

MASTER THESIS

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„AI and Intellectual Property Rights: Examining the Copyrightability of AI-Generated Non-Playable Character Content in Video Games under European Copyright Law“

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Abstract

This thesis delves into the intricate relationship between artificial intelligence (AI), copyright law, and video games, focusing on the recent phenomenon of AI-driven non-playable characters (NPCs). It begins by highlighting the immersive nature of story-driven video games and the pivotal role NPCs play in shaping player experiences. With the advent of AI in gaming, particularly through Large Language Models (LLMs) and Deep Learning Approaches (DLA), NPCs have evolved to autonomously generate diverse and realistic dialogue, thereby enhancing the gaming narrative.

The central inquiry revolves around the extent to which European Union (EU) copyright law protects AI-generated content, using the creation of an app titled “Urban Treasure Hunts” by a Smart NPC in the video game “The Matrix Awakens” as a case study. Through a thorough examination of EU copyright law, including the Berne Convention and CJEU Jurisprudence, this thesis argues that determining the eligibility of AI-generated content for copyright protection hinges on factors such as originality/creativity and expression, with a presumption of human authorship.

Key challenges arise due to the difficulty in discerning AI-generated content from human-authored material and the anthropocentric nature of EU copyright law. The thesis contends that while AI contributes to creative processes, it lacks the same degree of personal touch and intent as human creators. Additionally, the expression prerequisite poses challenges as human authors may struggle to identify AI-generated content accurately.

The thesis unfolds its argumentation through a structured analysis, including a review of international and EU copyright law, definitions and concepts of AI, and a detailed examination of “The Matrix Awakens” as a case study. Ultimately, it underscores the need for nuanced consideration of AI's role in creative endeavours within the framework of copyright law.

Keywords: artificial intelligence, copyright law, video games, non-playable characters, EU copyright protection, “The Matrix Awakens”.

Deutscher Abstract

Diese Arbeit untersucht die komplexe Beziehung zwischen künstlicher Intelligenz (KI), Urheberrecht und Videospielen und konzentriert sich dabei auf das jüngste Phänomen der KI-gesteuerten Nicht-Spieler-Charaktere (NPCs). Sie beginnt mit einer Betonung der immersiven Natur von Story-getriebenen Videospielen und der zentralen Rolle, die NPCs bei der Gestaltung von Spielerfahrungen spielen. Mit dem Aufkommen von KI in der Spieleentwicklung, insbesondere durch Large Language Models (LLMs) und Deep Learning Approaches (DLA), haben sich NPCs weiterentwickelt, um autonom vielfältige und realistische Dialoge zu generieren und damit die Spielhandlung zu verbessern.

Die zentrale Frage dreht sich um das Ausmaß, in dem das europäische Union (EU) Urheberrecht KI-generierten Inhalt schützt, wobei die Schaffung einer App mit dem Titel "Urban Treasure Hunts" durch einen Smart NPC im Videospiel "The Matrix Awakens" als Fallstudie dient. Durch eine gründliche Untersuchung des EU-Urheberrechts, einschließlich des Berner Übereinkommens und der Rechtsprechung des Europäischen Gerichtshofs (EuGH), argumentiert diese Arbeit, dass die Bestimmung der Eignung von KI-generierten Inhalten für den Urheberschutz von Faktoren wie Originalität/Kreativität und Ausdruck abhängt, unter der Annahme menschlicher Urheberschaft.

Herausforderungen ergeben sich aufgrund der Schwierigkeit, KI-generierte Inhalte von menschlich verfasstem Material zu unterscheiden, sowie der anthropozentrischen Natur des EU-Urheberrechts. Die Arbeit vertritt die Ansicht, dass KI zwar zum kreativen Prozess beiträgt, jedoch nicht über denselben persönlichen Touch und dieselbe Absicht wie menschliche Schöpfer verfügt. Darüber hinaus stellen die Anforderungen an den Ausdruck Herausforderungen dar, da menschliche Autoren möglicherweise Schwierigkeiten haben, KI-generierte Inhalte genau zu identifizieren.

Die Arbeit entfaltet ihre Argumentation durch eine strukturierte Analyse, einschließlich einer Überprüfung des internationalen und EU-Urheberrechts, Definitionen und Konzepte von KI sowie einer ausführlichen Untersuchung von "The Matrix Awakens" als Fallstudie. Letztendlich unterstreicht sie die Notwendigkeit einer nuancierten Betrachtung der Rolle von KI bei kreativen Unternehmungen im Rahmen des Urheberrechts.

Schlüsselwörter: Künstliche Intelligenz, Urheberrecht, Videospiele, Nicht-Spieler-Charaktere, EU-Urheberrechtsschutz, "The Matrix Awakens".

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Table with Abbreviations

General terms:

Artificial Intelligence	AI
Court of Justice of the European Union	CJEU
Deep Learning Approaches	DLA or DLAs
Deep Learning	DL
European Commission	EC
European Union	EU
End User License Agreement	EULA
Large Language Models	LLM or LLMs
Machine Learning Approaches	MLA or MLAs
Machine Learning	ML
Non-playable Characters	NPC or NPCs
Smart Non-playable Character	Smart NPC or Smart NPCs
United States	US
World Intellectual Property Organization	WIPO

Elaborated Terms:

The Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979)	Berne Convention
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Case C-683/17 Cofemel – Sociedade de Vestuário SA v G-Star Raw CV (2019) ECLI:EU:C:2019:721	Cofemel Case
European Commission, ‘Proposal for a Regulation of The European Parliament and of The Council Laying Down Harmonised Rules on Artificial Intelligence and Amending Certain Union Legislative Acts’	EU Artificial Intelligence Act
Directive 96/9/EC of 11 March 1996 on the legal protection of databases	EU Database Directive
Directive (EU) 2019/790 of 17 April 2019 on copyright and related rights in the Digital Single Market	EU Digital Single Market Directive
Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programmes	EU Computer Programme
Directive 2001/29/EC of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society	EU Infosoc Directive
Directive 2012/28/EU of 25 October 2012 on certain permitted uses of orphan works	EU Orphan Work Directive
C-469/17 Funke Medien NRW GmbH v Bundesrepublik Deutschland (2019) ECLI:EU:C:2019:623	Funke Medien Judgment
Case C310/17 Levola Hengelo BV v. Smilde Foods BV (2018) ECLI:EU:C:2018:899	Hengelo Judgment
Case C 05/08 Infopaq International v. Danske Dagblades Forening (2009) ECLI:EU:C:2009:465	Infopaq Judgment
Case C277/10 Martin Luksan v. Petrus van der Let (2012) ECLI:EU:C:2012:65	Luksan Judgment
Case C-355/12 Nintendo Co. Ltd and Others v PC Box Srl and 9Net Srl [2014] ECLI:EU:C:2014:25	Nintendo Case
Case C145/10 Eva Maria Painer v Standard VerlagsGmbH and Others (2012) ECLI identifier: ECLI:EU:C:2011:798	Painer Case
The Matrix Awakens: An Unreal Engine 5 Experience	The Matrix Awakens

1. Introduction

1.1. Prelude Information and Problem Statement

Video games produce interactive storytelling mechanisms, making it possible for players to engage directly with their environment. In this manner, the player becomes immersed in the game narrative, especially in story-driven video games.¹ The more static and repetitive the interactions with the environment become, the more negatively they impact the player.² Non-playable characters (NPCs) play a fundamental role in these story-driven video games, as they cooperate or confront the player, furthering the plot and creating different side stories.³ Essentially, NPCs are video game characters not controlled by the person playing the game, usually preprogrammed by the software developers with a limited set of robotic routines and primitive conversational abilities regarding in-game actions and interactions with the human player.⁴ Similarly, the player is given a pre-scripted choice of dialogue questions and answers, which further advance the video game storyline.⁵

With the contemporary advancement of Artificial Intelligence (AI) in the gaming industry, recent phenomena have witnessed the rise of AI-driven NPCs, altering traditionally preprogrammed and primitive conversational aspects of NPCs altogether.⁶ AI, or “computer-generated works,” in this regard, entails the output of digital neural networks that have instructed themselves to apply rules of musical, literary, or artistic assembly after being trained through a

¹ Steph Buongiorno and others, ‘PANGeA: Procedural Artificial Narrative Using Generative AI for Turn-Based Video Games’ [2024] arXiv preprint arXiv:2404.19721, 1.

² *ibid.*

³ MyounJae Lee, ‘An Artificial Intelligence Evaluation on FSM-Based Game NPC’ (2014) 14 Journal of Korea Game Society 127, 1.

Aditya Mehta and others, ‘Exploring the Viability of Conversational AI for Non-Playable Characters: A Comprehensive Survey’ (IEEE 2022), 1.

⁴ Montelli C, ‘What Does “NPC” Mean? Understanding Non-Player Characters, an Important Aspect of Any Video Game’ (Business Insider) <<https://www.businessinsider.com/guides/tech/npc-meaning>> accessed 29 May 2024.

⁵ Mehta (n 3) 1.

Guilherme Alves da Silva and Marcos Wagner de Souza Ribeiro, ‘Development of Non-Player Character with Believable Behavior: A Systematic Literature Review’ [2021] Anais Estendidos do XX Simpósio Brasileiro de Jogos e Entretenimento Digital 319.

⁶ da Silva (n 5) 319.

database of pre-existing works.⁷ Furthermore, these AI-driven NPCs utilise Large Language Models (LLMs) to autonomously generate various types of realistic, human-like texts, from poetry to fictional news, in an effort to advance the story plot in an unpredictable manner.⁸

The LLMs derive their data from a central knowledge bank, which, in most cases, is the internet at large, comprising millions of publicly accessible sources ranging from books, essays, poems, to social media posts.⁹ Additionally, the autonomous aspect is reflected in the Deep Learning Approaches (DLA), which have the capability to process large quantities of datasets through their deep neural networks. Consequently, they can learn to adjust their output based on the processed data and player input, creating new deep neurons.¹⁰ When applied to AI-driven NPCs, this bestows upon them the ability to alter and shape the storyline with their dialogues and actions within the environment in unforeseen ways, making every gaming experience unique to the player.¹¹

Challenges arise when AI-driven NPCs generate autonomous and unique concepts during in-game interactions with human players. Such is the case in the video game titled “The Matrix Awakens: An Unreal Engine 5 Experience” (The Matrix Awakens), which features AI-driven NPCs called “Smart NPCs”.¹² This marks the first instance in the history of the gaming industry where such Smart NPCs operate on Large Language Models and Deep Learning Approaches, drawing from sources across the worldwide internet, akin to OpenAI’s ChatGPT.¹³ They generate unique content in their dialogues with the player. Consequently, when a Smart NPC suggests an idea, such as creating a business app named “Urban Treasure Hunts”, important questions arise regarding

⁷ Jane C Ginsburg, ‘People Not Machines: Authorship and What It Means in the Berne Convention’ (2018) 49 IIC-International Review of Intellectual Property and Competition Law 131, 4.

Its more profound elaborations and concepts will be more thoroughly elaborated in the methodology chapter.

⁸ Andrea Omicini and others, ‘Non-Player Characters: A Study on the Derailment of Large Language Models’, 2-4. Susanna Värtinen, Perttu Hämäläinen and Christian Guckelsberger, ‘Generating Role-Playing Game Quests with GPT Language Models’ [2022] IEEE transactions on games., 1.

⁹ Nicolle Lamerichs, ‘Characters of the Future. Machine Learning, Data, and Personality’, 1.

¹⁰ Joshua Sirota and others, ‘Towards Procedurally Generated Languages for Non-Playable Characters in Video Games’ (IEEE 2019), 1.

¹¹ *ibid* 1.

¹² (Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 29 May 2024.

¹³ (Chatgpt) <<https://chat.openai.com/>> accessed 29 May 2024.

(Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 29 May 2024.

whether such AI-generated content is copyrightable under European Union (EU) copyright law. EU copyright law is chosen in this regard due to its strict preconditions on works requiring human authorship¹⁴, originality/creativity, and expression, as will be discussed.

1.2. Research Question and Thesis

This leads this master's thesis to research the narrowed down topic: To what degree does European Union copyright law protect the AI-generated concept of creating an app titled "Urban Treasure Hunts", developed through in-game dialogue between a human player and the "Smart non-playable character" in the video game "The Matrix Awakens"? In an effort to respond to the research question, this master's thesis will argue that the extent to which EU copyright law applies to the AI-generated concept of creating an app titled "Urban Treasure Hunts", developed through in-game dialogue between a human player and the "Smart non-playable character" in the video game "The Matrix Awakens", depends on the conditions of originality/creativity, and expression, provided there is human authorship.

To be more precise, this thesis advances that the invention of "Urban Treasure Hunts" by the Smart NPC is difficult to consider original or creative for two reasons. First off, using a global knowledge bank extensively, from which a great deal of the data used by the Deep Learning Approaches—which are then produced by LLM—is essentially solely repeating millions of processed books, articles, webpages, and social media postings. It doesn't have the same creative freedom or personal touch as software engineers. Second, even though the preparation stage work is credited to human authorship, by the time the Smart NPC announced the concept, Deep Learning Approaches would have changed the data to the point where it was impossible to determine any originality or creativity during the process and finalisation stages.

Moreover, the expression prerequisite poses another challenge to The Matrix Awakens video game being eligible for EU copyright protection. Because they are unable to accurately anticipate the output during the finalisation phase, human authors of Smart NPCs are unable to

¹⁴ Note that the term "input" in this master's thesis may refer to both human player input and human software developer input, as will be seen throughout this master's thesis.

accurately identify AI-generated content. The knowledge bank was only connected to millions of publicly accessible datasets by these software developers during the implementation stages, which makes it challenging to demonstrate that the human authors' general authorial intent was to have anticipated the results of the Smart NPCs with its app idea "Urban Treasure Hunts."

Finally, these challenges are only made viable given that human authorship is presumed over the work. This thesis argues that establishing sole machine authorship under EU copyright law is challenging, as the EU Copyright Law is heavily vested in an anthropocentric rhetoric. Although the term "author" is not defined by the EU Copyright Law, the EU Copyright Directives and the Court of Justice of the European Union (CJEU) Jurisprudence strongly suggest that it is anthropocentric. Such an assertion is crucial for the reader to keep in mind throughout the dissertation, as this master's thesis builds upon it through its analysis of originality/creativity and expression.

1.3. Chapters Outline

The master's thesis will unpack its argumentation through the following chapters. Primarily, it will dissect international and European copyright law and AI implications in the chapter on international copyright law. The Berne Convention from 1979, EU secondary legislation, as well as CJEU Jurisprudence, will elaborate on the terms of production in the scientific, literary, or artistic domain, human intellectual effort, originality/creativity, and expression, all preconditions to ascertaining a "work" eligible for copyright protection. Subsequently, it will describe its definitions and concepts, data inference, and shortcomings in the methodology chapter.

