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The dilemma of authorship for AI-generated work in the EU and US

A comparative study of the notions of 'human input' and 'author's own intellectual creation' in the assessment of authorship for copyright protection of AI-generated work

Ibrahim Halwachi

Supervisor: Anna Holmberg Borkmann
Examiner: Kristoffer Schollin

Summary

With the technological advancements of the 21st century, there has been a significant increase of AI-generated work in both the EU and the US. However, authorship of AI-generated works has been a contested issue as it challenges the traditional view of creations being associated with human beings. Currently, there is no specific copyright legislation that regulates the copyrightability of AI-generated works. Consequently, courts in both jurisdictions have to rely on existing copyright legislation in their assessments of authorship.

The thesis analyzes the existing copyright legislation in both jurisdictions and, most compellingly, argues that authorship is considered a human trait in both the EU and the US. However, it will also pinpoint that there is a lack of case law in the EU that specifically addresses AI-generated work, as opposed to the US.

The thesis also concludes that the existing copyright legislation in both jurisdictions is not suitable for the assessment of authorship of AI-generated work. On that note, the thesis also concludes that, while the legislation is not suited, it can still be argued to be appropriate for the courts to use.

Keywords: Artificial Intelligence, Generative AI, Authorship, AI-generated work

Sammanfattning

Med de tekniska framstegen under 2000-talet har det skett en betydande ökning av AI-generade verk i både EU och USA. Däremot har upphovsmannaskap för AI-generade verk varit en omtvistad fråga eftersom det utmanar den traditionella uppfattningen om att verk förknippas med människor. För närvarande finns det ingen specifik upphovsrättslig lagstiftning som reglerar upphovsrätten för AI-generade verk. Följaktligen måste domstolar i båda jurisdiktionerna förlita sig på befintlig upphovsrättslagstiftning i sina bedömningar av upphovsmannaskap.

Uppsatsen kommer att analysera den befintliga upphovsrättslagstiftningen i båda jurisdiktionerna och mest tilltalande argumentera för att upphovsmannaskap betraktas som en mänsklig egenskap i både EU och USA. Däremot kommer uppsatsen även att peka på att det saknas rättspraxis i EU som specifikt behandlar AI-genererade verk, till skillnad från USA.

I uppsatsen dras också slutsatsen att den befintliga upphovsrättslagstiftningen i båda jurisdiktionerna inte är lämpad för bedömningen av upphovsmannaskap av AI-generade verk. På den punkten drar uppsatsen också slutsatsen att även om lagstiftningen inte är lämpad, så kan den fortfarande argumenteras vara passande för domstolar att använda.

Nyckelord: Artificiell intelligens, Generativ AI, Upphovsmannaskap, AI-genererat verk

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Abbreviations

AI   Artificial Intelligence

AI Act   Proposal for a Regulation of the European Parliament and of the Council
                                laying down harmonized rules on artificial intelligence (Artificial
                                Intelligence Act) and amending certain union legislative acts

ANN   Artificial Neural Networks

Art.   Article

CJEU   Court of Justice of the European Union

Compendium   Compendium of US Copyright Office Practices

Copyright Act   The Copyright Act of 1976

Copyright Office   The United States Copyright Office

Database directive   Directive 96/9/EC of the European Parliament and of the Council
                                 of 11 March 1996 on the legal protection of databases

DL   Deep learning

DSM directive   Directive 2019/790 of the European Parliament and of the Council
                                 of 17 April 2019 on copyright and related rights in the Digital
                                 Single Market and amending Directives 96/9/EC and 2001/29/EC

ECJ   European Court of Justice

EP   European Parliament

EU   European Union

EU commission   European Commission

InfoSoc directive   Directive 2001/29/EC of the European parliament and of the Council
                        of 22 May 2001 on the harmonization of certain aspects of copyright
                        and related rights in the information society.

IP   Intellectual Property

ML   Machine learning

NAIIO   National Artificial Intelligence Initiative Office

Software directive   Directive 2009/24/EC of the European Parliament and of the Council
                        of 23 April 2009 on the legal protection of computer programs

Term directive   Council Directive 93/98/EEC of 29 October 1993 harmonizing
                        the term of protection of copyright and certain related rights

UK   United Kingdom

US   United States of America

VARA   The Visual Rights Act of 1990

1   Introduction

1.1   Artificial Intelligence and Copyright in the Fourth Industrial Revolution

"Some people worry that artificial intelligence will make us feel inferior, but then, anybody in his right mind should have an inferiority complex everytime he looks at a flower."

Alan Kay

Artificial intelligence (AI) has blossomed in recent years, becoming a hot topic in various legal areas, be it in legal tech, criminal law or even agricultural law.[1] Phenomena such as self-driving vehicles, facial recognition to unlock a cell phone and deepfake videos have only been seen as technologies of science fiction. However, these things are now not just plausible, but also perceivably present.[2] Adapting to the technological advances of today is not unique, it has for thousands of years been part of the human story.[3] From the invention of the telegraph to the introduction of the internet, each advancement brought its own set of legal challenges. Currently, AI is capable of performing tasks that would typically come under copyright protection when created by a human, such as creating music, books and even art.[4]

We are at the dawn of the Age of AI, which introduces new and unprecedented legal challenges.[5] Society is experiencing a technological shift which could fundamentally change society, the economy, the conditions for entrepreneurship, and even our perception of what it means to be human.[6] Klaus Schwab, chairperson of the World Economic Forum, has referred to this shift as the *Fourth Industrial Revolution,* in which AI constitutes the engine.[7] It can be viewed as a development of the digital revolution, characterized by an integration of technologies.[8] Other terms, such as *Industry 4.0, The Second Machine Age,* and *4IR*, are commonly used to describe the same phenomenon as Klaus Schwab termed the Fourth Industrial Revolution.[9]

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[1] Spindler p 1049.
[2] Garon p 7.
[3] Kempas p 17.
[4] Ramalho p 6.
[5] De Vries and Dahlberg p 31.
[6] Lindahl, 'Den fjärde industriella revolutionen - Innebörd och konsekvenser för Sverige och svenska företag', Lindahl, 8 November 2017, p. 3.
[7] World Economic Forum, *The Fourth Industrial Revolution: what it means, how to respond* sec. 1-2.
[8] Westman p 131.
[9] Kempas p 17.

The challenges posed by the fourth industrial revolution extends beyond national borders. AI is by its nature global, as systems developed in one country can function in another. While this universal applicability can bring its advantages, it poses transnational legal challenges, as there is no common ground on regulating AI and the new digital technologies.[10] The rapid expansion of AI-generated work has led to uncertainties in distinguishing between human and AI-generated work. Notably, over the next decade, numerous AI systems are likely to be developed, many of which will surpass what society could imagine.[11] In the realm of copyright, AI presents unique challenges to the traditional view of creations being associated with human beings.[12] The increased use of AI in the creative process, and growing trend of seeking copyright for AI-generated works, implies a re-evaluation of concepts such as 'authorship', necessitating a clearer legal stance.[13] The thesis terms this ambiguity as "the dilemma of authorship", since the mere ability of AI systems to produce creative works does not entitle them to authorship nor subjects them to copyright protection.[14]

As a consequence of the new industrial revolution, the European Parliament (EP), issued recommendations to the European Commission (EU commission) regarding civil law regulations on robotics. In order to encourage both innovation and legal certainty, the EU commission emphasizes a review of how AI and intellectual property (IP) rights interact. They acknowledge that we are entering an era where AI is on the brink of driving a new industrial revolution that will leave no part of society untouched. Furthermore, they emphasize that it is crucial for legislators to address the legal and ethical consequences of AI, without hindering innovation.[15] It is noteworthy that these recommendations were put forth back in 2017, and today, they are materializing into real legal challenges.

With the advancement of AI and new works being created using generative AI systems, complex questions are brought forward concerning copyright protection. Who, if anyone, may be assigned copyright protection for AI-generated work? Society has gradually shifted from a view of AI being seen merely as a tool in the creative process, like pen and paper, to now being the creator of

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[10] Mecaj p 191.
[11] Kempas p 18.
[12] Ramalho p 6.
[13] ibid 6.
[14] Wang p 901-912.
[15] European Parliament, Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics.

works.[16] On one side, AI can create a lot of value with less investment, in a shorter span of time than that of a human.[17] On the other side, traditional copyright notions such as "originality" and "authorship" are challenged.[18]

AI has been described to be advancing at a worrying pace, which necessitates the legal landscape to continue a process of adaptation.[19] Meanwhile, the increased use of AI in the creative process also presents interesting comparative questions, such as how authorship in the assessment of copyright for AI-generated work can differentiate between jurisdictions. AI-generated work has been a subject of debate and legal challenges in both the European Union (EU) and the United States (US).[20] The US, similar to the EU, acknowledges the importance of balancing AI regulation with innovation. The United States Copyright Office (Copyright Office) launched an initiative in early 2023 to delve into the copyright law and policy challenges brought on by AI technology, especially in determining the extent of copyright for works generated using AI systems.[21] However, unlike the EU, the US has been perceived as being in the early stages of its path towards regulation.[22]

Considering the US being one of the world's largest and most influential countries, both politically and economically, they constitute an interesting jurisdiction to compare the EU with in the assessment of authorship for copyright protection of AI-generated work. Moreover the US has a very active technology sector and leads in AI investments. In 2023, more than one in four dollars invested in American startups has been directed to AI-related companies.[23] Hence, to analyze if there are any differences in the assessment of authorship for AI-generated work, and contribute with a new point of view, this thesis will examine the specific notions of "author's own intellectual creation" in the EU and "human input" in the US.

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[16] Andres Guadamuz, 'Artificial Intelligence and Copyright', WIPO Magazine, October 2017, www.wipo.int/wipo_magazine/en/2017/05/article_0003.html.
[17] Ahuja p 274.
[18] cf Kempas p 79.
[19] Schiller p 1.
[20] Kim p 443.
[21] U.S. Copyright Office, *Copyright and Artificial Intelligence,* sec. 1.
[22] Rádi p 1446.
[23] Joanna Glasner, 'AI's share of US Startup Funding Doubled in 2023', Crunchbase news, 29 August 2023, https://news.crunchbase.com/ai-robotics/us-startup-funding-doubled-openai-anthropic-2023.

1.2 Purpose of the thesis and framing of questions

As the rise of generative AI in the creative process raises questions about authorship and copyright protection, which challenges the existing legal frameworks, there is a need for a clearer legal stance on AI-generated work. Hence, the purpose of this thesis is to analyze how existing copyright laws in the US and the EU are used in the assessment of authorship for copyright protection of AI-generated work, in order to see if there are any key differences, based on the notions of "human input" and "author's own intellectual creation". To facilitate a comparative discussion based on the purpose, the following questions will be answered:

1. Are there any key differences in the assessment of authorship for copyright protection of an AI-generated work between the US and the EU?
2. If there are differences, how does the US and the EU view the contributions of the author?
3. Is the current legislation in both jurisdictions suitable to assess AI-generated work, and if not, is it appropriate to use the legislation to assess its copyrightability?

1.3 Methodology and material

1.3.1 Methodological approach for analyzing authorship in AI-generated work

With a perspective emanating from a civil law system, the thesis considers the US's common law system when analyzing their copyright legislation and case law, which includes a different set of primary legal sources than that of the EU. These are constitutions, statutes, case law and regulations.[24] Furthermore, the different legal systems can imply philosophical differences in the assessment of authorship. For that reason, the thesis will first provide a legal historical background in chapter two, where two different philosophical ideas of copyright are analyzed. A legal historical background is important to give as it affects how the concept of authorship has been viewed over time. In addition, the chapter analyzes two fundamental theories, *natural law and utilitarianism*. By providing an initial insight into the evolution of the concept of authorship, along with rationales for copyright protection, the chapter provides a contextual framework that enables an understanding of why the assessment of authorship may vary between the jurisdictions.

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[24] Law Library of Louisiana, *Primary Sources - Basics of Legal Research* sec. 1.

A technological account of AI and the concept of intelligence is also given in chapter three, which lays the groundwork for a subsequent analysis of existing law and its application in case law, in chapters four and five. In the context of the thesis, the term "authorship" refers to the right to be recognized as the author of a work or creation that is AI-generated. Moreover, the terms "work" and "creation" are used interchangeably, but denote the same concept, that is, intangible outputs generated by an AI system.

The method used in this thesis for analyzing existing law finds inspiration in the legal dogmatic method. The main purpose of the legal dogmatic method has been described in several ways, such as interpreting and systemizing existing law with the ultimate goal of providing jurisprudence, to answer the question of what existing law is, and to describe and analyze it.[25] Kleineman describes the method as seeking answers in legislation, case law, preparatory works and the legal dogmatically oriented literature.[26] This list has been extended by Strömholm and Peczenik to also include custom, non-specific legal considerations and agreements.[27] The thesis will similarly analyze existing copyright legislation in the US and EU and analyze how it is assessed by courts in relation to authorship of AI-generated work. While the thesis finds inspiration in the legal dogmatic method, in the sense of scrutinizing and analyzing existing law, it does not follow it strictly, as the doctrine of legal sources, which forms the foundation of the legal dogmatic method, is limited to those legal sources acknowledged by Kleineman.[28] The thesis will not be limited to only these legal sources, as the main purpose of the thesis is not to answer what existing law is, what it should be or to describe it, but rather analyze how it is *assessed* by courts.

