks creativity. At this time, the majority of opinions supported the idea that the user should be the owner of the copyright of computer-generated works.²²⁴ However, a decade later, the Office of Technological Assessment (OTA) issued a report questioning CONTU's arguments and notably stating that it is misleading to think of programs as inert tools of creation.²²⁵

In the EU, Article 2(3) of the Software Directive 91/250/EEC enshrines the employer's right to exercise economic rights over computer-generated works of an employee, when the work is given in the exercise of his functions or following the employer's instructions. If a work is created by an employee, the copyright is assigned to the person or entity

²²³ Darin Glasser, "Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?" (2001) Duke L. & Tech Rev 24 1.

²²³ Commission, "Artificial Intelligence for Europe" COM (2018) 237 final citing Final Report of the National Commission on New Technological Uses of Copyrighted Works, July 31, 1978, Library of Congress/Washington 1979, 44.

²²⁴ Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) AIPLA Q J 131.

²²⁵ US Congress, Office of Technological Assessment, *Intellectual Property Rights in an Age of Electronics and Information* (1986) 72; Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) AIPLA Q J 131, 133.

responsible for bringing a creative work into the world, independently of the direct involvement of the person or entity in the creative effort.²²⁶

In the same way, even if the user of an AI program did not contribute to the process of creation of the work, the user is the person who most immediately caused the realization of the work. Based on this, it can be argued, as explained by Samuelson, that using “a generator program in some sense has ‘employed’ the computer and its programs for his creative endeavors. By this line of argument, similar considerations to those that underlie the employment rule support allocation of rights in AI generated works to users, regardless of the extent of their creative input.” However, only Directive 91/250/EEC on computer programs includes this rule on “work made for hire,” and the question of works protected by the copyright of workers in general remains in each member state.²²⁷

According to Wu,²²⁸ the user can be the owner of the copyright of programs that provide tools for the user to express their creativity under the following circumstances:

- The program output is not repetitive or predictable (fixation requirement).
- The user’s input satisfies both the fixation and the minimal creativity requirement.
- Joint authorship is not possible because the programmer fails to comply with the fixation requirement,
- The user is the “originator” of the work rather than the program itself.

Nevertheless, most of the domestic copyright laws agree that execution does not automatically turn a person into an author.²²⁹ Artificial intelligence is not always merely a tool. Annemarie Bridy explains that “some computer systems are designed to produce works that fall under the rubric of algorithmic or generative art, in which practitioners of generative art take a systems- approach to artistic production, removing their own personalities from the creative process and ceding control to self-executing algorithms.”²³⁰ The definition of algorithmic creativity and the conception of creativity of AI researchers is not bonded to philosophical points of view. Instead, researchers focus on programming computers to do creative artifacts that are recognized as songs, paintings or poems.²³¹ In other words, as stated by Wu, “as computer programs become more and more sophisticated – so that more and more of the creativity in a program’s output derives from the computer program rather than the user –it becomes clear that a more sophisticated test is required to serve the interests of justice and the goals of the copyright laws.”²³²

²²⁶ Candidate number: 183, “EU copyright protection of works created by artificial intelligence systems” (JUS399 Master’s thesis, University of Bergen June 1st, 2017) 31 citing Samuelson 120.

²²⁷ Ibid 31.

²²⁸ Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) AIPLA Q J 131, 175.

²²⁹ Jane C Ginsburg, “The Concept of Authorship in Comparative Copyright Law” for DePaul L. Rev. Symposium: ‘The Many Faces of Authorship’” (2003), 1072 Columbia Law School Research Paper No. 03-51 <<https://ssrn.com/abstract=368481>> accessed 31 October 2018.

²³⁰ Annemarie Bridy, “The Evolution of Authorship: Work Made by Code.” (2016) 39(3) Colum JL & Arts 395, 398.

²³¹ Ibid 399.

²³² Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) AIPLA Q J 131, 133- 34.

5.4 Joint Ownership

5.4.1 Programmer - Program owner

Granting copyright to human authors fulfills the purpose of fomenting the development of the AI industry, and promoting the creation of AI-generated works.²³³ For this reason, courts should attribute copyright protection in such a manner that encourage the development of protectable works and art.²³⁴ Courts can provide the incentive for AI and art development by granting copyright ownership to programmers and owners. Thus, independent programmers could hold the copyrights of the works generated by their AI, while in the case that they are linked to a company to create AI, through a work contract, copyrights would belong to both programmers and companies.²³⁵

The AI sector benefits when programmers are enthusiastic about continuing to create algorithms and programs, and when companies invest. Despite of the benefits this set up, financial investment is not a creative contribution to work, and, therefore, there is no joint ownership between the programmer and the program owner.

5.4.2 Programmer - User

Wu argues that the program and the user could obtain copyright protection when many features of the output are predictable and repeatable, the user's choices meet the requirement of minimal creativity, and the programmer and user intend to be joint authors, contributing parts of a unitary whole.²³⁶

Joint ownership could, in some ways, solve the problem of allocating copyright of computer-generated works to humans. However, this conception is easily supported, because collaborative work is not necessarily joint work. In addition, a contributor could only claim joint authorship if the contribution represents an "original expression that stands on its own."²³⁷ The first obstacle to joint authorship is the requirement that both the user's and the programmer's contributions must be copyrightable,²³⁸ because the contribution is mainly from the machine or its programmer, and the user is only a performer. For this reason, and because of the lack of collaboration between the parties, there is no possible claim of joint authorship.

Dr. Thomas Dreier and Dr. Gerhard Schricker explored the possibility of reforming of German copyright law to integrate a framework for dealing with multimedia creations and

²³³ Kalin Hristov, "Artificial Intelligence and the Copyright Dilemma." (2017) 57(3) IDEA 431, 444.

²³⁴ Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) AIPLA Q J 131, 133.

²³⁵ Kalin Hristov, "Artificial Intelligence and the Copyright Dilemma." (2017) 57(3) IDEA 431, 445.

²³⁶ Andrew Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs." (1997) 25(1) AIPLA Q J 131, 175-76.

²³⁷ Darin Glasser, "Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?" (2001) Duke L. & Tech Rev 24 1.

²³⁸ Commission, "Artificial Intelligence for Europe" COM (2018) 237 final 8 citing Paul Goldstein, Copyright: Principles, Law, and Practice §4.2.1.2, at 379 (1989).