The definitions of Artificial Intelligence, Machine Learning Approaches, Deep Learning Approaches, and Large Language Models as part of Generative AI are unfolded to understand the autonomous processes. Additionally, the video game *The Matrix Awakens* stands central with its Smart NPCs, to observe how the AI functions behind the video game. Furthermore, both the knowledge from the legal background and the methodology will be applied to the case study "*The Matrix Awakens*", observing whether the Smart NPC's generated content of "Urban Treasure

Hunts” is eligible as a work under EU copyright protection. Finally, the conclusion will reiterate the research question with its thesis, summarising all the chapters and analyses conducted.

2. Legal Background

After introducing the subject matter to the reader, this master's thesis transitions to the international copyright section. In this chapter, the Berne Convention will be explored, focusing on authorship protection, comparing authorship with computer-generated works, and examining the prerequisites of originality or creativity. The reason for selecting the Berne Convention is its significance in European Copyright Law, with EU Directives and CJEU Jurisprudence deriving and interpreting from it, making it as such paramount. In the subsequent subchapter, the EU Copyright Law framework will be analysed, including its secondary legislation and jurisprudence, to elaborate on the meaning of the term "work" with prerequisites of production in the scientific, literary, or artistic domain, human intellectual effort, originality/creativity, and expression. The relevance of this chapter is evident in the case study of the video game "The Matrix Awakens", where this legal background is applied coherently.

2.1. International Copyright Law

2.1.1. The Berne Convention and Copyright Protection

Before focusing solely on European Copyright Law, it's important to unpack the background in International Copyright Law and its artificial intelligence implications. This is because European Copyright Law is predominantly based on International Copyright Law, specifically the Berne Convention from 1979, which plays a fundamental role in this regard.¹⁵ This Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979) (Berne Convention), is an international convention that sets out ground rules for protection of copyright at national level.¹⁶ Originally conceived in September 1886, it has since been

¹⁵ PB Hugenholtz and JP Quintais, 'Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?' (2021) 52 IIC - International Review of Intellectual Property and Competition Law 1216, 1193. S. Ricketson and JC Ginsburg, '235 Fundamentals of Protection (Articles 3–6 and 18–20)' in Sam Ricketson and Jane Ginsburg (eds), *International Copyright and Neighbouring Rights: The Berne Convention and Beyond* (Oxford University Press 2022) <<https://doi.org/10.1093/oso/9780198801986.003.0006>> accessed 5 June 2024, 36.

¹⁶ Jonathan Law, *A Dictionary of Law* (OUP Oxford 2015), 86.

amended several times and nowadays comprises a total of 181 state signatories, also called the “Union” member states.¹⁷ The substantive starting point, therefore, is the Berne Convention with its definition on “literary and artistic works”.¹⁸ In its Article 2(1) of the Berne Convention, it defines such works to include “every production in the scientific, literary, and artistic domain, whatever may be the mode or form of its expression”.¹⁹ This includes, but is not limited to, books, pamphlets, and other writings; dramatic musical works; musical compositions; cinematographic works; drawings; paintings; architecture; maps; plans; works of applied art; photography; among others.²⁰

Furthermore, the Berne Convention, in Articles 1 and 3, ensures protection for these “works” and their “authors”, whether they are in the Union or not.²¹ Such protection granted to the “work” by the convention extends for the life of the author and fifty years after their death.²² When a non-Union author publishes their work within the territory of a Union member, the first country of submission is considered competent to protect the work.²³ As a result, two categories are distinguished: Union nationals and Union residents who are eligible to file for authorship protection over the “work”.²⁴ The right to claim authorship of the work for the author is explicitly stipulated in Article 6bis of the Berne Convention, which also includes the right to object to any mutilation, distortion or its modification.²⁵ Other rights of the “author” include authorising the

Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886, as revised at Paris on July 24, 1971 and amended in 1979 | S. Treaty Doc. No. 99-27 (1986) [The 1979 amended version does not appear in U.N.T.S. or I.L.M.] (Berne Convention)

¹⁷ ‘WIPO-Administered Treaties’ (WIPO Lex) <https://www.wipo.int/wipolex/en/treaties/ShowResults?search_what=C&treaty_id=15> accessed 29 May 2024 Law (n 16) 86.

¹⁸ Berne Convention (n 16).

¹⁹ *ibid* art 2(1).

²⁰ *ibid*.

²¹ *ibid* art 3.

The “Union” refers to countries that have ratified the Berne Convention and, according to its Article 1, it is applicable to them.

²² Berne Convention (n 16) art 7(1).

Except for exceptions provided to cinematographic works in article 7(2), and anonymous or pseudonymous works in article 7(3).

²³ Ricketson and Ginsburg (n 15) 9.

²⁴ S Ricketson and JC Ginsburg, ‘358 Authorship and Ownership (Articles 7 and 15)’ in Sam Ricketson and Jane Ginsburg (eds), *International Copyright and Neighbouring Rights: The Berne Convention and Beyond* (Oxford University Press 2022) <<https://doi.org/10.1093/oso/9780198801986.003.0007>> accessed 5 June 2024, 2.

²⁵ Berne Convention (n 16) art 6.

reproduction of its “work”, its public performance in cases of dramatic and musical works, its broadcasting, public recitation and any alterations, adaptations or arrangements.²⁶

2.1.2. Authorship and Computer-Generated Works

The previous paragraphs imply that the term “author” from the Berne Convention establishes the primary causal link to the above-mentioned rights and the protection of the “work”. However, when it comes to computer-generated works, the Berne Convention and its auxiliary elaborations and guides have not defined the notion of “author”. Instead, from its inception to the present day, there has been a general consensus among nations that the author is the human being who creates or makes the “work”.²⁷ The first attempts to elaborate on the term “author” came about in 1963, when the Committee of Governmental Experts broadly interpreted the definition to accommodate the various divergent legal systems in their transpositions.²⁸ During this time, there were no mentions of machine-generated works. It was not until the 1967 revision of the Berne Convention that machine authorship received its first notice.²⁹ Albeit not a direct interpretation of the term “author”, concerns were raised by the United States (US) Register of Copyrights Abraham Kaminstein, which highlighted the rapid advances in computer technology to challenge the outdated legal definitions in the US.³⁰

²⁶ Berne Convention (n 16) arts 9, 11, 11bis, 11ter, and 12.

²⁷ Ricketson and Ginsburg (n 24), ‘358 Authorship and Ownership (Articles 7 and 15)’ in Sam Ricketson and Jane Ginsburg (eds), *International Copyright and Neighbouring Rights: The Berne Convention and Beyond* (Oxford University Press 2022) <<https://doi.org/10.1093/oso/9780198801986.003.0007>> accessed 5 June 2024, 2.

Adolf Dietz, *The Concept of Author under the Berne Convention* (Association française pour la diffusion du droit d’auteur national et ... 1993), 10–18.

David Vaver, ‘The National Treatment Requirements of the Berne and Universal Copyright Conventions [Part 1]’ [1986] *International Review of Industrial Property and Copyright Law* (now *International Review of Industrial Property and Competition Law*). Volume 17 (1986), 577, 593.

Sam Ricketson, ‘The 1992 Horace S. Manges Lecture—People or Machines: The Bern Convention and the Changing Concept of Authorship’ (1991) 16 *Colum.-Vla JL & Arts* 1.

²⁸ International Bureau of Intellectual Property, *Berne Convention for the Protection of Literary and Artistic Works: Proposals for Revising the Substantive Copyright Provisions (Articles 1 to 20)*, Document S/1 (1986), 91.

²⁹ Ricketson and Ginsburg (n 24) 2.

Only one participant—US observer Abraham Kaminstein of the Register of Copyrights—mentioned computers in the 1967 Records.. See Abe A Goldman, ‘The Copyright Law: Nearly Sixty Years Later’ (1967) 28 *Ohio St. LJ* 261, 1.

³⁰ Ricketson and Ginsburg (n 24) 2.

Abe A Goldman, ‘The Copyright Law: Nearly Sixty Years Later’ (1967) 28 *Ohio St. LJ* 261, 1-2.

After such concerns were raised, in 1978, the World Intellectual Property Organization (WIPO) Guide remained silent on the matter. Instead, it suggested that the term “author” could include legal persons such as corporations, following the needs of national legal orders.³¹ The last attempt at the term’s elaboration came about in the 1990s with the Model Provisions for Legislation in the Field of Copyright, undertaken by WIPO. WIPO in this draft model solely reiterated for the author to be a “physical person who has created the work”.³² Henceforth, the human author has been generally considered to be the creator or maker of a work, with no mentions of computer-generated works stemming from the convention nor its auxiliary guides.

2.1.3. The Prerequisites of Originality or Creativity

Since the notion of an “author” is generally understood as the human creator or maker of the work, the case of AI autonomously generated “works” may be seen as redundant.³³ Instead, the analysis for the purposes of the Berne Convention should be approached from a different angle. AI should be regarded as a tool or instrument employed by the human author, as human creativity is presupposed in its process of creation.³⁴ The latter suggestion aims at exploring the connection between the input of a human author, and the resulting AI-generated work, which necessitates a degree of “originality”.³⁵ This degree of “originality” may be inferred from Article 2(3) of the Berne Convention, which states that alterations of a literary or artistic work shall be protected as “original works”.³⁶ For a work to be considered original, it has to be a product of the author’s thinking process/creation.³⁷ Additionally, the element of “originality” may be inferred from Article

³¹ World Intellectual Property Organization and Claude Masouyé, *Guide de La Convention de Berne Pour La Protection Des Œuvres Littéraires et Artistiques (Acte de Paris, 1971)* (OMPI 1978), para 1.16.

H Gaffar and S Albarashdi, ‘Copyright Protection for AI-Generated Works: Exploring Originality and Ownership in a Digital Landscape’ [2024] *Asian journal of international law* (Cambridge, U.K.) 24, 6.

³² ‘Setting of Norms in the Field of Intellectual Property Particularly under the Paris and Berne Conventions’, WIPO Document AB/XVIII/2, Annex A, quoting WIPO’s budget and programme for 1988–1989, agenda item PRG 04, 252. Ricketson and Ginsburg (n 24), 7.

³³ Gaffar and Albarashdi (n 31) 13.
Ginsburg (n 7), 1.

³⁴ Gaffar and Albarashdi (n 31) 13.

³⁵ *ibid.*

³⁶ Gaffar and Albarashdi (n 31) 13.
Berne Convention (n 16) art 2(3).

W. William Fisher II., ‘Recalibrating Originality’ (2016) 54 *Hous L Rev* 437, 455.

³⁷ Salsalina Itha Karina, ‘Is This Part Substantial or Is It Time to Rethink the Concept of Originality in Music?’ (2022) 5 *Nagari Law Review* 184, 2.

2(5) of the Berne Convention, which mandates that collections of literary or artistic works that constitute “intellectual creations” shall be protected as such.³⁸ Such a creation, in turn, presupposes a minimum level of creativity.³⁹ When assessing the precise degree of what constitutes “original works” or “intellectual creation,” this is left to the discretion of national legal instances during its transposition.⁴⁰

In conclusion, when intending to analyse a work made by an author under the Berne Convention, attention should be directed towards assessing the extent to which a computer-generated output can be considered a work created by a human author, rather than considering the AI as the “author” itself. This is because the international community predominantly envisions the human author as the primary creator, with little to no focus given to computer-generated works.⁴¹ Additionally, there is an underlying rationale for the work or creation to embody a certain degree of human originality or creativity for it to be attributable to the author. The pertinence of such inference will be evident in the next chapter, where the European copyright law strongly transposes and interprets these provisions in the light of EU secondary legislation and jurisprudence.

2.2. European Copyright Law

The reason behind this essay to have invoked the Berne Convention as part of international copyright law, is to make the interconnection between it and European Copyright Law. Similar to Article 2 of the Berne Convention, Article 1 of the Directive 2006/116/EC on the term of protection of copyright and certain related rights (EU Copyright Directive) utilises the expression “literary or artistic work”.⁴² Furthermore, the main EU *acquis communautaire* for copyright law comprises the

³⁸ Gaffar and Albarashdi (n 31) 18.
Berne Convention (n 16) art 2(5).

Fisher II (n 36) 455.

³⁹ Karina (n 37) 2.

⁴⁰ Gaffar and Albarashdi (n 31) 19.
Fisher II (n 36) 455.

⁴¹ The Universal Declaration of Human Rights, in its Article 27(2), which declares that everyone has the right to the protection of the moral and material interests emerging from literary, scientific, or creative achievement, similarly assumes human authorship. Since the “members of the human family” are the intended audience for human rights, a computer cannot be considered the author of the work.

Universal Declaration of Human Rights (adopted 10 December 1948 UNGA Res 217 A(III) (UDHR) art 27(2).

⁴² Directive 2006/116/EC on the term of protection of copyright and certain related rights | [2006] | OJ L 372, 27.12.2006 | p. 12–18 | (EU Copyright Directive) art 1.

Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programmes (EU Computer Programme Directive), the Directive 2012/28/EU of 25 October 2012 on certain permitted uses of orphan works (EU Orphan Work Directive), the Directive 2001/84/EC of 27 September 2001 on the resale right for the benefit of the author of an original work of art, the Directive 96/9/EC of 11 March 1996 on the legal protection of databases (EU Database Directive), the Directive (EU) 2019/790 of 17 April 2019 on copyright and related rights in the Digital Single Market (EU Digital Single Market Directive), and the Directive 2001/29/EC of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society (EU Infosoc Directive).⁴³ The majority of these Directives references back to the Berne Convention by establishing a common requirement for a “work” to qualify for protection: it must be “original” in the sense that it is the “author’s own intellectual creation”.⁴⁴ In addition to EU legislation, this concept has gained autonomy through the Court of Justice of the European Union, which reiterated it in several cases: Case C-05/08 in 2009, Case C-393/09 and C-403/08 and C-429/08 in 2010, Case C-145/10 in 2011, and Case C-604/10 in 2012.⁴⁵

⁴³ Directive 2009/24/EC on the legal protection of computer programs | [2009] | OJ L 111, 5.5.2009 | p. 16–22 | (EU Computer Programme Directive).

Directive 2012/28/EU on certain permitted uses of orphan works | [2012] | OJ L 299, 27.10.2012 | p. 5–12 | (EU Orphan Work Directive).

Directive 2001/84/EC on the resale right for the benefit of the author of an original work of art | [2001] | OJ L 272, 13.10.2001 | p. 32–36.

Directive 96/9/EC on the legal protection of databases | [1996] | OJ L 77, 27.3.1996 | p. 20–28 | (EU Database Directive).

Directive (EU) 2019/790 on copyright and related rights in the Digital Single Market | [2019] | OJ L 130, 17.5.2019 | p. 92–125 | (EU Digital Single Market Directive).

Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society | [2001] | OJ L 167, 22.6.2001 | p. 10–19 | (EU Infosoc Directive).

⁴⁴ EU Computer Programme Directive (n 43) art 1(3).

EU Database Directive (n 43) art 3(1).

EU Copyright Directive (n 42) art 6.