However, a pertinent question is the actual legal meaning of "existing law". This issue has long been a subject of concern, yet it remains without a common understanding.[29] Therefore, the thesis avoids relying solely on "established methods" in its analysis of the assessment of authorship, and avoids labeling any methods used. The idea that there are more methods to use than merely those established finds support from Mellqvist, who writes that "the number of methods must reasonably be as many as the number of researches."[30] On the same note, he acknowledges that, while there are many methods that are not relevant or lack sufficient quality, there are many that are relevant to the research task, without the possibility of providing these with a particular label.[31]

[25] Gunnarsson and Svensson p 102.
[26] Kleineman in Nääv and Zamboni p 21.
[27] Gunnarsson and Svensson p 114.
[28] Ibid, p 108.
[29] Ibid, p 105.
[30] Mellqvist p 991.
[31] Ibid, p 991.

As the first and second framing question of the thesis seeks to point out differences between the jurisdictions, a comparative discussion will be conducted in chapter seven, which will form the basis to address both questions. Given that two different legal systems are being compared, it can give rise to certain methodological difficulties. Thus, some considerations are taken into account. Firstly, a comparative approach implies more than just scrutinizing the existing law in the different jurisdictions. It entails a comparison to try to understand both the similarities and differences between them.[32]

Secondly, legal terms can easily be confused between the EU and US, despite being assumed to imply the same thing when translated. This is also true when a word is translated from one language to another. While the translation might sound similar, the meaning of the word or concept can be significantly different.[33] However, while misinterpretation constitutes a risk, Valguarerna argues that a comparative approach can contribute to building a "cultural bridge" and clarify that the meaning of concepts may differ. Misinterpretation of legal terms and concepts across the EU and US can in theory have detrimental effects on the analysis and discussion of the thesis. However, in order to mitigate such a risk, the thesis uses a comparative multilingual legal vocabulary produced by the Court of Justice of the European Union (CJEU), which clarifies the meaning of legal terms across jurisdictions.[34]

The EU legal order has its own set of legal sources.[35] The thesis will analyze EU copyright law and not Swedish. The Swedish copyright framework has, ever since joining the EU, been heavily influenced by EU law through both directives and regulations.[36] While comparing Swedish and US copyright law could provide valuable insights on AI-generated works, particularly if the analysis is focused on Sweden, comparing the EU and US provides insights to a broader legal framework that affects many nations, not just Sweden. Furthermore, the European Court of Justice (ECJ) established that EU law has supremacy over national law in *Costa v ENEL*.[37] In simpler terms, if Swedish law conflicts with EU law, the latter takes precedence.[38] Moreover, in the landmark ruling of *Van Gend en Loos,* the ECJ held that EU law has direct effect, that is, capable of being relied on and enforced by individuals in front of national courts.[39] The EU legal order

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[32] Valguarnera in Nääv and Zamboni p 143.
[33] Kleineman in Nääv and Zamboni p 42.
[34] *IATE European Union Terminology*, 'Interactive Terminology for Europe'.
[35] Strömholm, Lyles and Valguarnera p 340.
[36] Wolk p 340.
[37] Judgment of the Court of 15 July 1964, Costa v E.N.E.L, C-6/64.
[38] Conway, Herlin-Karnell and Ganesh p 26.
[39] Judgment of the Court of 5 February 1963, Van Gend en Loos v Administratie der Belastingen, C-26/62.

consists of the primary and secondary law, general principles of EU law, the case law of the CJEU and doctrine. The thesis will mainly analyze its secondary legislation, which includes directives, regulations, decisions, recommendations and opinions.[40] The CJEU's case law will also be analyzed to understand how current copyright legislation is assessed by the ECJ. While referring to it as the case law of the CJEU, the thesis is indeed analyzing rulings of the ECJ, which is one of its two major courts, which hears cases from national courts.[41] In addition, a part of the EU's legal order called soft law will also be analyzed, which includes non-binding documents in the form of, among other things, guidelines.[42]

Based on the analysis of chapters four and five, the sixth chapter will analyze whether existing laws are outdated in assessing AI-generated work and will also analyze impending AI regulation. This analysis will provide insights to address the third framing question of the thesis, which is to determine whether current legislation is both adapted, and if not, appropriate to be used in the assessment of authorship for copyright protection of AI-generated work.

It is important to note that, as of today, there is no copyright legislation in either the US or the EU that specifically regulates AI-generated work. Therefore, "current legislation" in the context of this thesis refers to the existing copyright laws in both jurisdictions, which will be analyzed due to the absence of any specific legislation. Furthermore, the copyright legislation analyzed in this thesis are those in effect up until the fifth of December, 2023. Notably, in the EU, intensive work is underway to establish new AI legislation. Accordingly, the thesis relates dynamically to these developments by keeping a watch out for any legislative news from the EU. This dynamic approach is important to consider as it will contribute with an up to date approach to the analysis. However, in order to put a reasonable end to the dynamic aspect of the thesis, current legislation will be analyzed up to and including the fifth of December, 2023.

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[40] Strömholm, Lyles and Valguarnera p 341
[41] European Union, *Court of Justice of the European Union*, sec. 11-12.
[42] Reichel in Nääv and Zamboni p 128.

1.3.2 Material and approach to the material used

As a point of departure, the choice of material will inevitably affect both the thesis validity and reliability, hence all material used is approached in a critical way. The thesis will to a great extent use electronic working papers and journal articles published on the Social Science Research Network (SSRN) and SpringerLink. As AI is a continuously developing and technical field of law, the benefit of using working papers and journal articles is both their frequency of publication, and their emphasis on often particular aspects of the copyright framework. The material is in other words more up to date than, for example, textbooks. However, the thesis critically examines the material by assessing the validity and reliability of each paper and article, based on three questions:

1. *Who wrote the paper or article? Is it a scholar, a practitioner, a student?*
2. *Has the paper undergone peer review?*
3. *If it has not undergone peer review, what sources does the paper use?*

The thesis also places significant emphasis on books. The primary sources used are written by Tobias Kempas, a legal counsel at a Swedish law firm, and Ana Ramalho, a legal counsel at Google.[43] These books are notably up-to-date, which ensures a dynamic approach to the developments in the field of generative AI. While there are limited books that specifically address AI-generated work, other books are also used to primarily analyze the foundations of AI. Given that both Kempas and Ramalho are legal counsels, there exists a risk, however small, of bias in their reasoning and argumentation. Although such bias is challenging to pinpoint, the material is examined critically, similarly to the thesis approach to the working papers and journal articles, by comparing it with other books used throughout the thesis, to the extent possible.

In addition to the electronic sources and the books, the thesis is largely based on US and EU copyright legislation up until the fifth of December, 2023, and case law. Emphasis will be placed on influential court cases related to AI and copyright law. A potential challenge that will be faced in this regard, however, is the lack of case law that specifically addresses AI-generated work in the EU, unlike the US. With that being said, this fact constitutes an interesting aspect that will be a subject of discussion in chapter seven.

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[43] Kempas (2023) and Ramalho (2022).

1.4 Delimitations and previous legal research

1.4.1 Limiting the thesis to Copyright

The thesis will be limited to AI in relation to copyright, and not other IP rights, such as patents, trademarks and designs. Including other IP rights beyond copyright poses a risk of overly broadening the scope of the thesis's scope and diverging into several interesting, but unconnected, paths.[44] It should be mentioned that the rapid growth of AI has a profound impact on all fields mentioned, hence, contributing to many interesting questions that can be analyzed in a future thesis. To that end, chapter eight provides some interesting thesis questions that can be examined in future theses, in relation to AI.

1.4.2 Artificial Intelligence and Generative Artificial Intelligence

It should be noted that the thesis will primarily focus on generative AI, which is a subset of AI. It is important to clarify that when using the term "AI" in connection with specific examples, analyses, or discussions, the thesis is referring to generative AI. However, the thesis will also touch upon AI as a broader phenomenon in certain parts of the thesis. In these contexts, "AI" should be interpreted as an overarching term that encompasses all forms of AI, not solely generative. The goal is to provide a balanced and comprehensive view of the subject, while clarifying which type of AI the thesis is addressing. A clarification on when AI is touched upon as a broader phenomenon, and generative AI specifically, is further described in the disposition.

1.4.3 Delimiting the Copyright requirements in the jurisdictions

As the thesis is set to examine two specific notions, it entails a delimitation to the copyright requirements in the respective jurisdictions. While both the EU and US copyright standards are twofold, this thesis will concentrate on "author's own intellectual creation" in the EU and "human input" in the US, examining their implication on authorship in the context of AI-generated work. The EU originality standard is twofold and requires that it is (i) the author's own intellectual creation and that there is (ii) an expression of that creation.[45] I will focus on the former, as this is particularly interesting when works are generated by an AI. The US originality standard is also a twofold requirement which requires that the work must (i) be the independent creation of its

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[44] On this note, cf Kempas p 44 who highlights several areas of law that can be considered in relation to AI.
[45] Ramalho p 25.

author and have (ii) a minimum level of creativity.[46] The notion of "human input" is not specifically stipulated by this twofold requirement, but has been interpreted through most definitions and case law to presuppose a human author.[47]

1.4.4   Previous legal research

AI and copyright is not a completely new concept within the legal debate. The question of copyright protection for AI-generated works has been addressed in other papers, both in Sweden and internationally. Within the Swedish context, available theses mostly delimit the research to Sweden, or extend it to include both Sweden and the EU, but they do not adopt a comparative perspective. Among others, Erika Hubert analyzes AI-generated work in a European context while Felix Makarowski and Ulrika Norling do the same, but also include Swedish law. However, similarly, none of these works adopt a comparative approach.[48] AI-generated work has also been addressed in literature. The most recent literature to do so has been provided by Kempas and Ramalho who both write about IP protection for AI-generated work.[49] However, while both of them provide detailed insights, they are neither comparative, nor focus on how different jurisdictions assess authorship for copyright protection of AI-generated work. Filling this gap is important as AI is not confined by national borders.

Despite being the subject of both theses and literature, there are still limited, if any, countries that have adapted their legislation to the advancements of AI.[50] Hence, this thesis aims to contribute to the legal debate by providing a comparative analysis, specifically focusing on the notions of "human input" and ''author's own intellectual creation". It is important to note that, although previous legal research has addressed AI, the field is continuously developing. Consequently, its legal stance can not be said to be the same as the last decade, last year, or even last month. To that end, this thesis seeks to build upon the established foundations in earlier theses and literature, by contributing with a comparative analysis to the question of AI-generated works.

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[46] Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340 (1991).
[47] cf Guadamuz, 'Artificial Intelligence and Copyright' sec. 6.
[48] Erika Hubert, "Artificial Intelligence and Copyright law in a European context" (Lund University, 2020), http://lup.lub.lu.se/student-papers/record/9020263. Felix Makarowski, "AI and Creative machines - copyright protection for AI generated works under EU and Swedish law" (Uppsala University, 2020), https://uu.diva-portal.org/smash/get/diva2:1287396/FULLTEXT01.pdf. Ulrika Norlin, "Kreativ artificiell intelligens och upphovsrättsliga utmaningar" (Stockholm University, 2019), https://www.upphovsrattsforeningen.com/files/getfile/6.%20Norlin%20Ulrika%20Artificiell%20Intelligence.pdf.
[49] Kempas (2023) and Ramalho (2022).
[50] Smuha p 60-61.

1.5   Disposition

For a pedagogical purpose, the thesis can be described as consisting of four parts. The first part consists of chapters one to three. This part of the thesis mainly seeks to provide insights that will be utilized in the comparative discussion in chapter seven. The second part of the thesis consists of chapters four to five, which mainly aim to provide insights to answer the first and second framing questions. The third part consists of chapter six and mainly aims to answer the third framing question. Finally, the fourth part consists of chapter seven, which will constitute a comparative discussion to answer all three framing questions based on the analysis on each previous part.

After the first chapter which provides an introduction to AI and copyright, as well as the frames of the thesis, the second chapter will track the history of authors in the EU and US. This will be done by analyzing philosophical bases and theories behind copyright protection in the two jurisdictions, in order to provide an understanding of the different rationales behind the protection of authors. After exploring the historical aspect, the chapter moves on to discuss who an "author" is in the two jurisdictions, and whether authorship should be redefined. The third chapter is devoted to detail AI as a broader concept first to provide some context, and then dives into generative AI and its foundations specifically. In addition, the chapter addresses whether machines can be intelligent, based on the points that have been made and definitions of AI that are presented.

Having analyzed both the rationales behind copyright and who an author is, as well as giving a detailed presentation of generative AI, the thesis introduces the analysis of US and the notion of human input in chapter four. First, the originality standard and copyright legislation are touched upon and then transitions to case law on AI-generated work. The final part of the chapter looks at whether the US Copyright Office is creating discrepancy with the Constitution through its resilience to register copyright to AI-generated work. After an analysis of the US, the fifth chapter moves on to analyze the EU and the notion of author's own intellectual creation. The chapter first touches upon copyright legislation, and then transitions to case law that has an impact on the notion of authors' own intellectual creation. Building upon chapters four and five, the sixth chapter looks at the current copyright framework for AI-generated work in both jurisdictions and analyzes whether the legislation is outdated, but also the advent of new legislation. Chapter seven is devoted to a comparative discussion, based on what has been presented in the analysis. Finally, chapter eight presents my final thoughts in relation to the analysis and discussion, and also acknowledges some future thesis questions that can be analyzed.