²³⁹ Ibid 7 citing Donna v Dodd, Mead & Co., Inc., 374 F. Supp. 429 (S.D.N.Y 1974) and Erickson v Trinity Theatre, 13 F.3d 1061 (7th Cir. 1994).

new technologies. They suggest two ways of conceiving the role of the computer, as either a tool or an instrument. In the latter case, it is the computer that makes the decisions. In this scenario, a co-authorship could be established, in which the programmer who develops the existing routines and different options shares credit with those who have interference in the management of them.²³⁹ In this case, the programmer has the right to control distribution of any unauthorized derivative work, while the users have the rights to any original expression that they create.²⁴⁰ According to Wu, “although these rights would not be ‘ownership’ rights that would allow the user to distribute the work, these rights would allow the user to preclude the programmer from distributing the derivative work.”²⁴¹

Thus, this notion of co-authorship does not resolve the allocation of copyright in non-derivative AI generated works, because it would affect those who have mainly contributed in the creation of the AI and the person who has worked indirectly in the creation of the work.

5.4.3 Programmer - AI

This theory would solve the legal limitations of granting copyright to a non-human author by assigning the rights to a human co-author. In this way, the AI holds the title of author but does not grant it economic rights, although the AI has recognition. However, recognition does not mean that the AI and the programmer are truly co-authors. Common and civil law jurisdictions demand the contributions made by co-authors to be distinguishable. This would be almost impossible in the case of AI programming with machine learning, due to its complexity. Such inability to distinguish between the contributions of potential co-authors makes joint authorship unfeasible.²⁴²

5.5 Special Categories

At the WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence, two new theories were proposed.²⁴³

The first theory suggests that expert systems should be considered as a special and concrete class of computer programs, which would demand a special classification of them. The second theory considers expert systems as a dual category that represents characteristics of both computer programs and databases. This means that they are not protected as a special category of creation but instead share the legal statutes of both elements.²⁴⁴

²³⁹ Wilson Ríos Ruiz, “Los sistemas de inteligencia artificial y la propiedad intelectual de las obras creadas, producidas o generadas mediante ordenador” (2001) *Revista La Propiedad Inmaterial* (3) 5, 9-10.

²⁴⁰ Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) *AIPLA Q J* 131, 145 citing *Samuelson and Russell v Price*, 612 F. 2d 1123, 1128, 205 U.S.P.Q. (BNA) 206, 211-12 (9th cir, 1979).

²⁴¹ Pamela Samuelson, “Allocating Ownership Rights in Computer-Generated Works” (1985) *U Pitt L Rev* 1185, 1210-11 citing *Melville B Nimmer, Nimmer on Copyright* § 3.04, at 3-19 (1991).

²⁴² Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 39.

²⁴³ WIPO Worldwide Symposium on the Intellectual Property Aspects of Artificial Intelligence, Stanford University, Stanford (California), United States of America, March 25 to 27, 1991 (World Intellectual Property Organization 1991).

²⁴⁴ Wilson Ríos Ruiz, “Los sistemas de inteligencia artificial y la propiedad intelectual de las obras creadas, producidas o generadas mediante ordenador” (2001) *Revista La Propiedad Inmaterial* (3) 5, 11-12.

The WIPO was in favor of the second thesis put forward and expressed this in a proposed addition to the Berne Convention. Ultimately, these points did not finally appear in the treaty adopted in December 1996 in the city of Geneva. This issue remains a part of the agenda of discussion in committee sessions that meet with a view of adapting the Berne Convention protocol.²⁴⁵

With respect to the first theory, the report highlights that “the more autonomous robots are, the less they can be considered simple instruments in the hands of external agents.”²⁴⁶ Because of this, the general rules on liability are not sufficient, and different rules that focus on how a machine should behave are required. These new rules need to center on whether a machine can be held partially or fully liable for its acts. As a consequence, it has become increasingly urgent to address the fundamental question of whether robots should have legal personality and regulate computer-generated works. The relevance of this topic was clear on October 25, 2017. On this day, the robot Sophia²⁴⁷ became a citizen of Saudi Arabia, the first robot to hold legal human citizenship.

5.6 The Algorithm (AI)

International considerations seem to dismiss the notion of a non-human author having the ownership of copyright protection of its works,²⁴⁸ based on the arguments of human authorship, personality, and intellectual labor: because the lack of direct incidence on the resulting work, AI is never considered to be the originator. Nonetheless, these arguments can be contradicted by looking closely at the definition of authorship and creativity and analyzing the link between the actual creativity of AI and the work it produces. A generalized change in the definitions to include not only human aspects could lead to new legislation on the subject. After CONTU’s final report, OTA began to define the computer as a non-inert tool, “the stage is set for granting copyright to the computer itself.”²⁴⁹

In 2016, the European Parliament requested the establishment criteria relating to “own intellectual creation” applicable to computer or robot-generated works. The European Commission has started a discussion and initiated the development of policies to grant rights to robots.²⁵⁰ While this is an ongoing process with no resolution in sight, it demonstrates the Commission’s intention to resolve the problem of the advancement of AI and its lack of legal regulation.²⁵¹

²⁴⁵ Wilson Ríos Ruiz, “Los sistemas de inteligencia artificial y la propiedad intelectual de las obras creadas, producidas o generadas mediante ordenador” (2001) *Revista La Propiedad Inmaterial* (3) 5, 11-12.

²⁴⁶ WIPO Worldwide Symposium of 1991.

²⁴⁷ Although Sophia is not considered an AI, instead it is a “chatbot”.

²⁴⁸ For example, the U.S case which does not grant author’s rights to the Naruto monkey over a photography.

²⁴⁹ Darin Glasser, “Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?” (2001) *Duke L. & Tech Rev* 24 1.

²⁴⁹ Commission, ‘*Artificial Intelligence for Europe*’ COM (2018) 237 final 8-9.

²⁵⁰ “Robots and artificial intelligence: MEPs call for EU-wide liability rules” (*News European Parliament*, 16 Feb 2017) <<http://www.europarl.europa.eu/news/en/press-room/20170210IPR61808/robots-and-artificial-intelligence-meps-call-for-eu-wide-liability-rules>> accessed 15 November 2018.

²⁵¹ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 38.

Based on the requirement to express creativity, the own intellectual creation or personality, IA authorship would not conform to European, Colombian or American creativity standards.²⁵² However, works generated by AI may meet this requirement if the concept of algorithmic creativity is accepted. The problem is that although the neural architecture of AI involves creativity, under current legal circumstances, this type of creativity is not considered sufficient for the attribution of authorship.

As a disadvantage of this theory, it can be considered that the AI is not the direct creator of original works. As there are AI that use machine learning to learn for themselves,²⁵³ develop strategies,²⁵⁴ and use algorithmic creativity,²⁵⁵ there are others that only act as an instrument. Furthermore, on a more general level of copyright, AI authorship contradicts one of the objectives of intellectual property law as it does not provide an incentive for authors to create and bring benefits to society.²⁵⁶

At an academic level, Wu states that authorship should be granted to the AI in following conditions:

- The programmer of the AI fails the fixation requirement because the work produced is not repeatable or predictable.
- There is no “user” of the AI (in other words, AI has produced the art work on its own). This means that joint ownership is not applicable.
- Joint ownership is not applicable because there is no user.
- The work generated by the AI meet the requirements of fixation and originality as they would for a human.
- The AI possesses the discretion over whether to produce future works, and, therefore, awarding it copyright protection encourages the creation of future creative works.