EU Digital Single Market Directive (n 43) art 14.

Hugenholtz and Quintais (n 15) 1194.

⁴⁵ Case C-05/08 | Infopaq International v. Danske Dagblades Forening | (2009) | ECLI:EU:C:2009:465 | (Infopaq Judgment) paras 37-39.

Thomas Margoni, ‘Artificial Intelligence, Machine Learning and EU Copyright Law: Who Owns AI?’ [2018] Machine learning and EU copyright law: Who owns AI, 16.

See also: Case C-393/09 | Bezpečnostní softwarová asociace - Svaz softwarové ochrany v Ministerstvo | (2010) | ECLI:EU:C:2010:816 |

Joined Cases C-403/08 and C-429/08 | Football Association Premier League Ltd and Others v QC Leisure and Others and Karen Murphy v Media Protection Services Ltd | (2011) | ECLI:EU:C:2011:631 |

Case C-145/10 | Eva-Maria Painer v Standard VerlagsGmbH and Others | (2012) | ECLI identifier: ECLI:EU:C:2011:798 | (Painer case).

Case C-604/10 | Football Dataco Ltd and Others v Yahoo! UK Ltd and Others | (2012) | ECLI:EU:C:2012:115 | Mark Perry, ‘The Harmonisation of EU Copyright Law: The Originality Standard’ (2016), 86.

2.2.1. Production in Scientific, Literary or Artistic Domain

By observing these EU elements, which are simultaneously derived from and extrapolated from the Berne Convention⁴⁶, the following structure is proposed to analyse whether an endeavour such as computer-generated works might be considered a “work” under EU copyright law. Principally, the work must belong to the scientific, artistic, or literary domain. Secondly, it must be a product of human intellectual effort. Thirdly, it must possess a certain degree of originality or creativity. Lastly, it must be an expression created by the author.⁴⁷ To the first established notion, the prerequisite of the work belonging to the scientific, literary or artistic domain stems from the Berne Convention. In EU copyright law, as observed, this has been reiterated in Article 1 of the EU Computer Programme Directive. It mandates substantively for the rights of an author of an “artistic or literary” work within the meaning of Article 2 of the Berne Convention to extend for life of the author and for 70 years after his death.⁴⁸ Similar provisions, including but not limited to those in the Infosoc Directive⁴⁹, the EU Copyright Directive (from its Article 1 as mentioned earlier)⁵⁰, and the EU Database Directive.⁵¹

In this way, the EU Computer Programme Directive in conjunction with Infosoc Directive, EU Copyright Directive and the EU Database Directive amongst others teleologically interpret and/or legally link the examples of “works” with the meanings outlined in Article 2 of the Berne Convention for the EU member state addressees.⁵² Despite not explicitly defining the term “work” itself, the EU *acquis communautaire* does however possess some of its own examples of works.⁵³

⁴⁶ Case C-277/10 | Martin Luksan v. Petrus van der Let | (2012) | ECLI:EU:C:2012:65 | (Luksan judgment), para 59. Case C-310/17 | Levola Hengelo BV v. Smilde Foods BV | (2018) | ECLI:EU:C:2018:899 | (Hengelo judgment), paras 38-39.

⁴⁷ Hugenholtz and Quintais (n 15) 1194.

⁴⁸ EU Copyright Directive (n 42) art 1.

Hasan Kadir Yilmaztekin, *Artificial Intelligence, Design Law and Fashion* (Routledge 2022), 77.

⁴⁹ EU Infosoc Directive (n 43) preamble para 19.

⁵⁰ EU Copyright Directive (n 42) art 1, see also preamble paras 2, 5, 6, 13, 15, 16, 21, and art 7.

⁵¹ EU Database Directive (n 43) preamble paras 28, 35, 37, and art 5(3).

⁵² Yilmaztekin (n 48) 77.

⁵³ *ibid* 84.

So are computer programmes⁵⁴ and press publications regarded as “literary works”⁵⁵, whereas plastic or graphic art such as pictures, paintings, drawings, engravings, prints, sculptures, tapestries, ceramics are considered to be “works of art”.⁵⁶

The CJEU jurisprudence is somewhat ambiguous regarding whether the matter in question must fall within the artistic, literary, or scientific domain as a precondition.⁵⁷ This has been demonstrated in its Joined cases C-403/08 Football Association Premier League Ltd and Others v QC Leisure and Others and C-429/08 Karen Murphy v Media Protection Services Ltd.⁵⁸ When tasked with interpreting whether transmitted programme content from one undertaking to another constitutes “television broadcasting” within the meaning of Article 2(a) of the Conditional Access Directive⁵⁹ and Article 1(a) of the Television without Frontiers Directive⁶⁰, the CJEU concluded that “sporting events” are “not to be regarded as intellectual creations classifiable as works”.⁶¹ This possibly suggests that the CJEU judicially reviewed whether sporting events constitute an artistic, literary, or scientific work. However, this interpretation is contradicted by the subsequent sentence in paragraph 98 of the judgment, which states that there is no room for “creative freedom” for the purposes of copyright, implying this to fall within the originality/creativity category.⁶²

In a similar manner, case C-310/17 Levola Hengelo BV v Smilde Foods BV (Hengelo Judgment) also vaguely hints upon such a “domain test”.⁶³ In this case, the CJEU was specifically

⁵⁴ The term “computer program” according to preamble paragraph (7) of the EU Computer Programme Directive includes programs in any form, including those which are incorporated into hardware. In addition, it comprises likewise preparatory design work culminating into the development of a computer program at a later stage.

EU Computer Programme Directive (n 43) preamble para 7.

⁵⁵ EU Computer Programme Directive (n 43) art 1.

EU Digital Single Market Directive (n 43) art 2(4).

⁵⁶ EU Directive 2001/84/EC (n 43) art 2(1).

⁵⁷ Hugenholtz and Quintais (n 15) 1194.

⁵⁸ Joined cases C-403/08 and C-429/08 (n 45).

⁵⁹ Directive 98/84/EC on the legal protection of services based on, or consisting of, conditional access | [1998] | OJ L 320, 28.11.1998 | p. 54–57.

⁶⁰ Council Directive 89/552/EEC on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities | [1989] | OJ L 298 of 17.10.1989 | 05.99.00.00 Archived summaries |

⁶¹ Joined cases C-403/08 and C-429/08 (n 45) paras 54(2)(a) and 98.

⁶² *ibid* paragraph 98.

Hugenholtz and Quintais (n 15) 1194.

STEF Van Gompel, ‘Creativity, Autonomy and Personal Touch. A Critical Appraisal of the CJEU’s Originality Test for Copyright’ [2014] *The work of authorship* 95, 106.

⁶³ Hengelo Judgment (n 46).

asked to determine whether creations that can be perceived visually and/or audibly fall under EU copyright protection, which includes Article 2(1) of the Berne Convention with its phrase “every production in the literary, scientific, and artistic domain, whatever may be the mode or form of its expression”.⁶⁴ In its verdict, the CJEU ascertained that in order for a “work” to be protected by the EU Infosoc Directive, it must be “expressed in a manner which makes it identifiable with sufficient precision and objectivity”.⁶⁵ Rather than evaluating whether such creations belong to the literary, scientific, or artistic domain, the CJEU took the approach of linking them with the expression precondition mandated by the author.⁶⁶

In conclusion, the EU's approach to assessing whether a creation should be subject to the scientific, literary, or artistic domain is *de jure* mandatory for substantive eligibility for EU copyright protection, with references to Article 2(1) of the Berne Convention. However, in practice, it has not received much attention from the CJEU. Instead, it has been interlinked with existing elements of originality/creativity, and expression. When applied to AI-generated output, this ambiguous interpretation suggests the possibility of it satisfying the criterion, provided that it can be sufficiently ascertained to contain such elements of originality/ creativity, and expression.

2.2.2. “Human” Intellectual Effort and Artificial Intelligence

The second prerequisite for evaluating whether AI might be considered a work relates to the paradigm of “human” intellectual effort. Similarly to the Berne Convention, the EU Copyright Law is vested within the tradition of author’s rights (*droit d’auteur*), which originate from the copyright laws of national legal systems.⁶⁷ From these systems, there is a presumption that copyright protects original expression stemming directly from the human author.⁶⁸ As illustrated in previous chapters, the Berne Convention does not explicitly define the term “author,” although it strongly suggests that an author is a natural person, or possibly a legal person, as explained by

Hugenholtz and Quintais (n 15) 1194.

⁶⁴ *ibid*, para 25(1).

⁶⁵ *ibid* para 40.

⁶⁶ Hugenholtz and Quintais (n 15) 1194.

⁶⁷ Yilmaztekin (n 48) 109.

⁶⁸ Giulia Priora, ‘Copyright Law and the Promotion of Scientific Networks: Some Reflections on the Rules on Co-Authorship in the EU’ (2019) 9 Queen Mary Journal of Intellectual Property 217, 219.

the 1978 WIPO Guide. Despite EU Copyright Law not explicitly mentioning the authorship to extend to a natural or a legal person, its “anthropocentric” concentration on human authorship is evident in numerous legal aspects.⁶⁹

For example, the EU Copyright Directive extends copyright protection for the life of the author and for 70 years after his death, explicitly referring to human beings.⁷⁰ In addition, Article 1(4) of the EU Copyright Directive addresses “natural persons who have created the work”, similarly hinting at authors being natural persons.⁷¹ Such an assertion is further reinforced by its preamble paragraph 16, which states that a photographic work can only be considered an original if it is the author’s own intellectual creation “reflecting his personality”.⁷² The CJEU jurisprudence supports this anthropocentric assertion in its cases C-145/10 *Eva-Maria Painer v Standard Verlags GmbH* (Painer Case) and C-683/17 *Cofemel - Sociedade de Vestuário SA v G-Star Raw CV* (Cofemel Case) through relying upon the notion of a “human being” engaging in creative acts.⁷³ The former case illustrates in paragraph 92 of its judgment that solely the author of a portrait photograph is able to stamp the work created with his “personal touch”.⁷⁴

The latter case bolsters this notion in its paragraph 30 of the judgment, by indicating that it is necessary for the subject matter to “reflect the personality of its author, as an expression of his free and creative choices”.⁷⁵ Moreover, in her separate opinion on the Painer Case, Advocate General Trstenjak reaffirmed that EU copyright protection pertains only to “human creations,” a stance later accepted by the CJEU.⁷⁶ As a result, for AI to be considered an author, it must exhibit

⁶⁹ Hugenholtz and Quintais (n 15) 1195.

See also Ana Quintela Ribeiro Neves Ramalho, ‘Originality Redux: An Analysis of the Originality Requirement in AI-Generated Works’ (Giuffrè Editore 2019).

⁷⁰ EU Copyright Directive (n 42) art 1.

⁷¹ EU Copyright Directive (n 42) art 1(4).

⁷² *ibid* preamble para 16.

⁷³ Painer Case (n 45).

Case C-683/17 | *Cofemel – Sociedade de Vestuário SA v G-Star Raw CV* | (2019) | ECLI:EU:C:2019:721 | (Cofemel Case)

Hugenholtz and Quintais (n 15) 1195.

⁷⁴ Painer Case (n 45) para 92.

⁷⁵ Cofemel Case (n 73) para 30.

Yilmaztekin (n 48) 109.

See also Case C-572/13 | *Hewlett-Packard Belgium SPRL v Reprobel SCRL* | (2015) | ECLI:EU:C:2015:750 |

⁷⁶ Verica Trstenjak, ‘Opinion of Advocate General Trstenjak Delivered on 12 April 2011 - I - 12538’ <<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62010CC0145>>, para 121.

Yilmaztekin (n 48) 109.

a “personal touch” and reflect its “personality” through the expression of its “free and creative choice”, setting the threshold particularly high under EU copyright law for the AI to become the sole author.⁷⁷

Such a threshold is seen as particularly high under EU Copyright Law, as these computer-generated works can with difficulty provide for a personality, personal touch, or a free and creative choice. For starters, this would entail the potential recognition of AI legal personhood with rights and responsibilities, which could chaotically shape copyright law.⁷⁸ As an illustration, the AI legal personhood may bring about (co)ownership ambiguity, legal recognition, and enforcement implications, and a lack of control and accountability.⁷⁹ The academia therefore similarly proposes AI-generated works with human involvement as the key to analysing the EU copyright authorship

⁷⁷ See also Kalin Hristov, ‘Artificial Intelligence and the Copyright Dilemma’ (2016) 57 *Idea* 431.

Y. Cho, ‘Copyright Aspects of Artificial Intelligence-Generated Works - Copyrightability and Author’ (2020) 19 *Ethics and Policy Research, Journal of Media Law*, 113.

Nina I Brown, ‘Artificial Authors: A Case for Copyright in Computer-Generated Works’ (2018) 20 *Colum. Sci. & Tech. L. Rev.* 1.

⁷⁸ T. Aplin and G. Pasqualetto, ‘Artificial Intelligence and Copyright Protection’ in Rosa Maria Ballardini, Petri Kuoppamäki and Olli Pitkänen (eds), *Regulating Industrial Internet Through IPR, Data Protection and Competition Law* (Kluwer 2019), 17.

See also, Robert van den Hoven van Genderen, ‘Legal Personhood in the Age of Artificially Intelligent Robots’ in Woodrow Barfield and Ugo Pagallo (eds), *Research Handbook on the Law of Artificial Intelligence* (Edward Elgar Publishing 2018) 213-250.

To observe tort law implications, see Ryan Abbott, ‘The Reasonable Computer: Disrupting the Paradigm of Tort Liability’ (2018) 86 *Geo. Wash. L. Rev.* 1.

To observe criminal law challenges, see Sabine Gless, Emily Silverman and Thomas Weigend, ‘If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability’ (2016) 19 *New Criminal Law Review* 412. To observe human rights involvement, see Surya Deva, ‘Can Robots Have Human Rights Obligations? A Futuristic Exploration’ (2012) 2 *A Futuristic Exploration* (December 31, 2012). The law of the future and the future of law 185.

⁷⁹ Carys J Craig, ‘The AI-Copyright Challenge: Tech-Neutrality, Authorship, and the Public Interest’, *Research handbook on intellectual property and artificial intelligence* (Edward Elgar Publishing 2022), 2-5.

See also: Annette Flanagan and others, ‘Nonhuman “Authors” and Implications for the Integrity of Scientific Publication and Medical Knowledge’ (2023) 329 *Jama* 637.

Mehrdad Maghsoudi and others, ‘Co-Authorship Network Analysis of AI Applications in Sustainable Supply Chains: Key Players and Themes’ (2023) 422 *Journal of cleaner production* 138472.

Joseph Crawford and others, ‘Artificial Intelligence and Authorship Editor Policy: ChatGPT, Bard Bing AI, and Beyond’ (2023) 20 *Journal of University Teaching & Learning Practice* 1.