2 Understanding the copyright rationales in the EU and US

2.1   Theories and philosophical ideas of copyright

Historically speaking, there have been two prominent approaches to copyright law in the EU and US, founded on different philosophical bases. Two theories can be said to be the founding stones of the approaches, *natural law* and *utilitarianism*. Approaches based on natural law emphasize rights and duties, whereas the utilitarian approach emphasizes promoting social welfare. In simpler terms, and with regards to copyright, natural law views the creation of an author as a moral right worthy of protection, whereas the utilitarian view is interested in benefiting society, and not necessarily in the relation between the author and their work.[51]

On one side, there is the Anglo-saxon approach, *Copyright,* commonly adopted by Anglo-saxon nations, such as the United Kingdom (UK) and US.[52] Their approach to copyright is characterized by the view that exclusive rights are merely an economic tool, which stimulates and rewards creativity.[53] This view is expressed in the British Statue of Anne, enacted by the British Parliament in 1710, and referred to as the world's first copyright law. The Statue of Anne reads:

> "*Whereas printers, booksellers, and other persons have of late frequently taken the liberty of printing, reprinting, and publishing, or causing to be printed, reprinted, and published, books and other writings, without the consent of the authors or proprietors of such books and writings, to their very great detriment, and too often to the ruin of them and their families: for preventing therefore such practices for the future, and for the encouragement of learned men to compose and write useful books; may it please your Majesty, that it may be enacted* [...]"[54]

The statue articulates an utilitarian approach by framing the issue in terms of societal welfare and emphasizes the importance of encouraging the creation of useful works for the public good. Hence, the focus is put on incentivizing and rewarding the author.[55] This is reflected in the Patent and Copyright Clause of the US constitution, which seeks to "promote the progress of science and

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[51] Ramalho p 53.
[52] Canellopoulus-Bottis p 1-4.
[53] Kempas p 111.
[54] 8 Anne, c. 19 (1710) I.
[55] Kempas p 111.

useful arts, by securing for limited times to authors and investors the exclusive rights to their respective writings and discoveries."[56]

On the other side, in the EU, there is a strong tradition of "author's rights", influenced by the French system of *Droit d'Auteur,* and commonly adopted in nations with a European legal tradition. In contrast to the Copyright approach, the EU approach places the author at the center, rather than the social welfare.[57] According to the natural rights argument, copyright is a natural right, meaning that laws do not create the right, they only acknowledge the right's existence.[58] Schollin writes that the approach is of natural law and akin to the deontological reasoning inherent in Human Rights discourse.[59] His view is supported by, among others, Bottis, who writes that the foundations are deontological in nature and built on the idea of natural rights.[60] As mentioned, France has been an influential country in the EU system. In 1791, Isaac Le Chapelier, a reporter of the French decree on copyright, expressed "the most sacred, the most legitimate, the most inattackable and the most personal of all properties, is the work which is the fruit of a writer's thoughts'."[61]

From the premise of natural law, two main theories of copyright can be adhered to, that is, the labour theory and the personality rights theory. The labour theory is rooted in John Locke's ideas and implies that every man should own the products of his labour. Since one owns one's body, then one also owns the labour of it and, consequently, the fruit of that labour.[62] The personality rights theory, typically ascribed to the ideas of Kant and Hegel, holds that an intellectual work is an extension of the creator's personality and, therefore, they should have control over how these works are used.[63] Similarly, both theories underpin the relation between the author and his work, as opposed to the Utilitarian focus on the impact of that relation on society.[64] Having laid out the fundamental ideas of Droit d'Auteur and Copyright, a question that arises is how these stand against each other with regards to authors.

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[56] U.S. Const. art. I, § 8, cl. 8.
[57] Kempas p 111.
[58] Ramalho p 21.
[59] Schollin p 292.
[60] Canellopoulus-Bottis p 5.
[61] Geiger p 21.
[62] Ramalho, p. 21
[63] Ibid, p. 23
[64] Ibid, p. 24

2.1.2 Droit d'Auteur and Copyright

Droit d'Auteur, which values the personal over the commercial, focuses on protecting the author's personal connection to their work.[65] Copyright, however, emphasizes the economic use of a work by creating incentives and rewarding the author with a limited economic monopoly.[66] The intent of rewarding authors with such a monopoly is merely to increase their productivity; it is not the primary objective. These incentives, to create socially valuable works, are founded on the utilitarian idea of achieving social benefit.[67] Thus, public interest takes precedence over private interests. In contrast, the public interest as such is not attempted to be served by the droit d'auteur, with the exception of a tangential way in which happy authors improve society. The author does not owe society, rather it is society that owes him.[68]

Prior to 1886, authors' copyright protection in a particular country was based on their own nation's laws and any bilateral copyright agreements made between their native country and other nations. It should be noted, however, that the European states were part of a vast network of bilateral agreements.[69] Multilateral copyright agreements, in the comprehensive and inclusive sense that we understand them today, took time to emerge, except for the early treaties in which France and the UK were driving forces.[70] The Berne Convention, created in Switzerland in 1886, became the first and most significant multilateral copyright agreement.[71] One of its primary objectives was to provide extended protection for works that had previously been unprotected due to the absence of bilateral copyright agreements and inadequate national copyright laws.[72] Initially signed by 10 European member states, today it has over 180 members, including the US.

The Berne Convention recognizes the moral rights of authors, such as the right to be identified as the author of a work, distinct from any economic ownership rights or any transfers of those rights.[73] Article (Art.) 6*bis* of the Berne Convention stipulates the moral rights of authors. As previously mentioned, moral rights are antithetical to the Copyright approach adopted by Anglo-Saxon nations, such as the US, as they emphasize the economic use of a work.

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[65] Drummond, *Droit d'Auteur vs. Copyright - Learn the differences between Brazil and U.S. main regulations,* sec. 4.
[66] Schollin p 292.
[67] Fromer p 1746.
[68] Baldwin p 16.
[69] Schollin p 31.
[70] Ibid.
[71] Ricketson and Ginsburg, under the title Origins of the Berne Convention, p 38.
[72] Deters p 982.
[73] Van Bremen and Thibodeau p 84.

Interestingly, it wasn't until 1988 that the US acceded to the Berne Convention, with the convention coming into force for the US the following year, over a century after its initial signing in Switzerland. The presence of moral rights, stipulated in Art. 6*bis*, is said to be one of the primary reasons for why the US refused to accede to the Berne Convention for such a long time.[74] Notably, moral rights were never completely incorporated into US law, and they still remain mainly unprotected. Instead, in response to this lack of protection, the Visual Artists Rights Act (VARA) was passed, which in some sense derives from the fact of the US not protecting moral rights. However, the VARA only gave moral rights to a very small subset of works, that is, to visual works such as paintings and photographs. In addition, the VARA only protects the right to attribution and integrity. Beyond the limited protection offered by the VARA for visual works, no other types of works are afforded moral rights in the US.[75]

Despite a longstanding tradition that values the protection of an author's personal connection to their work over both economic and public interests, it has been noted that the EU has moved closer to the commercially driven Anglo-saxon system, moving away from its foundational principle of protecting the author and giving way to a commercially driven EU.[76] While the EU has harmonized nearly all aspects of copyright protection in the last decade and a half, it has repeatedly excluded moral rights in their harmonization efforts. This exclusion of moral rights can be observed in several directives, where it is explicitly stated that moral rights remain outside the scope of the particular directive.[77]

The EU commission acknowledges that moral rights have not been harmonized, but reportedly sees no need for such harmonization.[78] The act of avoiding harmonization is notable, considering past criticism by the EU commission of the US for not implementing moral rights. In a 2004 report, the EU commission blamed the US for creating an imbalance of benefits to the detriment of the EU, as US authors benefit from moral rights in the EU, a situation which is not reciprocated for EU authors in the US.[79] Ultimately, the act of avoiding harmonization indicates, Bottis argues,

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[74] Jacobs p 172.
[75] Canellopoulus-Bottis p 10.
[76] Ibid, see p 11-21 where Canellopoulus-Bottis points out how the European legislator has come far from the deontological idea behind the protection of authors.
[77] See e.g Council Directive 2001/29 EEC of 22 May 2001 on the Harmonization of Certain Aspects of Copyright and Related Rights in the Information Society p 19 and Council Directive 96/9 EEC of 11 Mar. 1996 on the Legal Protection of Databases p 28.
[78] Commission staff document SEC(2004) 995, p 15.
[79] Report on United States barriers to trade and investment 2004 (December 2004), p 65-66.

that the EU copyright system is moving closer to the Anglo-saxon system.[80] Evidently, there is a philosophical difference between the protection of authors in EU and US copyright law. The droit d'auteur approach views copyright as a human right, aligning with a deontological perspective that upholds the intrinsic value of creative expression, and places the author's rights above economic considerations. Conversely, the US adheres to a utilitarian framework, and views copyright as a type of commercially driven privilege, focusing on maximizing commercial use through incentives and a limited economic monopoly, often at the expense of moral rights.

What is clear from both the theories and philosophical ideas behind the protection of authors in the US and EU is, in one way or another, to benefit either society or the author. What remains unanswered, however, is who such an author is in both jurisdictions. This question is particularly important to address as, in legal terms, authorship determines who holds the copyright to the AI-generated work.

2.2   Who is an author in US and EU copyright law?

2.2.1   The clear view of requiring a human author in the US

Under US copyright law, the author is generally considered to be the creator of the original expression in a work.[81] Despite this general understanding, there is a notable lack of a clear and explicit definition of an "author" in both the US Constitution and The Copyright Act of 1976 (Copyright Act). Nevertheless, the Copyright Office has taken a clear stance in the matter by only acknowledging works "created by a human being" as eligible for copyright protection.[82] This position is explicitly stated in their administrative manual, where it is outlined that the Copyright Office will register an original work of authorship, provided that the work was created by a human being. To further emphasize this point, the Copyright Office asserts that works that fail to satisfy the requirement of being created by a human being, are not copyrightable under current laws.[83] This principle was discussed and highlighted in the case of *Naruto v. Slaters*.

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[80] Canellopoulus-Bottis p 9.
[81] U.S. Copyright Office, *FAQ - Definitions - Who is An Author?*, sec. 1.
[82] Congressional Research Service, '*Generative Artificial Intelligence and Copyright Law*' p 1.
[83] US Copyright Office, 'Compendium of US Copyright Office Practices', sec. 306 and 313.2.

2.2.1.2 Claiming authorship for selfies taken by a macaque monkey

Imagine a monkey taking selfies, which subsequently leads to a copyright dispute. Although it may sound fictional, this scenario unfolded in the case of *Naruto v. Slater*.[84] The case involves a copyright dispute over selfies (the "Monkey Selfies") taken by a macaque monkey. In 2011, a macaque named Naruto took multiple selfies using a camera belonging to British photographer David Slater in Indonesia. In this series of photos, one of them became internationally known as the "Monkey Selfie", which as the name implies, portrayed a selfie taken by a monkey. The photos went viral, and People for the Ethical Treatment of Animals (PETA) filed a lawsuit on behalf of the monkey, arguing that Naruto was the copyright owner of the photos, which the defendants had falsely claimed authorship of.[85]

The plaintiffs argued that Naruto's copyright had been violated by displaying, advertising, and selling copies of the Monkey Selfies. The Monkey Selfies were original works of authorship that were created by Naruto, not Slater, through a series of purposeful and voluntary actions on his part.[86] The defendants filed a motion to dismiss the case, asserting that Naruto had no standing and could not state a claim under the Copyright act. To the detriment of the plaintiff, the US Court of Appeals for the Ninth Circuit agreed with the district court, holding that the Copyright act does not confer standing upon animals. In addition, the appellate court added that the Copyright Office agrees that works created by animals are not entitled to copyright protection.[87]

2.2.2 The anthropocentric approach of the EU copyright acquis

Under EU copyright law, the author is generally considered to be the person who has created the work.[88] Similar to the US law, there is no transversal definition of an author. What can be said is that authorship is addressed in some directives, such as directive 2009/24/EC (Software directive) and directive 96/9/EC (Database directive).[89] However, neither directive gives a proper definition of an author, rather, the member states are given leeway to define what constitutes consent of the "author" in their national legislation.[90] They do, however, in the context of computer programs

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[84] Naruto v. Slater, No 15-04324-WHO (2016).
[85] Ibid, p 35.
[86] Ibid, p 43.
[87] Naruto v. Slater, No 16-15469 (9th Cir 2018), p 2.
[88] EUIPO, *Consumers' frequently asked questions (FAQS) on copyright - Summary report*, p 15.
[89] Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs and Directive 96/9/EC of 11 March 1996 on the legal protection of databases.
[90] Ramalho p 30-31.

and databases provide that the author shall be the natural person or group of natural persons who created it, or the legal person designated as the rightgolder under national law.[91]

The EU copyright acquis relies largely on the Berne Convention, which similarly, does not provide a definition.[92] However, both the wording of the Convention and its historical context imply that the term "author", within the context of the Convention, refers to the natural person who has created the work.[93] Quintais and Hugenholtz note that although EU copyright law does not expressly state that copyright protection requires a human creator, its "anthropocentric", that is, human-centered approach, to copyright protection is evident in a number of the EU copyright acquis.[94] In addition, Verhar and Gills write that the anthropocentric approach is evident in, among others, German copyright law, which underscores the essential role of a human author in the creation of a copyrightable work.[95] While the Naruto case concerned a monkey taking photos, the *Painer* case similarly provides interesting insights on authorship in the context of photographs.