Finally, although AI can produce copyrightable original works,²⁵⁷ computers are not able to execute several tasks required to be suitable for copyright protection. For example, AI cannot sue because of an infringement of its rights, and it cannot transfer rights to third parties to meet the needs of a dynamic market. Finally, machines cannot be motivated to do tasks or create works by granting them copyright or rights in the outputs:²⁵⁸ unlike the human developers, AI have no use for financial incentives. Thus, without the contribution

²⁵² Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 39 citing *Infopaq International v Danske Dagblades Forening* – case C-5/08, Court of Justice of the EU and *Eva-Maria Painer*.

²⁵³ See Ch 4.2.

²⁵⁴ *Ie AlphaGo Zero*.

²⁵⁵ The definition of algorithm creativity and the conception of creativity of AI researchers is not bonded to philosophical points of view. Annemarie Bridy, “The Evolution of Authorship: Work Made by Code.” (2016) 39(3) *Colum JL & Arts* 395.

²⁵⁶ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017), 39 citing *Kur and Dreier*.

²⁵⁷ Algorithm creativity.

²⁵⁸ Darin Glasser, “Copyrights in Computer-Generated Works: Whom, if Anyone, Do We Reward?” (2001) *Duke L. & Tech Rev* 24 1.

²⁵⁸ Commission, “*Artificial Intelligence for Europe*” COM (2018) 237 final 9-10.

of AI programmers and companies, AI would no longer be available for the general public.²⁵⁹

5.7 Public domain

Daniel Gervais proposes that, although original works can be produced autonomously by a computer, these works fall into the public domain because international copyright does not dispense protection. This is because only human intellectual creations are protectable: since no one can claim ownership, anyone can therefore use the works generated by computers.²⁶⁰

This argument places AI generated works in the category of free/libre software and open-source software (FLOSS) with a copyleft license. Thus, the work remains accessible, and this model appears to establish a potential for uncoordinated and decentered creativity.²⁶¹ To its favor, this position argues that creators or artists have an incentive other than economic gain, and the process of creation involves knowledge and contribution from different persons. For example, David Berry highlights that no man is an island, and creativity is thus always a collective achievement.²⁶² Bridy emphasizes the “close relationship between legal and literary constructions of the notion of ‘authorship’” (and thus the collective creation of works).²⁶³ Following the same line, Mark Rose wrote that “Copyright is founded on the concept of the unique individual who creates something original and is entitled to reap a profit from those labors. Until recently, the dominant modes of aesthetic thinking have shared the romantic and individualistic assumptions inscribed in copyright. But these assumptions obscure important truths about the processes of cultural production,”²⁶⁴ the creative process of production would be represented by a collectivity. Peter Jaszi affirms that “The persistence of the notion of ‘authorship’ in American copyright law makes it difficult for any new legal synthesis, which would focus on the reality of collective creativity, to emerge.”²⁶⁵ The notion of author as a unique person with completely original ideas, creates difficulties at the time of leaving works in the public domain, although these have been the fruit of a social construction. Woodmansee asserts that “The law has yet to be affected by the ‘critique of authorship’ initiated by Foucault (...). It would seem that as creative production becomes more corporate, collective, and collaborative, the law invokes the Romantic author all the more insistently.”²⁶⁶ However, it cannot be denied, that one or more authors have greater participation in the creative process, than the entire society.

²⁵⁹ Kalin Hristov, “Artificial Intelligence and the Copyright Dilemma.” (2017) 57(3) IDEA 431, 444.

²⁶⁰ Wilson Ríos Ruiz, “Los sistemas de inteligencia artificial y la propiedad intelectual de las obras creadas, producidas o generadas mediante ordenador” (2001) *Revista La Propiedad Inmaterial* (3) 5, 11-12.

²⁶¹ David Berry, *Copy, Rip, Burn: The Politics of Copyleft and Open Source* (Pluto Press, 2008) preamble.

²⁶² *Ibid.*

²⁶³ text in parentheses added by the author.

²⁶⁴ Annemarie Bridy, “Coding Creativity: Copyright and the Artificially Intelligent Author.” (n 13) 4 citing Mark Rose, *Authors and Owners: The Invention of Copyright* (1993).

²⁶⁵ *Ibid* 4 citing Peter Jaszi, *On the Author Effect: Contemporary Copyright and Collective Creativity* Cardozo Arts & Ent LJ 293 (1992).

²⁶⁶ *Ibid* 4 citing Martha Woodmansee, “The Genius and the Copyright. Economic and Legal Conditions of the Emergence of the ‘Author’” (1984) (17) *Eighteenth-Century Studies* 425, 292.

Copyleft licenses grant certain freedom to the users of a software, such as using, reading or modifying its source code and distributing the software to third parties. Furthermore, FLOSS developers uphold other values related to freedom, such as open communication, decision-making, and community orientation.²⁶⁷

Nevertheless, the public domain theory illustrates a basic problem presented by AI: the rule of awarding copyright protection to the “originator” of a work conflicts with the objective promoting future creativity by awarding copyright.²⁶⁸ The choice of whether copyright includes economic compensation should be decided by the author by, for example, explicitly indicating that the software is intended to be free or open-source. Changing the regulation to automatically assign AI copyright to the public domain could be detrimental to the author’s rights: it would be equating AI generated works with works that do not meet the criteria for protection. Furthermore, although AI does not fulfill the human author requisite, there are always humans, the programmer, owners, and users, indirectly involved in the construction of these works. These people invest effort, creativity, and time. They should be awarded with copyright protection. In addition, the incentive of the progress of science and arts²⁶⁹ is a guiding principle for copyright legislation.

²⁶⁷ The International Federation for Information Processing (IFIP), *Open Source Systems: Towards Robust Practices* (13th IFIP WG 2.13 International Conference, OSS 2017 Buenos Aires, Argentina, May 22-23, 2017 SpringerOpen).

²⁶⁸ Andrew Wu, “From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs.” (1997) 25(1) AIPLA Q J 131, 157.

²⁶⁹ As embodied in the U.S Constitution (1787).