Andrea Katalin Tóth, ‘Algorithmic Copyright Enforcement and AI: Issues and Potential Solutions through the Lens of Text and Data Mining’ (2019) 13 *Masaryk University Journal of Law and Technology* 361.

criterium.⁸⁰ That is because the AI is in this case utilised as a mere tool, leaving the creative concept or idea to the human being as part of the personal touch and creative choice threshold.⁸¹

In conclusion, the EU Copyright Law, much like the Berne Convention, is rooted in an anthropocentric perspective, placing the human being at the centre despite lacking a uniform definition of an author. This focus is evident in EU legislation such as the EU Copyright Directive, as well as in landmark cases like *Painer* and *Cofemel*, where Advocate General Trstenjak explicitly referred to EU copyright as pertaining to human beings. Furthermore, the criteria of personality, personal touch, and free and creative choice pose significant barriers for AI to become the sole author, as this would require recognition of its legal personhood. Academia thus proposes that emphasis should be placed on assessing the degree of human personality, personal touch, and free and creative choice involved with AI, rather than considering AI as the sole author. It is imperative for the reader to maintain cognisance of this subchapter throughout the thesis, as the dissertation similarly approaches this comprehensive undertaking, as evidenced by the forthcoming case study, from the anthropocentric perspective of human authorship.

2.2.3. Originality/Creativity

The previous subchapter briefly touched upon the expressions of personal touch and creative choice emanating from the *Painer* and *Cofemel* cases.⁸² This leads this essay to transition to its subsequent preconditions to what entails work within the EU copyright framework, notably originality or creativity. The originality or creativity standard may be inferred from the phrase “author’s own intellectual creation”, as reiterated by EU legislation and case law.⁸³ To be more

⁸⁰ Helene Margrethe Böhler, ‘EU Copyright Protection of Works Created by Artificial Intelligence Systems’, 18. (EU copyright protection of works created by artificial intelligence systems)
See also Martin Miernicki and Irene Ng, ‘Artificial Intelligence and Moral Rights’ (2021) 36 AI & SOCIETY 319 Margoni (n 45).

⁸¹ Böhler (n 80) 18.

⁸² Cf footnotes 73-74.

⁸³ Cf footnotes 42-45.

According to Article 1(3) of the Computer Programme Directive, a computer programme is considered original if the creator is the only one who can create it, and no other factors can be used to judge whether or not it qualifies for protection.

Begoña Gonzalez Otero, ‘Machine Learning Models under the Copyright Microscope: Is EU Copyright Fit for Purpose?’ (2021) 70 GRUR International 1043, 1048.

precise, the phrase presupposes that the work: i) is the author's own creation and not copied, and ii) constitutes an "intellectual creation".⁸⁴ The latter is, in turn, subject to the originality or creativity threshold, as stamped by the cases C-403/08 and C-429/08 Football Association Premier League and Others, C-310/17 Hengelo Judgment and C-683/17 Cofemel Case.⁸⁵ The CJEU held in these cases that in order to consider a work, the "work must first be original" in the sense that it is "the author's own intellectual creation".⁸⁶

Additionally, in cases C-145/10 Painer and C-469/17 Funke Medien NRW GmbH v Bundesrepublik Deutschland (Funke Medien), the CJEU elaborated upon intellectual creation to imply originality, which is reflected in the author making "personal" and "creative choices".⁸⁷ The Painer Case however directly addressed a situation in which a work was created with the aid of a machine, making it especially relevant for AI-generated output.⁸⁸ Specifically, the CJEU was tasked with determining whether photographic works, such as portrait photos, are afforded "weaker" copyright protection against adaptations when the realistic image is significantly altered.⁸⁹ In its verdict, the CJEU ruled that the portrait photographer must be able to make "free and creative choices in several ways and at various points in its production". This includes during the "preparation phase", "when taking a portrait photograph", or in the end "when selecting the snapshot", allowing for the expression of his "personal touch" through the freedom to exercise their "creative abilities".⁹⁰ This means that for an AI-generated output to be considered original or

⁸⁴ Hugenholtz and Quintais (n 15) 1196.

Mireille Van Eechoud, 'Along the Road to Uniformity-Diverse Readings of the Court of Justice Judgments on Copyright Work' (2012) 3 J. Intell. Prop. Info. Tech. & Elec. Com. L. 60, 75.

⁸⁵ Cofemel Case (n 73).

Hengelo Judgment (n 46).

Joined cases C-403/08 and C-429/08 (n 45).

Eleonora Rosati, 'CJEU Rules That Copyright Protection for Designs Only Requires Sufficient Originality' (2019) 14 Journal of Intellectual Property Law & Practice 931, 932.

⁸⁶ Hengelo Judgment (n 46) para 36.

Cofemel Case (n 73) para 29.

Joined cases C-403/08 and C-429/08 (n 45) para 97.

Rosati (n 85), 932.

⁸⁷ Painer Case (n 45) paras 92, 94 and 99.

C-469/17 | Funke Medien NRW GmbH v Bundesrepublik Deutschland | (2019) | ECLI:EU:C:2019:623 | (Funke Medien Judgment), paras 19 and 25.

Hugenholtz and Quintais (n 15) 1196.

⁸⁸ Hugenholtz and Quintais (n 15) 1196.

⁸⁹ Painer Case (n 45) para 43(4).

⁹⁰ Painer Case (n 45) paras 90-93.

Rosati (n 85) 932.

creative, evaluation should be conducted throughout the stages of preparation, the process, and final touches or finalisation by the human author.⁹¹

The Case C-5/08 Infopaq Judgment further elucidates the application of AI to the standard of originality/creativity. The judgment sought to determine whether the processing, reproduction, and scanning of entire newspaper articles by a commercial business without the rightholder's consent constitutes an infringement of Article 5(1) of the Infosoc Directive.⁹² During the review process, the CJEU advanced the argument that newspaper articles should be considered an intellectual criterion (and therefore protected), which is inferred from the "form" and "manner" in which the subject is presented, as well as its "linguistic expression".⁹³ Moreover, the words themselves in isolation, flowing from the newspaper articles, do not constitute an intellectual creation. It is only through the "choice, sequence, and combination" of these words that an "expression of originality in a creative manner" is formed, constituting an intellectual creation.⁹⁴ By analogy, it may be inferred that AI-generated output is not considered an intellectual creation in itself. However, when evaluated in the context of the human author's input of choice, sequence, and combination, the output may acquire the necessary expression of originality in a creative manner to become an intellectual creation.⁹⁵

⁹¹ Similarly ascertained by Cofemel Case (n 73) in its para. 30. and Case C-833/18 | SI and Brompton Bicycle Ltd v Chedech / Get2Get | (2020) | ECLI:EU:C:2020:461, para 23.

Yilmaztekin (n 48) 87-88.

Tito Rendas, 'Copyright Protection of Designs in the EU: How Many Originality Standards Is Too Many?' (2018) 13 Journal of Intellectual Property Law & Practice 439, 439.

⁹² Infopaq Judgment (n 45) para 26.

EU Infosoc Directive (n 43) art 5(1).

⁹³ Infopaq judgment (n 45) para 44.

Rosati (n 85) 801-802.

⁹⁴ *ibid* para 45.

Rosati (n 85) 801-802.

⁹⁵ Hugenholtz and Quintais (n 15) 1197.

Yilmaztekin (n 48) 87-88.

Rosati (n 85) 801-802.

See also Funke Medien Judgment (n 87) para. 23. and Cofemel Case (n 73), para. 54. It stipulates that an intellectual endeavour cannot be substituted for a simple "aesthetic effect".

See Daniel Inguanez, 'A Refined Approach to Originality in EU Copyright Law in Light of the ECJ's Recent Copyright/Design Cumulation Case Law' (2020) 51 IIC-International Review of Intellectual Property and Competition Law 797 on overprotection and the results of accumulation.

Funke Medien Judgment (n 87) also established that evaluating the originality and inventiveness of military reports cannot be based solely on the "mere intellectual effort and skill" of making them.

When considering this threshold of when the work is considered to be original/creative, some scholars have proposed evaluating it on a spectrum from subjectivity to objectivity. For example, in the Infopaq Judgment, the CJEU has focused on the idea that the more subjective the judgment is to the human author, the more eligible it is to be considered original, with its key central element being the expression of creativity.⁹⁶ The objective criterium, in turn, aims at comparing the work with pre-existing works to assert whether it is an original.⁹⁷ In this manner, for a work to be considered an original, the subjective “mark” of the author’s personality is presupposed.⁹⁸

In conclusion, for an AI-generated output to be considered original or creative within the meaning of EU copyright law, it must be the human author’s own work and constitute an intellectual creation that embodies such originality or creativity standard. This threshold is then evaluated on a case-by-case basis, taking into account human input during the stages of preparation, process, and finalisation. Additionally, it includes the form, choice, sequence, and combination through which the human author expresses his personal touch and creative abilities. As a general principle, it should be noted that the more subjective this expression stands with the author, the more it would be considered original/creative.

2.2.4. Expression

After expanding upon the criterion of originality or creativity (original expression in a creative manner), this essay shifts its focus to the final prerequisite under EU Copyright Law for what constitutes a “work”. From cases such as Painer and Infopaq, there were mentions of the human author necessitating the “expression” of their originality in a creative manner.⁹⁹ Case C-393/09 *Bezpečnostní softwarová asociace v Ministerstvo kultury* reinforced this precondition by

⁹⁶ Van Eechoud (n 84) 75.

Benoît Michaux, ‘L’originalité En Droit d’auteur, Une Notion Davantage Communautaire Après l’arrêt Infopaq’ [2009] *Auteurs & Média* 473, 473-488.

Tatiana Synodinou, ‘Book Chapter: The Foundations of the Concept of Work in European Copyright Law’ [2012] *Codification of European Copyright, Challenges and perspectives*, the Hague, Kluwer Law International 93, 95-96.

⁹⁷ Synodinou (n 96) 95-96.

⁹⁸ *ibid.*

⁹⁹ Infopaq Judgment (n 45) para. 45.

Painer Case (n 45) para. 89.

stating that the components of the graphic user interface did not permit the author to “express his creativity in an original manner”.¹⁰⁰ This implies that the author’s creative freedom must be discernible from his “expression”, a *conditio sine qua non* for the CJEU in its interpretation of EU copyright protection.¹⁰¹ Such a reaffirmation stems from Case C-469/17 Funke Medien, which asserts that “only something which is the expression of the author’s own intellectual creation may be classified as a work”.¹⁰²

Case C-310/17 Levola Hengelo takes this a step further by making this “expression” subject to it being “identifiable with sufficient precision” albeit not necessarily vested in a “permanent form”.¹⁰³ Such a verdict became adjudicated when intending to ascertain whether EU copyright law precludes the taste and smell of a food product as the author’s own intellectual creation.¹⁰⁴ The case carries an underlying presumption that the work is not expressed in a haphazard manner by the human author, although authorial intent may still be discerned to some extent.¹⁰⁵ Nevertheless, not all expressive features of the work can be preconceived, as that would bear significant implications for unforeseen side effects such as “slapdash paint drippings”.¹⁰⁶ Instead, general authorial intent suffices in this regard, that is the human author to have had a general conception of the work before it is “expressed”. In this manner, it leaves room for unforeseen expressive features to a certain extent.¹⁰⁷

To sum up, this implies that AI-generated output should be attributed to a human author, as discussed in the section on human intellectual effort. The element of expression is central to this

¹⁰⁰ Case C-393/09 | Bezpečnostní softwarová asociace - Svaz (n 45) para 50.

¹⁰¹ Yilmaztekin (n 48) 87-88.

Hugenholtz and Quintais (n 15) 1199.

¹⁰² Funke Medien Judgment (n 87) para 20.

¹⁰³ Hengelo Judgment (n 46) para 40.

¹⁰⁴ Hengelo Judgment (n 46) para 25.

¹⁰⁵ Hugenholtz and Quintais (n 15) 1199.

Yilmaztekin (n 48) 107.

See also the High Court of Cassation (The Netherlands), Zonen Endstra v. Nieuw Amsterdam (2008) ECLI:NL:HR:2008, HR 30 May 2008, NJ 2008, 556 where there is no need for creative intent: the creative production itself should be the sole criterion for determining whether a work is the product of a creative act.

¹⁰⁶ Hugenholtz and Quintais (n 15) 1200.

Yilmaztekin (n 48) 107

¹⁰⁷ Hugenholtz and Quintais (n 15) 1200-1201.

Jane C Ginsburg and Luke Ali Budiardjo, ‘Authors and Machines’ (2019) 34 Berkeley Tech. LJ 343, 363

Dan L Burk, ‘Thirty-Six Views of Copyright Authorship, by Jackson Pollock’ (2020) 58 Hous. L. Rev. 263.

attribution, encompassing the author's creative freedom evident in its "expression". Moreover, this expression does not necessarily need to be in a permanent form, albeit it must be identifiable with sufficient precision. As long as the human input can be identified with sufficient precision in the various stages of AI-generated output, this threshold will be met. Lastly, a general conception from the human author is sufficient; meaning, they must have had a general conception of the AI-generated output, allowing for unforeseen, unintended effects to be copyrightable to some extent.¹⁰⁸

¹⁰⁸ Eleonora Rosati, 'Copyright as an Obstacle or an Enabler? A European Perspective on Text and Data Mining and Its Role in the Development of AI Creativity' (2019) 27 Asia Pacific Law Review 198, 206. See also Otero (n 83).

3. Methodology

From the legal background, it can be inferred that for an AI-generated output to meet the criteria of a work, it must *de jure* primarily belong to a scientific, literary, or artistic domain. This criterion is directly derived from Article 2(1) of the Berne Convention, referenced by the EU legislation. Despite the EU legislation mandating this *de jure* requirement, it has not become a standalone practice of evaluation by the CJEU in its jurisprudence. Instead, it ambiguously interlinks the concept of a work with existing elements of originality, creativity, and expression. Secondly, due to its anthropocentric focus, the work must be attributed to the human author. This perspective was reinforced through the EU Copyright Directive, as well as the CJEU Painer and Cofemel cases. Therefore, AI is excluded from becoming the sole author, as it would imply the need for AI to satisfy the components of personality, personal touch, and free and creative choice outlined in the Painer and Cofemel cases. Such an endeavour would necessitate granting legal personhood to AI. Instead, it is better to evaluate AI-generated input in terms of human personality, personal touch, and free and creative choice.

Thirdly, AI-generated output attributed to the human author's work must demonstrate originality or creativity within the meaning of intellectual creation. This is evaluated based on human input during the stages of preparation, processing, and finalisation, with particular attention to the form, choice, sequence, and combination through which the human author expresses their personal touch and creative abilities. The more subjective this expression stands central with the author, the more it would be considered original or creative. Finally, the human-attributed element of expression must be identifiable with sufficient precision in the various stages of AI-generated output. The general conception of the AI-generated output by the human author must be proven in this regard, allowing for some degree of unforeseen and unintended effects to be copyrightable.

