TILBURG UNIVERSITY

Innovating personhood

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Research into the feasibility of conferring an artificial entity with and exploring the borders of legal personality

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Preface

"Science is operated by the skill of the scientist and it is through the exercise of his skill that he shapes his scientific knowledge."

Michael Polanyi, 'Personal Knowledge. Towards a Post-Critical Philosophy'[1]

In front of you lies the master's thesis 'Innovating personhood'. The research that has been carried out within the framework of this thesis has been conducted in order to finish the master's program Law & Technology at Tilburg University. During the year of 2018, I eagerly researched the legal area of copyright and a promising type of technology that is AI. Copyright and AI have had my interest for quite some time and it has been my pleasure to write my thesis containing both of these aspects.

I would like to express my gratitude to everyone who has supported me during the thesis process. I would like to thank several persons specifically, who have supported me both personally and professionally.

Initially, I want to thank my first thesis supervisor, Tom Chokrevski, for his enthusiastic and spot-on feedback. I have not always taken the opportunity to seek for his guidance, but his feedback during the most important time of my research – the introduction – has encouraged me during the continuation of my research that I was on the right path.

Secondly, I wish to acknowledge the important contribution my second thesis supervisor, Shazade Jameson, has made in order for me to establish a substantiated foundation of my research and in refining it near the end. I value the effort she took in providing her constructive comments. I always appreciated her feedback, because I feel it has helped me to improve my academic writing and maintain a critical look at my own work.

Furthermore, I would like to express thanks to my girlfriend for not only her expertise in ethics and the English language in general, but for always having a sympathetic ear when I needed one and offering any sort of help when I ever needed it as well.

Finally, I would like to thank my friends, family, colleagues and fellow students for all

[1] M. Polanyi, *Personal Knowledge. Towards a Post-Critical Philosophy*, London: Routledge & Kegan Paul 1958, p. 51.

their support for the benefit of my studies or for other matters that helped me to finish my thesis to my satisfaction. Having finished my research, I believe I would add to Polanyi's quote at the start of this preface that skill and knowledge are concepts that cannot only be achieved individually, but interacting with others represents a fundamental element of it.

I sincerely hope that you will read my thesis with interest.

Faziel Abdul

Tilburg, 9 January 2019

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1 Introduction

"Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain-that is, not only write it but know that it had written it. No mechanism could feel (and not merely artificially signal, an easy contrivance) pleasure at its successes, grief when its valves fuse, be warmed by flattery, be made miserable by its mistakes, be charmed by sex, be angry or depressed when it cannot get what it wants."

Geoffrey Jefferson, 'The Mind of Mechanical Man'[2]

1.1 Problem analysis

Technology has progressed significantly in the past decades. For instance, Microsoft is developing a computer program that is able to translate Mandarin text into English text,[3] Google has produced a visual search engine; search by taking a picture,[4] and (the by Google owned) DeepMind has programmed an algorithm that can create speech and music.[5] Some of these developments might benefit society more than others. However, all are related to a specific technological development or research field known as artificial intelligence (AI).

1.1.1 AI

McCarthy defined AI in 1956 as "the science and engineering of making intelligent machines".[6] Before that, Turing introduced the Imitation Game (nowadays known as the Turing test), which shines a light on the matter whether a machine can exhibit human intelligence.[7] Turing believed that machines should be taught to learn, not through imitating the mind of an adult, but rather by teaching the machine to learn in the same sense as the mind of a child is

[2] G. Jefferson, The Mind of Mechanical Man', *British Medical Journal* (1) 1949, iss. 4616, p. 1105-1110.
[3] L. Del Bello, 'AI Translates News Just as Well as a Human Would' <https://futurism.com/ai-translator-microsoft/> Accessed 16 March 2018.
[4] D. Nield, 'The Google Lens Visual Search Magic Is Now Rolling out on IOS | TechRadar' <https://www.techradar.com/news/the-google-lens-visual-search-magic-is-now-rolling-out-on-ios> Accessed 16 March 2018.
[5] D. Coldewey, 'Google's WaveNet Uses Neural Nets to Generate Eerily Convincing Speech and Music', *TechCrunch* 2016 <https://techcrunch.com/2016/09/09/googles-wavenet-uses-neural-nets-to-generate-eerily-convincing-speech-and-music/> Accessed 16 March 2018.
[6] N.A. Kangude and S.B. Raut, 'Introduction to Artificial Intelligence', *IJCSET* (2) 2012, iss. 3, p. 958-962.
[7] A.M. Turing, 'Computing Machinery and Intelligence', *Mind Quarterly Review of Psychology and Philosophy* (59) 1950, iss. 236, p. 433-460.

stimulated in its development. A sub-research field within AI that approximates Turing's conviction is Machine Learning (ML).[8] ML has a part in, among other things, the previously mentioned inventions by Microsoft, Google and DeepMind. ML will be expanded on more in-depth further in this research. For now, it is important to realize that a key element of ML is data, and a ML-algorithm is able to analyse data in order to abstract information that a human being would not necessarily obtain on its own or sometimes even never could have foreseen.[9] Seeing as how Google and Microsoft use ML to generate their work, especially this technology has some interesting implications. For example, if a human being's actions are limited to merely writing a code, without having knowledge about all that can follow out of the algorithm, who then can derive rights and obligations from the algorithm's actions? Subsequently, if an AI-algorithm is applied to robots that are capable of influencing the physical world, what does that mean with regards to liability? These questions are all related to law. In Jefferson's opinion at the start of this chapter, it seemed like AI could only equal a human being's brain if it could express emotions. Looking at the developments in AI that focus on ML, it appears that science is more concentrated on making algorithms smarter, than imbuing it with feelings.

1.1.2 Law and AI

Following the rise of AI, it is useful to first discuss how it interacts with the law, what legal issues arise and why this relation is relevant. With every new technology, legislators deal with the question whether it is necessary to regulate technology and to what extent the current law suffices. Lessig distinguishes, in what he calls "The New Chicago School", four modalities of regulation, i.e. law, social norms, market and architecture, that guide an individual's or a regulated entity's behaviour. According to the Old Chicago School, the importance of law as a regulator is inferior to the three other regulatory modalities. The doctrine of the Old Chicago School considers law as a regulator to be less effective and slower than its fellow other regulatory modalities. Lessig argues in his theory of the New Chicago School that social norms, market and architecture each are kept more balanced and are subject to law. For instance, law can create norms that regulate the market by imposing strict rules on certain maximum prices. As such, law regulates behaviour directly by setting norms and indirectly by regulating the

[8] M. Mills, 'Artificial Intelligence in Law: The State of Play 2016' <https://www.neotalogic.com/wp-content/uploads/2016/04/Artificial-Intelligence-in-Law-The-State-of-Play-2016.pdf> Accessed 16 March 2018.
[9] E. Alpaydin, *Introduction to Machine Learning*, Cambridge: MIT Press 2014, p. 2; P. Louridas and C. Ebert, 'Machine Learning', *IEEE Software* (33) 2016, iss. 5, p. 110-115; S. Theodoridis and K. Koutroumbas, *Pattern Recognition*, Amsterdam: Elsevier Science & Technology 2006, p. 485.

market that in turn regulates behaviour.[10] The drawback of law as a regulatory tool is exposed when the development of technology is linked to the Old and New Chicago School. As a result of rapidly progressing technology, legislators are not able to keep up with all technological developments which in turn leave a regulatory vacuum, i.e. a gap in the status quo.[11] Especially AI develops at a high pace and is more eligible for regulatory measures, because this field of technology – in the age of the Internet of Things (IoT) – has recently developed several practical applications for society to use, for instance self-driving cars or every other electronical device that is preceded by the word 'smart'. The current gap in the law is also exposed in terms of intellectual property when theorizing about an AI-algorithm that creates something that its programmer could never have foreseen. A programmer is not able to predict what the result of the algorithm's 'thinking' will be and insofar has not directly created the artwork.[12] In this context, thinking is used to illustrate the process an algorithm experiences when it makes a decision and is therefore linked to decision-making. The programmer has not gone through the creative process of creating an artwork and the algorithm is not able to obtain rights. Additionally, in terms of legitimacy, societal approval with regards to AI is vital. In a Eurobarometer published by the European Commission, researchers have concluded that people who are well-informed or use technology regularly have a positive response to it and are more able to accept the possibilities it provides as well.[13] Therefore, to legitimize the use of AI in society, public education or acclimatization to technology is necessary. It is not the role of scientific research per se to educate or assist society in acclimatizing to technology, but scientific research does indirectly contribute to the pursuit of legitimacy by providing clarity with well-substantiated evidence on challenges that might emerge from society interacting with technology. For instance, the European Commission ordered the Draft Ethics Guidelines for Trustworthy AI, issued by the European Commission's High-Level Expert Group on Artificial Intelligence. These guidelines aim to promote trust with regards to AI in society, and thereby implicitly emphasize the importance of legitimacy. The final version of these guidelines is due in March 2019. It is important to check the final version for comparison, as it is