6 REGULATORY FRAMEWORK

Each country has autonomy to regulate copyright in its jurisdiction within the framework of international copyright treaties.²⁷⁰ Even under the Berne Convention,²⁷¹ the faculty of each country to specify their own rules is mentioned,²⁷² in an attempt to protect the rights of authors in an effective and uniform manner,²⁷³ since copyright protection is subject to the principle of territoriality and *lex loci protectionis*.²⁷⁴ The members of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS agreement) have the obligation to directly harmonize the law with the budgets of the agreement. Whether a work published in one state enjoys copyright protection in another state is subject to international treaties.²⁷⁵ Despite many specific differences, the legal systems²⁷⁶ overall agree that the term “author” refers to a human being who exercises subjective judgment and who controls its execution.²⁷⁷

Specifically, the problem that corresponds to this thesis is that the fundamental requirement that the work has been created by a person does not include works created by AI systems, but in the legal development of copyright protection in this type of work, jurisdictions have already advanced.

6.1 The United Kingdom

6.1.1 Legislation

Under UK law, copyright law remains structured around specific categories of works.²⁷⁸ This has created problems for unconventional creations, which do not easily fall into one of these categories.²⁷⁹ However, the CDPA includes a mention and regulation on the subject of computer-generated works, by stating, “‘computer-generated,’ in relation to a work, means that the work is generated by computer in circumstances such that there is no human author of the work.”²⁸⁰ However, computer generated is different to AI generated. The autonomy of the machine in an AI generated work distinguishes them. And the CDPA reveals vagueness when it states, regarding computer-generated works, that “the author of the work shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken.”²⁸¹ But in this case, the creator is neither a human nor

²⁷⁰ The Berne Convention (1886), the TRIPS Agreement (1994) and the WCT (1996).

²⁷¹ The Berne Convention for the Protection of Literary and Artistic Works of 1886.

²⁷² See numeral 2, art. 2 Berne Convention.

²⁷³ The Berne Convention, preface.

²⁷⁴ Law of the place where the protection is claimed.

²⁷⁵ See TRIPS agreement, Berne Convention and WIPO Copyright Treaty.

²⁷⁶ In both common and civil law.

²⁷⁷ Jane C Ginsburg, “‘The Concept of Authorship in Comparative Copyright Law’ for DePaul L. Rev. Symposium: ‘The Concept of Authorship in Comparative Copyright Law’ for DePaul L. Rev. Symposium: ‘The Many Faces of Authorship’” (Columbia Law School Research Paper No. 03-51 2003) 1092 <<https://ssrn.com/abstract=368481>> accessed 31 October 2018.

²⁷⁸ Sections 3 to 8 CDPA.

²⁷⁹ *Lucasfilm Ltd v Ainsworth* (UKSC 39); Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 319.

²⁸⁰ Section 178 Copyright, Designs and Patents Act of 1998.

²⁸¹ Jane C Ginsburg, “‘The Concept of Authorship in Comparative Copyright Law’ for DePaul L. Rev. Symposium: ‘The Many Faces of Authorship’” (2003) 1070 Columbia Law School Research Paper No. 03-51 <<https://ssrn.com/abstract=368481>> accessed 31 October 2018 citing: Copyright, Design and Patent Act. 1988. § 9(3); 9(2).

a juridical person. As machines cannot be legal right holders, the lawmakers felt the need to designate a right-holder, a natural person, a legal entity or a corporation, depending on the circumstances.²⁸²

6.1.2 Cases

For many years, the standards for originality had been determined by the landmark UK case: *Walter v Lane*.²⁸³ The ruling of *Walter v Lane* determined that a set of hand-written notes was constituted “considerable intellectual skill and brain labor.”²⁸⁴ Specifically, this case concerned a reporter who transcribed and corrected a speech of Lord Rosebery and decided that the former should be awarded copyright ownership of the text.

Another significant case in the development of UK copyright law is *Ladbroke v William Hill*, which pitted two of the largest British betting companies and bookmakers, Ladbroke and William Hill, against each other. Since the 1950s, William Hill's "fixed and odd" football coupons included a list of upcoming matches. Over the next decade, Ladbroke entered the business and adopted a similar product.²⁸⁵ The importance of this case in the UK is somewhat confusing as it is unclear whether the decision would have been the same after the European test of "the author's own intellectual creation," which encompasses the questions of whether the choices were made by the coupon authors, whether there was a creative element and whether the author embodied his personality.²⁸⁶ *Ladbroke v William Hill* also discussed the components of the “sweat of the brow” standard. According to the standard of originality defended in the mentioned cases, the principal component of originality is labor. Thus, any original work created because of a person's effort and labor is protected. A work is considered original, as long as it is not copied and originates from the author.

However, more recent cases have prompted a revision of the originality standard. In the field of software, in *Nova Productions Ltd. v Mazooma Games Ltd*, resolving a conflict between two creators of electronic pool games. The UK Royal Court attributed authorship to the creator of the elements of the infringed video game. In the *Temple Island Collections Ltd. v New English Teas Ltd. Case*, Nicholas John Houghton sued the latter company over alleged copyright infringement of a black and white photograph of the Houses of Parliament with a red London bus in the foreground. The judge ultimately determined that copyright is infringed when someone reproduces not only the whole, but also a substantial part of a work in a material form.

²⁸² Jane C Ginsburg, “The Concept of Authorship in Comparative Copyright Law” for DePaul L. Rev. Symposium: ‘The Many Faces of Authorship’ (2003) 1070 Columbia Law School Research Paper No. 03-51, 1070 citing: See Justine Pila & Andrew Christie, *The Literary Work within Copyright Law: An Analysis of its Present and Future Status*, 13 I.P.J. 133, 156 (1999).

²⁸³ It was a judgement of the House of Lords about Authorship under the UK Copyright Act 1842.

²⁸⁴ *Andrés Guadamuz*, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPC <<https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018.

²⁸⁵ Centre for Intellectual Property and Information Law, “*Ladbroke v William Hill* (1964) 1 All ER 465” University of Cambridge <<https://www.civil.law.cam.ac.uk/virtual-museum/ladbroke-v-william-hill-1964-1-all-er-465>> accessed 7 November 2018.

²⁸⁶ *Ibid.*

6.2 The United States of America

6.2.1 Legislation

The American Copyright Act is the only statutory source of copyright protection in the country.²⁸⁷ This law has been modified multiple times to adapt to changes in technology and telecommunication and provide for works on the Internet, sound recordings and their digital use,²⁸⁸ computer programs, and databases. In the case of AI generated derivative works, it enshrines the assumption that the copyright holder is the programmer. This copyright entails a non-exclusive right of use over the work and grants external users license to use the program. Furthermore, the Final Report of the National Commission on New Technological Uses of Copyrighted Works determines that the user of the program can hold the status of author. As the ownership rights of both programmer and user are legally protected, there is a possibility of co-authorship in this context.