This thesis acknowledges the anthropocentric focus vested within the legal background with its extensive scholarly literature review. As such, it will be inserting itself into the academic discourse of EU copyright protection and Artificial Intelligence by building upon such an anthropocentric premises by stating that the extent to which EU copyright law applies to the AI-

generated concept of creating an app titled “Urban Treasure Hunts”, developed through in-game dialogue between a human player and the “Smart non-playable character” in the video game “The Matrix Awakens”, depends on the conditions of originality/creativity, and expression.

As will be argued, considering the invention of “Urban Treasure Hunts” by the Smart NPC as original or creative is challenging for two main reasons. Firstly, the Smart NPC extensively utilises a global knowledge bank, from which a significant portion of the data used by the Deep Learning Approaches—produced by LLM—is essentially a repetition of millions of processed books, articles, webpages, and social media postings. This lacks the same creative freedom or personal touch as that of software engineers. Secondly, even though the preparatory work is attributed to human authorship, by the time the Smart NPC announces the concept, the Deep Learning Approaches would have modified the data to a degree where determining any originality or creativity during the process and finalisation stages becomes impossible.

Furthermore, the requirement for expression presents another obstacle for “The Matrix Awakens” video game to qualify for EU copyright protection. Due to the inability to predict the output accurately during the finalisation phase, human authors of Smart NPCs struggle to identify AI-generated content precisely. The knowledge bank was only integrated with millions of publicly accessible datasets by these software developers during the implementation stages, making it difficult to establish that the human authors’ overall authorial intent was to anticipate the outcomes of the Smart NPC with its app idea, “Urban Treasure Hunts”.

3.1. Conceptualisation

3.1.1. Artificial Intelligence and Machine Learning Approaches

When it comes to the terms and definitions outlined within this essay, it is imperative to delve deeper into them to clarify their proper meanings. Given that the case study involves a video game partially operated by an AI system, understanding its nature is highly relevant. The term “Artificial Intelligence” or “Computer-Generated Works” is defined according to the most recent 2021 EU Proposal for a Regulation Laying Down Harmonised Rules on Artificial Intelligence (EU

Artificial Intelligence Act) as a software that is developed using one or more of the techniques and approaches listed in Annex I.¹⁰⁹ Furthermore, this software can “generate outputs” for a given set of “human-defined objectives” such as recommendations, content, predictions, or decisions that influence the environments they interact with. Annex I of the Artificial Intelligence Act mentions (a) Machine Learning Approaches (MLA), including supervised, unsupervised, and reinforcement learning such as deep learning; (b) Logic and knowledge-based approaches, including inductive (logic) programming, knowledge representation, knowledge bases, deductive and inference engines, and reasoning systems; and (c) Bayesian estimation¹¹⁰, statistical approaches, and search and optimisation methods.¹¹¹

From this broad definition, as vested in the EU Artificial Intelligence Act itself and therefore pertinent for EU copyright law systemic interpretation, Machine Learning Approaches constitute an important premise. MLA, in this regard, refers to the scientific study of algorithms or statistical models carried out by a computer system¹¹², seen as a subset of AI, with the ability to learn from raw data.¹¹³ The machine learning approaches, in turn, build a mathematical model based on sample data inferred from their previous input, known as training data, to improve their future predictions or decisions.¹¹⁴ These MLAs are distinguished into categories of supervised

¹⁰⁹ European Commission, ‘Proposal for a Regulation of The European Parliament and of The Council Laying Down Harmonised Rules on Artificial Intelligence and Amending Certain Union Legislative Acts’ <https://eur-lex.europa.eu/resource.html?uri=cellar:e0649735-a372-11eb-9585-01aa75ed71a1.0001.02/DOC_1&format=PDF> (EU Artificial Intelligence Act) article 3(1).

See also Ku Chhaya A Khanzode and Ravindra D Sarode, ‘Advantages and Disadvantages of Artificial Intelligence and Machine Learning: A Literature Review’ (2020) 9 International Journal of Library & Information Science (IJLIS) 3 which characterises it as a synthesis of physiology and computer science that enables computers to think, remember, and comprehend human behaviour.

¹¹⁰ An effective statistical technique for handling conditional probability is called Bayesian estimation. To estimate an unknown population parameter, previous evidence is used.

(PennState: Statistics Online Courses) <<https://online.stat.psu.edu/stat415/lesson/23/23.2>> accessed 30 May 2024.

¹¹¹ European Commission, ‘ANNEXES to the Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts’ https://eur-lex.europa.eu/resource.html?uri=cellar:e0649735-a372-11eb-9585-01aa75ed71a1.0001.02/DOC_2&format=PDF, Annex I.

¹¹² A “computer system” is a device for processing, storing, and displaying information ‘Computer’ (Encyclopædia Britannica, 28 May 2024) <<https://www.britannica.com/technology/computer>> accessed 30 May 2024.

¹¹³ Khanzode and Sarode (n 109) 2.

Sumit Das and others, ‘Applications of Artificial Intelligence in Machine Learning: Review and Prospect’ (2015) 115 International Journal of Computer Applications, 1.

¹¹⁴ Khanzode and Sarode (n 109) 2.

learning, and unsupervised learning.¹¹⁵ Supervised learning refers to the comparison of the computed output with the expected output, where the human being intervenes with the aim of adjusting the errors from the expected output.¹¹⁶ Unsupervised learning involves the computer system learning on its own by discovering and adopting patterns based on the initial human input.¹¹⁷ Once again, the supervised/unsupervised learning dichotomy, as well as the MLAs within the framework of the AI system, will be relevant for the case study of the game “The Matrix Awakens” as the game is propelled by an AI system itself. Furthermore, these Machine Learning Approaches will serve as a foundation for exploring Deep Learning and Large Language Models in the subsequent chapters. They will act as building blocks for dissecting the case study video game, The Matrix Awakens, and its Non-Playable Characters.

3.1.2. The Concept of a “Video Game”

Similarly, the case study places its centre of attention on a video game, which necessitates further elaboration. A “video game” is according to the European Commission (EC) defined broadly as “an electronic or computerised game played by manipulating images on a video display or television screen”.¹¹⁸ These video games are typically played on gaming platforms, which are generally understood as the combination of hardware and software on which the video game runs.¹¹⁹ Examples include, but are not limited to, computer systems such as gaming consoles, personal computers, mobile phones, smart phones or tablets.¹²⁰

¹¹⁵ Tharindu Kaluarachchi, Andrew Reis and Suranga Nanayakkara, ‘A Review of Recent Deep Learning Approaches in Human-Centered Machine Learning’ (2021) 21 *Sensors* 2514, 2.

¹¹⁶ Khanzode and Sarode (n 109) 2.

¹¹⁷ Khanzode and Sarode (n 109) 2.

Kaluarachchi (n 115) 2.

¹¹⁸ European Commission, ‘The Economy of Culture In Europe: Study Prepared for the European Commission (Directorate-General for Education and Culture)’ https://ec.europa.eu/assets/eac/culture/library/studies/cultural-economy_en.pdf, 270.

As it is defined broadly, this dissertation regards the case study The Matrix Awakens as a video game and will refer to it in this manner.

Kaluarachchi (n 115) 3.

¹¹⁹ F. Willem Grosheide, Herwin Roerdink and Karianne Thomas, ‘Intellectual Property Protection for Video Games: A View from the European Union’ (2014) 9 *J. Int’l Com. L. & Tech.* 1, 3.

¹²⁰ *ibid* 3.

It is important to note that these video games, being multifaceted, fall substantive-wise within various domains of EU copyright law, such as computer programmes (software), databases, and audiovisual and cinematographic works.¹²¹ With regard to EU directives, the content of a video game spills over into the copyright protection of EU Computer Programme Directive, EU Infosoc Directive, EU Copyright Directive, and the EU Orphan Works Directive.¹²² The CJEU supported this multifaceted, complex nature of a video game in its Case C-355/12 Nintendo Co. Ltd and Others v PC Box Srl and 9Net Srl (Nintendo Case).¹²³ In this case, the CJEU was tasked with interpreting the legal status of a “video game” under the EU Copyright Directive and Infosoc Directive.¹²⁴ In its verdict, it harmoniously interpreted that “video games... constitute complex matter comprising not only a computer programme (software) but also graphic and sound elements” each of which pertains to different EU copyright directives.¹²⁵ Keeping such information in mind is important, as it forms the copyright basis for the video game “The Matrix Awakens” and categorises it within the scientific, literary, or artistic domain, as will be seen in Chapter 4.1.

3.1.3. Non-Playable Characters and Deep Learning

Furthermore, the video game “The Matrix Awakens” will provide for so called Non-Playable Characters (NPCs) with its actions performed by the AI, which will be evaluated in the light of the four criteria of a production in scientific, literary or artistic domain, human intellectual effort, originality/creativity and expression. In this manner, the NPCs, as the title suggests, are video game characters that do not represent and cannot be manipulated by a human player.¹²⁶ NPCs have ever since their inception been used in video games to interact with the player to advance the plot or sometimes even initiate different side stories to guide the human player.¹²⁷ In addition, they

¹²¹ Grosheide (n 119) 10.

Greg Lastowka, ‘Copyright Law and Video Games: A Brief History of an Interactive Medium’ [2013] The SAGE Handbook of 495, 496-497.

¹²² Lastowka (n 121) 496-497.

Grosheide (n 119) 10.

¹²³ Case C-355/12 | Nintendo Co. Ltd and Others v PC Box Srl and 9Net Srl | [2014] | ECLI:EU:C:2014:25 | (Nintendo Case).

¹²⁴ Nintendo Case (n 123) para 23.

¹²⁵ *ibid* para 23.

Yilmaztekin (n 48) 95.

¹²⁶ ‘Non-Player Character Definition & Meaning’ (Merriam-Webster) <<https://www.merriam-webster.com/dictionary/non-player%20character>> accessed 30 May 2024.

¹²⁷ Mehta (n 3) 96.

are added into the game itself so that it makes the world in the game feel more alive to the human player.¹²⁸ They can take the form of: managing resources, helping human players, providing challenges, trading, providing narrative expositions and many others based upon the game programming itself.¹²⁹ NPCs have been predominantly popular in story-intensive games, with the majority of them being “pre-scripted and isolated”.¹³⁰ Essentially, this means that the human player is presented with a set of preprogrammed dialogue choices that advance the in-game conversation, as shown in Figure 1 below.¹³¹



Figure 1: Non-Playable Character named Alvor from the video game “The Elder Scrolls V: Skyrim”¹³²

¹²⁸ Muhammad Fikri Hasani and Yogi Udjaja, ‘Immersive Experience with Non-Player Characters Dynamic Dialogue’ (IEEE 2021), 1.

İlay Yüce, ‘Video Games and Video Game Elements as Copyrighted Works’ [2022] Available at SSRN 4707917, 5. See also Aidan Faustina, ‘Rules of the Game: Are The Rules and Mechanics of Video Games Copyrightable?’ [2024] UCLA Entertainment Law Review, Forthcoming.

¹²⁹ Hasani and Udjaja (n 128) 1.

Yüce (n 128) 5.

See also Aidan Faustina, ‘Rules of the Game: Are The Rules and Mechanics of Video Games Copyrightable?’ [2024] UCLA Entertainment Law Review, Forthcoming.

¹³⁰ Mehta (n 3) 96.

¹³¹ *ibid.*

¹³² Bethesda Game Studios and Bethesda Softworks, *The Elder Scrolls V: Skyrim* (Bethesda Game Studios, 2011) [video game].

Figure 1 is derived from the video game titled “The Elder Scrolls V: Skyrim,” a single-player role-playing video game developed by Bethesda Game Studios and published in 2011 by Bethesda Softworks.¹³³ As shown in Figure 1, the human player interacts with the video game’s NPC named “Alvor” regarding the sale of goods. From the preprogrammed set of questions and answers, the human player, in this case, chooses to ask the question “What have you got for sale?” to which Alvor, the NPC, responds, “Hmm... Blades, helmets. Pretty much anything to suit your needs”. Such an illustration depicts a preprogrammed trading NPC, that cannot be controlled by the human player, and which aids the player in advancing the in-game story through trading valuable items.¹³⁴

The story, however, is different when it comes to AI-driven NPC dialogues, which will be analysed in the case study of this dissertation. To be more precise, in contrast to preprogrammed NPCs, AI-driven NPCs possess the capability to autonomously “learn, adjust, and respond” to human players’ decisions in an effort to ameliorate the complexity and unpredictability of narratives in video games.¹³⁵ As a result, such intelligence empowers players to shape the video game story through their choices, creating unique storylines and experiences.¹³⁶ In this manner, each human player’s journey differs based on the interactions with the AI-driven NPCs, resulting in a more personalised gaming experience as opposed to a pre-determined NPC dialogue and path.¹³⁷ Such an endeavour is made possible through the use of a subset of unsupervised Machine Learning Approaches, named Deep Learning (DL). The upcoming Data Inference section on Smart NPCs will centre its focus more closely on contrasting AI-driven NPCs with preprogrammed NPCs, with a specific examination of AI-driven NPCs originating from the video game “The Matrix Awakens.

¹³³ Scrolls C to E, ‘The Elder Scrolls V: Skyrim’ (Elder Scrolls) <https://elderscrolls.fandom.com/wiki/The_Elder_Scrolls_V:_Skyrim> accessed 30 May 2024.

¹³⁴ Hasani and Udjaja (n 128) 1-2.

¹³⁵ (Ai-driven npcs: The new chapter in Immersive storytelling) <<https://www.techopedia.com/ai-driven-npcs-the-new-chapter-in-immersive-storytelling>> accessed 30 May 2024.

¹³⁶ *ibid.*

¹³⁷ *ibid.*

Deep Learning is an AI methodology that enables systems to learn and process data similarly to human beings.¹³⁸ That is the case, given that Deep Learning constitutes deep neural networks integrated within the AI computer system, allowing them to dissect raw input data and automatically discover a representation needed for the subsequent learning task.¹³⁹ Technical-wise, Deep Learning methods are representation-learning methods with multiple levels of representation achieved through the acquisition of simple but non-linear modules, each transforming the representation autonomously at one level from the complex multi-layered system.¹⁴⁰

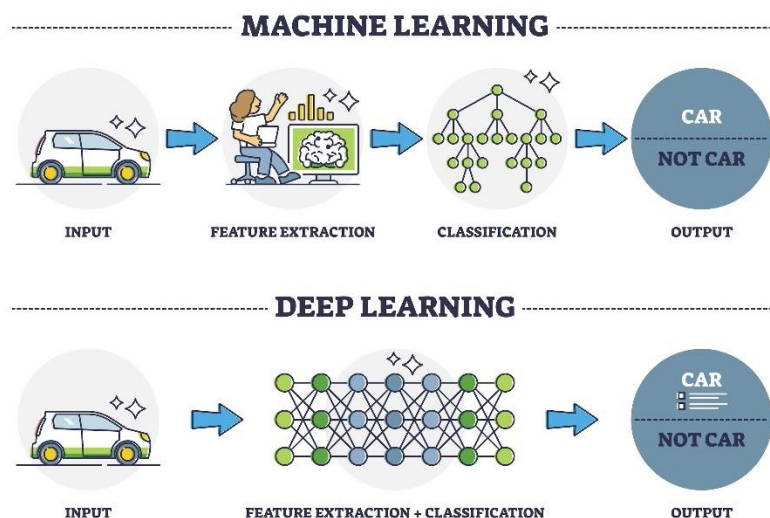


Figure 2: The Differences Between Machine Learning and Deep Learning¹⁴¹

In other words, after its initial conception by the human author, the remaining complex layers of representations are autonomously learned and adjusted by the AI from the acquired raw data, as illustrated with Figure 2.¹⁴² Figure 2 clearly delineates how after the input has been given, the Deep Learning system extracts and classifies it autonomously to produce the output, as opposed

¹³⁸ Ayaan Anand, *Exploring the Applications and Limitations of Large Language Models: A Focus on ChatGPT in Virtual NPC Interactions* (Drexel University 2023), 2.