[10] L. Lessig, 'The New Chicago School', *The Journal of Legal Studies* (27) 1998, iss. S2, p. 662-672.
[11] V. Wadhwa, 'Laws and Ethics Can't Keep Pace with Technology. Codes we live by, laws we follow, and computers that move too fast to care', *MIT Technology Review* 2014, https://www.technologyreview.com/s/526401/laws-and-ethics-cant-keep-pace-with-technology, Accessed 25 September 2018.
[12] R. Michalczak 'Animals' Race Against the Machines', in: V.A.J. Kurki & T. Pietrzykowski (eds.), *Legal Personhood: Animals, Artificial Intelligence and the Unborn*, Cham: Springer Nature 2017, p. 98.
[13] European Commission, 'Special Eurobarometer 460. Attitudes towards the impact of digitisation and automation on daily life', European Union 2017, p. 10 <https://ec.europa.eu/digital-single-market/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life> Accessed 25 September 2018.

due after this research has been completed. However, it can be assumed that its aim will remain unaltered.[14]

The backlog legislators are confronted with regarding up-to-date legislation confirms the importance, or rather urgency of legal scientific research within the field of AI, for instance, legal (and ethical) liability issues concerning the responsible entity when a self-driving car is involved in a traffic fatality.[15] However, these matters are not limited to liability issues that consider tangible property. Lupu, for instance, approaches technology from the field of intellectual property rights. He primarily focusses on the importance of AI (or any other technology) and if it offers the promised benefits accordingly.[16] Lupu shows that outdated legislation also has consequences on the rights holder of intellectual property rights, for instance, when a song that is composed by an algorithm infringes upon the copyright of someone, who then holds the rights to that specific music? This illustrates which legal issues arise when technology such as AI develops human-like characteristics, like imitating a human being's creativity or functioning when he creates an artwork or drives a car. These issues are normally solved by holding the person accountable who infringes upon the right of another. However, the entity that causes the infringement is an algorithm. Legally speaking, it is not possible to hold an algorithm accountable for its actions as an algorithm does not have legal personality, i.e. that which entitles it to hold rights and obligations.

The lack of legal personality (or legal personhood) is what distinguishes the previously mentioned examples of the liability of a self-driving car and the copyright infringement of an AI-algorithm. In some jurisdictions, such as that of the Netherlands, the driver of a car would be liable if he hits a pedestrian who crosses the road, regardless of whether the driver of the car could have reasonably prevented the accident (Article 185 of the Dutch Road Traffic Act 1994). Similarly in Dutch law, if a human being creates a work of art that infringes upon the copyright of another author's work, legally speaking, he is liable for any harm that causally follows (Article 6:162 Dutch Civil Code). The obvious liable person, and thus the legally responsible person, is removed when considering these acts are performed by an AI-algorithm. Legal personhood is a legal concept that is traditionally reserved for natural and legal

[14] High-Level Expert Group on Artificial Intelligence, *Draft Ethics Guidelines for Trustworthy AI*, Brussels: European Commission 18 December 2018, p. 2.
[15] S. Russel, D. Dewey, M. Tegmark, 'Research Priorities for Robust and Beneficial Artificial Intelligence', *AI Magazine* (36) 2015, iss. 4, p. 107-109.
[16] M. Lupu, 'Artificial Intelligence and Intellectual Property', *World Patent Information* (53) 2018, par. A1-A3.

persons, which an algorithm is not. It entitles those entities to be granted with rights and duties that helps them participate in human society.[17] In everyday language use, a person is referred to as a natural person or a human being. In law, the concept of a person also extends to corporations. Thus, rights that used to be simply the privilege of human beings, now also apply to non-humans. This raises the question whether the law does not already contain a solution to extend the concept of personhood to other entities.[18]

1.1.3 Doctrinal approach to legal personhood and AI

According to Adriano, in his explanation of the legal action theory, legal personhood is something which is based on the recognition of a legal construct becoming reality in a factual situation.[19] Within the legal doctrine, authors have theorized all across the legal spectrum about the issue of AI and legal personhood and how this should be approached. In 1992, Solum could only theorize about what the legal implications of granting an AI with legal personhood could possibly be, because technology was not advanced then as it is now. However, he states that if an AI could behave like a human being, its thinking process could equal that of a human mind and its behaviour could be confirmed by cognitive science, then it would be sensible to treat AIs like human beings.[20] Since then, different authors have placed their views on the issue of treating an AI like an entity with legal personality.

Guadamuz approaches the issue from a comparative perspective in relation to copyright law. He remarks that different states, such as the United States, Australia and the European Union (EU), would all come up with a different answer. With this, he implies that there is no singular answer. Furthermore, Guadamuz fears that a discussion on handing an algorithm copyright might ignite a broader discussion on providing artificially intelligent entities with even more rights. His careful approach concludes in providing copyright to the person responsible for operating the AI. For example, the programmer or the programmer's supervisor, because this would be the most sensible and efficient approach. No current amendment of the law is required, according to Guadamuz.[21] Hristov's take is similar to Guadamuz', however, he believes a change is necessary, namely a reinterpretation of the notion of 'employer' and 'employee'. Present labour law does not acknowledge an AI-algorithm as an employee,

[17] D. N. Hoffman, 'Personhood and Rights', *Polity* (19) 1986, iss. 1, p. 75-77.
[18] L. Beckman, 'Personhood and legal status: reflections on the democratic rights of corporations', *Netherlands Journal of Legal Philosophy* 2018, iss 1, p. 13-28.
[19] E.A.Q. Adriano, 'Natural Persons, Juridical Persons and Legal Personhood', *Mexican Law Review* (8) 2015, iss. 1, p. 112.
[20] L.B. Solum, 'Legal Personhood for Artificial Intelligences', *North Carolina Law Review* (70) 1992, iss. 4, p. 1231-1232.
[21] A. Guadamuz, 'Artificial Intelligence and Copyright' *WIPO Magazine* 2017, iss. 5, p. 14-19.

nor is it susceptible of having an employer. Nevertheless, Hristov believes that there are opportunities trying to adapt the notions of 'employer' and 'employee' to be in line with certain electronic entities. [22] As Rubinstein argues, if not in changing the law, then perhaps in its definitory ambiguity.[23] Bayern also tries to look into the current legal doctrine to bestow rights on a non-legal entity by means of granting an AI-algorithm legal significance as the result of an agreement. He does not argue that an algorithm is capable of concluding an agreement, but he believes the question of liability and to whom any rights that flow out of the algorithms actions flow could be solved by laying down agreements in a contract. [24]

The previously mentioned authors all have in common that they are trying to find a solution in the current legal doctrine, however, in doing so they evade the overarching question whether an AI-algorithm should have copyright and if the current notion of legal personhood is sufficient to provide the algorithm with such a right. Mason believes Western society as such is facing a change which is similar to any technological change in the past. Technological development changes processes and creates new opportunities for some, but also, in doing so, destroys jobs for others. As opposed to his peers, Mason is not trying to find a legal solution, but he tries to explain why changing the existing paradigm concerning legal personhood is not that peculiar in light of past industrial changes. By not looking at the legal aspects, he broadens the debate from a legal, to an ethical and societal one. In expanding the ongoing debate, he offers new possible insights in tackling the issue of granting an AI-algorithm with copyright, namely if a legal approach necessarily is the right one.[25] As justice is a legal and an ethical term and as such is evaluated by both worlds, so too can the notion of legal personhood be influenced by other disciplines.[26]

1.1.4 Electronic personhood

In line with the current debate on AI, the Committee on Legal Affairs of the EU (the Committee) has called upon the European Commission to create a specific legal status for what they

[22] K. Hristov, 'Artificial Intelligence and the Copyright Dilemma' *IDEA: The Journal of the Franklin Pierce Center for Intellectual Property* (57) 2017, iss. 3, p. 431-454.
[23] M.H. Rubinstein, 'Employees, Employers, and Quasi-Employers: An Analysis of Employees and Employers who Operate in the Borderland and Between an Employer-And-Employee Relationship', *University of Pennsylvania Journal of Business Law* (14) 2012, iss. 3, p. 605-659.
[24] S. Bayern, 'The Implications of Modern Business-Entity Law for the Regulation of Autonomous Systems', *Stanford Technology Law Review* (19) 2015, iss. 1, p. 93-112.
[25] R.O. Mason, 'Four Ethical Issues of the Information Age' *MIS Quarterly* (10) 1986, iss. 1.
[26] H. Kelsen, Bonnie Litschewski Paulson and Stanley L Paulson, *Introduction to the Problems of Legal Theory*, Oxford: Oxford University Press 1997, p. 17 and 57.

call ‘smart robots’, to ensure the prevention of liability issues with regards to electronic entities.[27] As a result, the European Parliament has taken steps in creating a framework for regulation to ensure the rights and responsibilities for an AI by means of an ‘electronic personhood’. This new type of legal personality is similar to the legal personhood corporations enjoy.[28] However, among several European lawmakers, legal experts and manufacturers there has been a widely shared critique with regards to the desirability of electronic personhood.[29] AI and Robotics experts, industry leaders, law, medical and ethical experts have urged the European Commission in an open letter to refrain from creating a new type of legal personhood. They believe this does not solve the issue of liability and the proposal only looks at the legal and economic impact of AI and Robotics, without considering the societal, ethical and psychological impact.[30] In response, the European Commission has issued a press release emphasizing the importance of ensuring an appropriate and ethical legal framework with regards to AI and the Commission urges each Member State to prepare their state for the socio-economic changes brought by AI. With regards to liability, the Commission believes this issue should be approached with the same values the Union stands for as codified in the EUs Charter of Fundamental Rights.[31] Through this statement, the European Commission does not explicitly, perhaps implicitly by omission, go into the desirability of an electronic personhood. Nevertheless, it is apparent AI calls for a different interpretation of what is now known as the rights holder, or with regards to intellectual property, as the maker.[32] Therefore, research into the scope of European or similar society’s conceptions of personhood is necessary to provide clarity. Moreover, it is important to give electronic personhood a fair chance and argue why (or why not) to object against this new type of personhood.