The problem with this legislation is that it only regulates works created by people who used software as an instrument: the law does not discuss creations made autonomously made by AI. This is because the US does not accept the notion of a non-human author. On this topic, Compendium II of Copyright Office Practices Section 503.03(a) states:

“Works-not originated by a human author.

In order to be entitled to copyright registration, a work must be the product of human authorship. Works produced by mechanical processes or random selection without any contribution by a human author are not registrable. Thus, a linoleum floor covering featuring a multicolored pebble design which was produced by a mechanical process in unrepeatable, random patterns, is not registrable. Similarly, a work owing its form to the forces of nature and lacking human authorship is not registrable; thus, for example, a piece of driftwood even if polished and mounted is not registrable.”

In the US, the Copyright Office requires protectable works to be created by human authors. AI-generated works are not copyrightable, although they fulfill the requisite of originality and are creative works.²⁸⁹ The compendium of best practices indicates that ***“(The office) will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author.”***²⁹⁰ Thus, the US, by denying the allocation of copyright to non-human authors, will place AI-generated works automatically in the public domain.²⁹¹

²⁸⁷ 17 U.S.C. § 102(a).

²⁸⁸ For example, Recording Industry Association of America v MP3 and Napster case.

²⁸⁹ US Copyright Office supra note 4 § 306.

²⁹⁰ Emphasis added; US Copyright Office, supra note 4 § § 313.2.

²⁹¹ Kalin Hristov, “Artificial Intelligence and the Copyright Dilemma.” (2017) 57(3) IDEA 431.

It can be interpreted from the U.S. Copyright Act that the generative software developer is the copyright owner of the software.²⁹² However, it is not clear whether the programmer has any legal copyright on the works produced autonomously and independently by the software. There is an issue because copyright law has not adapted its model of authorship which is aimed at humans²⁹³ to a more open model which fits the current social changes.

6.2.2 Cases

The American debate surrounding the topic of copyright has centered on the issues of originality and creativity.²⁹⁴ In *Burrow-Giles Lithographic Co. v Sarony*,²⁹⁵ the Supreme Court considered the constitutionality of extending copyright protection to mechanically reproduced photographs, without the requirements of originality and creativity stipulated in the Trade-Mark cases of 1879.²⁹⁶ *Burrow-Giles* argued that Napoleon Sarony's photograph of Oscar Wilde was, therefore, not the original production of the author. Following this ruling, the Supreme Court defined authorship and copyright in broadly humanistic terms. The author is presented as "he to whom anything owes its origin; originator; maker; one who completes a work of science or literature;" copyright is "the exclusive right of a man to the production of his own genius or intellect." The Court concluded that authorship can also be understood in terms of causation: the author is "the cause of the picture" and "the man who...gives effect to the idea, fancy, or imagination." It means, the person who takes the photograph should make a creative composition and the camera is a mere instrument.²⁹⁷

A number of later works further developed these concepts. In *Baltimore Orioles v MLB Players Association*, the 7th Circuit court found that "(a) work is original if it is the independent creation of its author. A work is creative if it embodies some modest amount of intellectual labor." Furthermore, in *Andrien v S. Ocean County Chamber of Commerce* and *Lindsay v Wrecked & Abandoned Vessel R.M.S. Titanic*, American courts ruled that printers whose activities give concrete form to clients' conceptions are not the authors of the resulting works, because they have in no way "intellectually modified or mechanically enhanced the concept articulated by [the client], other than to arrange it in a form that could be photographed as part of the [printing] process."²⁹⁸

A key case in the development of American copyright law is *Bleistein v Donaldson Lithographing Co.* In its ruling, Judge Holmes based his conception of authorship on human personalities, moving away from the US approach to the development of creativity and originality by stating that "The copy is the personal reaction of an individual upon

²⁹² Annemarie Bridy, "The Evolution of Authorship: Work Made by Code." (2016) 39(3) *Colum JL & Arts* 395, 23 citing: "See 17 U.S.C. § 201 (2011) (providing that copyright vests initially in the author of a work); *Apple Computer, Inc. v Franklin Computer Corp.*, 714 F.2d 1240, 1249 (3d Cir. 1983) (holding that 'a computer program, whether in object code or source code, is a 'literary work' and is protected from unauthorized copying, whether from its object or source code version')."

²⁹³ Annemarie Bridy, "The Evolution of Authorship: Work Made by Code." (2016) 39(3) *Colum JL & Arts* 395, 23.

²⁹⁴ Andres Guadamuz "The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction" (n 295).

²⁹⁵ *Burrow-Giles Lithographic Co v Sarony*, 111 U.S. 53 (1884).

²⁹⁶ The trade-mark cases 100 U.S. 82 (1879); *United States v Steffens*, *United States v Wittemean*, and *United States v Johnson*.

²⁹⁷ Annemarie Bridy, "Coding Creativity: Copyright and the Artificially Intelligent Author." (2012) 2012 *Stan Tech L Rev* 5) 5.

²⁹⁸ Jane C Ginsburg, "'The Concept of Authorship in Comparative Copyright Law' for DePaul L. Rev. Symposium: 'The Many Faces of Authorship'" (2003) 1072 *Columbia Law School Research Paper No. 03-51* <<https://ssrn.com/abstract=368481>> accessed 31 October 2018.

nature. Personality always contains something unique...something irreducible, which is one man's alone. That something he may copyright.”²⁹⁹

Feist Publications Inc. v Rural Telephone Service Co. is possibly the most important case regarding copyright allocation in the US. It presents a threshold of creativity and proposes a “test of originality”: these policies have become a constitutional requirement for obtaining copyright protections.³⁰⁰ In *Feist v Rural Telephone*, the US Supreme Court also emphasizes that “copyright protects only those constituent elements of a work that possess more than a de minimis quantum of creativity.”³⁰¹ More than 550 lower court decisions have discussed or applied the *Feist* criterion of originality since the decision³⁰² and most copyrighted works have no difficulty in meeting its threshold in the *Feist* originality test.³⁰³

Slater v Naruto monkey is a famous copyright case that addresses a work produced by a non-human. In this case, an Indonesian monkey named Naruto took a photograph of itself with the camera of a professional British photographer, David Slater. Wikipedia Commons posted the image, tagging it belonging to the public domain: this prompted a dispute between Slater and Wikipedia. People for the Ethical Treatment of Animals also demanded that copyright be granted to the monkey. Ultimately, the US Court of Appeals for the Ninth Circuit decided not to attribute author's rights to the monkey or David Slater. Instead, the photograph was determined to be public domain. In the *Naruto* case, most of legal analysis has focused on US law.³⁰⁴ The US Copyright Office weighed in, using the “photograph taken by a monkey”³⁰⁵ to demonstrate that animals cannot produce copyrightable works. However, Slater has British nationality and the photo was taken in Indonesia, thus, US copyright law should not have prevailed.³⁰⁶

There are two significant cases that highlight the process software copyright allocation: *Atari Inc. v North American Philips Consumer Elec. Corp.*, revolving around the famous “Pac-Man” game and *Williams Elec. Inc. v Arctic Int'l. Inc.*, concerning the game “Defender.” Contrary to the then conventional legal considerations, in which copyright is lead to the public domain, U.S. courts ruled that the copyright in the images and screens of the disputed game must be granted to the copyright owner of the software. The programmers' explanation of how the program worked led the courts to decide in their favor.³⁰⁷

²⁹⁹ Annemarie Bridy, 'Coding Creativity: Copyright and the Artificially Intelligent Author.' (2012) 2012 Stan Tech L Rev 5) 5.