2.2.2.1 Advocate General Trsenjak's emphasis on a human author in Painer

While the Painer case will be analyzed further in chapter five, the case touches upon the question of who can be an author.[96] Ms. Painer, an Austrian freelance photographer, took several photographs of a girl named Natascha Kampusch. At the age of 10, Natascha was abducted, but managed to escape at the age of 18. Between the time of her escape and her initial television appearance in public, five newspaper publishers across Austria and Germany featured photographs taken by Ms. Painer. Alongside these images, some publishers also displayed photo-fits, created by altering one of Ms. Painer's photos to depict an aged version of Kampusch. These actions took place both without Ms. Painer's consent, and without indicating her as the author of neither the photographs nor the derivative photo-fits.[97] The Austrian Supreme Court held that copyright protection for portrait photographs was weaker than for other photographs. However, the ECJ did not agree. They held that under Art. 6 of Council Directive 93/98/EEC (Term directive), a portrait photograph could be protected if such photograph is an intellectual creation of the author.[98]

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[91] Directive 2009/24/EC art. 2 (1) and Directive 96/9/EC art. 4 (1).
[92] Hugenholtz and Quintas p 1207.
[93] Ibid, p 1195.
[94] Ibid, p 1195.
[95] Vehar and Gils p 718-726.
[96] Judgment of the Court of 7 March 2013, Painer, C-145/10.
[97] Judgment of the Court, C-145/10, paras 27-37.
[98] Ibid, para 87.

In her opinion, the Advocate General Trsenjak stated that "[...] only human creations are therefore protected [...]", referring to the wording of Art. 6 of the Term directive.[99] Her statement supports what Quintas and Hugenholtz noted. In their opinion, Trsenjak's opinion is perhaps the clearest formulation of the principle that an author must be a human, adding that her conclusion was subsequently approved by the ECJ, which provides some confirmation as to who can be an author in EU law.[100] Having said that, not all scholars are convinced that authorship should be limited to humans, as some advocate the idea of granting copyright to non-human authors.

2.3   Redefining authorship to include AI?

Among those advocating for the idea of redefining authorship is Professor Ryan Abbott, who argues that the human authorship requirement should be widened to include both human and non-human authors. He argues that assigning authorship to non-humans is an innovative new way to encourage AI growth and development.[101] Abbott finds support from Colin R. Davies, who likewise, and independently of Abbott, is a proponent of redefining authorship. Davies argues, among other things, that companies, despite lacking a physical form, can own property, earn money, and hold IP rights. In contrast, computers are not afforded the same status regarding the IP rights for their creations. Davies argues that this distinction is unfounded, drawing on the analogy of companies to illustrate his point.[102]

In contrast, Myers argues that, since AI is an inanimate system, it does not need and does not respond to incentives in order to create works.[103] Myers does, however, acknowledge that this argument could confuse the purpose of incentives, as it is the human behind the AI who would possibly respond to the incentives, not the AI.[104] Myers finds support from other scholars, such as Margoni, who is a proponent of AI-generated works being placed in the public domain.[105] As for Professor Abbotts argument that it would encourage AI growth and development, Hristov is critical, arguing that such a theoretical solution could lead to "an uncertain future full of legal challenges and systematic abuse."[106]

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[99] Opinion of Advocate General Trstenjak, Painer, C-145/10, para 121.
[100] Scannell p 734.
[101] Abbott p 1098-1099.
[102] Davies p 617.
[103] Myers p 23.
[104] Ibid.
[105] Margoni p 1-12.
[106] Hristov p 441.

3   Defining Artificial Intelligence: Concepts and Foundations

3.1   What is Artificial Intelligence?

The concept of AI can be dated back almost 70 years, when John McCharty in 1955 coined the term during a summer research project on AI.[107] However, at this point, AI was not completely new. A couple years earlier, in 1951, the first AI based program was written by Christopher Strachey. Although not so advanced, it was a checkers program that could compete with users.[108] Despite being a very broad field, Boden has described AI as the study of how to build or program computers to enable them to do what (human) minds can do.[109] To achieve that purpose, machines rely on sets of algorithms, which essentially are mathematical instructions designed to solve problems, provide answers or carry out particular tasks.[110]

The legal society has claimed that AI is interesting, but no one has said what it *is*.[111] A legal discussion on AI presupposes that the concept is, in some manner, defined.[112] Among authors who have written leading textbooks in the study of AI, are Stuart J. Russell and Peter Norvig. They write that the quest of understanding how we *think* and act, considering our intelligence being so important to us, has been a question that has thrilled humans for thousands of years. In their opinion, we most commonly associate AI to something with autonomously thinking and rational behavior that mimics human intellect.[113] Traditionally, creation has, independent of field, been associated with human beings. However, with the recent advancements in the field of AI, this notion has been challenged.[114]

Concepts such as weak and strong AI have been introduced. In simpler terms, weak AI is limited to perform a specific task, whereas strong AI can perform any intellectual task without the help of a human. Notably, we have yet to see the existence of any strong AI.[115] An example of weak AI is ChatGPT, which was released in 2022 and brought AI into the mainstream with its widespread

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[107] Kempas p 24.
[108] Roe p 105.
[109] Clark in Boden p 15
[110] Kempas p 28-29.
[111] Russell and Norvig p 19.
[112] Kempas p 23.
[113] Russell and Norvig p 1-2.
[114] Ramalho p 6.
[115] Kempas p 79.

use. Even though ChatGPT became synonymous with AI for a big part of the legal world, as it gained massive amounts of users in a short span of time, it only reflects a small percentage of the current AI systems available.[116]

Currently, there is no universally accepted definition of AI.[117] The absence of such a definition can be attributed to several reasons, but with no definite answer. AI is a rapidly evolving field, and what is considered AI will continuously expand. Furthermore, AI has a diverse application, further complicating the task of creating a universal definition.[118] However, despite the lack of an universally accepted definition, several proposals of definitions have been put forward in both the EU and US. One definition, that was put forward by the EU commission back in 2016, has been cited and used more frequently in the legal debate.[119] They defined AI as "[...] systems that display intelligent behavior by analyzing their environment and taking actions - with some degree of autonomy - to achieve specific goals."[120]

The EU commission's definition is somewhat ambiguous as to what is meant by the vague concept of *intelligence*. For that reason, the definition has been further developed by an expert group on AI related issues within the Commission, named AI HLEG. They avoid the word "intelligence" and instead focus on the AI system being able to act rationally, that is, deciding the best action to take to achieve the given goal.[121] Emphasis is also placed on the ability to perceive, interpret and reason, which indicates that the system is assumed to have relatively sophisticated capabilities.[122] In line with the definitions put forward by the EU commission and the AI HLEG, the National Artificial Intelligence Initiative Office (NAIIO) in the US, responsible for coordinating AI research and policymaking, defined AI as "[...] a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments."[123]

Similarly, both definitions emphasize that AI refers to systems that act intelligently toward predetermined goals by analyzing their environment and taking actions, potentially with some level of autonomy, based on human-defined objectives. While it is necessary to describe AI as a

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[116] To mention some, there is DALL-E, Midjourney, Stable Diffusion and Adobe Firefly.
[117] Kempas p 24 and Ramalho p 7.
[118] cf Kempas p 31-34 who discusses several proposed definitions.
[119] Ibid, p 31.
[120] COM (2018) 237 final, sec. 1.
[121] European Commission, *Ethics Guidelines for Trustworthy AI*, p 36.
[122] Kempas p 32.
[123] National Artificial Intelligence Initiative Act of 2020 (Pub. L. 116-283) SEC. 5002 (3).

broader phenomenon to provide a bit of context, in the realm of AI-generated work, generative AI is particularly important to analyze.

3.1.2   Generative AI and its foundations

Generative AI refers to a type of AI that can generate new content in text, image, music and video forms based on what it has learned from existing data.[124] While generative AI has become more widespread in recent years, it is by no means a completely new technology. In 1966, the computer scientist Joseph Weizenbaum developed the first chatbot named ELIZA, a computer program designed to imitate a Rogerian psychotherapist, that is, person-centered therapy.[125] However, it was not until 2014 that generative AI had its major breakthrough with Ian Goodfellow and other researchers at the University of Montreal's introduction of Generative Adverisal Networks, a type of machine learning (ML) algorithm with the capacity to create hyperrealistic images, videos, music and text.[126]

The pivotal spotlight that generative AI received was notably marked by the emergence of ChatGPT in November of 2022. Although ChatGPT is not the first or only generative system available, it does mark a significant breakthrough in generative AI, as it set the record for the fastest growing app in the history of web applications, with almost 100 million users after only 4 months of its launch.[127] While there is an array of generative AI systems available, the most common are Dall·E, Midjourney and ChatGPT. The two former are known for generating images, while the latter for generating text. While these generative AI systems are common, they are part of a larger and evolving landscape of generative AI.

Generative AI gets very technical but can be described as being built on the foundations of neural networks, ML and deep learning (DL), which are all subsets of the overarching AI. ML focuses on developing algorithms to learn and make predictions or decisions based on data. Under ML are neural networks, which are a kind of data structure that are inspired to mimic how neurons in the human brain work. DL is a further subset of ML that involves neural networks with many layers

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[124] Garon p 14.
[125] Bassett p 805-808.
[126] Elgendy p 341.
[127] Trust p 1.

(hence "deep") that can generate content based on their learned patterns from data.[128] Hence, all subsets are connected and will be further described.

3.1.2.1 An attempt to mimic the human brain with Artificial neural networks

Artificial neural networks (ANN) is a computational learning system that forms the base of deep learning, a subfield of machine learning, where algorithms are inspired to mimic how neurons in the human brain work based on mathematical models.[129] Like the human brain, these self-learning algorithms consist of so-called *neurons*. These neurons process a small part of the task which are grouped into several layers that can influence each other's behavior. The collective output of these grouped neurons in turn leads to the generation of complex data patterns.[130] A simple ANN consists of three types of layers, that is, inputs, hidden and output. ANN takes in data, trains themselves to recognize the patterns in the data, and then predicts the outputs for a new set of similar data.[131] Figure 1 illustrates a typical ANN structure:
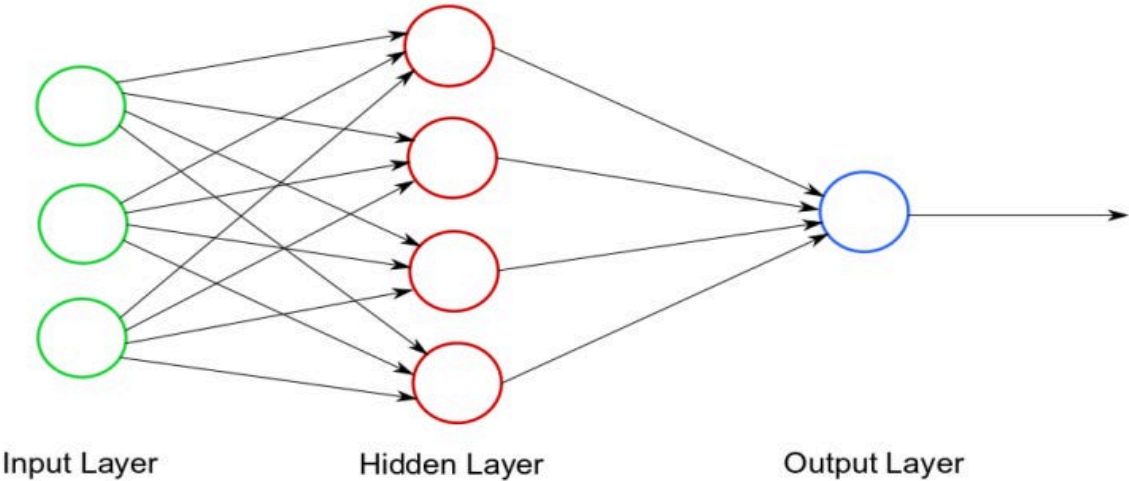
Figure 1 - Typical ANN structure [132]

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[128] Kempas p 30.
[129] Ibid.
[130] Tegmark p 94.
[131] ScienceDirect, *Artificial Neural Networks*, chapter 5.
[132] Deepak Singh, 'Hidden layers in Product Management', Growth Catalyst, 8 April 20203, https://www.growth-catalyst.in/p/hidden-layers-in-product-management.

3.1.2.2 Machine learning: enhancing performance through experience

According to AI-researcher Tegmark, neural networks have completely changed AI and begun to dominate the subset of AI called *machine learning*.[133] Machine learning refers to a type of function or model where systems can think and perform tasks that humans can, but more efficiently. The more data a machine learning algorithm can access, the greater the learning capacity of it.[134] Hutter has expressed that machine learning builds upon systems that can learn from past data, make good predictions, are able to generalize, act intelligently and more.[135] In simpler terms, machine learning is essentially programs that learn and adapt automatically through experience and by the use of data, enabling the programs to learn how to make decisions or predictions without being specifically programmed to produce a particular outcome.[136] Machine learning uses algorithms to analyze data, which subsequently allows the program to learn and make decisions. Over time, this process contributes to the AI improvings its performance by learning from experiences.[137]

3.1.2.3 Deep learning: the independent problem solver

Deep learning is a subset of machine learning, which builds upon the foundations of ANN. The subset uses ANN and connects them to each other - allowing them to process more complex patterns than traditional machine learning. The system has the ability to interpret a complex amount of data on a scale that a human would not be able to handle.[138] Deep learning and machine learning are primarily distinguished by the fact that in the former case, the computer system itself learns how to solve problems. Unlike machine learning, a big part of the process happens automatically, provided there is access to a large amount of data that the deep learning system can use to train itself.[139] Interestingly, no one really knows how, nor can explain why deep learning really works, similarly to the human brain. Yampolskiy, a professor of computer science at the University of Louisville writes "but this also seems to mean that what we know depends upon the output of machines, the functioning of which we cannot follow, explain, or understand".[140]

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[133] Tegmark p 94.
[134] Kempas p 28.
[135] IDSIA, *How to Predict with Bayes and MDL,* p 42.
[136] Brandewinder, under the title 256 Shades of Gray, p 2.
[137] Kempas p 28 and Tegmark p 94.
[138] Tegmark p 99.
[139] *IDG IT-ord,* 'Djup maskininlärning'.
[140] Yampolskiy p 4.