[27] Committee on Legal Affairs, *Draft report with recommendations to the Commission on Civil Law Rules on Robotics by the European Parliament*, Brussels: European Parliament 2016, p. 12.
[28] A. Hern, ‘Give robots ‘personhood’ status, EU committee argues’, *The Guardian* 12 January 2017 <https://www.theguardian.com/technology/2017/jan/12/give-robots-personhood-status-eu-committee-argues> Accessed 5 October 2018.
[29] J. Delcker, ‘Europe divided over robot ‘personhood’, *Politico* 2018 <https://www.politico.eu/article/europe-divided-over-robot-ai-artificial-intelligence-personhood> Accessed 5 October 2018.
[30] Open Letter to the European Commission Artificial Intelligence and Robotics, <www.robotics-openletter.eu> Accessed 5 October 2018.
[31] European Commission, ‘Artificial intelligence: Commission outlines a European approach to boost investment and set ethical guidelines’, European Commission – Press release 2018 <http://europa.eu/rapid/press-release_IP-18-3362_en.htm> Accessed 5 October 2018.
[32] F. Gurry, ‘Artificial intelligence and intellectual property: an interview with Francis Gurry’, *WIPO Magazine* 2018, iss. 5, p. 2-7.

1.2 Research question

This thesis aims to give a critical reflection on whether an AI-algorithm should have legal personality. The issue will be tackled from the perspective of copyright law. In line with the critique on electronic personhood and the statement of the European Commission, this thesis will approach the issue, as explained in the problem analysis, from a broad perspective, taking both legal and ethical consequences into account. This has led to the following research question:

Should an AI-algorithm be entitled to a legal status in order for it to obtain copyright to the artwork which is the result of its actions, based on the concept of legal personhood that we know so far or with respect to electronic personhood and in light of any legal and ethical implications granting an algorithm with legal personhood carries?

1.3 Sub-questions and methodology

The research question consists of several concepts that will be touched upon in three sub-questions. Every sub-question will address one or more of these concepts in order to answer the research question. In this section, after each sub-question the type of research methodology will be explained. Koops' taxonomy for descriptive research in law and technology has offered guidelines to conduct this research.[33]

Sub-question 1: In what sense does the artwork that is created by an AI-algorithm relate to the artwork that is created by a human being and what is required for an AI-algorithm to be granted with copyright?

A conceptual approach will provide an answer to this sub-question. The research has been divided into AI and copyright law. First, the type of technology will be outlined, more specific an outline of AI from the general technology to its applications in practice by means of, for instance, robots. Subsequently the newness of the technology will be touched upon, who the users are and how it is possible to regulate it. All this will assist in creating a framework of AI.

Secondly, the regulation (or law) will be explained. What applicable law within which jurisdiction is relevant to take into consideration? This thesis focusses on electronic personhood, which is proposed by a Committee of the EU. Therefore, it is sensible to look into EU-

[33] E.J. Koops, 'A taxonomy for descriptive research in law and technology', in: E. Palmerini & E. Stradella (eds.), *Law and Technology. The Challenge of Technological Development*, Pisa 2013: Pisa University Press, p. 37-57.

copyright law. However, since there is not one EU-copyright law, the copyright of the Netherlands will be used as a reference since the Supreme Court of the Netherlands has expanded on crucial elements of copyright law in their case law. The technology (AI) will then be applied to the applicable law (copyright law) and compared to the applicability of copyright to a human being.

Sub-question 2: To what extent do the notions of electronic personhood and the existing legal personhood relate in order for an AI-algorithm to acquire copyright?
The second sub-question delivers an in-depth review of the notion of legal personhood and electronic personhood. First, the sub-question delves into legal personhood as it is currently known. Secondly, electronic personhood will be explained and in what manner these two types of personhood relate to each other. Although the previous sub-question has set EU-law as the applicable law, the notion of legal personhood is somewhat universal within democratic societies and therefore literature from different legal systems outside of the EU can also be relevant. However, without any knowledge of non-Western societies' use of legal personhood and with the knowledge of similar use of legal personhood across Western societies, the research can be further demarcated to literature originating from Western societies.

Sub-question 3: In what sense are the legal and ethical implications of granting an algorithm personhood sufficiently problematic to grant or impede an algorithm with such a right?
The normative aspect of this thesis is taken into account in this sub-question. A normative outlook of weighing the legal and ethical implications of granting an algorithm with rights. Legal implications will also concern not tarnishing the essence of the notion of legal personhood by extending or adapting it to fit it for electronic entities. For instance, Dyschkant states that legal personhood functions to grant value and rights to an individual.[34] These values and rights need to be addressed to answer this sub-question. The research method that will be used in answering this sub-question is an evaluative research method, which looks at the framework evaluative consequentialism or at utilitarianism with a focus on value.[35] To support this framework, there will be a further expansion on the notions of property and personality that will be linked to evaluative consequentialism. The evaluation aims to assess whether an AI-

[34] A. Dyschkant, 'Legal Personhood: How We Are Getting It Wrong', *University of Illinois Law Review* 2015, iss. 5, p. 2107.
[35] M. van Hoecke, 'Preface', in: M. van Hoecke & F. Ost (eds.), *European Academy of Legal Theory Monograph Series*, Oxford: Hart Publishing 2011, p. V.

algorithm – presuming it can – should have legal personhood and whether this is a desirable option.

1.4 Relevance

In a world where technology is advancing at a high velocity and where legislators are conflicted and obstructed by a polarized society, it is important for science to attempt to offer guidance in challenging cases. As is shown in the analysis of the problem, even within science, there is uncertainty on how to deal with the issue of granting an AI legal personhood. The relevance of this thesis lies in filling this gap in legal science, but also offering political guidance in how to deal with such an issue that is set between the fields of law and technology.

1.5 Reading guide

This thesis consists of five chapters. After this chapter, the second chapter will provide clarity onto what AI specifically and legally entails and how it fits in our current understanding of copyright. To clarify, robotics will be discussed in chapter two as well. The various types of robots that are discussed in this thesis all fall under the same meaning of robots, that is robots that function using an AI-algorithm. Subsequently, chapter three offers an in-depth analysis of the notion of legal and electronic personhood and to what extent these two concepts relate with one another. Chapter four evaluates whether the legal and ethical implications, that are derived from the explanation provided in chapter three, are sufficiently problematic to grant or impede the endowing of an algorithm with personhood. Lastly, chapter five will form the conclusion by providing a well-substantiated answer to the research question.

2 Copyright for algorithms

"1. A robot may not injure a human being or, through action allow a human being to come to harm

2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws."

I. Asimov, Runaround

2.1 Introduction

Initially, copyright was intended to protect the investment made by publishers who printed books. Nowadays, the aim of copyright has shifted to the protection of the moral and economic rights of the author.[36] In other words, the protection shifted from a publisher, generally a company, to a natural person who is the creator of the work himself. With the recent developments in the field of AI, algorithms are able to construct works in the sense of Article 2 of the Berne Convention for the Protection of Literary and Artistic Works (BC) that are qualitatively indistinguishable with that of a human being.[37] In copyright, the protection does not solely refer to the end product. The creative thinking process of the creator of a work is key in the admission of copyright.[38] To comprehend the legal relation between an AI-algorithm and the work it has created, first, a descriptive and in-depth outline of AI will be established, that gradually becomes more specific. In line with the quote at the beginning of this chapter from Asimov's fictional story *Runaround*, section 2.2 will explain the true capabilities of AI and whether an AI really should have Asimov's law to begin with. Secondly, this chapter will delve into copyright law and what is required for copyright law to apply. Finally, an assessment will be made to determine how copyright can be applied to AI and to what extent this differs from the application of copyright to natural and legal persons.

[36] A. Kur & T. Dreier, *European Intellectual Property Law. Text, Cases and Materials*, Cheltenham: Edward Elgar 2013, p. 241.
[37] A. Guadamuz, 'Artificial Intelligence and Copyright', *WIPO Magazine* 2017, iss. 5, p. 14-19.
[38] Case C-5/08 *Infopaq* [2009], recital 45.

2.2 From algorithm to action

The introduction has already somewhat gone into what AI is. This section will provide a more in-depth account into its concept, that is what an AI actually is and how it can be legally qualified. This section will follow the three-step explanation of AI as written down in *Artificial Intelligence: A Modern Approach*, that can be considered as a leading handbook in AI.[39] The book starts with explaining what AI is and what its central aim is: problem-solving. It continues by describing how an AI-algorithm gains the ability to reason and plan by obtaining knowledge via learning. To close, the handbook illustrates how the problem is solved by means of communication, perception and action. The goal of this section is to illustrate how technology has developed from performing a simple calculation to creating art. Furthermore, this section will have to translate computer scientific literature and concepts into legal ones.