³⁰⁰ Edward Lee, “Digital Originality” (2012) 14 Vand J Ent & Tech L 919, 922 citing *Feist Publ'ns, Inc. v Rural Tel. Serv. Co.*, 499 U.S. 340, 346-48 (1991).

³⁰¹ *Andrés Guadamuz*, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPR < <https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018.

³⁰² Edward Lee, “Digital Originality” (2012) 14 Vand J Ent & Tech L 919, 922 citing Westlaw, <http://www.westlaw.com> (follow “Search” hyperlink and select “Terms & Connectors” hyperlink; then select “U.S. Courts of Appeals Cases” and “U.S. District Court Cases” hyperlinks; then enter “Feist /p originality” in the “Search” hyperlink).

³⁰³ *Ibid*; *Feist*, 499 U.S. at 345.

³⁰⁴ *Andrés Guadamuz*, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPR < <https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018 Masnick, 2011; Schlackman, 2013.

³⁰⁵ *Ibid* citing Copyright Office, 2014.

³⁰⁶ *Ibid*.

³⁰⁷ Petar Hristov Manolakev, “Works Generated by AI – How Artificial Intelligence Challenges Our Perceptions of Authorship” (Master Thesis, Tilburg University, 2017).

6.3 The European Union

6.3.1 Legislation

While the EU has increasingly harmonized copyright laws across its member states in the last 25 years,³⁰⁸ the European *acquis communautaire*³⁰⁹ does not cover all areas of copyright law.³¹⁰ There are no community-wide copyright laws, and only the exceptions and limitations to copyright and related rights are harmonized across the Union. This is due to the fact that, The EU does not have direct jurisdiction in the field of copyright due to the principle of territoriality, whereby each member state has its own laws. However, the EU produces Directives³¹¹ to execute the provisions of the EC Treaty³¹² through which it regulates matters of free market for goods and services.³¹³

The EU has tried to integrate the treatment to property protection, including intellectual property, in the Directive 2001/29/EC. This directive tries to harmonize certain aspects of copyright and related rights in the information technology sector. However, it does not contemplate requirements for copyrightability of works, such as the level of creativity or the human element.

The Directive on Copyright in the Digital Single Market (EU Copyright Directive) intends to harmonize further aspects of European Union copyright law contribute to the functioning of the internal market, ensure a high level of protection for rights holders, and facilitate the clearance of rights. The proposal is based on and complements the rules laid down in Directive 96/9/EC, Directive 2001/29/EC, Directive 2006/115/E, Directive 2009/24/EC, Directive 2012/28/EU, Directive 2014/26/EU, and Directive 2010/13/EU.³¹⁴

The directive was approved by the European Parliament on September 12, 2018 and is due to be discussed by the European Parliament, the European Commission, and the Council of the European Union. At the end of the process, the Directive will either be approved in its totality or rejected.

Existing EU copyright law primarily consists of eight Directives. Only the Computer Programs Directive 1991 (CPD), the Database Directive 1996, the Information Society Directive (InfoSocD), and the Orphan Works Directive are relevant to the current study.

³⁰⁸ See art. 1 (3) of the EU Software Directive 2009/24/ EC, art. 6 of the EU Term Directive 2006/116/EC, art. 3 (1) of the EU Database Directive 96/9/EC, case C-5/08 Infopaq International A/S vs Danske Dagblades Forening, case C-393/09 Bezpečnostní softwarová asociace v Svaz softwarové ochrany, case C-429/08 Karen Murphy v Media Protection Services Ltd. case C-145/10 Eva-Maria Painer v Standard Verlags GmbH and others and Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights.

³⁰⁹ Legislation, legal acts and court decisions.

³¹⁰ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 307.

³¹¹ Within the framework of the Berne Convention, the TRIPS Agreement and the WCT.

³¹² Treaty establishing the European Community.

³¹³ Willem Grosheide, Herwin Roerdink and Karianne Thomas, "Intellectual Property Protection for Video Games A View from the European Union" (2014) 9 (1) JICLT, 4 citing EU copyright law Thomas Dreier, P. Bernt Hugenholtz, *Concise European Copyright Law*, Kluwer Law International 2006.

³¹⁴ Directive on Copyright in the Digital Single Market.

The InfoSocD is meant to implement the WCT and the WIPO Performances and Phonograms Treaty (WPPT). The Preamble of the InFoSocD considers amongst other things that copyright stimulates the development and commercialization of products and services, as well as the exploitation of their creative components. It also considers that the current legislation on copyright needs to be adapted in order to respond adequately to economic changes, without the need to add new concepts for the protection of intellectual property.³¹⁵

The European copyright framework currently only covers innovation and human creativity. Therefore, while technological advances allow the creation of AI-generated works, the copyright rights of these works are unprotected. For this reason, various EU institutions have addressed the necessity of clarifying the legal implications of AI developments. The Legal Affairs Committee of the European Parliament published in May 2016 a draft report with recommendations to the Civil Law Standards Committee on Robotics, stating that “Robotics and AI have become one of the most prominent technological trends of our century. The fast increase of their use and development brings new and difficult challenges to our society” and also that “It is crucial that regulation provides predictable and sufficiently clear conditions to incentivize European innovation in the area of robotics and AI.”³¹⁶

In February 2017, the European Parliament adopted a motion calling on the European Commission to develop civil laws related to robotics and AI. This resolution recognizes intellectual property as one of the relevant areas of law in this context.³¹⁷ It notes that there is no legal provision that specifically applies to robotics, but that the doctrines and legal regimes in force can easily be applied to this field. However, certain aspects require special consideration, and the motion therefore suggests that the European Commission should elaborate criteria for “own intellectual creation” applicable to copyrightable works created by computers or robots.³¹⁸

The Commission should examine how to balance intellectual property rights applied to hardware and software standards, stimulating innovation; proposing scenarios that address issues such as autonomous and own intellectual creation and issues of authorship and ownership of works created or generated by or involving computers or robots.³¹⁹ In light of rapid advancements in AI, EU legislation faces civil law challenge.³²⁰ This thesis seeks to address these issues

³¹⁵ Willem Grosheide, Herwin Roerdink and Karianne Thomas, “Intellectual Property Protection for Video Games A View from the European Union” (2014) 9 (1) JICLT, 4.