3.2   Can machines be intelligent?

Defining intelligence has proven to be a challenging task even for leading AI-researchers. Tegmark recounts an interesting experience during a symposium on AI arranged by The Nobel Foundation in Sweden, where some leading AI researchers had a panel discussion. He writes that "not even the most intelligent intelligence-researchers could agree on what intelligence is."[141] It has been argued that the difficulty to define AI is not a result of it being hard to define the term artificial, rather, it is due to the difficulty of defining the meaning of acting *intelligently*.[142]

Throughout history, scholars have sought to determine whether AI systems possess human-level intelligence. One of the most prominent scientists in this field, referred to by Tegmark as a "computer pioneer", is Alan Turing.[143] In 1950, Turing published the seminal paper "Computing Machinery and Intelligence", in which he posed the question "Can machines think?"[144] To answer this question, Turing famously developed the *Turing test*. The hypothetical test is built upon a human judge having a conversation, or rather interrogation, with a computer for five minutes. If the human fails to determine whether the respondent is a human or a program, and the program manages to fool the human 30% of the time, the machine can be said to have shown true intelligence.[145] Even though passing the Turing test provides a possible sign that a system is intelligent, it is not an ultimate indicator of its intelligence. His seminal paper does not assert that passing the test would be decisive proof of intelligence, rather, it is engaging with the question of machine intelligence by providing his own beliefs and considering opinions that are opposed to his own to stimulate thought and discussion.[146]

What can be said is that the test focuses on observable behavior, rather than aspects that are difficult to measure, such as consciousness.[147] In Turing's opinion, it is meaningless to try to answer the hypothetical question of whether machines can think, as the only way by which one could be sure that a machine thinks is to *be* the machine and to feel oneself thinking.[148] His opinion is supported by other experts, such as Russell and Norvig, who argue that the additional project of making a machine conscious in exactly the way humans are is not one that we are

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[141] Tegmark p 65-66.
[142] Kempas p 27.
[143] Tegmark p 72.
[144] Turing p 433.
[145] Russell and Norvig p 1035.
[146] Turing p 442-443.
[147] Kempas p 25.
[148] Turing p 446.

equipped to take on.[149] Turing, however, conjectured that by the year 2000, a system would be intelligent enough to pass his test. In 2021, Russell and Norvig concluded that two decades later, this achievement was yet to be acknowledged.[150] Their opinion found support from other writers, such as Stan Franklin, who back in 2014 acknowledged that the Loebner Prize, established in 1991 for the first AI program to pass the Turing test, remained unawarded until it was defuncted in 2020.[151] Notably, Russell and Norvig were proven wrong, as both Google's LaMDA and Open AI's ChatGPT passed the Turing test a year later.[152] However, computer scientists like Rajaraman claim that the Turing test has not been passed, as no AI has been able to pass the test by meeting the specific requirements that Turing outlined. Moreover, he writes that experts are still debating whether or not the Turing test is a reliable indicator of true artificial intelligence.[153]

In line with the definitions proposed by the EU commission, AI HLEG and the NAIIO, several definitions of AI relate to human cognitive abilities and behavior. Such abilities and behaviors are, for example, problem solving, abstract thinking and learning. The ability to show such abilities is often associated with human intelligence, however, without any unambiguous definition of "intelligence".[154] The challenge of defining the meaning of acting intelligently, as earlier mentioned, is also an effect of the technical advancements as such. What scholars have defined as intelligence throughout history, in different societies, groups and eras, have changed. Consequently, the true meaning of acting intelligently should perhaps be given a broader meaning.[155] As Spindler writes, much depends on how we define "intelligence" when discussing AI and drawing parallels to human intelligence.[156]

In 2016, the EP noted that it is conceivable that AI will eventually surpass human intellectual capacity.[157] This reflects a recognition of the rapid advancements in AI and implies that AI could become more proficient than humans. However, it also gives the impression that the EP views human and artificial intelligence as interchangeable concepts, which can be questioned.

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[149] Russell and Norvig p 1037.
[150] Ibid, p 1035.
[151] Franklin in Frankish and Ramsey p 18.
[152] Mark Roberts, 'ChatGPT passes Turing Test: A turning point for Language Models' MLYearning, 9 May 2023, www.sydney.edu.au/news-opinion/news/2023/02/15/chat-gpt-and-the-mesopotamians.html.
[153] Rajamaran p 899.
[154] Kempas p 25.
[155] Ibid, p 25.
[156] Spindler p 1049.
[157] European Parliament, Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics, sec. P.

3.2.1 Are human and artificial intelligence interchangeable concepts?

As Boden described it, AI is the study of how to build or program computers to enable them to do what (human) minds can do. As AI's role in society has grown significantly in recent years, it has been argued that there is misunderstanding by viewing human and artificial intelligence as interchangeable concepts.[158] In a legal sense, using human intelligence as a foundation, or comparable basis for assessing artificial intelligence, can be misleading.[159]

To illustrate the point, this ambiguity can in some manner be described through the idea of *Moravec's paradox,* which is a concept that emanates from the robotics researcher Hans Moravec.[160] In 1988, Moravec wrote "it is comparatively *easy* to make computers exhibit adult level performance on intelligence tests or playing checkers, and *difficult or impossible* to give them the skills of a one-year-old when it comes to perception and mobility."[161] He suggests that teaching computers to perform tasks that humans find difficult is simple, but teaching them to perform tasks that humans find simple is hard. When applying this idea to the process of ANN algorithms, it is not possible to mimic how the neurons in the human brain work, as biological neural networks and artificial neural networks are intelligent in different ways.[162] ANN learns from data through algorithms and data, while human intelligence involves a mix of our experiences, emotions and social contexts.[163]

Spindler contends that, as AI is not intelligent in a legal sense, it can not be compared to a human will.[164] As illustrated with Moravec's paradox, human intelligence is not comparable to artificial intelligence. In essence, Spindler's contention, which emphasizes the distinct nature of human intelligence, supports the court's decision in Naruto v Slater and the Advocate General's opinion in Painer, as previously analyzed. Human intelligence is unique and is not interchangeable with artificial intelligence in a legal sense. In contrast to Spindler, Kempas does not see the difference between human and artificial intelligence as a bigger problem. His point is that it is difficult, if not impossible to distinguish between a human created and AI-generated work. Thus, the question becomes whether there is any relevant difference between ANN and biological intelligence.[165]

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[158] Korteling, Van De Boer-Visschedjik, Bankendaal, Boonekamp and Eikelbloom p 3-5.
[159] Ibid, p 6
[160] Abersek and Flogie, under the title Conclusions, p 230.
[161] Moravec p 15, emphasis added.
[162] Korteling, Van De Boer-Visschedjik, Bankendaal, Boonekamp and Eikelbloom p 1-8.
[163] cf Ramalho on p 8 who argues that human intelligence is an ensemble of several components.
[164] Spindler p 1050.
[165] Kempas p 78.

4 Human input in the US

4.1 The originality standard of the US copyright regime and Copyright Act

Referring back to section 1.3.3, the notion of "human input" is not specifically stipulated, but can be interpreted through most definitions which presuppose a human author.[166] In order to qualify for copyright protection, the Supreme Court in *Feist* held that a work must be original to the author.[167] The Court emphasized the requirements importance by stating that it the *sine qua non* and a bedrock requirement of copyright.[168] Jovanovic writes that in terms of how the originality requirement is interpreted in US court practice, the Feist decision may be viewed as revolutionary.[169]

US copyright law is currently regulated by the Copyright Act. Beyond the Copyright Act, the Berne Convention finds applicability when regulating foreign authors.[170] Under the Copyright Act, a work may be registered if it qualifies as an "original work of authorship fixed in any tangible medium of expression."[171] Moreover, the Copyright Act stipulates that an "anonymous work" is a work on the copies or phonerecords of which no *natural person* is identified as an author.[172] Notably, as Ramalho points out, the wording of anonymous works essentially presumes that an author is a human through the phrasing of "natural persons".[173] In *Community for Creative Non-Violence,* the Supreme Court referred to the author of a work as "the person who translates an idea into a fixed, tangible expression entitled to copyright act".[174] Yet again, though not clearly stated, the reference to a "person" makes it clear that an author must be a human being in the assessment of copyright protection.

Having established human input as a prerequisite for protection, it becomes important to understand how this is applied in practice. This is where the Compendium of US Copyright Office Practices comes into play.

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[166] Guadamuz, 'Artificial Intelligence and Copyright'.
[167] Feist Publications, Inc. v. Rural Tel. Serv. *Co.*, 499 U.S. 340 (1991), at 345.
[168] 'Sine qua non', *Cambridge Dictionary*, emphasis added. Sine qua non is Latin for "a necessary condition without which something is not possible".
[169] Jovanovic p 32.
[170] See section 2.1.4 for more details on the Berne Convention.
[171] U.S. Code, Title 17, § 102(a).
[172] U.S. Code, Title 17, § 101, emphasis added.
[173] Ramalho p 36.
[174] Community for Creative Non-Violence v. Reid, 490 U.S. 730 (1989), at 737.

4.1.2   Compendium of US Copyright Office Practices

The Compendium of US Copyright Office Practices (Compendium) is a detailed administrative manual created by the Copyright Office that serves as a comprehensive guide to practices and procedures used by the Copyright Office. The Compendium provides guidance in a wide range of topics, such as the registration of copyright claims.[175] However, despite being extensive, its policies and practices do not have the force of law. Consequently, the copyrightability of each application implies a case-by-case assessment.[176]

As mentioned, under the Copyright Act, copyright protects original works of authorship. To that end, the Compendium emphasizes that a work must be created by a human to qualify as a work of authorship.[177] Upon elaborating on the requirement, the Compendium refers to the *Burrow-Gilles* case, where the Supreme Court held "We entertain no doubt that the Constitution is broad enough to cover an act authorizing copyright of photographs, *so far as they are representations of original intellectual conceptions of the author"*.[178] The court is implying that for a photograph to be copyrighted, it must be an original work that stems from the original effort and creative conception of a human author. This reinforces the idea that copyright is reserved for creations that originate from human thought and imagination, rather than being accidental or purely mechanical reproductions. Further on under the same section, the Compendium expressly declares that the Copyright Office will not register works produced by nature, animals or plants. Similarly, works created by "machines or mere mechanical processes that operate randomly or automatically without any creative input or intervention from a human author", will not be registered.[179]

While the Compendium is a comprehensive administrative manual, the Copyright Office in March 2023 issued specific guidance on copyright registration of AI-generated works.[180] It maintains that copyright can not be applied to entirely non-human works, but a combination of human and generative AI may be registered, provided the work is the result of "sufficient human authorship". However, this protection only extends to the human-authored aspects of the work and not those generated by the AI, hence making it very limited.[181]

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[175] US Copyright Office, 'Compendium of US Copyright Office Practices' (3rd ed).
[176] Compendium (third) sec. 309.3.
[177] Compendium (third) sec. 313.2.
[178] Burrow-Giles Lithographic Company v. Sarony, 111 U.S. 53 (1884), at 58, emphasis added.
[179] Compendium (third) sec. 313.2.
[180] U.S. Copyright Office, '*Policy Statement on Copyright Registration for AI-Generated Works'*.
[181] Ibid, p 4.

4.2 Navigating the Assessment of AI-generated works

At the outset, it should be mentioned that US copyright protection does not require registration. It is automatically granted when an original work of authorship is created and fixed in a tangible medium of expression.[182] However, one will have to register a work to be able to bring an infringement action, and probably most important for AI-generated work, registration is the only way to clarify or assert claims of authorship of such work.[183]

4.2.1 The Creativity Machine of Stephen Thaler

One of the most recent cases concerning the copyrightability of AI-generated works is the case of *Stephen Thaler*. Stephen Thaler, a computer scientist, developed an AI system known as the "Creativity Machine", capable of generating original artwork. In 2019, Thaler filed a copyright application for a visual artwork titled "A Recent Entrance To Paradise", which was generated by the Creativity Machine. He listed the Creativity Machine as the author, holding that the artwork had been "autonomously created by a computer algorithm running on a machine."[184] However, although listing the Creativity Machine as the author, he noted that it was a "work-for-hire" to the owner of the AI, entitling him any copyright protection.[185]

In their initial letter dated August 12, 2019, the Copyright Office denied Thaler's application, asserting that copyright law only protects works created by a human, not those autonomously generated by an AI.[186] Thaler requested the Copyright Office to reconsider their first refusal letter, arguing that "the human authorship requirement is unconstitutional and unsupported by either statute or case law."[187] Despite reconsideration, the Copyright Office refused registration as Thaler had failed to show any intervention by a human author. Thaler filed for a second request of consideration on May 27, 2020. He held the same arguments as his previous letter, which ultimately led the Copyright Office to refuse registration again, as Thaler failed to provide evidence of human authorship or any convincing reason for the Copyright Office to depart from copyright jurisprudence.[188]

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[182] Oliar and Powell p 2214.
[183] Ibid, p 2214-2216.
[184] Stephen Thaler Second refusal letter February 14, 2022.
[185] Ibid. p 2.
[186] Ibid.
[187] Ibid.
[188] Ibid, p 3.