2.2.1 AI

AI is a computer science concept that, in this sub-section, will be approached through a legal lens. It is not relevant for this research to form a comprehensive computer science definition of AI. It is, however, necessary to have a clear definition of what is meant by AI in this thesis, because even among AI-researchers, there is no consensus of what AI exactly entails. Computer sciences will offer tools to interpret the notion of AI in order to create a legal outline. Simply put by McCarthy, AI consists of a broad research field of science and engineering that involves creating intelligent machines.[40] This definition will act as a starting point to discover what AI actually means and it will be used in the further course of this thesis.

McCarthy emphasizes that there is no consensus on the definition of AI, but his view does allow for a deeper look into the elements he mentions to try to introduce an outline of what AI entails. Tyugu mentions two understandings of AI as a research field. First, a purely academic approach, that is understanding intelligence by means of creating systems with real intelligent behaviour. Secondly, building intelligent applications that are to be applied in practice.[41] The first type corresponds with *strong AI*, which means a machine acts like it is actu-

[39] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016.
[40] J. McCarthy, 'What is Artificial Intelligence?', 2007 <www-formal.stanford.edu/jmc/> Accessed 7 October 2018.
[41] E. Tyugu, *Algorithms and Architectures of Artificial Intelligence*, Amsterdam: IOS Press 2007, p. 1.

ally thinking. The latter resembles *weak AI*, which presumes a machine acts as if it were intelligent.[42] These two approaches have in common that they are both aimed at creating intelligent machines. Nevertheless, intelligence is an ambiguous term that is subjectively dependent on the involved party. It is therefore necessary to understand what is meant by 'intelligence'. Schank has listed several characteristics of what society considers as intelligent. Not all are required, but each contains an element of intelligence, for example an entity that can be communicated with. The entity would need some knowledge as to what it is (self-awareness) and knowledge and awareness of the outside world. Finally, a machine should have the capability to plan and to some extent be creative, i.e. create an original work of value.[43] In order to fulfil these requirements, a machine needs tools to act, for instance sensors to acquire data. With this information, an intelligent machine has to be able to reason, schedule and plan, know heuristics and learn.[44] In other words, to be able to act intelligently, sensors, but also processing powers, must enable the AI to process natural language (natural language processing), represent knowledge of what data it has acquired (knowledge representation), use the information to reason (automatic reasoning) and adapt to new circumstances by learning from what it knows (machine learning).[45]As a result, the artificial entity is able to be creative, as it is capable of using its obtained knowledge to create a work that is new and possibly possesses value. The concept of creativity and whether an AI is in fact able to be creative will be explained more in-depth in sub-section 2.3.2. However, to summarize, the way in which intelligence is explained in this sub-section, will be the norm when intelligence is mentioned in this research.

Besides intelligence, McCarthy also mentions machines in his description of AI. The European Parliament defines machine as "an assembly, fitted with a drive system other than directly applied human or animal effort, consisting of linked parts or components, at least one of which moves, and which are joined together for a specific application'.[46] The label 'hardware' is often used to describe the machine when referring to a computer, which consists, among others things, of the computer case, computer chips and wires. In the age of IoT, that does not merely involve traditional pieces of hardware such as a desktop personal computer or

[42] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 1020.
[43] R.C. Schank, 'What is AI, Anyway?', *AI Magazine* (8) 1987, iss. 4, p. 59-65.
[44] J. Johnson & P. Picton, *Concepts in Artificial Intelligence: Designing Intelligent Machines*, Oxford: Alden Press 1995, p. 6-7.
[45] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 2.
[46] Article 2(A) Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on Machinery, and Amending Directive 95/16/EC.

a laptop. Think of smart fridges that are capable of telling its users when the milk is past its expiration date or a smart thermostat that increases the temperature when its owner approaches his or her home. Without going into its privacy and security issues, the machine cannot simply rely on hardware to exhibit intelligence.[47] Other factors are necessary in order for a machine to act intelligently, for instance software (applications), data, storage capabilities and a network connection. Additionally, of course, rudimentary features such as electricity are essential for a machine that works with AI to function. As explained by Petzold, by means of electricity, code is used for human beings to communicate to a computer system. A written piece of code, e.g. an algorithm, consists of a numerical order that represents an instruction for a software program to run.[48] Weik describes an algorithm as "a finite set of well-defined rules for the solution of a problem in a finite number of steps and to a stated precision".[49] Code is what distinguishes AI with less intelligent algorithms. An AI-algorithm is written with the aim to be intelligent and consists of instructions for the machine it is connected to, to act as such. The next sub-section will illustrate more in-depth to what extent a machine is able to act intelligently.

2.2.2 Machine learning

ML has been briefly addressed in the introduction as an algorithm that is able to adapt to new situations by learning from data. ML-algorithms are meant to organize existing knowledge to generate new insights.[50] This is also understood by Russel & Norvig as improving a performance by observation. A programmer is not able to encode the solution in its initial code, because he cannot predict the outcome in the same manner as the algorithm can. On the contrary, the programmer probably will not ever know the solution himself.[51] This sub-section illustrates the process of how the ML-algorithm reaches its conclusion in order to create a clear understanding of ML and its implications, especially in this age of big data.

Primarily, it is important to get a clear understanding of what the 'learning'-element of machine learning entails. In order for an algorithm to learn successfully, it is essential it does

[47] Cf. K. O'Hara, 'The Fridge's Brain Sure Ain't the Icebox', *IEEE Internet Computing* (18) 2014, iss. 6, p.81-84.
[48] C. Petzold, *Code. The Hidden Language of Computer Hardware and Software*, Redmond: Microsoft Press 2000, p. 50.
[49] M.H. Weik, 'Algorithm', in: *Computer Science and Communications Dictionary*, Boston: Springer 2001 <https://link.springer.com/referenceworkentry/10.1007/1-4020-0613-6_477> Accessed 5 December 2018.
[50] E. Tyugu, *Algorithms and Architectures of Artificial Intelligence*, Amsterdam: IOS Press 2007, p. 80.
[51] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 693.

not merely learn from past examples to apply to same new examples. It should be able to generalize the solution, also known as inductive reasoning or inductive inference. Otherwise, the effect of the algorithm would be too narrow to be considered as learning. It would merely copy what it has seen. On the other side of the spectrum, if the learning algorithm is programmed too broadly, there is a risk that the program will reach useless conclusions. Therefore, in order for an algorithm to learn from past examples, it has to be based on principles that do not let the algorithm stray to useless conclusions.[52] This means that the principles are aimed to let the algorithm function efficiently and accurate.

Moreover, the examples or instances of data have to be labelled accordingly to the purpose of the algorithm, for instance as spam or non-spam when the objective is to filter out spam. Some features or characteristics also have to be assigned to the data that describe the data, this phenomenon is also known as meta-data. Subsequently, a variation of samples help the algorithm to learn. A training sample is used to train the algorithm, a validation sample is used to tune the parameters of the algorithm and a test sample is used to evaluate the performance of the algorithm. The loss function measures to what extent a label differs with what the algorithm predicts in order to establish an error rate by means of the test samples. A hypothesis set subsequently applies the features of data to the label. Each set is tested and the set with the best performance is used as the validation sample. In turn, the best hypothesis is used to predict the examples of the test sample, on which the initial loss function has been evaluated.[53]

This process of ML is linked to supervised learning. There are many different types of machine learning. For the purpose of this thesis, it is not necessary to define all types. Most relevant are the types of machine learning that exhibit the most intelligent actions, that is unsupervised machine learning and deep (reinforcement) learning which will be explained in the following sub-sections.

2.2.3 Unsupervised learning

As its name implies, unsupervised learning does not require 'supervision' from its creator, i.e. someone to label all the data and characterize its features. Unsupervised learning tries to discover structures in data without knowing what the desired output is. This process reflects the way in which a human being learns. If someone is told what a dog is by being shown a picture

[52] S. Shalev-Shwartz & S. Ben-David, *Understanding Machine Learning. From Theory to Algorithms*, New York: Cambridge University Press 2014, p. 2.
[53] M. Mohri, A. Rostamizadeh & A. Talwalkar, *Foundations of Machine Learning*, Cambridge: The MIT Press 2012, p. 3-6.

of a dog, a human being will try to find the characteristics of a dog on its own (like it barks, walks on four legs, usually held as a pet) and will be able to apply these self-made criteria to new instances of checking whether something is a dog.[54] So too does unsupervised learning try to find features by means of creating data clusters. It tries to find certain patterns or regularities to the input data. For instance, companies can process the data of their customer to determine which customers have common features in order to assign them a cluster. Depending on their characteristics, a company can propose certain products that are fitting to their needs.[55] The way in which the algorithm learns is much more explorative and less analogical, which means it tries to find new patterns using a fresh look instead of trying to use data in order to reach a premediated goal. As a consequence, AI has evolved from merely solving difficult problems for human beings that are easy to solve with computational power, to now performing refined ways of thinking using unsupervised learning that are already relatively simple for human beings but which used to be difficult for an AI. In the words of Ryle, the type of knowledge has evolved from knowing that (something is the case) and knowing how (to do things), i.e. the distinction between theory and practice.[56] Polanyi in 1958, and further concretized in 1995 by Nonaka, rephrase Ryle's take on knowledge by distinguishing explicit knowledge and tacit knowledge. Nonaka explains explicit knowledge as being formal and systematic, which make it easy to communicate. Tacit knowledge is harder to communicate, because it is gained from experience in order to hone one's technical skills, also taking the cognitive dimension in which the skilful person resides into account, such as his beliefs and perspectives. To illustrate this, Nonaka uses the example of creating product specifications of a home bread-making machine by observing a baker who famously makes the best bread in Osaka. The explicit knowledge is written down by the observer in the product specifications. Tacit knowledge is the type of knowledge that the bread maker has gained from his experience.[57] Polanyi describes tacit knowledge partly as skilful performance that is *"achieved by the observance of a set of rules which are not known as such to the person following them"*[58]