³¹⁶ European Parliament, Committee on Legal Affairs (2016), p. 20; Willem Grosheide, Herwin Roerdink, and Karianne Thomas “Intellectual Property Protection for Video Games A View from the European Union” (2014) 9 (1) JICLT.

³¹⁷ European Parliament (2017) 20 lit s.

³¹⁸ Ibid num 10.

³¹⁹ Wilson Rios, “La regulación legal de la robótica y la inteligencia artificial” (*Ámbito Jurídico*, 7 Feb 2017) <<https://www.ambitojuridico.com/noticias/analisis/tic/la-regulacion-legal-de-la-robotica-y-la-inteligencia-artificial>> accessed 23 October 2018.

³²⁰ Candidate number: 183, “EU copyright protection of works created by artificial intelligence systems” (JUS399 Master’s thesis, University of Bergen 1 June 2017) 33.

6.3.2 Cases

Since no EU Directive has established a general standard for originality that is applicable to all copyrightable works, the ECJ has begun to harmonize the originality requirements through judicial interpretation in recent years.³²¹

In *Infopaq v Danske Dagblades*, the Danish press clipping service Infopaq International and the Danish Newspaper Association had a dispute over the reproduction of press clippings sold to the clients. The clipping process involved data capture and consisted of scanning images of the original articles, translating these images into text, and creating 11-word snippets. The court had to determine whether the degree of originality of the snippets was sufficient, since the process was highly mechanized, and it was decided that the definition of originality should contain the “author’s own intellectual creation,” meaning it had to rule in favor of granting copyright to the work.³²² This case uses the aforementioned Directive 2001/29/EC. Based on this decision, the CJEU achieved full harmonization of the originality requirement at the EU level. The originality requirement now refers to the “author’s own intellectual creation”³²³ across the EU. Although *Infopaq* could be considered to apply to literary works and the disposition of fragments, in the case of *BSA v Ministry of Culture*, the CJEU applied the decision to other works, granting copyright to a graphical user interface in a computer program.³²⁴

Later cases in the ECJ’s attempts to harmonize originality standards include a decision concerning the copyrightability of a news clipping service (case C-393/09 *Bezpečnostní softwarová asociace – Svaz softwarové ochrany*) and a case addressing the broadcasting rights for sporting events (joint cases *Football Association Premier League Ltd and other v QC Leisure and other* (C-403/08) and *Karen Murphy v Media Protection Services Ltd* (C-429/08)). The originality criterion was further clarified in *Murphy v Media Protection Services Ltd*, where the European Court of Justice considered that copyright could not be claimed for a sporting event per se because “an ‘author’s own intellectual creation’ involves that the process must leave room for “creative freedom for the purposes of copyright.”³²⁵

In the case C-145/10 *Eva-Maria Painer v Standard Verlags GmbH and Others*, the court confirmed the *Infopaq* judgment, proposing a useful set of rules: the copyright of a photograph should be granted if “the author was able to express his creative abilities in the

³²¹ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 308-309.

³²² *Andrés Guadamuz*, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPR <<https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018.

³²³ Candidate number: 183, “EU copyright protection of works created by artificial intelligence systems” (JUS399 Master’s thesis, University of Bergen 1 June 2017) 16.

³²⁴ *Andrés Guadamuz*, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPR <<https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018.

³²⁵ Candidate number: 183, “EU copyright protection of works created by artificial intelligence systems” (Master’s thesis, University of Bergen 2017).

production of the work by making free and creative choices.”³²⁶ This decision indicates that an intellectual creation should reflect the author’s personality; his capacity to express his creative ability requires him to make free and creative choices.³²⁷

In conclusion, within the framework of the current case law of the European Court of Justice, the system of European copyright law, its foundation and the legal literature supporting it, copyright cannot be claimed in the case of AI-generated works. Up until now, even if it is an outstanding achievement and the creation of the AI is considered to be artistic, the work cannot be granted with copyright protection without the presence of a human author.

6.4 Germany

6.4.1 Legislation

As a member of the European Union, Germany implements the EU Directives regarding copyright.³²⁸ On an internal level, German copyright is codified by the rules laid out in the UrhG.³²⁹ The UrhG provides an open-ended list in Article 2 (1), which creates few problems with regard to protecting unconventional works via copyright law.³³⁰ However, the same article establishes that only the author’s personal intellectual creations constitutes works: this could exclude AI copyright ownership due to ontological considerations about creativity or intellectual creation.

6.4.2 Cases

Previously, German courts demanded a substantial degree of originality in the applied works of art. Only if the artistic quality was superior to standards of the typical designer, the work could be subject to copyright protection. In the *Geburtstagszug* (Birthday Train) case, the plaintiff, a toy designer, sued a salesman and toy manufacturer, arguing that his creation (the train) should receive a higher remuneration for copyright. The applicant was unsuccessful at first instance and on appeal, as the designs of the toys did not meet the requirements for copyrighted works of art. However, the Federal Supreme Court allowed the appeal and granted the right.

The Federal Supreme Court of Germany (Bundesgerichtshof) abandoned the previous line of case law concerning the requirements for protection of industrial designs under intellectual property law, arguing that Directive 98/71/EC abandons the distinction between

³²⁶ Andrés Guadamuz, “The monkey selfie: copyright lessons for originality in photographs and internet jurisdiction” (2016) 5 (1) IPR <<https://policyreview.info/articles/analysis/monkey-selfie-copyright-lessons-originality-photographs-and-internet-jurisdiction>> accessed 10 November 2018.

³²⁷ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 308-309.

³²⁸ Directive 96/9/EC, Directive 2001/29/EC, Directive 2006/115/E, Directive 2009/24/EC, Directive 2012/28/EU, Directive 2014/26/EU and Directive 2010/13/EU.

³²⁹ By its German acronym of Urheberrechtsgesetz.

³³⁰ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 320.

applied works of art and non-profit works of art. This Directive was implemented in 2004 following the reform of the German Registered Designs Act.³³¹

6.5 Colombia

6.5.1 Legislation

Copyright in Colombia is regulated principally by Law No. 23 of 1982 on author's rights.³³² It is also impacted by the Berne Convention, the Rome Convention, the TRIPS agreement, the Universal Declaration of Human rights, the International Covenant on Economic, Social and Cultural Rights, Law No. 1450 of 2011, Law No. 1753 of 2015, Law No. 44 of 1993, Law No. 1915 of 2018, and the modificatory Law No. 44 of 1993. Law No. 23 of 1982 grants copyright ownership to "the author of the work." The law also specifies that the owner represents the human person,³³³ and the work must be "a creation of his spirit." In addition, the Andean decision 351 expressly states that the author is a natural person who performs the intellectual creation,³³⁴ and the Colombian Copyright Center prescribes that a work is all human expression product of ingenuity and talent.