¹³⁹ Christian Janiesch, Patrick Zschech and Kai Heinrich, 'Machine Learning and Deep Learning' (2021) 31 *Electronic Markets* 685, 688.

¹⁴⁰ Christian Janiesch, Patrick Zschech and Kai Heinrich, 'Machine Learning and Deep Learning' (2021) 31 *Electronic Markets* 685, 685.

¹⁴¹ 'Deep Learning vs Machine Learning: The Ultimate Battle.' (., 2 May 2022) <<https://www.turing.com/kb/ultimate-battle-between-deep-learning-and-machine-learning>> accessed 30 May 2024.

¹⁴² *ibid.*

to Machine Learning Approaches where the human user intervenes.¹⁴³ The Deep Learning system attached to the AI-driven NPCs will be pertinent for evaluating their eligibility for EU copyright protection, which raises challenges regarding the degree to which human input is discernible to classify it as original or creative. It is important to bear in mind that the notion of Deep Learning encompasses another subset called Large Language Model, which is a Generative AI Model generating questions, responses, and written texts after having processed and learned itself from large amounts of datasets. This concept will be further elaborated upon in the subsequent chapters.

3.2. Data Inference

In this master's thesis, the data will primarily consist of analysis of primary and secondary qualitative sources. Primary sources include, but are not limited to, international treaties and declarations, EU secondary legislation such as Directives and Regulations, international and EU jurisprudence, national legislation and jurisprudence, guidelines, recommendations and video game footage. Secondary sources encompass scholarly or academic peer-reviewed journals, books, reports, theses, and other scholarly documents. Without delving too deeply into the legal framework, it goes without saying that this dissertation operates within a legal positivist framework. This means that it prioritises the recognition of existing laws (*lex lata*), such as legislative enactments, judicial decisions, or social customs, over ideals of what the law should be (*lex ferenda*), as they bear the strongest normative power.¹⁴⁴

3.2.1. The Matrix Awakens and Smart AI-Driven NPCs

The most important source, which this master's thesis will be concentrating upon, is the video game titled "The Matrix Awakens: An Unreal Engine 5 Experience" produced by Epic Games¹⁴⁵ and its partners SideFX, Evil Eye Pictures, The Coalition, and WetaFX (formerly Weta

¹⁴³ *ibid.*

¹⁴⁴ Leslie Green and Thomas Adams, 'Legal Positivism' in Edward N Zalta (ed), The Stanford Encyclopedia of Philosophy (Winter 2019 Edition) <https://plato.stanford.edu/archives/win2019/entries/legal-positivism/> accessed 30 May 2024.

Brian H Bix, 'Legal Positivism' [2005] The Blackwell guide to the philosophy of law and legal theory 29, 30-32.

¹⁴⁵ Epic Games, Inc is an American company founded in 1991, with its headquarters in Cary, North Carolina. It possesses subsidiaries worldwide, including in Europe titled Epic Games Entertainment International GmbH. (Epic games terms of service - epic games) <<https://www.epicgames.com/site/en-US/tos>> accessed 30 May 2024.

Digital) on December 6th, 2021.¹⁴⁶ The video game is an action third person open world game situated in a huge, explorable open-world city that is based upon the action movie “The Matrix” from 1999, delivered by Warner Bros Entertainment Inc.¹⁴⁷ The city constitutes sixteen kilometres square of photoreal, quickly traversable blocks, roads with realistic human-like inhabitants.¹⁴⁸ In essence, it allows the human player to freely roam around in a global simulation teeming with “photorealistic AI-driven characters and vehicles”, enabling them to interact with their environment and alter their story with every decision they make.¹⁴⁹ In addition, it also encapsulates action scenes featuring Keanu Reeves and Carrie-Anne Moss in a digital form, actors from the 1999 film The Matrix, starring in various story performances.¹⁵⁰ One story performance, for example, lets the human player undergo a thrilling car chase with the two in-game actors, adding to the overall action-like experience stemming from the game.¹⁵¹

The expression “photorealistic AI-driven characters” from the producers refers to AI-driven NPCs stemming from the video game, which they coin “Smart NPCs”.¹⁵² These Smart NPCs are capable of dynamically responding to the player’s in-game voice in real time, adapting their dialogue, emotional tone, and body gestures in reaction to the human player.¹⁵³ This marks the first instance in the history of the gaming industry where such Smart NPCs have been endowed with the capability to autonomously engage in dialogue with human players, creating the

¹⁴⁶ (Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 30 May 2024.

(The matrix awakens: An unreal engine 5 experience - thank you) <<https://www.unrealengine.com/fr/wakeup-thank-you>> accessed 30 May 2024.

It has so far only officially been released as a video game demo, which signifies that it is a trial version of the full game limited to a certain time period or a point in progress. Despite this, however, it bears the same characteristics as a video game and is therefore presumed to be a video game within the context of this dissertation.

¹⁴⁷ ‘The Matrix’ (WarnerBros.com | The Matrix | Movies) <<https://www.warnerbros.com/movies/matrix#about>> accessed 30 May 2024.

¹⁴⁸ (Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 30 May 2024.

¹⁴⁹ *ibid.*

¹⁵⁰ (Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 30 May 2024.

¹⁵¹ (Behind the scenes on The matrix awakens: An unreal engine 5 experience) <<https://www.unrealengine.com/en-US/spotlights/behind-the-scenes-on-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 30 May 2024.

¹⁵² ‘Replica Smart Npcs’ (Replica Studios) <<https://www.replicastudios.com/blog/smart-npc-plugin-release>> accessed 30 May 2024.

¹⁵³ (Replica unveils AI-powered smart npcs for Unreal engine | venturebeat) <<https://venturebeat.com/games/replica-unveils-ai-powered-smart-npcs-for-unreal-engine/>> accessed 30 May 2024.

‘Have We Hit an Upper Limit of Voice Acting in Videogames?’ (Replica Studios) <<https://www.replicastudios.com/blog/upper-limit-of-voice-acting-in-videogames>> accessed 30 May 2024.

possibility to respond to any questions, general remarks or statements.¹⁵⁴ This phenomenon is made possible through the utilisation of an AI Large Language Model (LLM), a Generative AI method similar to OpenAI's ChatGPT, in that it infers its datasets from the internet at large before generating written texts to the user input.¹⁵⁵ For clarity purposes, it is best illustrated with Figure 3, which demonstrates how Generative AI is a subset of Deep Learning Approaches, which in turn is a subset of Machine Learning, all of which pertain to the AI domain in general.¹⁵⁶

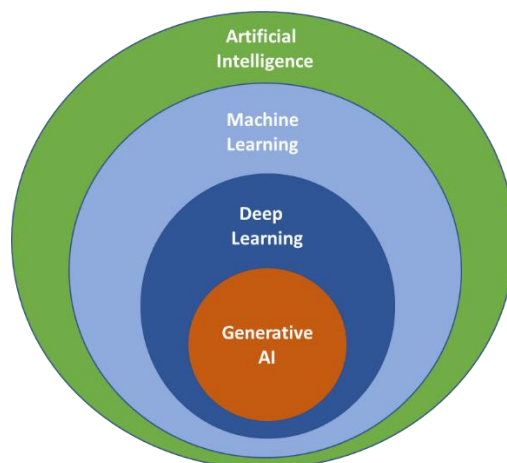


Figure 3: Artificial Intelligence with its Subsets and Layers¹⁵⁷

The AI's Large Language Model utilises Deep Learning methods, a subset of Machine Learning Approaches as mentioned in the conceptualisation chapter, to statistically predict the natural language output provided by human players given the context of previous state of actions and information.¹⁵⁸ It is part of the Generative AI subcategory, enabling it to leverage deep neural

¹⁵⁴ 'Have We Hit an Upper Limit of Voice Acting in Videogames?' (Replica Studios) <<https://www.replicastudios.com/blog/upper-limit-of-voice-acting-in-videogames>> accessed 30 May 2024.

¹⁵⁵ Muhammad B, 'AI-Powered Smart Npcs Coming to Unreal Engine from Replica Studios' (BeyondGames.biz, 5 June 2023) <<https://www.beyondgames.biz/37411/ai-powered-smart-npcs-coming-to-unreal-engine-from-replica-studios/>> accessed 30 May 2024.

(Chatgpt) <<https://openai.com/chatgpt/>> accessed 30 May 2024.

¹⁵⁶ Wagh A, 'What's Generative Ai? Explore Underlying Layers of Machine Learning and Deep Learning' (Medium, 2 July 2023) <<https://medium.com/@amol-wagh/whats-generative-ai-explore-underlying-layers-of-machine-learning-and-deep-learning-8f99272e0b0d>> accessed 30 May 2024.

¹⁵⁷ Wagh A, 'What's Generative Ai? Explore Underlying Layers of Machine Learning and Deep Learning' (Medium, 2 July 2023) <<https://medium.com/@amol-wagh/whats-generative-ai-explore-underlying-layers-of-machine-learning-and-deep-learning-8f99272e0b0d>> accessed 30 May 2024.

¹⁵⁸ Roberto Gallotta and others, 'Large Language Models and Games: A Survey and Roadmap' [2024] arXiv preprint arXiv:2402.18659, 2.

Penny Sweetser, 'Large Language Models and Video Games: A Preliminary Scoping Review' [2024] arXiv preprint arXiv:2403.02613, 2-4.

networks to model and generate text data based on three premises: utilising a large neural network, pre-training this neural network through self-supervision, and taking advantage of large-scale datasets of text.¹⁵⁹ Generative AI, such as the LLM, takes advantage of Deep Learning Approaches to infer from myriad processed and self-trained datasets, generating written content output as a result.¹⁶⁰

In practice, when a human player provides audio input to the video game *The Matrix Awakens* in the form of their voice, the Smart NPC will in turn generate output by deconstructing the question or statement, inferring information from the databank, linking that information with the human input, and communicating the response to the human player through the LLM.¹⁶¹ The databank in this instance, is the information inferred from the worldwide Internet worth millions of gigabytes, which the LLM uses to learn, adjust and respond to the human player.¹⁶² As an illustration, the AI-driven answer provided by a Smart NPC from the video game *The Matrix Awakens* is depicted in Figure 4 below.

See also: Graham Todd and others, 'Level Generation through Large Language Models' (2023).

¹⁵⁹ Stefan Feuerriegel and others, 'Generative Ai' (2024) 66 *Business & Information Systems Engineering* 111, 114. (What is a large language model (LLM)? | cloudflare) <<https://www.cloudflare.com/learning/ai/what-is-large-language-model/>> accessed 30 May 2024.

Sweetser (n 158) 2.

¹⁶⁰ Feuerriegel (n 159) 114.

¹⁶¹ Feuerriegel (n 159) 114.

See also Judith van Stegeren and Jakub Myśliwiec, 'Fine-Tuning GPT-2 on Annotated RPG Quests for NPC Dialogue Generation' (2021).

¹⁶² (What is a large language model (LLM)? | cloudflare) <<https://www.cloudflare.com/learning/ai/what-is-large-language-model/>> accessed 30 May 2024.



Figure 4: A dialogue between a human player and a Smart NPC stemming from the video game *The Matrix Awakens*
Source: Screenshot captured by the author of this thesis from the game *The Matrix Awakens* by Epic Games.

Figure 4 depicts a screenshot from the video game *The Matrix Awakens*, showing the interaction between the human player and the AI-driven Smart NPC.¹⁶³ In the upper half of the illustration, it can be observed that the human player is prompted with the option to “hold down (keyboard button) C to talk”, allowing them to activate real-time voice input into the video game for asking questions, giving comments, or making general statements to the Smart NPC. It is important to mention once again, and in contrast to Figure 1, that these Smart NPCs answer autonomously based on their Deep Learning and Machine Learning Approaches, rather than relying on a preprogrammed set of questions and answers to advance the storyline. In this instance, the human player activated the button to ask the question “Come up with a new business idea and concept.” The Smart NPC responds with the line “Think ‘Urban Treasure Hunts.’ An app that creates personalised scavenger hunts across the city for groups, making every corner an adventure!” as portrayed in the lower bottom of the illustration. This statement serves as the focal point of this master’s thesis, aiming to evaluate the extent to which AI-generated concept of

¹⁶³ (Introducing ‘the matrix awakens: An Unreal engine 5 experience’) <<https://www.unrealengine.com/en-US/blog/introducing-the-matrix-awakens-an-unreal-engine-5-experience>> accessed 30 May 2024.

creating the “Urban Treasure Hunts” app derived from the dialogue with the Smart NPC in The Matrix Awakens is entitled to EU copyright protection.

3.2.2. Data Shortcomings and Acknowledgments

This master’s thesis acknowledges and recognises that copyright matters are attended to and subject to its *lex specialis* governed by the freedom to contract in contract law.¹⁶⁴ Such is the case with the video game “The Matrix Awakens”, where Epic Games provides an End-User License Agreement (EULA).¹⁶⁵ In the agreement, it is explicitly stated that “Epic Games and its licensors own all title, ownership rights, and intellectual property rights in the Software and Services.”¹⁶⁶ Furthermore, all rights granted to the user are “granted by express license only and not by sale,” whereby Epic Games solely grants the “personal, non-transferable, non-exclusive, non-sublicensable limited right and license” to install and use the Software on compatible devices the user owns for personal entertainment use.¹⁶⁷

Similarly, the user is prohibited from copying, reproducing, redistributing, deriving source code from, modifying, adapting, translating, decompiling, or disassembling to make derivative works based on it.¹⁶⁸ In this manner, all title, ownership, including the intellectual property rights, remain within the hands of the software developers, which in this case is Epic Games. The pertinence of such a contract claim extends to all concepts derived from AI-driven Smart NPCs stemming from the video game The Matrix Awakens. This master’s thesis highlights such an

¹⁶⁴ Chris Turner, *Contract Law* (Routledge 2013), 4-6.

See also Raymond T Nimmer, ‘Breaking Barriers: The Relation between Contract and Intellectual Property Law’ (1998) 13 Berkeley Tech. LJ 827.