Gaining tacit knowledge seems redundant if a human being is already able to do it, however, taking the amount of computational power that an AI possesses into account, an AI

[54] K.P. Murphy, *Machine Learning. A Probalistic Perspective*, Cambridge: The MIT Press 2012, p. 9-10.
[55] E. Alpaydin, *Introduction to Machine Learning*, Cambridge, The MIT Press 2014, p. 11-12.
[56] G. Ryle, 'Knowing How and Knowing That: The Presidential Address', *Proceedings of the Aristotelian Society* (46) 1946, iss. 1, p. 1-16.
[57] I. Nonaka, 'The Knowledge-Creating Company', *Harvard Business Review* 1991, iss. 6, p.98.
[58] M. Polanyi, *Personal Knowledge. Towards a Post-Critical Philosophy*, London: Routledge & Kegan Paul 1958, p. 51.

can apply this type of knowledge to a considerably larger amount of data. Tasks that are difficult for human beings to achieve, like calculations involving large numbers, are relatively easy using AI. On the other hand, some solutions seem clear to a human being, but can be difficult for an AI. Combined with the potential of big data, AI creates numerous possibilities, like speech or image recognition. Moreover, the clusters that are provided with unsupervised learning, can be labelled to perform supervised learning tasks.[59] However, that does not automatically mean that the algorithms calculations using unsupervised learning are always correct. For instance, IBMs supercomputer Watson was asked in the American gameshow Jeopardy! in which city in the United States the largest airport was based. The computer answered Toronto, which seems strange for anyone familiar with American topography as Toronto is not a city in the United States. The programmers clarified the error by stating it could be explained by the way the word 'cities' was written (not as city's) and that there definitely was a city in the United States called Toronto. They argued that their computer does not necessarily search for the right answer, but it looks at what answer has the highest probability of being correct.[60]

2.2.5 Deep (reinforcement) learning

The previously mentioned explorative learning methods belong to a specific branch of unsupervised learning, that is deep learning. Deep learning is initially inspired by the way in which the human brain works. According to Goodfellow, Bengio and Corville, deep learning has currently expanded beyond its neuroscientific origin, as a result of the limited present-day knowledge about the human brain that does not contain more information about using the brain as a guide than already can be applied in AI.[61] Deep learning consists of an algorithm that learns from experience by viewing the world as a hierarchy of concepts. Each complicated concept is made up of simpler concepts, creating several layers of concepts using artificial neural networks (ANNs).[62] Neural networks in the human brain recognize patterns in what is perceived by each of the human senses. Each neuron is capable of procuring information and exchanging the information with other neurons. As a result, a neural network is formed. An average human brain comprises of approximately 100 billion neurons that all have 1000 – 10000 connections with adjacent neurons. ANNs consist of hundreds of processing elements that are able to process, store and transfer data to other processing elements

[59] I. Goodfellow, Y. Bengio & A. Corville, *Deep Learning*, Cambridge: The MIT Press 2016, p. 1.
[60] K.D. Ashley, *Artificial Intelligence and Legal Analytics. New Tools for Law Practice in the Digital Age*, Cambridge, Cambridge University Press 2017, p. 15-16.
[61] I. Goodfellow, Y. Bengio & A. Corville, *Deep Learning*, Cambridge: The MIT Press 2016, p. 13-15.
[62] Ibid, p. 1.

forming an artificial neural network.[63] This is where the analogy of a human brain and an ANN ends. The many layers of the ANN are especially good at performing general tasks that require an analysis of seemingly abstract input data, particularly in present times due to the accessibility of inexpensive computing resources. Louridas & Ebert mention tasks, such as image recognition and automatic translation.[64]

Deep learning in itself, as well as supervised and unsupervised learning, aim at perceiving and interpreting the world. Another branch of machine learning called reinforcement learning also incorporates interaction with the world. Reinforcement learning requires an agent to take action in an environment by using sensors that will be criticized in its choices in order for the agent to make the best choice to solve a problem and get a reward.[65] It is assumed that the agent wants to earn the biggest reward. The best choice will get him the biggest reward and he will get the biggest reward if his choice is least criticized. The object is to maximize the net total reward. This is different from supervised and unsupervised learning, because there are no data or labels as input. However, by learning from the agent's choices in the environment, output data is formed, that acts as enforcement for future choices. The emphasis is on the given reward, i.e. the type of reward teaches the algorithm.[66] In order to illustrate reinforcement learning, Buduma uses the example of balancing a pole. The agent can balance the pole by moving it. The environment will punish the agent if the pole is not balanced and reward the agent if it is. In order to receive the highest reward, the agent will have to make the best choices to allow the pole to stand upright.[67]

The combination of the deep learning paradigm and reinforcement learning paradigm have resulted in a new joint research field of deep reinforcement learning. Combining these two paradigms increases the agent's perception of the world. Deep reinforcement learning solves the issue of reinforcement learning where the algorithm has to deal with an input of high-dimensional data from its environment, that is data regarding a certain instance that shows a large number of variables. For instance, a human being can be considered an instance

[63] S. Agatonovic-Kustrin & R. Beresford, 'Basic concepts in artificial neural network (ANN) modeling and its application in pharmaceutical research', *Journal of Pharmaceutical and Biomedical Analysis* (22) 2000, iss. 5, p. 718-720.
[64] P. Louridas & C. Ebert, 'Machine Learning', *IEEE Software* (33) 2016, iss. 5, p. 110-115.
[65] E. Alpaydin, *Introduction to Machine Learning*, Cambridge: The MIT Press 2014, p. 517-518.
[66] N. Buduma, *Fundamentals of Deep Learning. Designing Next-Generation Machine Intelligence Algorithms*, Sebastopol: O'Reilly Media 2017, p. 247.
[67] Ibid, p. 248.

and its variables are his weight, height, skin colour, hair colour, etc.[68] Deep learning is an efficient tool to map high-dimensional data, because of its neural networks. An ANN assisting reinforcement learning in absorbing high-dimensional data creates a new type of network, namely a deep Q-network. This new type of network still has many unexplored aspects.[69] The utility of deep reinforcement learning is derived from its learning capabilities to control a diverse collection of demanding tasks. Deep Q-networks achieve these challenging tasks without a substantive amount of prior knowledge and therefore have promising theoretical and practical implications. For instance, Mnih et al. evaluate Deep Q-networks by using an Atari 2600 (gaming) platform, in which an agent is able to perform 49 different acts. The authors found that 'regular' reinforcement learning methods are outperformed by the Deep Q-networks, without having any prior knowledge about the games the authors have used as assessment tool.[70]

2.2.5 Applications of AI and the research field of Robotics

The previous sub-sections nearly exclusively discussed AI-algorithms that have intelligent 'thinking' capabilities and how it is possible that an algorithm is able to make intelligent decisions. Nonetheless, this thesis started with an algorithm painting an artwork or composing music. This sub-section delves into how these outcomes come into being by addressing the applicative side of AI. Moreover, it is important to discuss what the practical outcomes or realizations are of intelligent algorithms. To demarcate the numerous possibilities AI has to offer, the examples from the introduction, that possess a copyrightable subject-matter, will serve as a research subject in determining what hardware is necessary to accomplish the desired outcome of the algorithm.

Only recently, Christie's auction house in New York auctioned a painting that was created by an AI-algorithm.[71] It had been made by a technology called Generative Adversarial Networks (GANs).[72] However, the painting itself was printed by a simple printer. The printer

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[68] D.L. Donoho, 'High-Dimensional Data Analysis: The Curses and Blessings of Dimensionality', 2000, p. 1-32 <https://pdfs.semanticscholar.org/63c6/8278418b69f60b4814fae8dd15b1b1854295.pdf?_ga=2.31339327.1632844680.1540988469-1578143299.1540988469> Accessed 31 October 2018.

[69] S.S. Mousavi, M. Schukat & E. Howley, 'Deep Reinforcement Learning: An Overview', in: Y. Bi, S. Kapoor & R. Bhatia (eds.) *Proceedings of SAI Intelligent Systems Conference (IntelliSys) 2016*, Cham: Springer International Publishing 2018, p. 426-440.

[70] V. Mnih et al., 'Human-level control through deep reinforcement learning', *Nature* (518) 2015, iss. 7540, p. 529-533.

[71] G. Cohn, 'AI Art at Christie's Sells for $ 432,500', *The New York Times* 25 October 2018 <https://www.nytimes.com/2018/10/25/arts/design/ai-art-sold-christies.html> Accessed 31 October 2018.