Ultimately, after two reconsiderations to his detriment, he sued the Copyright Office in June of 2022 for not aligning with established legal principles, by denying registration of his work. In its decision in August of this year, the District Court of Columbia through Judge Howell sided with the Copyright Office.[189] The Court held that works generated autonomously by AI are not copyrightable due to the lack of human authorship. The Court emphasized that copyright law, while adaptable to times, requires human creativity as this is the "*sine qua non* at the core of copyrightability[..]".[190] Moreover, Judge Howell noted that copyright has never stretched so far to be granted to work that was "absent any guiding human hand,", adding that "human authorship is a bedrock requirement of copyright".[191] Judge Howell even referred to the Naruto v Slater case where the Court held that the Copyright Act does not confer standing upon animals, emphasizing the requirement of a human author.[192]

With the Court's emphasis on human involvement, their decision leaves open questions regarding the extent of human involvement necessary for copyright protection of an AI-generated work. The decision implies that works created by humans using generative AI might still be eligible for copyright protection, contingent on the level of human involvement in the creative process. However, the case of *Zarya of the Dawn* implied differently.

4.2.2   Human involvement should suffice, right Zarya?

On September 15, 2022, Kristina Kashtanova submitted a copyright application for her comic book, titled "Zarya of the Dawn", which involved the use of generative AI in the creative process.[193] The case occurred between the original application of Thaler's case in 2019 and the District court's decision in August of 2023. Initially, in her application, Ms. Kashtanova did not disclose that her work contained both human authorship and generative AI, through the use of Midjourney.[194] Hence, the Copyright Office granted her registration at face value of her representation, recognizing her as the author of both the text and images in the book. Subsequently, Ms. Kashtanova publicly announced that her AI-generated artwork had been successfully registered. As the use of generative AI had not been disclosed in her application, and

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189 Stephen Thaler v Shira Perlmutter, No 22-1564 (BAH) (2023).
190 Ibid, p 8, emphasis added.
191 Ibid, p 9.
192 Ibid, p 12.
193 Zarya of The Dawn refusal letter February 21, 2023.
194 Ibid, p 2.

a successful registration had been granted based on incorrect, or at minimum, incomplete information, her public announcement prompted the Copyright Office to reconsider the registration.[195]

The Copyright Office requested more information from Ms. Kashtanova, and in response, her counsel argued that Midjourney had been used merely as a tool in the creative process of the comic book. Alternatively, Ms. Kashantova had actively participated in the selection, coordination, and arrangement of the images and text, which the counsel claimed constituted human authorship.[196] However, the Copyright Office did not agree. They acknowledge that while the text and the overall compilation (the selection, coordination and arrangement of text and images) were protectable under copyright, the individual images generated by Midjourney did not meet the requirement of human authorship.[197] As previously mentioned, the Compendium states that machines that operate randomly or automatically without any creative input or invention from a human author, are not subject to copyright protection.

Every image, according to Ms. Kashtanova, was produced through "a similar creative process." She would start by entering a text prompt to Midjourney, referring to it as "the core creative input" for the image. Based on this prompt, Midjourney would generate output images, which she would pick one or more from to develop. By tweaking and changing the prompt, Midjourney would then generate new intermediate images. Ms. Kashtanova termed this process as "trial-and-error", as the final image was the result of "hundreds or thousands of descriptive prompts" to the generative AI, until it ultimately created the most accurate representation of her envision.[198] Despite her detailed description of the creative process, the Copyright Office held that "Midjourney users lack sufficient control over generated images to be treated as the "master mind" behind them."[199] Consequently, the Copyright Office held that the initial copyright registration was issued based on inaccurate and incomplete information. Ultimately, they decided to grant copyright for the text of the comic and for the work as a whole, but not for the individual images generated by the generative AI. The decision implies that, even when there is a human author using a generative AI with a great extent of human involvement in the creative process, the Copyright Office will not register copyright protection for the AI-generated work.

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[195] Zarya of The Dawn refusal letter February 21, 2023, p 2-3
[196] Ibid, p 3.
[197] Ibid, p 9.
[198] Ibid, p 8.
[199] Ibid. p 9.

Interestingly, based on the decision of the Copyright Office, while it is arguable that only one brief prompt by Ms. Kashtanova to Midjourney would most likely result in a court not finding the effort sufficient enough to meet the originality requirement, this was not her case. She actively participated in the creative process by providing Midjourney with "hundreds or thousands of descriptive prompts" that would result in the final image, independent of the developments she would also do to the result of the "core creative input". Having said that, the Copyright Office did not view Midjourney as merely a tool that Ms. Kashtanova had used. Rather, they emphasized that while her prompts could "influence" the generated output, it does not change the fact that Midjourney generates images in an unpredictable way.[200]

While the Copyright Office discusses both prompts and instructions detailedly, they do not acknowledge any distinction between AI-generated and AI-assisted output, which could be an important consideration. AI-generated output refers to a work that has been generated without any human intervention, while AI-assisted refers to a work that has been generated with material human intervention and/or direction.[201] As the Thaler case decision implied, AI-generated work might still be eligible for copyright protection, contingent on the level of human involvement in the creative process.[202] Ms. Kashtanova's extensive involvement in the creative process, providing numerous prompts and actively shaping the output of Midjourney, arguably places her work in the realm of AI-assisted rather than purely AI-generated.

The Copyright Office underscores a crucial issue by not recognizing the individual images generated by Midjourney copyright protection, despite Ms. Kashtanova's significant human input. Kempas argues that, in a situation where a human has been directly involved in the creative process and similar to Ms. Kashtanova has manually modified the final result, the AI-system should be regarded as a tool. However, on the same point, he does acknowledge that the difficult question is to determine the degree of human contribution that is required.[203] This raises a question of whether the Copyright Office are creating discrepancy with the constitution, through their resilience to register AI-generated work for copyright protection.

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[200] Zarya of The Dawn refusal letter February 21, 2023, p 9.
[201] Pieter De Grauwe and Sacha Gryspeerdt, 'Artificial intelligence (AI): The qualification of AI creations as "works" under EU copyright law', Gevers, 22 November 2022, www.gevers.eu/blog/artificial-intelligence/artificial-intelligence-ai-the-qualification-of-ai-creations-as-works-under-eu-copyright-law/.
[202] Stephen Thaler v Shira Perlmutter, No 22-1564 (BAH) (2023) p 13-14.
[203] Kempas p 86.

4.3 Is the Copyright Office creating discrepancy?

Innovation has always been a key factor in improving human life throughout history. It is, at its core, an endeavor deeply rooted in our humanity.[204] The thrive to promote innovation is reflected in The Patent and Copyright Clause of the US constitution. The Clause empowers Congress to enact legislation governing copyrights and patents, and in the realm of copyright, the Congress is empowered to grant authors exclusive rights over their writings.[205] The constitution reads:

"[The Congress shall have Power…] To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[206]

According to Hristov, there is a discrepancy between the constitutional goal of the Congress to promote innovation, creativity and new technology, and the resilience of the Copyright Office to register copyright protection for AI-generated works.[207] Moreover, the discrepancy could affect innovation negatively as this resilience creates a lack of incentives to both develop and invest in AI.[208] Consequently, it will result in less AI-generated works being created, as the idea of a work being released to the public domain, without a certain period of copyright protection prior to the release, decreases incentives for creators.[209]

In the light of the case law and Compendium, it is clear that the Copyright Office will not register works that lack human authorship. For now this entails, Ramalho argues, that it is both clear and inescapable that there is a requirement of a human author for a work to be eligible for copyright protection. Moreover, the current drafting appears to not regard the future, more precisely, if machines manage to create works that are neither random nor automatic.[210] As the Court in the Thaler case had reason to remind, human authorship is a bedrock requirement of US copyright. With that being said, it becomes pertinent to explore how the EU addresses similar challenges, which brings us to the concept of "author's own intellectual creation".

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[204] Lee p 1-2.
[205] *Legal Information Institute,* 'Intellectual Property Clause'.
[206] U.S. Const. art. I, § 8, cl. 8.
[207] Hristov p 431.
[208] Ibid, p 438.
[209] Ibid, p 439.
[210] Ramalho p 37.

5 Author's own intellectual creation in the EU

5.1 The originality standard of the EU copyright regime and harmonization

As mentioned, the EU originality standard consists of a twofold requirement, in which the notion of "author's own intellectual creation" is particularly interesting for AI-generated work. The idea of "author's own" is thought to be a concession of the British originality requirement, while "intellectual creation" is thought to be an expression of the continental European conception of copyright as an expression of the author's identity.[211] Since AI-generated works do not originate from a human mind in the traditional sense, they complicate the idea of an author's own intellectual creation. Instead, as illustrated in section 3.1.2, the works are produced by algorithms that process large amounts of data and follow prompts to produce outputs.[212] When a generative program is used, the "intellectual" aspect of the work becomes less clear because it is questionable whether an AI can possess creativity or a personality in the same way a human does.

The EU copyright acquis consists of thirteen directives and two regulations that set harmonized standards.[213] Harmonization of copyright has been an important part of the EU's legislative work. Some of the reasons being copyright's financial importance, international impact, as well as to uphold the EU's fundamental aim of creating and maintaining an internal market built on the free movement of goods, services, capital and persons.[214] One of the main directives regulating copyright law is Directive 2001/29/EC (InfoSoc directive). While the directive does not address AI-generated works, it was the EU's initial attempt to harmonize the Member States' copyright legislation in the light of the digital information society.[215] The directive aimed to provide a high level of protection for authors and their works, among other purposes, to enable the free movement of copyrighted goods and services within the internal market.[216] Notably, the InfoSoc directive does not mention the notion of author's own intellectual creation. However, case law has clarified its stance in several rulings.

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[211] Axhamn p 347.
[212] See section 3.1.2 and its subsects for a pedagogical account of how that process works.
[213] European Commission, *The EU copyright legislation*, sec. 1.
[214] DS 2007:29 p 12.
[215] Ferri p 24.
[216] Directive 2001/29/EC, preamble para 6.

5.2   Navigating the Assessment of AI-generated works

At the outset, it is important to note that, similar to the US, copyright protection in the individual EU member states arises automatically without the need for registration.[217] Each member state retains sovereignty over its own legal system. While a directive has to become law in each Member State once adopted at EU level, the decision of how to develop its own laws to implement these regulations rests with each individual Member State.[218] As for the judgements of the ECJ, they are binding and can not be overruled by national courts, as this would make EU law impossible to be applied equally or effectively in Member States. This reasoning follows from the supremacy of EU law, established by the court in *Costa v ENEL*.[219]

Currently, the ECJ has not specifically ruled on the AI-generated works, leaving the question of authorship open in that regard. However, according to an article by Alpman, there may now be pending legal cases in the EU as well.[220] The ECJ gives rulings on cases that are referred to it by the courts of Member States, which implies that, for the ECJ to give a ruling on AI-generated work, a case must be referred to it for a preliminary ruling.[221] Nonetheless, the ECJ does have established case law, particularly concerning the notion of author's own intellectual creation, that can impact the assessment of authorship of AI-generated work.[222]

5.2.1   Infopaq setting the scene for author's own intellectual creation

The Infopaq case is considered as perhaps the most influential case law from the ECJ which clarified the relationship between the notion of author's own intellectual creation and the InfoSoc directive.[223] While the copyright condition of author's own intellectual creation is stipulated for computer programs in the Software directive, databases in the Database directive and photographic works in the Term directive, the same is not stipulated in the harmonized InfoSoc directive for other types of works.[224] Notwithstanding, the ECJ clarified in Infopaq that, although not stipulated in the InfoSoc directive, the notion is extended to all subject matter falling within its

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[217] Hutukka p 1052.
[218] EUR-Lex, *European Union directives*, sec. 3.
[219] Judgment of the Court, C-6/64.
[220] Marie Alpman, 'AI hotar upphovsrätten', Forsking & Framsteg, 10 October 2023. <https://fof.se/artikel/ai-satter-upphovsratten-pa-spel/>.
[221] EUR-Lex, *Preliminary ruling proceedings - recommendations to national courts,* sec. 2-5.
[222] Hugenholtz and Quintas p 1194-1196.
[223] Judgment of the Court of 16 July 2009, Infopaq International, C-5/08.
[224] Art. 1(3) directive 2009/24/EC, Art. 3(1) directive 96/9/EC and Art. 6 directive 93/98/EEC.

scope. More specifically, the court held that "copyright within the meaning of Art. 2(a) of Directive 2001/29 [InfoSoc directive] is liable to apply only in relation to a subject-matter which is original in the sense that it is the author's own intellectual creation."[225]

Infopaq International (Infopaq) was a Danish company that monitored and analyzed the media with a primary business of extracting summaries from selected articles in the Danish daily newspapers and other periodicals. In the course of their business, they would extract 11-word extracts from articles that were selected by their customers by means of a "data capture process". The snippets contained certain keywords that would be compiled into summaries and subsequently sent to their customers.[226] The defendant, Danske Dagblades Forening (DDF), was a professional association of Danish daily newspaper publishers which had a duty to support its members with copyright issues. They claimed that Infopaq had infringed upon the copyright of the rightholders' of the articles by the commercial exploitation of the articles, without the authorisation of the copyright rightholders'.[227]

One of the central issues was whether these 11-word extracts of copyrighted material could be considered to be "reproduction in part" within the meaning of Art. 2(a) of the InfoSoc directive, which regulates that authors have the exclusive right to authorize or prohibit reproduction, in whole or in part, of their works.[228] The ECJ held that the author must be able to make creative choices, which is evidenced clearly "from the form, the manner in which the subject is presented and the linguistic expression." Words considered in isolation can not be considered to fall under the notion of author's own intellectual creation, as it is "only through the choice, sequence and combination of those words that the author may express his creativity in an original manner and achieve a result which is an intellectual creation."[229] The ECJ ruled that the 11-word extract of a copyrighted material is considered a reproduction in part within the meaning of Art. 2(a) of the InfoSoc directive, if the words reproduced express the intellectual creation of the author. This determination of whether the extract expresses the author's own intellectual creation is to be made by the national court.[230] Furthermore, the court found that the act of printing out the extracts did not fulfill the condition of being transient in nature for temporary acts of reproduction referred to in Art. 2 of the InfoSoc directive, as required by Art. 5(1). This implied that the reproduction