Tina Hart, Simon Clark and Linda Fazzani, *Intellectual Property Law* (Bloomsbury Publishing 2013).

¹⁶⁵ Epic Games | End User License Agreement from the video game The Matrix Awakens | (2021).

Cf OpenAI’s ChatGPT Terms of Use, which allows the user to retain ownership rights in both the Input and Output, collectively as the content, and the Terms of Use for an AI illustration generator like Midjourney, which confers all assets to the user but retains the right to reproduce, prepare derivative works of, publicly display, publicly perform, sublicense, and distribute the text and image prompts the user inputs.

‘Midjourney Terms of Service’ (Midjourney) <<https://docs.midjourney.com/docs/terms-of-service>> accessed 30 May 2024.

(EU terms of use) <<https://openai.com/policies/eu-terms-of-use>> accessed 30 May 2024.

Anna Jaruga-Rozdolska, ‘Artificial Intelligence as Part of Future Practices in the Architect’s Work: MidJourney Generative Tool as Part of a Process of Creating an Architectural Form’ [2022] *Architectus*, 5.

¹⁶⁶ Epic Games | End User License Agreement from the video game The Matrix Awakens | (2021), art 6.

¹⁶⁷ *ibid* art 7.

¹⁶⁸ *ibid* art 1.

acknowledgment to limit its analysis to uniquely the EU copyright protection eligibility by excluding any contractual claims. Finally, this master's thesis acknowledges having utilised "Grammarly", an AI application designed to verify and adjust spelling, grammar, punctuation, clarity, and engagement.¹⁶⁹

¹⁶⁹ 'Free Ai Writing Assistance' (Grammarly) <<https://www.grammarly.com/>> accessed 30 May 2024.

4. Case Study: The Video Games “The Matrix Awakens”

After unpacking the legal background in the initial sections and clarifying the meanings and terms of AI, Machine Learning, Deep Learning, and Large Language Models as part of Generative AI, this thesis proceeds to the central chapter of the dissertation. This is where the legal background will be applied within the methodological framework established in the previous chapter. In this sense, this chapter aims to demonstrate the main argument, emphasising that the primary challenges or difficulties lie within the thresholds of originality or creativity and expression. It builds upon the underlying assumption that there is human authorship attributable to the work. The chapter will unfold this argument by closely examining whether the Smart NPC’s invention of the business app “Urban Treasure Hunts” constitutes a production within the literary, scientific, or artistic domain, reiterating the necessity of human intellectual effort, whether it is originally conceived in a creative manner, and whether it bears the author’s expression.

4.1. Production in Scientific, Literary or Artistic Domain

With regard to the classification of the video game “The Matrix Awakens” within the scientific, literary, or artistic domain, this master’s thesis observes that this threshold is met. Broadly speaking, a video game comprises computer programmes (software), databases, and audiovisual or cinematographic works.¹⁷⁰ According to Article 1 of the EU Copyright Directive, which references Article 2 of the Berne Convention, the software, database, and audiovisual or cinematographic components of the video game all fall within the scientific, literary, or artistic domain.¹⁷¹ The software component is protected as a literary work and is embedded in the file available for download for “The Matrix Awakens”.¹⁷² Additionally, “The Matrix Awakens”

¹⁷⁰ Grosheide (n 119) 9.

Huma Mehfooz and Gaurav Bhalla, ‘Copyrightability of Video Games’ [2016] International Journal of Recent Research Aspects ISSN 2349, 5.

¹⁷¹ Grosheide (n 119) 9.

Mehfooz and Bhalla (n 170) 5.

See also: Thomas Hemnes, ‘Adaptation of Copyright Law to Video Games’ (1982) 131 U. Pa. L. Rev. 171.

Mr Stan Abrams, ‘The Legal Status of Video Games: Comparative Analysis in National Approaches’ [2013] WIPO Magazine 7.

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

¹⁷² Mehfooz and Bhalla (n 170) 9.

includes short cinematic action scenes featuring Keanu Reeves and Carrie-Anne Moss, considered audiovisual or cinematographic works and therefore protected as artistic works.¹⁷³ The database consists of a collection of independent works, materials, or other data arranged systematically, meaning that depending on its nature, it spans all three production domains.¹⁷⁴ This is particularly evident in “The Matrix Awakens”, which possesses a database containing written narratives or stories, scripts, scientific research data, and character models or visual artwork depicting the city landscape, textures, and building models amongst others.

Concerning the EU Copyright Protection more closely, the video game, as already mentioned in the conceptualisation section, falls within the EU Computer Programme Directive, EU Infosoc Directive, EU Copyright Directive, and the EU Orphan Works Directive. Article 1 of the EU Computer Programme Directive protects the copyright of computer programmes, which are defined as programmes in any form, including those incorporated into hardware, as well as the preparatory design work leading to the development of a computer programme.¹⁷⁵ The EU Infosoc Directive grants Epic Games’ European subsidiary branch Epic Games Entertainment International GmbH the rights of distribution, communication, and reproduction for the video game “The Matrix Awakens” within the framework of the information society.¹⁷⁶ The EU Copyright Directive stipulates that Epic Games Entertainment International GmbH’s authorship rights must last for 70 years after the work is lawfully made available to the public.¹⁷⁷ Finally, the EU Orphan Works Directive protects parts of The Matrix Awakens that could be considered orphan works—works where no rightsholders can be identified—and permits their usage in publicly accessible libraries, educational institutions, museums, among other contexts.¹⁷⁸

Wu (n 171) 132.

¹⁷³ EU Copyright Directive (n 42) art 2.

Mehfooz and Bhalla (n 170) 4.

¹⁷⁴ EU Database Directive (n 43) art 1.

¹⁷⁵ EU Computer Programme Directive (n 43) art 1.

See also Hemnes (n 171) 173.

Mehfooz and Bhalla (n 170) 4-5.

¹⁷⁶ EU Infosoc Directive (n 43) art 2, 3, 4.

¹⁷⁷ EU Copyright Directive (n 42) art 1(4).

¹⁷⁸ EU Orphan Works Directive (n 43) arts 1(1) and 2(1).

Mehfooz and Bhalla (n 170) 4-5.

Wu (n 171) 132.

Finally, the Smart NPCs flowing from the video game “The Matrix Awakens” fall under both artistic and literary works. To be more precise, the unique character appearances, personalities, behaviours, and other visual effects fall within the former category, as mandated by the EU Copyright Protection.¹⁷⁹ Meanwhile, the AI-driven Large Language Model propelling these Smart NPCs is considered software, and thus a literary work within the meaning of the EU Computer Programme Directive.¹⁸⁰ The same applies to the concept of Smart NPCs creating an application called “Urban Treasure Hunts”, owing to the fact that it is inferred from knowledge banks containing worldwide sources of literary works in a written form, as well as the AI software coding and programming of Deep Learning and LLM. Considering that the prerequisite of the video game and its Smart NPCs belonging to the scientific, literary, or artistic domain is primarily a legal requirement, the CJEU’s stance on this matter has been rather ambiguous as illustrated in the legal background chapter. Thus, The Matrix Awakens, along with its Smart NPCs, are considered a production within the scientific, literary, or artistic domain, inspiring the creation of an application called “Urban Treasure Hunts”.

4.2. “Human” Intellectual Effort

On the subject of “human” intellectual effort, an anthropocentric perspective dictates that human authorship is vested in the Smart NPCs’ expression of creating the “Urban Treasure Hunts” application. This dissertation similarly observes this criterion to be met, considering that the video game “The Matrix Awakens”, along with its Smart NPCs, had the initial input of human software developers. For these reasons, the legal background has placed significant emphasis on human authorship. This thesis contends that proving sole machine authorship to be difficult under EU copyright law, and thus naturally presupposes that the human individual is attributable for such work at present, while not excluding such a possibility for the future. The EU copyright directives

¹⁷⁹ EU Copyright Directive (n 42) arts 1 & 2.

¹⁸⁰ EU Computer Programme Directive (n 43) art 1.

Yüce (n 128) 5-6.

Otherwise the coding and programming would be considered traditionally as scientific works.

Tyler T Ochoa, ‘Who Owns an Avatar-Copyright, Creativity, and Virtual Worlds’ (2011) 14 Vand. J. Ent. & Tech. L. 959, 960.

See also Julian Velasco, ‘The Copyrightability of Nonliteral Elements of Computer Programs’ (1994) 94 Columbia Law Review 242.

in conjunction with the CJEU jurisprudence do not define the term “author”, albeit heavily imply for it to be anthropocentric as seen from the legal background chapter.

The Matrix Awakens video game was created by developers at the Epic Games studios on December 6th, 2021, with the aid from its partners SideFX, Evil Eye Pictures, The Coalition, and WetaFX (formerly Weta Digital).¹⁸¹ In this manner, its Smart NPC’s were in a similar manner conceived by these developers, ranging from its visual artwork to programming. However, recourse should be had to the extent of the human input given in its conception stages to evaluate the human authorship for the Smart NPC’s output. Moreover, the phases of Smart NPC’s Generative AI implementation are illustrated in Figure 5 as follows: 1. Problem Definition, 2. Data Collection & Preprocessing, 3. Model Selection, 4. Model Training, 5. Model Evaluation, 6. Model Fine-tuning, 7. Deployment, and 8. Monitoring and Maintenance.¹⁸² These are all steps where human involvement is crucial in the conception of Smart NPC’s Generative AI, whereas in the steps of fine-tuning and deployment, the Deep Learning Approaches operate more autonomously through self-learning.¹⁸³

¹⁸¹ Cf footnotes 145-146.

¹⁸² Ajay Bandi, Pydi Venkata Satya Ramesh Adapa and Yudu Eswar Vinay Pratap Kumar Kuchi, ‘The Power of Generative Ai: A Review of Requirements, Models, Input–Output Formats, Evaluation Metrics, and Challenges’ (2023) 15 Future Internet 260, 8.

¹⁸³ Christopher T Zirpoli, ‘Generative Artificial Intelligence and Copyright Law’, 15.

See also: Ani Parnagian, ‘Should AI Have Intellectual Property Rights? An Analysis of Copyright Law on Generative AI’.

S Alex Yang and Angela Huyue Zhang, ‘Generative AI and Copyright: A Dynamic Perspective’ [2024] arXiv preprint arXiv:2402.17801.

Pamela Samuelson, ‘Generative AI Meets Copyright’ (2023) 381 Science 158.

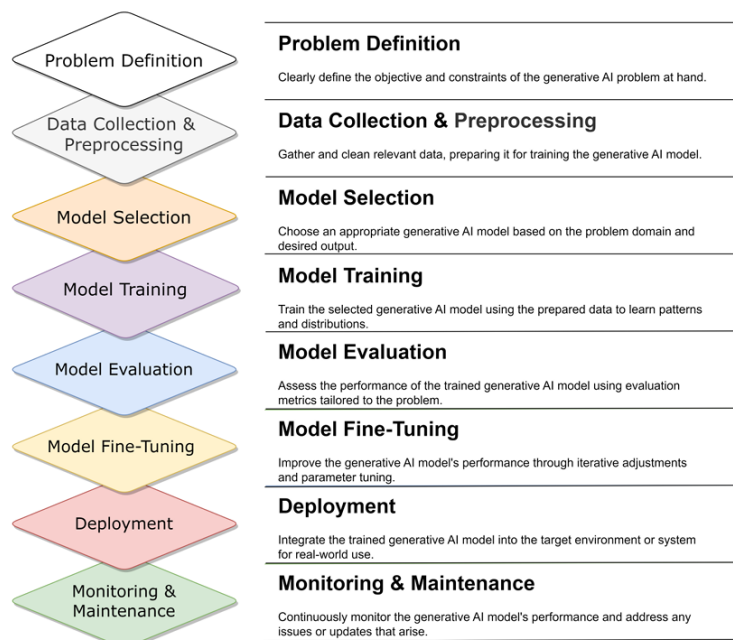


Figure 5: Implementation phases of Generative AI such as Smart NPCs from the video game *The Matrix Awakens*¹⁸⁴

In the problem definition phase, the software developers (human authors) aim to define the problem Generative AI intends to resolve, through identifying the data requirements, desired outcomes, and any constraints or limitations.¹⁸⁵ In the subsequent phase, the developers collect a large and representative dataset that encompasses characteristics and patterns for the Smart NPC to learn from, similar to the Large Language Model with its worldwide internet knowledge bank of texts and written works.¹⁸⁶ Consequently, in the model selection phase, the most appropriate model is chosen to build upon by these developers, which in the case of Smart NPCs was the Large Language Model. This choice was made to address commonsense queries, answer factoid questions, and extract factual knowledge about entity relations in a human-like written manner.¹⁸⁷ Once these steps have been established, the human author commences with the model training

¹⁸⁴ Bandi and Kuchi (n 182), 8.

Parnagian (n 183) 5.

Samuelson (n 183) 159.

¹⁸⁵ Bandi and Kuchi (n 182) 8.

Zirpoli (n 183) 15.

¹⁸⁶ Bandi and Kuchi (n 182) 8.

Zirpoli (n 183) 15.

¹⁸⁷ Bandi and Kuchi (n 182) 8.

using the collected datasets. Throughout the process, the LLM that drives the Smart NPCs learns the underlying patterns and statistical relationships within the data.¹⁸⁸

Subsequently, its performance is evaluated in the next step, enhancing the quality of the generated outputs through text correction.¹⁸⁹ After this step, the Smart NPC gets deployed to generate new samples, observing whether its output aligns with the distribution of the training data.¹⁹⁰ It is from within these two steps where Deep Learning Algorithms step in, in which the AI commences to operate on an increasingly autonomous manner.¹⁹¹ Finally, after getting deployed, the software developers continuously observe and monitor the Smart NPC's LLM datasets to ensure its seamless performance, albeit their practical input is no longer needed.¹⁹² From this, it may be inferred that within the implementation phases of creating Smart NPCs stemming from the video game "The Matrix Awakens", the human input of the software developers is central. Consequently, the expression of the NPCs can be attributed, at the very least, to the conception of these human authors.

4.3. Originality/creativity

Despite attributing human authorship to the Smart NPCs, the most significant challenge lies in meeting the threshold of originality or creativity for the AI's invention of an app called "Urban Treasure Hunts" to be entitled to EU copyright protection. This thesis contends that the invention of "Urban Treasure Hunts" by the Smart NPC is challenging to be considered original or creative for two reasons. Firstly, the extensive utilisation of a worldwide knowledge bank, from which data is inferred to a large degree by the Deep Learning Approaches, subsequently generated by LLM, merely results in a reiteration of millions of processed books, essays, websites, and social media posts. In this manner, it lacks the software developers' personal touch and creative abilities. Secondly, despite the work being attributed to human authorship in the preparation phase, by the time the Smart NPC proclaims the idea, the Deep Learning Approaches would have altered the

¹⁸⁸ Bandi and Kuchi (n 182) 8-9.