In July 2018, Law No. 1915 of 2018 was adopted, modifying the earlier Law No. 23. This law was initially proposed as a mechanism to comply with the Free Trade Agreement signed between Colombia and the USA,³³⁵ but a number of elements not included in the original trade agreement were later added. The law introduces aspects that were already in force in the national territory by the Andean Decision 351 of 1993, and because these aspects correspond to commitments acquired by the country in the WIPO Treaty. Although the law came into force recently, it does not regulate or even contemplate computer generated or AI generated works.

6.5.2 Cases

Colombia is a country in which AI is growing. Although Colombian legal scholars have investigated foreign regulations and doctrine that focus on the copyrightability of AI generated works, to date there has been no legal specific discussion of the issue internally, and no cases have been filed. However, in the judgment on constitutionality C-276/96 brought by Maria Teresa Garcés Lloreda, suing art. 20, 81 and 98 of Law No. 23 of 1982, the Court considered granting authorship to non-human authors, specifically to legal persons, and to natural persons who did not directly create the work, by stating that "the general principle recognizes as author the natural person who creates the work, to which the original ownership of the work is attributed; starting from this presupposition, legal persons, since they lack creative capacity, cannot be original owners of the copyright derived from them, which is different from the natural persons that constitute them.

³³¹ Robert P Merges and Seagull Haiyan Song *Transnational Intellectual Property Law, Text and Cases* (Edward Elgar Publishing 2018) 320.

³³² Modified by laws 44 of 1993 and 1915 of 2018.

³³³ Or a legal person for cinematographic products, edition or reproduction of phonograms.

³³⁴ Art 3 Andean Decision 351.

³³⁵ In force since 15 May 2012.

However, legal persons and some natural persons who do not participate in the creative act may be recognized as holders of the copyright of a work.”³³⁶ This decision could apply to AI generated-works for granting copyright either to the programmer (in case of natural persons without direct intervention in the creative process) or to the algorithm (in the hypothetical event in which legal personality is recognized for the machines).

³³⁶ Judgment on Constitutionality C-276/96 (Sentencia C-276/96).

7 CONCLUSION

The central question in the present thesis was how to fairly regulate the copyright of AI generated works, when a human element is traditionally necessary. Allocating copyright to AI-generated works is a modern challenge faced by legal systems around the world. The historical overview in this thesis revealed that Copyright law has evolved from the first known dispute, in which copyright protected the copying of books, to the protection of publishers and booksellers in the 17th century, after the invention of the printing press, to the romantic discourse of the right of author in Europe in the 18th century, and the protection of the authors' rights in the Statute of Anne. The scientific and academic community has come to recognize the creative potential of AI, and they have begun to request that it be legally regulated. It was from the Feudal Regime in Venice that copyright was gradually protected as inherent to the human being, until its protection as a property right in the statute of Anne. Finally, in the 18th century the conception of the romantic author began and is still valid. The romantic author supposes that the author is a creative being, and therefore, to this day, human being is an implication to have the possibility that the works are copyrightable. Analyzing the required human element revealed that it is not specifically the human being that is asked for, but the attribute of creativity, a feature that has long been considered exclusively human. Even in the first definitions of AI, it tries to explain its creative capacity, comparing it with the human being, classifying the concept in "thinking humanly" and "acting humanly. However, it is currently considered that algorithms can work with creativity, which means that this is a time of possible change in copyright regulation.

For this reason, it was analyzed how AI works and it was found that the academic community, based on scientific postulates and without furthering a philosophical meaning, considers that the different types of AI work in an unpredictable and autonomous way using algorithmic creativity so that their works are novel and original reasons why their works meet the requirements to be considered creative works. For example, Kalin Hristov affirms that "since only the authors of creative works may enjoy 'authorship,' it should be redefined to include both human and non-humans' authors,"³³⁷ and authors such as Colin R. Davies and Ryan Abbott have claimed that authorship can be recognized to computers under current legislation.³³⁸

Thus, it seems that machines should be able to hold copyright, since they can comply with all the established requirements of creativity and originality. The issue then becomes how to exercise these rights, since machines are neither natural or juridical persons. One possibility is that the works remain in the public domain. However, considering that copyright and intellectual property laws seek to recognize the work of the author and encourage innovation, the option of granting copyright to machines seems counterproductive: machines cannot be incentivized with economic compensation, and

³³⁷ Kalin Hristov, "Artificial Intelligence and the Copyright Dilemma." (2017) 57(3) IDEA 431.

³³⁸ Ibid 441 citing Ryan Abbott, "I think, therefore I invent: Creative Computers and the Future of Patent Law, 57B.C.L REV 107 a (2016); Colin R Davis, "An Evolutionary Step in Intellectual Property Rights- Artificial Intelligence and Intellectual Property, 27 Computer L. & Security Rev 601 (2011).

recognizing their contributions does not encourage a creative spirit. The way AI works is linked to how it has been programmed and used.

The analysis of other possible ownership theories is necessary, such as the different categories proposed, the role of the user in the performance of the AI, the role of the companies, the joint authorship and the intervention of the programmer as the main source of effort and to whom the existence of the AI is owed and finally, the final work. Other areas of study, such as computer science, are important to obtaining a better, more complete understanding of the functioning of AI. These fields can serve as a basis for the comprehension of the scientific and economic scope of this domain and its relationship with copyright law.

Legal systems based on common and civil law and reveal that although there is no perfect clarity as to who owns the copyright in AI creations. Nevertheless, the current laws and regulations can be interpreted in such a way as to answer this question. This legal development is pioneered by the UK, which has acknowledged the existence of works exclusively generated by computer in its legislation. The CDPA has established a system for granting the copyright of this type of work to the person “by whom the arrangements necessary for the creation of the work are undertaken.”³³⁹

Because of the contribution of programmers in creating the AI, this thesis concludes that they are the ones to whom the copyright should be granted. In addition, the programmer can be encouraged by the recognition of his authorship and financial benefits, thus fulfilling one of the key purposes of copyright protection. However, the problem with this solution is that, although the AI owes its existence to the programmer, he does not directly create the final product. This could cause future problems in allocating copyright, when for example the programmer is also an AI. In the future there needs to be a discussion about the continuity of granting these rights, which considers awarding the programmer for the output of works that he did not create.

³³⁹ CDPA Section 9 (3).

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