[72] G. Cohn, 'Up for Bid, AI Art Signed 'Algorithm'', *The New York Times* 22 October 2018 <https://www.nytimes.com/2018/10/22/arts/design/christies-art-artificial-intelligence-obvious.html?module=inline> Accessed 31

did not take part in the 'creative' thinking process to create the painting. Similarly, other algorithms' potential only becomes tangible after an element of hardware has been added to the equation. An important difference between an algorithm and hardware, is the ability to change the physical world. An algorithm cannot create a painting on its own, it needs a printer to make its creation tangible. This deficiency of algorithms paves the way for the research field known as robotics. Therefore, it is essential to mention robotics in this thesis. Moreover, robotics has a part in determining the way in which the physical world is influenced by AI. Hence, it is important to explain in what is included in the world of robotics and in what manner it influences the human beings live in.

A printer is able to affect the physical world, but there are other requirements it has to fulfil for it to be considered a robot. For instance, it requires effectors that can affect the physical world, e.g. arms, wheels and legs. A robot needs sensors in order for it to become aware of their environment.[73] Robotics has a wide variety of applications, such as in space exploration, medicine, the military or in plain children's toys.[74] In recent developments, the field of robotics has tried to mimic the biology of a human being in certain ways. For instance, evolutionary robotics tries to create autonomous robots that do not need the supervision of a human being.[75] Another subfield of robotics, called neurorobotics, is inspired on the nervous system of human beings and animals. Neurorobotics also uses neural networks, but, contrary to ANNs, these neural networks are derived from the neurobiological system.[76] Robots as such, perform tasks that are imposed upon them. ML assists robots in precepting their environment. Using reinforcement learning, a robot could, for instance, learn how to make a helicopter perform a dangerous move by making it study data of recorded controls of an expert human pilot.[77] This section shows that robots can affect the physical world and are intended to copy human beings or humanlike characteristics. As such, their effect on the physical world can be in line with the type of effects a human being has on the physical world. For example, if a robot

October 2018; Cf.: I.J. Goodfellow et al, 'Generative Adversarial Nets' *Advances in Neural Information Processing Systems* (27) 2014, p. 1-9 <https://papers.nips.cc/paper/5423-generative-adversarial-nets.pdf> Accessed 31 October 2018.

[73] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 971.

[74] W.L. Stone, 'The History of Robotics', in: T.R. Kurfess (ed.) *Robotics and Automation Handbook*, Boca Raton: CRC Press 2005, p. 16-19.

[75] D. Floreano, Phil Husbands & Stefano Nolfi, 'Evolutionary Robotics', in: B. Siciliano & O. Khatib (eds.), *Springer Handbook of Robotics*, Berlin: Springer-Verlag 2008, p. 1423.

[76] M.A. Arbib, G. Metta & P. van der Smagt, 'Neurorobotics; From Vision to Action', in: B. Siciliano & O. Khatib (eds.), *Springer Handbook of Robotics*, Berlin: Springer-Verlag 2008, p. 1453-1454.

[77] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 985, 1002-1003.

drives a car or if the car is a robot itself, the factual (and not necessarily legal) effect – if the robot would be the cause of a car accident – would be the same as with a human driver.

2.3 Copyright law

Now that a clear understanding of AI has been established, this chapter follows by tackling the second concept, that is copyright. This section will zoom in on EU-copyright law as this research focusses on a new EU legal status and copyright sits on the intersection of creations that are established by an entity that can be considered as intelligent and the new potential liability issues with regards to copyright infringement. First, conventional copyright law will be illustrated and how it is applied to human beings. Secondly, bearing in mind what an AI actually is, this section will determine whether the artwork of an AI-algorithm is susceptible to copyright.

2.3.1 Copyright law applied to human beings

A human being acquires copyright by creating a work that is eligible for copyright protection. Different concepts within this description of copyright protection require further attention. For instance, the notion of a work and why a work is protected by copyright. Also, what does it mean to be a creator or author of a copyrighted work and who acquires the exclusive right. In other words, what is susceptible to copyright and who or what is eligible for obtaining those rights. Moreover, why are those entities eligible for obtaining those rights?

Before delving into the specifics of a work and the rights holder of copyright, it is imperative to establish a legal framework of applicable copyright laws. EU copyright law is regulated in international treaties, agreements and conventions and EU Directives that are adopted in national laws. On an international level, most relevant are the BC, Agreement on Trade-Related Aspects of Intellectual Property Rights, WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty. On the EU level, several Directives are meant to harmonize copyright on different subject-matters. Most relevant regarding copyright is the Directive 2001/29/EC on the harmonisation of certain aspects of copyright and related rights in the information society (InfoSoc Directive). Many national copyright laws within the EU are quite different but contain a fairly similar structure. For instance, many national copyright laws within the EU have reached a consensus with regards to the definition of the protected subject matter within copyright law, the conditions for protection, the rules on ownership, moral rights, and the limitations and exceptions.[78] The copyright regulations will therefore be

[78] A. Kur & T. Dreier, *European Intellectual Property Law. Text, Cases and Materials*, Cheltenham: Edward Elgar 2013, p. 242.

approached from the Dutch level, as the Dutch Supreme Court has quite expanded on copyright in its previous decisions.[79] Copyright law in the Netherlands is regulated in the Auteurswet (translated: Dutch Copyright Act (DCA)). These different types of regulation will serve as a basis on which the notion of a work and the rights holder of copyright will be approached.

Article 2(1) BC sums up several protected works, such as forms of literature, choreographic works, musical compositions and visual arts. Article 10(1) DCA protects similar types of works, but, contrary to the BC, its list is not exhaustive.[80] Other types of works are ascertained by judges. For instance, the Dutch Supreme Court decided in 2006 that, in essence, a smell is not copyrightable. However, the composition of the fragrance can be a copyrighted work.[81] A more recent example that has been submitted to the ECJ, regards the qualification of a taste as a work.[82] The ECJ has established a general rule in the Infopaq case to assist national courts and to reach harmonization concerning copyright within the EU. The court stated that copyright is only applicable to that original subject-matter which is the author's own intellectual creation.[83] What the author's own intellectual creation is, depends on "the choice, sequence and combination of the words that the author uses to express his creativity in an original matter."[84] The Dutch Supreme Court has followed-up on the outline provided by the ECJ and has added that a work requires an own, original character, carrying a personal stamp of the author.[85] The definition of the Dutch court has several similarities with that of the European court, for instance originality and creativity of the author are important concepts. Moreover, this implies a creator is necessary to be able to make those creative choices. In short, basically everything that is produced by an intelligent entity can be protected by copyright as long as it is sensibly perceptible and original.[86]

Copyright was initially exclusively granted to publishers, printers or booksellers who had the exclusive means to publish, print or sell a book. This rationale was based on the interests of the parties that had most to lose in case of infringement of their rights. In the present day, the rationale has shifted from protecting these parties to protecting the author.[87] Looking

[79] F.e.: Dutch Supreme Court 30 May 2008, IER 2008, 58 (*Endstra-tapes)* and Dutch Supreme Court 24 February 2006, IER 2006, 39 (*Kinetic schedule*).
[80] Dutch Supreme Court 16 June 2006, IER 2006, 54 (*Lancôme/Kecofa*), recital 3.3.2.
[81] Ibid, recital 3.3.1.
[82] Dutch Court of Appeal Arnhem-Leeuwarden 23 May 2017, ECLI:NL:GHARL:2017:6697 (*Levola/Smilde Foods*).
[83] Case C-5/08 *Infopaq* [2009], recital 37.
[84] Ibid, recital 45.
[85] Dutch Supreme Court 30 May 2008, IER 2008, 58 (*Endstra-tapes*), recital 4.3.
[86] K. Koelman, 'Copyright in the Courts: Perfume as Artistic Expression?', *WIPO Magazine* 2006, iss. 5, p. 2-3.
[87] C. Seville, *EU Intellectual Property Law and* Policy, Cheltenham: Edward Elgar Publishing 2009, p. 7.

at the BC, the author has a central role as being subject to the protection the convention provides. The BC has set some criteria to determine the eligibility for copyright protection, which are the nationality of the author, the place of publication of the work and the residence of the author (Article 3 BC). It does not clarify who or what an author is, but the BC does connect the author to his work, implying an author is the entity that creates the work. The word 'entity' is used intentionally as, in anticipation of the next sub-section, an algorithm is also able to create a work but cannot be considered a person. The DCA provides a clearer description of who can be considered the rights holder of copyright. According to Dutch law, the maker obtains an exclusive right to his work or the legally assigned owner of copyright, such as an employer or supervisor who have been granted exclusive rights by means of a contractual relationship (Article 5-7 DCA). If the maker of a work is not indicated on the work itself, then the DCA presupposes that the maker is the person who makes the work available to the public (Article 4(1) DCA). This is also known as the presumption of evidence of the rightsholder. This presumption of evidence is extended to legal persons, such as an association or foundation, when during the publication of the work by a legal person it is not clear who the maker is (Article 8 DCA).[88]

2.3.2 Copyright law applied to an algorithm

The DCA or BC do not explicitly mention what type of entity can be the rightsholder. They merely speak of the author, publisher or those that have become rightsholder by means of a contractual relationship. The author is usually a natural person. An employer and publisher can both be a natural person and a legal person. A contract or a court will have to decide which type of legal personality applies. With the development of AI, copyright has become more complicated. A new entity emerges that can create an artwork that equals that of a human being. Technology is progressing rapidly and it is problematic for legislators to keep up with the changing status quo. This sub-section will explore to what extent the current copyright law is sufficient to solve the issue of who the rights holder is when a work is created by an AI-algorithm. In order to achieve this, this sub-section will try to fit the entity known as an AI-algorithm within the meaning of the previously mentioned types of rights holder, such as the maker (natural person), the publisher or employer/supervisor (legal persons). At the same time, several issues will be pointed out that arise. For instance, does the car worker obtain