¹⁸⁹ Yang and Zhang (n 183) 3.

¹⁹⁰ Bandi and Kuchi (n 182) 8-9.

¹⁹¹ Feuerriegel (n 159) 118.

Zirpoli (n 183) 15-16.

¹⁹² Feuerriegel (n 159) 118.

information to such a degree that neither originality nor creativity would be deducible in the process and finalisation stages.

To reiterate the threshold of originality or creativity under EU copyright law, the work must be the author's own creation, constituting an intellectual creation. Evaluation is posited within the CJEU Painer case's stages of preparation, process, and finalisation of the creation, during which the author's expression of their personal touch and creative abilities is paramount. To ascertain such claims, the form, choice, sequence, and combination are regarded as key factors. The more subjective the personal touch and creative abilities are associated with the author, the higher the chance of meeting the originality and creativity prerequisite.

4.3.1. Smart NPC's Knowledge Bank and Originality/Creativity

The invention of Smart NPCs, creating an app titled "Urban Treasure Hunts", can be with difficulty ascertained as original or creative, as it lacks the personal touch and creative abilities associated with human authors (its developers). The AI-generated content lacks such personal touch and creative abilities, given that the Large Language Model generates content based on millions of sources worldwide from the internet, essentially reiterating past inventions.¹⁹³ To being with, Deep learning techniques are employed for Smart NPCs to extract and analyse vast amounts of data, aiming to discern meaningful insights and patterns. These insights and patterns, in turn, enhance the performance of AI models.¹⁹⁴ Therefore, Deep Learning Approaches are crucial, as Smart NPCs rely on large datasets, reaching into the millions, which would be impractical for human developers to manage manually.¹⁹⁵ Such large datasets are inferred from publicly available

¹⁹³ Nicola Lucchi, 'ChatGPT: A Case Study on Copyright Challenges for Generative Artificial Intelligence Systems' [2023] European Journal of Risk Regulation 1, 8.

See also: Robert W McGee, 'ChatGPT and Copyright Infringement: An Exploratory Study' [2023] Available at SSRN 4578430.

Anna Jaruga-Rozdolska, 'Artificial Intelligence as Part of Future Practices in the Architect's Work: MidJourney Generative Tool as Part of a Process of Creating an Architectural Form' [2022] Architectus.

Nina I Brown, 'Artificial Authors: A Case for Copyright in Computer-Generated Works' (2018) 20 Colum. Sci. & Tech. L. Rev. 1.

¹⁹⁴ Lucchi (n 193) 11.

¹⁹⁵ *ibid* 11.

sources such as books, essays, social media posts, and websites, encompassing text, images, and other content.¹⁹⁶

Essentially, without access to extensive data volumes, AI algorithms like Smart NPCs would struggle to learn and improve their performance.¹⁹⁷ As detailed in the methodology chapters, Deep Learning Approaches autonomously create datasets of new neurons, from which the LLM generates new works. These newly generated works, based on datasets derived from millions of publicly accessible essays, websites, books, and social media posts, do not allow space for software developers to impart their personal touch and creative abilities, as the information provided is a mere reiteration from the publicly available sources. The subjective “mark” of the software developers is omitted in this regard, as the initial programming input alone would not suffice to link it with the AI-generated concept of “Urban Treasure Hunts”. Furthermore, discerning its personal and creative choices is challenging, given that these concepts are not directly linked to the human author. It wasn't preprogrammed in the knowledge bank as a creative NPC response such as in Figure 1, nor does it reflect the author’s personal touch through the reiteration of worldwide accessible information, albeit someone else’s to a certain degree.

In conclusion, the creation of an app named “Urban Treasure Hunts” by Smart NPCs would be regarded with difficulty as original or creative, as it lacks the personal touch and creative abilities associated with the software developers. The Large Language Model generates content based on its Deep Learning Approaches, which gather data from millions of publicly accessible sources on the internet, including books, texts, social media posts, essays, and websites. As the argument holds, such reiterated information does not reflect the personal or creative choices of the human author, nor does it bear their subjective mark as developers. The Smart NPC's knowledge bank was not programmed with specific NPC responses; rather, it inferred sources from publicly accessible worldwide information questionably deducing some other person’s personal touch.

¹⁹⁶ *ibid.*

¹⁹⁷ *ibid.*

4.3.2. Stages of Preparation, Process and Finalisation in light of Human Author's Originality/Creativity

In the stages of preparation, process, and finalisation, the only original human input can be discerned in the preparation stage. This leaves the process and finalisation stages predominantly in the hands of the Smart NPC. As a result, content generated by the Smart NPC, such as “Urban Treasure Hunts,” paradoxically falls beyond the scope of being considered an original or creative work, despite being attributable to the human author. It falls beyond such scope, as the human author reflected its originality in a creative manner in the preparation stages, a process significantly altered by the time the Smart NPC proclaims the idea of creating “Urban Treasure Hunts.” The preparation stage is analogous to the implementation phases stemming from Figure 5 in the previous subchapter. More precisely, the preparation phase entails the creation and elaboration of the Smart NPC's design and idea, which rests largely within the hands of the software developers.¹⁹⁸ The process and finalisation stages, as depicted in Figure 5, are analogous to including the steps of converting the plan into rough draft versions of the final work and processing and reworking these draft versions, tasks primarily executed by the AI-driven Smart NPCs.¹⁹⁹

More precisely, in these last two stages, the Smart NPCs' Deep Learning Approaches take over and operate in a more autonomous manner, analogous to the Model Fine-Tuning and Deployment phases depicted in Figure 5. The Deep Learning Approaches within these phases commences to autonomously collect and process data, and then adjust and learn by creating new deep neurons. Consequently, by the time the Smart NPC creates an innovative app titled “Urban Treasure Hunts,” this process has been entirely conducted autonomously through Deep Learning Approaches and generated by its Large Language Model, without the need for developer's original nor creative input. Thus, in these stages of the process and finalisation, the autonomously learned and generated content by AI deviates entirely from human's original thinking reflected in a creative manner, since the coding or programming input has significantly altered from its conception. The

¹⁹⁸ Hugenholtz and Quintais (n 15) 1229.
McGee (n 193) 5.
Lucchi (n 193) 3.

¹⁹⁹ Hugenholtz and Quintais (n 15) 1229.

AI cannot once again be deemed the creator of the work; it necessitates “human” personal touch and creative choices in this regard under EU Copyright Law.

In conclusion, the preparation stage primarily rests within the hands of the software developers. However, in the later stages of process and finalisation, this responsibility predominantly shifts to the AI, driven by its Deep Learning Approaches and LLM. As a result, any creation generated from these stages deviates to such an extent from human authorship that it can be difficult to regard it as the author's own original work reflected in a creative manner. The initial coding or programming input has been so heavily altered that it is no longer possible to distinguish the author's originality or creativity. It's important to note that, although the human authors built the Smart NPC from scratch, their role in the implementation phases, as demonstrated in Figure 5, could still arguably assert human authorship in its conception stages. However, by the time the Smart NPC proclaims the idea of “Urban Treasure Hunts,” it would not constitute to be original nor creative as a result of the autonomous deviation.

4.4. Expression

When it comes to the expression part, a certain degree of the human author's creative freedom is subject to analysis to establish whether there was a general authorial intent from its conception, analogous to the implementation phases from Figure 5. A certain degree of unintended, unforeseen effects falls within the tolerated copyright framework, provided that the human author's input can be identified with sufficient precision. As this master's thesis will argue, the expression threshold poses another challenge due to the human author not being able to precisely predict the output within the finalisation stage, and as a result cannot be identified with sufficient precision.²⁰⁰

²⁰⁰ Hugenholtz and Quintais (n 15) 1233.

Cf footnote 191 with these sources: Robert W McGee, ‘ChatGPT and Copyright Infringement: An Exploratory Study’ [2023] Available at SSRN 4578430.

Nicola Lucchi, ‘ChatGPT: A Case Study on Copyright Challenges for Generative Artificial Intelligence Systems’ [2023] European Journal of Risk Regulation 1.

Anna Jaruga-Rozdolska, ‘Artificial Intelligence as Part of Future Practices in the Architect's Work: MidJourney Generative Tool as Part of a Process of Creating an Architectural Form’ [2022] Architectus.

Nina I Brown, ‘Artificial Authors: A Case for Copyright in Computer-Generated Works’ (2018) 20 Colum.

Similar to the argument from the previous subchapter, Deep Learning Approaches can be considered a “black box” for Smart NPCs.²⁰¹ As established in the previous subchapter, the programming by human developers undergoes significant alteration by the time the NPC generates its autonomous output. Building upon this argument, human authors would struggle to precisely predict the outcome of Smart NPCs constructing business plans such as “Urban Treasure Hunts”. To ascertain this, it would be necessary for human authors to provide evidence showing that they had preprogrammed such a function during conception, similar to the creation and elaboration of the idea stemming from the implementation phases depicted in Figure 5. In the case of *The Matrix Awakens*, human authors only wired the knowledge bank to millions of publicly accessible internet sources. Consequently, the general authorial intent is difficult to discern due to the software developer’s limited capability to predict from which sources or domains the NPC will infer. At best, the developer may anticipate broadly for the Smart NPC to interact with its environment and the human player in written form, knowing it will “alter the storyline of the video game”. However, such an unintended and unforeseen specific side effect of a Smart NPC elaborating upon the business concept of “Urban Treasure Hunts” would be too far-fetched to be linked to the general prediction of a human author.

In summary, the expression prerequisite poses another challenge to *The Matrix Awakens* video game being eligible for EU copyright protection. Human authors of the Smart NPCs lack the capability to precisely predict the output within the finalisation stage, and as a consequence, cannot identify the AI-generated content with sufficient precision. These software developers solely wired the knowledge bank during its implementation phases to millions of publicly available datasets, making it difficult to prove the general authorial intent of the human authors to have predicted the output of the Smart NPC with its app idea “Urban Treasure Hunts”.

²⁰¹ Hugenholtz and Quintais (n 15) 1233.

5. Conclusion

5.1. Research Question and Legal Background Reiteration

This Master's dissertation has intended to research the question: To what degree does European Union copyright law protect the AI-generated concept of creating an app titled "Urban Treasure Hunts", developed through in-game dialogue between a human player and the "Smart non-playable character" in the video game "The Matrix Awakens"? In its efforts of responding to the research question, this master's thesis argued that the extent to which EU copyright law applies to the AI-generated concept of creating an app titled "Urban Treasure Hunts", developed through in-game dialogue between a human player and the "Smart non-playable character" in the video game "The Matrix Awakens", depends on the conditions of originality/creativity, and expression, given that there is human authorship.

When it comes to the production in scientific, literary or artistic domain section, with reference to Article 2(1) of the Berne Convention, the EU's methodology for determining whether a work belongs in the literary, artistic, or scientific domain is *de jure* required for substantive eligibility for EU copyright protection. In actuality, though, the CJEU has not given it any thought. Rather, it has been connected to already-existing aspects of expression and originality/creativity. This ambiguous interpretation, when applied to AI-generated output, raises the possibility that it will meet the requirement if it can be conclusively determined to possess the originality/creativity and expression components.

The EU Copyright Law, like the Berne Convention, is based on an anthropocentric view of human intellectual effort; although there is no universal definition of an author, it still places the human being at the centre. This emphasis is demonstrated by EU laws such as the EU Copyright Directive and by significant rulings like *Painer* and *Cofemel*, in which Advocate General Trstenjak specifically mentioned the human element of EU copyright. Furthermore, as AI would need to be granted legal personhood in order to fulfil the criteria of personality, human touch, and free will and creativity, these factors present formidable obstacles to AI becoming the only author.

Therefore, academia suggests that rather than treating AI as the sole author, more focus should be made on evaluating the degree of human personality, personal touch, and free and creative choice engaged with AI.

An AI-generated product must be the original work of the human author and constitute an intellectual creation that satisfies the requirements of original work in a creative manner in order to be deemed original or creative under EU copyright law. After that, this criterion is assessed case-by-case, considering human input at the preparation, processing, and finalisation stages. It also encompasses the manner in which the human author uses form, selection, order, and combination to convey his unique style and creative ability. It should be emphasised that, generally speaking, an expression would be deemed more original or creative the more subjective the author is reflected in it.

The requirement for expression suggests that human authors should be given credit for any work produced by AI, as was covered in the section on human intellectual effort. The expression component, which includes the author's creative freedom as seen in its “expression”, is essential to this attribution. Furthermore, this phrase need not be in an immutable form; it just needs to be sufficiently recognisable. This criterion will be satisfied as long as the human input can be reliably identified across the various stages of the output produced by AI. Last but not least, a general authorial intent from the human author suffices; that is, they need to have had a broad idea of the AI-generated output, for unanticipated, unexpected results to be partially protected by copyright.

5.2. Law Application and Thesis Reiteration

When applying these thresholds to the video game *The Matrix Awakens*, this thesis advanced that the invention of “Urban Treasure Hunts” by the Smart NPC to be difficult to consider original or creative for two reasons. Principally, using a global knowledge bank extensively, from which a great deal of the data used by the Deep Learning Approaches—which are then produced by LLM—is essentially reiterating millions of processed books, articles, webpages, and social media postings. It does not possess the same creative freedom or personal touch as from the software developers. Second, even though the preparation stage work is credited to human

authorship, by the time the Smart NPC proclaimed the concept, Deep Learning Approaches would have changed the data to the point where it was impossible to determine any originality or creativity during the process and finalisation stages.

Furthermore, there is another obstacle to “The Matrix Awakens” video game's eligibility for EU copyright protection: the expression prerequisite. AI-generated content cannot be correctly identified by human writers of Smart NPCs since they are not able to predict the output during the finalisation phase. Since these software developers only connected the knowledge bank to millions of publicly available datasets during the implementation phase, it is difficult to show that the human authors’ general authorial intent was to have foreseen the outcomes of the Smart NPC with its app idea “Urban Treasure Hunts.”

Ultimately, the fact that human authorship is assumed over the work is what makes these issues feasible. This thesis contended that because EU copyright law is strongly rooted in anthropocentric discourse, it is difficult to demonstrate sole machine authorship under the law. The EU Copyright Directives and the CJEU Jurisprudence strongly imply that the term “author” is anthropocentric, even though the EU Copyright Law does not define it. This formed the underlying presumption during the above-mentioned arguments throughout the dissertation, as the master’s thesis expanded upon the notions of originality/creativity and expression.

To conclude, this master’s thesis delved into a very recent and specific phenomenon, aiming to contribute to the understanding of how software developers can protect their future work and the degree to which human authorship is still required for autonomously generated work to be considered an intellectual creation. Currently, EU copyright law mandates human authorship; however, this thesis does not discount the possibility of sole machine authorship in the future. Stemming from the sections on expression and human intellectual effort, another pertinent question addressed to academia and legal practitioners is the extent to which other copyrighted works inferred from publicly accessible internet sources are infringed upon when a Large Language Model such as the Smart NPC extracts information from them.

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