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[225] Judgment of the Court, C-5/08, para 37.
[226] Judgment of the Court, C-5/08, para 13.
[227] Judgment of the Court, C-5/08, paras 14-15.
[228] Art. 2(a) directive 2001/29/EC.
[229] Judgment of the Court, C-5/08, paras 44-5.
[230] Judgment of the Court, C-5/08, para 48.

process could not be carried out without the consent of the relevant right holders, unless they satisfied the conditions laid down in Art. 5(1).[231]

The Infopaq decision evidently gave a clarification of the relationship between the notion of author's own intellectual creation and the InfoSoc directive. However, considering that generative AI gets very technical through its different foundations of ANN, ML and DL, it raises an interesting question of how technical considerations, rules or constraints can play an impact on the notion of the author's own intellectual creation. On that point, the ECJ provides valuable insights in the joined cases of *FAPL v QC Leisure* and *Murphy v Media Protection Services*.[232]

5.2.2 A creation dictated by technical considerations, rules or constraints

The cases involved two separate but related disputes. The central issue was the use of foreign decoder cards that made it possible to access and show live Premier League football matches in pubs around the United Kingdom (UK). These decoder cards made it possible for, in this case UK pubs, to showcase the football matches at a much cheaper price than the subscription offered by BSkyB, who were the official licensee for live Premier League broadcasting at the time.[233] The FAPL claimed that by trading in foreign decoding devices designed or adapted to grant access to FAPL and others services without authorisation, the defendants infringed on their copyright.[234]

The defendants, however, claimed that the allegations were unfounded, as the decoder cars were being used legally as these had "been issued and placed upon the market, in another Member State, by the relevant satellite broadcaster."[235] In their ruling, the ECJ referred to the Infopaq case, holding that the InfoSoc directive could protect sporting events, provided that it is the author's own intellectual creation. Although the ruling does not explicitly describe how this is achieved, it can be understood on the contrary to mean that the author was able to express his creative abilities in the production of the work by making free and creative choices. More specifically the court held that football matches leave "no room for creative freedom for the purposes of copyright", which consequently made them reject the idea that sporting events could be intellectual

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[231] Judgment of the Court, C-5/08, para 74.
[232] Judgment of the Court of 4 October 2011, Case C-403/08 Football Association Premier League and Others and C-429/08 Murphy.
[233] Judgment of the Court, C-403/08, para 41.
[234] Judgment of the Court, C-403/08, para 46.
[235] Judgment of the Court, C-403/08, para 49.

creations.[236] In addition to the joined cases of FAPL, the case of *Football Dataco* also provides valuable insights on the notion of author's own intellectual creation.[237] Similarly, the case concerned football fixtures, which Football Datacao and others would create for the English and Scottish football leagues. More specifically, they drew up and published the list of all the fixtures that would be played each year in the English and Scottish league. Subsequently, these fixture lists were used by the defendants, *Yahoo! UK and others*, for the purpose of providing both news and information, and/or to organize betting events.[238]

Football Datacao and others argued that the fixture lists were protected under both the database directive and under the UK copyright legislation. Yahoo! UK and others argued that such rights did not exist, making them entitled to use the lists in their business without paying license fees.[239] The ECJ held that a database is protected by copyright under the database directive if the selection or arrangement of the data constitute the author's own intellectual creation.[240] However, they noted that for databases, this criterion is not met "when the setting up of the database is dictated by technical considerations, rules, or constraints which leave no room for creative freedom."[241] The court ruled that the fixture lists were indeed dictated by technical considerations, rules or constraints, leaving no room for such creative freedom, and thus did not constitute an author's own intellectual creation.[242]

Notably, in both the joined cases of FAPL and Football Datacao, the ECJ similarly emphasizes the importance of creative freedom for a work to be considered an author's own intellectual creation. Applying this principle to AI-generated work, if such a work is primarily generated by an AI, the degree of creative freedom exercised by a human author might be minimal or even non-existent. This could imply that AI-generated works might not meet the condition of being an author's own intellectual creation, at least under the legal framework as interpreted by the ECJ in the cases. While the cases address the aspect of creative freedom for a creation to be considered an author's own intellectual creation, a situation where a creation has been created with the aid of a machine or device has yet to be addressed. In light of this, the Painer case provides valuable insights.

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[236] Judgment of the Court, C-403/08, para 98.
[237] Judgment of the Court of 1 March 2012, Football Dataco and Others, C-604/10.
[238] Opinion of Advocate General Mengozzi, Football Dataco and Others, C-604/10, para 5.
[239] Judgment of the Court, C-604/10, para 21.
[240] Judgment of the Court, C-604/10, para 29.
[241] Judgment of the Court, C-604/10, para 39
[242] Judgment of the Court, C-604/10, para 44.

5.2.3   Recognizing authorship with the aid of machines or devices

In the *Painer* case, Art. 6 of the Term directive, which protects photographs that are the result of an author's own intellectual creation, was one of the questions referred to the ECJ by the Austrian Supreme Court in Ms. Painer's action to stop the defendants from reproducing and publishing her portrait photographs without her consent.[243] The ECJ acknowledged its earlier judgment in Infopaq, in that copyright protection applies to an original subject-matter, such as a photograph, if it is the author's own intellectual creation.[244] Furthermore, the court clarified when this was the case by referring back to the joined cases of *FAPL*, where they held that it is the case if the author is able to express his creative abilities in the production of the work by making free and creative choices.[245] As the case concerned portrait photographs, the ECJ held that the photographer is able to make free and creative choices in a number of ways and throughout the production process. This can be done by, among other things, choosing the background, the angle of view and ultimately developing the picture(s) using developing technologies. These free and creative choices made would subsequently result in the work being created with the author's personal touch.[246]

The court's ruling suggests that even when a machine or device is used in the creative process, the work could still be subject to copyright protection, provided that the creative choices and intellectual input of the author are significant to the created work. In other words, the ECJ emphasizes human creativity and intellectual effort. However, on this point, it is notable to consider the fate of Ms. Kashtanova in Zarya of the Dawn, as her extensive involvement in the creative process was not found to be sufficient. While the ECJ undeniably makes its own assessments, it seems difficult to see how they could make an assessment that would be considerably different from the assessment of the Copyright Office. The point is, despite any creative choices and intellectual inputs that are significant to a created work, the unpredictable nature of generative AI remains a factor.

In light of the fact that courts in both the US and the EU are applying existing copyright legislation that does not specifically regulate AI-generated work, it raises the question of whether the legislation is suitable to use in the assessment of authorship for AI-generated work.

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[243] Judgment of the Court of 7 March 2013, Painer, C-145/10. See section 2.2.2.1 for a recount on the facts of the case.
[244] Judgment of the Court, C-145/10, para 87.
[245] Judgment of the Court, C-145/10, para 89.
[246] Judgment of the Court, C-145/10, paras 90-92.

6   The suitability of the legislation to Generative AI

6.1   Assessing AI-generated work with outdated legislation?

The Patent and Copyright Clause of the US constitution was stipulated in 1787 and the initial Copyright Act was implemented in 1790. It was not until 1976 that the Copyright Act was revised to cope with the technological advancements and the need to modernize copyright law.[247] Since the 1976 revision, no other revisions have been done to cope with further advancements, such as generative AI, and it still serves as the basis for copyright law in the US today.[248] Hristov argues that the advancement of machine learning has led to a significant increase in AI-generated works. The Copyright Act, however, is outdated and does not adequately address this development, resulting in AI-generated works being released into the public domain due to the lack of a framework adapted to deal with such AI systems.[249]

While the US copyright framework is arguably older, it was not until the early 1990s that the EU enacted copyright legislation.[250] Several EU directives have been adopted to adapt to the digital age. One of its earliest directives, the Database directive, does not directly address generative AI as this technology was not prevalent or widely considered at the time the directive was created.[251] Furthermore, neither the EU's initial attempt to harmonize copyright in light of digital technologies through the InfoSoc directive, nor Directive 2019/790 (DSM directive) focusing on adapting copyright rules to the digital age, is no different in addressing generative AI.

Evidently, the copyright legislation in both jurisdictions were established in a time before the emergence of advanced AI technologies and, consequently, they do not specifically address the challenges posed by AI-generated work, such as authorship. Despite the advancements of AI, such as ChatGPT, Hristov argues that little has been done to accommodate it.[252] While Hristov is correct in emphasizing the need to accommodate technological advancements, the focal question does not solely have to be whether the legislation is outdated. Rather, it could be whether the

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[247] Association of Research Librariies, *Copyright timeline: A history of Copyright in the United States,* sec. 3-6.
[248] What can be noted is that the US became signatories of the Berne Convention in 1988, but it entailed no revision to the Copyright Act of 1976.
[249] Hristov p 453.
[250] The EU's first major legislation on copyright was Council Directive 91/250/EEC of 14 May 1991 on the legal protection computer programs.
[251] Özen, 'Is Europe Fit for the Digital Age? A study on the European Database Protection Framework and its Implications for Artificial Intelligence Technology' p 7.
[252] Hristov p 433.

legislation is, considering how old it is in both jurisdiction, inherently ill-suited to assess AI-generated work and never has been fitted for such assessments. Consequently, a better question to ask is whether there should exist legislation that is suitable to AI-generated work. In particular, this boils down to an important aspect to consider, that is, the legal need to protect AI-generated work.

6.1.1   The legal need to protect AI-generated works

While Hristov is correct in that little has been done, at least from a legislative point of view, a question that arises in connection to her statement is whether there actually is a need for copyright protection for AI-generated work. Arguably, AI-generated works create a legal limbo, as generative AI systems rely on existing works to develop and generate new works.[253] Relying on existing work in turn raises questions about potential copyright infringement. It would be plausible to argue that, which some commentators and courts already have, these generative programs are infringing on other copyright holders' exclusive rights by generating outputs that either resemble their existing works, or use copies of existing works to train their generative AI systems.[254]

OpenAI, the creators of ChatGPT and Dall·E, is among the many developers of AI systems. In response to a request for a comment on their training process, they stated that their programs are trained on "large, publicly available datasets that include copyrighted works."[255] OpenAI acknowledges that this process "involves first *making copies* of the data to be analyzed."[256] Unauthorized creation of such copies may infringe the exclusive right of copyright holders to make reproductions of their works.[257] However, the principle of "fair use" is most likely invoked in the US, to justify the training process of generative programs with existing works. Put simply, the fair use doctrine provided a set of exemptions that allows others to use work that is copyrighted, without the permission of the copyright holder.[258]

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[253] See section 3.1.2 and its subsects for a pedagogical account of how that process works.
[254] Congressional Research Service, '*Generative Artificial Intelligence and Copyright Law*', p 3.
[255] United States Patent and Trademark Office, '*Request for Comments on Intellectual Property Protection for Artificial Intelligence Innovation*', p 1.
[256] Ibid, p 2, emphasis added.
[257] Christopher Zirpoli, 'Generative Artificial Intelligence And Copyright Law', Eurasiareview, 1 October 2023, www.eurasiareview.com/-generative-artificial-intelligence-and-copyright-law-analysis/.
[258] Levan p 1105.

There is no equivalent or analogous doctrine to fair use in the EU. Nonetheless, Art. 5 of the InfoSoc directive does outline exceptions and limitations to copyright, such as for private copying. However, unlike the US fair doctrine, these exceptions are not open-ended and are subject to interpretation by each EU member state within their own legal frameworks.[259] While there is no straightforward answer as to whether there is a legal need to protect AI-generated work, one thing is certain for now, the advent of new AI regulation is on its way.

6.2 Bracing for Change: The advent of new AI regulation

On 16 June 2023, the EP passed the text of the Artificial Intelligence Act (AI Act). The act is the world's first comprehensive AI law and is expected to be adopted in early 2024, pending final EU procedures.[260] The AI Act aims to regulate AI within the EU, ensuring that they are safe, respect human rights, and operate transparently. It classifies AI systems based on their level of risk: unregulated, limited risk, high risk and unacceptable.[261] For generative AI systems like ChatGPT, the AI Act lays out some transparency requirements, including an obligation to disclose when content has been generated by AI and an obligation to inform users when interacting with an AI system.[262] While the AI Act represents a significant step towards regulating the use of AI, it does not explicitly regulate any copyright aspects of AI-generated work, such as the assessment of authorship. However, considering that it aims to create a framework for responsible AI use, it is not completely incomprehensible that the assessment of AI-generated work has fallen outside the scope of the AI Act. Having said that, the legislation paves way towards the responsible use of AI, however, without answering any copyright questions regarding works created by generative AI.

In contrast to the EU, the US has not advanced as significantly in regulating AI, with the most notable actions being through executive orders issued by the Biden administration. An executive order is a declaration from the US president or a governor which has the force of law.[263] The most recent executive order on AI was issued on October 30, 2023, which aims to promote the development and use of AI in a manner that is safe, secure and trustworthy.[264]

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[259] Schönning, 'The legitimacy of the InfoSoc directive - Specifically regarding the copyright exceptions' p 39.
[260] European Parliament, *EU AI Act: first regulation on artificial intelligence,* sec. 1-3.
[261] Ibid
[262] COM (2021) 206 final, art. 52.
[263] *Legal Information Institute,* 'Executive order'.
[264] Executive (E.O.) 14110 on Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence.

Apart from acknowledging the impact of generative AI on various fields and an intention to assist in creating efficient mechanisms to distinguish between content produced with AI and that which is not, nothing is said about how it will be done.[265] The copyrightability of AI-generated works and how it should be assessed remains unanswered in the executive order, similar to the AI Act.