[88] R.W. Holzhauer & S.L. Gellaerts, *Van Idee naar IE*, Deventer: Kluwer 2011, p. 40-41.

property when they produce cars in a factory? [89]

The first prerequisite for obtaining copyright is whether the creation can be considered a work. It has been established that an AI-algorithm is capable of creating a painting and writing music. These creations can generally be considered as a work within the meaning of Article 2(1) BC and 10(1) DCA. However, it is subsequently required that the creation is original and creative choices have been made. Originality is the first condition that can be contested. An algorithm learns from examples and can also be taught not to recreate something. In what manner does this make its choices creative? In order to establish whether its choices are creative, it is necessary to first define 'creativity' or 'creative choices'. How can be ascertained that this work, created by an algorithm, stems from having made creative choices? Hausman refers to something new, newness of intelligibility and newness of valuable intelligibility as key criteria of creativity.[90] These criteria are to be seen in conjunction. The criterion 'new' means something different has to be created than what there already was. The creation is not creative if it is already known.[91] Moreover, the new creation, has to have epistemological value, i.e. the value must be recognizable and knowable.[92] To be intelligible, the creation itself also has to be understood in a sense of how relatable it is to people.[93]

Applying the beforementioned criteria to an AI-algorithm, the example of an AI creating a painting is used.[94] By using a lot of data on Rembrandt's paintings as an example, an AI was able to produce 'the next Rembrandt'-painting. With this, the AI was urged to perform a specific test that approximates human behaviour, i.e. Rembrandt's skill with the paintbrush. The AI has to make choices, because all it has are examples of earlier paintings. These paintings do not instruct the algorithm how to paint. It merely provides examples, from which the AI can abstract guidelines on the general scheme of Rembrandt's work. The painting is undeniably creative, because it creates something new (a painting) that was not there before. The algorithm uses ML to abstract general rules out of earlier examples to create something new. As it creates something that could be the work of a world-renowned artist, the product itself relates to the public as something of value, making it valuable and intelligible. However, its value may decrease as more samples are created. Nevertheless, the Rembrandt painting, made

[89] J. Boyle, 'Shamans, Software and Spleens: Law and the Construction of the Information Society', in: J. Boyle & J. Jenkins (eds.), *Intellectual Property: Law & The Information Society. Cases & Materials*, Durham: Center for the Study of the Public Domain 2014, p. 271-275.
[90] C.R. Hausman, 'Criteria of Creativity', in: M. Krausz et al. (eds.), *The Idea of Creativity*, Leiden: Brill 2009, p. 5.
[91] Ibid, p. 5.
[92] Ibid, p. 10.
[93] Ibid, p. 7.
[94] F.e. https://www.nextrembrandt.com.

by an algorithm, has been created by making creative choices. Hence, it has been established that the creation of the algorithm could be understood as a work within the meaning of Article 2(1) BC and 10(1) DCA and are therefore susceptible to copyright protection. An emphasis should be placed on 'could be' because copyright protection has to be determined on a case-by-case basis. A court will have to check the criteria of a work each time, but this sub-section has shown that is possible for an algorithm to create a copyrighted work.

Now it has been determined that an AI-algorithm can produce a work, the next question is whether an algorithm is eligible for possessing copyright. In other words, can an algorithm obtain copyright? A first thought would be, no, an algorithm cannot obtain copyright. Copyright is a legal concept, written in the law and the law is written for legal subjects, whereas an algorithm is not a legal subject. However, this is not necessarily true as there are also corporations. Dewey describes that a corporation is also the bearer of rights and duties, but it cannot marry or perform other legal acts that a natural person can do.[95] Dewey's argument shows that the concept of legal personhood has been a point of discussion for almost a century, if not longer. The rights and duties are important, because it specifies to what extent the legal personality has to reach. Legal personality only has to reach as far as the subject is able to conform to the rights and duties inflicted on it. Copyright bestows the specific rights and duties on rightsholders. The most important rights for a rightsholder are the right to make the work available to the public, reproduce, adapt or in any other way use the work (Article 9, 12 BC). A rights holder also has moral rights, e.g. the right to object to a distortion, mutilation or other modification of the work (Article 6bis (1) BC). These rights do not require much from a rightsholder. They merely provide rights on behalf of the usage of the work. However, it could be problematic for an algorithm to enforce its rights. In the current situation, a rightsholder usually reports infringement of his copyright to the infringer or a supervisory authority. If a programmer is able to create an algorithm that can create a work of art, it should also be possible for it to create a new algorithm that can monitor whether the copyright is infringed. Fortunately, copyright does not always require consent, quotations for instance are under certain circumstances also possible without consent (Article 10 (1) BC). Other than some unfair competition rules, rightsholders do not have any particular duties concerning their copyright.[96] In summary, with assistance of its programmer regarding the enforcement of its

[95] J. Dewey, 'The Historic Background of Corporate Legal Personality', *The Yale Law Journal* (35) 1926, iss. 6, p. 656.
[96] Cf. D. Vaver, 'Copyright and the Internet: From Owner Rights and User Duties to User Rights and Owner Duties', *Case Western Reserve Law Review* (57) 2007, iss. 4, p. 748-750.

rights, an algorithm is able to conform to the rights and duties of a copyright holder. Therefore, as it is also able to create a work, by making creative choices, it is susceptible to be granted with copyright and can be considered the rights holder. At the same time, it also has some prerequisites that can be troublesome. For instance, its success depends on someone to enforce their rights, since an algorithm will not always be able to do so. Moreover, who will enforce rights for an electronic entity that has no legal personality? On the other hand, a human being also is not always able to enforce its rights. Looking back at Asimov's laws, they appear to do contain some wisdom, as an AI can cause harm to human beings. However, the type of harm Asimov foresaw, might be different than preventing copyright infringement or any other liability issues.

2.5 Conclusion

The first concept that has been tackled in this research is that of AI. The idea was to generate a comprehensive view of what is meant by AI when it is mentioned within the context of granting an AI with rights and obligations. This chapter has shown that an AI-algorithm is merely a piece of code, often written down digitally to instruct a computational device to act intelligently. By means of robotics and other pieces of hardware, the algorithm is able to make its intelligent actions tangible in the physical world and – based on processing large amounts of data – is able to make autonomous decisions. This sparked the question if an entity should have rights and obligations with regards to the influence it has on the physical world as its actions possibly result in causing legal consequences. Especially intellectual property law has some interesting common ground with AI as it governs property that is created by the mind, that generally requires some type of intelligence, and AI is meant to think intelligently. Its intelligent way of thinking provides an AI-algorithm to be able to create a work, because its intelligence leads to the ability to make creative choices. Moreover, an algorithm can be the rights holder as it is able to bear the rights and duties that are required to be able to hold copyright. It gets problematic when an algorithm has to enforce its rights or perform on its duties. An algorithm is not able to be the bearer of all conveyed rights and duties of copyright. The next chapter will therefore discuss in what this notion of legal personality is and to what extent it has to change for an algorithm to be eligible for fully obtaining copyright.

3 The interpretation of legal personhood

"Personality involves the knowledge of oneself as an object, raised, however, by thought into the realm of pure infinitude, a realm, that is, in which it is purely identical with itself. Individuals and peoples have no personality, if they have not reached this pure thought and self-consciousness."

G.W.F. Hegel, Philosophy of Right[97]

3.1 Introduction

The Committee that is affiliated with the European Parliament acknowledges the issue of personhood with regards to electronic entities, such as AI-algorithms and robots. As much is clear from the Draft Report with recommendations to the Commission on Civil Law Rules on Robotics (Draft Report) presented on the 31st of May 2016 and the importance of the report is confirmed by the European Parliament in their follow-up Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (Parliament Resolution). The Committee proposes, amongst other things, to create a new type of personhood to add to the existing legal personhood that is meant specifically for electronic entities: the electronic personhood.[98] The European Parliament confirmed this proposal in their Parliament Resolution.[99] Not everyone, however, is in favour of the idea of the Committee. On the opposing side, numerous experts from the field of AI and Robotics have expressed their doubts about the Committee's intention to create a new type of legal personality. Their main doubts are that the benefit of all humanity is not carefully taken into consideration. Subsequently, that electronic personhood will create a solution for non-existent liability issues and they argue that the new type of legal status does not fit into our current understanding of personhood.[100]

This chapter will provide an in-depth description of the Committee's proposal of elec-

[97] G.H.W. Hegel, *Philosophy of Right*, Kitchener: Batoche Books Limited 2001 (translated by: S.W. Dyde), p. 51-54.
[98] Committee on Legal Affairs, *Draft report with recommendations to the Commission on Civil Law Rules on Robotics by the European Parliament*, Brussels: European Parliament 2016, p. 12.
[99] European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), principle 59f.
[100] Open Letter to the European Commission Artificial Intelligence and Robotics <www.robotics-openletter.eu> Accessed 11 November 2018.

tronic personhood and it will pit the proposal against the conventional type of legal personhood. A look into conventional legal personhood will provide more clarity on its rationale and why it is or is not suited for an algorithm in the first place, looking at the gaps that electronic personhood is supposed to fill. The aim of this chapter is to reveal the gaps and assess whether electronic personhood is the right choice, by addressing these gaps.. Subsequently, to clarify the focus on the Committee's Draft Report instead of the Parliament's Resolution, the Committee's proposal has functioned as an extensive basis for the Parliament's Resolution and has therefore more information about how electronic personhood should be interpreted. Moreover, the Parliament's Resolution has no binding legal effect, but functions more as a declaration of intent to discuss future policy.