Notably, in a article by Shana Lynch, she refers to Alex Engler, a fellow in Governance Studies, who holds that the AI Act will make it harder for the US to pass their own laws, as companies will not want different sets of rules for two different markets.[266] While the AI Act could in theory make it harder for the US to implement their own AI laws, it does not make it impossible, as the AI Act could have an extraterritorial effect by contributing to setting a standard. As an example, the European Union's General Data Protection Regulation (GDPR), which became law in May of 2018, set a global standard by constituting the strongest privacy and security law in the world. The GDPR has even inspired the data protection laws, such as Brazil's General Data Protection Law (LGPD) and California's Consumer Privacy Act (CCPA).[267] Likewise, the AI Act could influence US lawmakers to adopt AI legislation that sets a similar standard, mitigating the risk of companies having to deal with two sets of rules for two different markets.

While there is an advent of new AI regulation in both jurisdictions, through the AI Act in the EU and executive orders in the US, both jurisdictions seemingly leave AI-generated works unanswered from a copyright perspective. This implies that courts must, at least for now, continue to rely on existing copyright laws, in the absence of any specific legislation on AI-generated work. Nonetheless, the transparency requirements of generative AI systems like ChatGPT can have other impacts on copyright, such as shedding light on the origin of the data used to train these generative systems. Above all, having to be transparent with the data used becomes particularly valuable for copyright rightholders, as a lot of often copyrighted material is used in the training processes.[268]

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[265] See e.g Section 2(a) and Section 4.1(b) on the Biden Administrations ambitions for AI.
[266] Shana Lynch, 'Analyzing the European Union AI Act: What Works, What needs improvement', Stanford University, 21 July 2023,
https://hai.stanford.edu/news/analyzing-european-union-ai-act-what-works-what-needs-improvement.
[267] Kurapati and Gili p 3.
[268] On this point, see section 3.1.2.2 and 3.1.2.3 on machine learning and deep learning for a recount on how and why such data is used in the training process of generative AI systems.

7   Discussion

7.1 Navigating the differences between the assessment of authorship

The thesis's first framing question is whether there are any key differences in the assessment of authorship for copyright protection of an AI-generated work between the US and the EU. Throughout the thesis, some interesting differences have been noticed, which consequently means that the thesis's second framing question also becomes relevant, which goes hand in hand with the first question and asks how the jurisdictions view the contributions of the author.

A crucial difference in the assessment of authorship for AI-generated work is interestingly not in the actual assessment, but rather the fact that the US has specific case law on AI-generated work, while the EU does not. This key difference unarguably affects the possibility of conducting a comparative discussion based on similar conditions, as the US provides clear answers on how existing copyright legislation is applied in the assessment of authorship, whereas the EU does not. This leads to a higher degree of uncertainty on behalf of the EU, and in particular, assumptions become more prominent on how the ECJ would deal with a case concerning AI-generated work. On this point, a question that arises is why there is no specific case law on AI-generated work in the EU. This is a difficult question in which the thesis has not managed to find an answer.

However, reframing the question to ask why there is case law in the US might provide insights. Both ChatGPT and Midjourney, which have been prominently referred to in this thesis, are AI systems developed in the US. As was mentioned in the introduction, the US has a very active technology sector with a lot of money invested in AI-related companies.[269] Consequently, this can lead to more legal issues and thus more AI-related lawsuits arising in the US. However, it is challenging to compare authorship assessments between the US and EU due to the lack of similar case law in the EU. Nevertheless, legal cases may as noted be pending in the EU.[270] Despite the absence of specific case law on AI-generated work in the EU, the cases analyzed from the ECJ still constitute valuable material for comparison. They provide insights into the assessment of authorship, which in the absence of any specific case law, enables a comparison between the US and the EU.

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[269] Sec. 1.1.
[270] Sec. 5.2.

What is clear in the US approach is an emphasis on the creator of a work being a human. Both the Copyright Office and US courts maintain that authorship is considered a human trait. In the case involving Naruto's monkey selfies, the court held that the Copyright Act does not confer standing upon animals, further emphasizing the human nature of authorship. Furthermore, the Copyright Office made it clear that it will only register works created by human authors, and not those generated by an AI system. This point was especially true for both Stephen Thaler and Ms. Kashtanov, who both used generative AI systems to create their works.

Notably, such a human-centric approach to authorship is also true for the EU. Most compelling, the Advocate General in Painer underlined that only human creations are protected. However, unlike the US, the EU places higher emphasis on the intellectual aspects of a work, rather than the sole fact that the creator is a human. Similarly, the ECJ in Infopaq, the joined cases of FAPL and Murphy, and Football Datacao, emphasized the importance of creative freedom and the ability of the author to make creative choices for a work to be considered an author's own intellectual creation. The ECJ's emphasis on making free and creative choices suggests that the ECJ could make another assessment with regards to authorship, by placing more weight on the intellectual aspects of the work, rather than focusing on a human to be the creator. If this turns out to be the case when the ECJ is faced with an AI-generated for the first time, it will unarguably constitute an important key difference in the assessment of authorship between the US and EU.

However, this brings me to my next question, how the contributions of the authors are viewed in both jurisdictions. While it has been acknowledged that the ECJ might make a different assessment of authorship by focusing more on the intellectual aspects contributed by the author, I do not see how they will make an assessment that is considerably, or practically any, different to the US. Arguably, the involvement of Ms. Kashtanova in Zarya of the Dawn is a clear example of creative choices by both altering all the outputs, and proving the generative AI with hundreds or thousands of prompts. Yet, the generated images were not found to be works of authorship, as Midjourney was argued to be the mastermind behind the final output. Drawing parallels to this assessment, it is reasonable to argue that the ECJ will make a similar assessment and not find any free and creative choices to exist when a generative AI is the mastermind behind the final output. However, drawing such a parallel undermines the idea of the EU emphasizing on the intellectual aspect of a work. The point is, while it is true that Ms. Kashtanovas extensive involvement and creative choices were not sufficient, one must remember that the US places higher emphasis on the creator of a work being human, which may explain the outcome in her case. Thus, while the

US will not view the contributions of an author as sufficient in the assessment of authorship when an AI-system is used, the same can not be ascertained for the EU, until the ECJ has taken its stance on the matter.

7.2 The unsuited but appropriate legislation of AI-generated work?

Lastly, the thesis's third framing question is whether the current legislation in both jurisdictions are suitable to assess AI-generated work, and if not, if it is appropriate to use the legislation to assess its copyrightability. What has been established is that authorship is considered a human trait in both the US and the EU. Given this, it can be argued that the current copyright legislation in both jurisdictions, with their prevailing humanistic approach, is not suited for assessing AI-generated work. It goes without saying that AI systems, like ChatGPT, Midjourney or Dall·E are not human, and therefore can not meet this requirement.

However, while the existing copyright legislation in both jurisdictions is arguably unsuitable to assess authorship of AI-generated work, as it does not consider works created by generative AI systems, the follow-up question is whether it is appropriate to use it for this purpose. The straightforward answer is that it is not appropriate due to the legislation's unsuitability for AI-generated work. Having said that, its unsuitability does not necessarily exclude its appropriateness. Advocates like Abbott and Davies argued that authorship should be redefined to include AI as it will encourage AI growth and development, while others like Margoni and Hristov argued that AI's do not need incentives and that such a redefinition would create an uncertain legal environment.[271] The debate highlights the complexity of redefining authorship to include AI systems as both sides provide reasonable arguments for their stance. While the opponents are right in the fact that AI systems do not necessarily need incentives, they perhaps exclude the fact that it is the human behind the AI systems who would possibly respond to the incentives, not the AI. Hence, redefining authorship to include AI systems could potentially foster innovation and incentive authors to create new works, and developers to develop new advanced AI systems.

Having said that, my opinion is that one can not advocate for redefining authorship without considering the rationales behind the copyright legislation in both jurisdictions. Rather, the

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[271] Sec. 2.3.

discussion should be if a redefinition of authorship correlates with the ideas of Droit d'auteur and Copyright, which underlie the copyright legislation of the EU and the US respectively.[272] As has been touched upon, the copyright legislation of both jurisdictions is old, albeit arguably older in the US.[273] Thus, a conceivable line of argumentation is that the ideas of Droit d'auteur and Copyright are old and outdated, emanating in eras where AI was not even a fictional imagination. Consequently, the humanistic approach to authorship in the copyright legislation is outdated and does not consider the technological advancements of the 21st century. In light of this, it is not appropriate to use the copyright legislation available for the purpose of assessing authorship of AI-generated work.

However, from another perspective, a conceivable line of argumentation is that the legislation of both jurisdictions is upholding the rationales of copyright, and it is thus appropriate to use it in the assessment of authorship, without redefining authorship to include AI. In my opinion, the second line of argumentation is more compelling as copyright legislation should not relate dynamically to societal or technological developments, but rather maintain and uphold the rationales it is based on. There is no convincing reason to abandon fundamental copyright ideas, such as Droit d'Auteur and Copyright, which have been developed over a long period of time. Such a strong privilege as that provided by copyright should be reserved for works that really deserve it, not those generated with the help of an AI system. Interestingly, I propose that only works that "really deserve it" should be afforded copyright protection. On this point, I have to critically examine my own argument.

If an author goes through a "trial-and-error" process, similar to that of Ms. Kashtanova in Zarya of the Dawn, with hundreds or thousands of descriptive prompts to generate the final result, then what else is required for the work to be considered a work of authorship that deserves protection? Reasonably, courts should perhaps focus more on how the author has been involved in the creative process, rather than the fact that an AI system was used. While the EU lacks case law on AI-generated work, making this point harder to elaborate on for the EU, the US case law is somewhat contradictory. As Judge Howell upheld in the Thaler case, human authorship is a bedrock requirement of copyright. However, the Zarya of the Dawn case showed that extensive human involvement is not enough for the Copyright Office to register copyright protection of an

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[272] Sec. 2.1.
[273] Sec. 6.1.

AI-generated work. Considering this contradiction, the legislation is perhaps not appropriate to use, in the sense that not even extensive involvement is enough for authorship,

Notably, on the point of appropriateness, the definitions of AI presented by the EU commission, AI HLEG, and NAIIO also deserve attention.[274] Similarly, these definitions emphasize some type of intelligent behavior based on human-defined objectives. However, a question that arises is whether it is appropriate for courts to apply these definitions without considering the differences analyzed between human and artificial intelligence.[275] Having said that, it remains unclear whether these definitions are used or how they possibly influence the assessment of authorship. This ambiguity makes it challenging to conclude on whether these definitions are appropriate or not. The point is, any definition of AI that is put forward should not equate human and artificial intelligence as interchangeable. There is a distinct nature to human intelligence, as illustrated by Moravec's paradox, which underscores the inappropriateness of such an interchangeable approach to human and artificial intelligence. However, as suggested by Kempas, this is perhaps not the bigger problem, as the challenging task is to distinguish between a human created and AI-generated work.

All things considered, the current copyright legislation in both jurisdictions is arguably unsuitable for the purpose of assessing authorship of AI-generated work due to the prevailing humanistic approach to authorship, which does not align with AI systems. Consequently, the question then becomes whether it is appropriate to still use the legislation in the assessment. This question does not have a straightforward answer as there are as discussed three possible lines of argumentation. It could be argued that the copyright legislation is outdated as the ideas of Droit d'auteur and Copyright are very old, hence questioning its appropriateness. On the other hand, it could be argued that the use of existing legislation is indeed upholding the fundamental copyright rationales underlying US and EU copyright legislation, and is thus appropriate to use. Finally, its appropriateness can also be questioned in the sense that extensive involvement of an author in the creative process is evidently not found to be sufficient for authorship. However, the last line of argumentation is indeed, as mentioned, not applicable on behalf of the EU, due to the absence of specific case law on AI-generated work.

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[274] Sec. 3.1.
[275] Sec. 3.2.1.

8 Concluding remarks and the future

8.1 Concluding remarks and future thesis questions to examine

The creation of AI-generated work is undoubtedly challenging existing legal frameworks in both the US and the EU. This issue is likely to remain a hot topic within the legal debate and a matter for courts to address. Evidently, there is no specific legislation on AI-generated work in either jurisdiction, and the path towards a different outcome for AI-generated work in the assessment of authorship remains uncertain.

The EU AI Act will hopefully guide the use and transparency of AI systems in a direction that benefits both creators and users of such systems, in a way that further encourages innovation and development of advanced AI systems. It may also influence US lawmakers to adopt AI legislation that sets similar standards. However, despite the potential of the EU AI act to encourage innovation and influence US lawmakers, the question of authorship for AI-generated work remains unresolved within the frames of this thesis. Consequently, this thesis suggests two future research questions that remain unanswered, which can offer a foundation to take up where this thesis leaves the legal stance of authorship for AI-generated work, and build on.

Firstly, the thesis has explored, but not definitively answered, the question of how the US and the EU can collaborate on regulating AI-generated work. A future thesis could analyze and potentially propose ways in which these jurisdictions can together influence specific legislation regarding such works, while focusing on how the human-centric approach to authorship could be dealt with in such legislation.

Secondly, the thesis has also touched upon whether there is a legal need to protect AI-generated work, as this perhaps can impact the assessment of authorship for AI-generated work, but has concluded that there is no straightforward answer. In this regard, it could be very valuable to interview practicing lawyers who work with copyright aspects of AI on a daily basis. What do they think? Is there a legal need? If so, how should this protection be designed? Interviewing practicing lawyers is a unique approach to the question of authorship for AI-generated work as this, to my knowledge, has not been done in any theses.

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