3.2 Legal personhood in copyright

Legal personhood is a foundational concept within Western states that recognises an entity that bears rights and obligations. The importance of legal personhood infers from the opportunity to make use of the rule of law, which constitutes for instance safeguards to seek legal protection against the state.[101] This section's aim is not to merely define legal personhood, but also to find the rationale behind this legal concept. An imperative question is what makes legal persons as such and why? This section will make a distinction between legal persons as bearers of rights and obligations in general and legal persons that are the maker of a copyright protected work. Looking back at Hegel's somewhat difficult to operationalise definition of personality at the beginning of this chapter, the terms of legal personality and legal personhood will be used as synonyms. Hegel's notion of personality is important to this research, and will be further explained, but it also illustrates the difficulty in which the concept resides. Therefore, it is in the interest of this research to maintain one meaning behind personality and personhood.

3.2.1 Legal personality

Legal personality has been a matter of discussion ever since the term came into being. As with most legal concepts, lawyers will try to find the borders to make their argument. In the case of Roe vs. Wade, the United States Supreme Court struggled to decide whether a foetus could be considered a person, and, should therefore be protected against abortion. The autonomy of the mother clashed with the autonomy of the foetus and its overall quality of life.[102] Why is it so

[101] A. Zariski, *Legal Literacy. An Introduction to Legal Studies*, Edmonton: AU Press 2014, p. 30.
[102] J.A. Parness, 'Social Commentary: Values and Legal Personhood', *West Virginia Law Review* (83) 1981, iss. 3, p. 487-504.

important if a foetus is recognized as a person? The importance is derived from the legal status of a person, i.e. a legal person. Legal personality attributes value and rights. A legal person is an entity that bears rights and duties. Even though a foetus is not able to exercise its rights, others can represent it in a court of law. If someone is able to bear rights and duties, it is also able to enjoy the protection the law has to offer. Legal personality can therefore be an attractive point to argue. It has not only been extended to foeti, but also to corporations in a somewhat amended form. Moreover, animal rights activists have been trying to argue to grant animals with legal personality for years. For instance, in 2011, a monkey named Naruto took a picture of himself with the camera of a British photographer. Animal rights group PETA sued the British photographer for infringing upon the monkey's copyright. A court dismissed the case, because animals do not have any legal standing in a court of law. If the court did accept the case, that would have meant that animals do have some type of legal personality and could have rights.[103] In a more recent case, a New Zealand court granted a river legal personality. A representative for the river argued that he considered the river an ancestor, as it is part of his tribe.[104] Before that, two Indian rivers were given a legal status, for instance, to solve socio-environmental and economic problems, in other words, to reach valuable normative goals.[105] Generalizing these cases, where a foetus and a river did acquire legal personality, but an animal did not, this sub-section will venture into the territory of what makes an entity eligible for acquiring legal personality and why. As a result of its ambiguity, even in its origin and use in law, legal personality will be approached in this sub-section from the perspective of authors who favour a different position. As such, this sub-section will reflect to what degree the concept of legal personality is disputed, i.e. how conservative notions of legal personality are contested in modern-day views.

Hegel's notion of personality is a point of contact for present day authors who write about personality. His theory of personality is discussed in this thesis, because it meticulously describes what personality is and – over time – it is still being applied and/or addressed. It therefore is even now considered to be relevant in the context of personality and serves as a starting point to explain the concept of personality. Hegel argues that a person is made up of a

[103] A. Guadamuz, 'Can the monkey selfie case teach us anything about copyright law?' *WIPO Magazine* 2018, iss 1, p. 40-46.
[104] E.A. Roy, 'New Zealand river granted same legal rights as human being', *The Guardian* 16 March 2017 <https://www.theguardian.com/world/2017/mar/16/new-zealand-river-granted-same-legal-rights-as-human-being> Accessed 6 January 2019.
[105] E.L. O'Donnell & J. Talbot-Jones, 'Creating legal rights for rivers: lessons from Australia, New Zealand, and India', *Ecology and Society* (23) 2018, iss. 1.

will with its unique trait being an abstract identity and self-consciousness. He does not necessarily associate a person to a human being, but he writes of an entity that has an awareness of itself being completely abstract whereas all actual restrictions and values are ignored. Hegel's sense of personality involves self-consciousness and being limited and unlimited at the same time. Limited, for instance, in certain features of the body and senses and unlimited in one's ability to think. Meaning that, among other things, Hegel equals will to one's ability to think. More specifically, Hegel values will as an important element of personality, less so than the human body, if a person is able to see his will as an object, an immaterial phenomenon in an immaterial world separate from all other things.[106] Gray argues that personality also constitutes physical and spiritual desires and interests. More practically, the ability to exercise its rights and duties. However, Gray contradicts himself by stating that other entities without a will or even a directly corporeal form, such as supernatural beings, are also eligible to have legal personality. It can therefore be assumed that Gray's meaning of will reaches beyond the physical and spiritual desires and interests of human beings. He favours will and intelligence above all as defining traits of legal personality.[107] A corporation has legal personality in order for a large group of persons to conduct enterprises that they could not do on their own. It therefore serves as an extension of a natural person's legal personality.[108] A corporate sole is often a natural person who makes decisions within a corporation. The corporation itself merely provides continuity. Even though a corporation in itself is not able to express its will, a natural person will assist it in doing so. Legal personality is therefore not restricted to human beings.[109]

Dyschkant is in favour of the viewpoint of disconnecting legal personality as a concept that requires a natural person. She argues that the focus should be on bearing rights and duties, not humanity itself. Natural persons differ from legal persons in the way in which they are established, by nature or by law. They both have an element of humanity in them, as most corporations are set up by (a group of) natural persons. According to Dyschkant, levelling the bearer of rights and duties with humanity, leads to obscurity of the important elements of being the bearer of rights and duties. A person relates to someone being capable of bearing rights and duties. However, not all persons are able to achieve this. Think of new-born babies

[106] G.H.W. Hegel, *Philosophy of Right*, Kitchener: Batoche Books Limited 2001 (translated by: S.W. Dyde), p. 51-54.
[107] J.C. Gray, *Nature and Sources of the Law*, New York: The Macmillan Company 1921, p. 27-28.
[108] G.F. Deiser, 'The Juristic Person', *University of Pennsylvania Law Review and American Law Register* (57) 1908, iss. 3, p. 133.
[109] B. Smith, 'Legal Personality', *Yale Law Journal* (37) 1928, iss. 3, p. 283-285.

or comatose humans. Dyschkant makes a point by questioning why the Indian government has made a statement about dolphins being non-human persons, but has not codified it into policy. She believes this is connected with animals not being able to communicate with humans, even though they may exhibit higher cognitive capacities than a child. Dyschkant therefore proposes a new perspective on legal personality that focuses on an entity's capabilities of having rights by zooming in on its relationship with others and societal standing. In order to decide whether an entity could have rights, she argues to first look at the specific rights and examine whether the entity is able to enjoy those rights by granting it personhood. This will lead to some humans having more rights than others, but, on the other hand, to more non-human actors obtaining rights.[110]

Next to Dyschkant, Kurki contests the existing paradigm of legal personality as well. He challenges "the legal-persons-as-right-holders view" that defines a person as the bearer of rights and duties which is most commonly used. He places three different interpretations of legal personality and applies them to several situations. Remarkably, each theory can lead to other types of entity, such as animals, being granted legal personality. Kurki does not offer a solution, but his intention is to show that our current understanding of legal personality might be outdated and is in need of being amended to our modern day standards. This approach seems in line with the cases where a river was granted a legal status, more specifically at the point of using a legal status to reach normative goals.[111]

3.2.2 Authorship

Up until now, legal personality in general has been discussed. However, legal personality is a general concept that can be further internalized by a specific legal area. For example, corporate law has specific types of legal personality, such as a private company, limited liability company, partnership, foundation or association. In order to tie this section in with the last chapter, this sub-section focuses on the legal person within the legal area of copyright, i.e. the maker or author of a copyright protected work.

Foucault has expressed a clear view of what an author is. According to Foucault, the role of the author calls for several issues. Using the name of an author, as a reference, conveys more than merely the substantive elements of a piece of text that is referred to. Foucault uses the example of referring to Aristotle. This reference can point to the specific type of text, it

[110] A. Dyschkant, 'Legal Personhood: How We Are Getting It Wrong', *University of Illinois Law Review* 2015, iss. 5, p. 2107-2108.
[111] V.A.J. Kurki, 'Why Things Can Hold Rights: Reconceptualizing the Legal Person', in: Visa A.J. Kurki & T. Pietrzykowski (eds.), *Legal Personhood: Animals, Artificial Intelligence and the Unborn*, Cham: Springer International Publishing 2017, p. 69-89.

can refer to the author of the *Analytica priora* or it can refer to the inventor of the philosophical study of being, i.e. ontology.[112] An author's name therefore serves as a functional means of classification. It can also point to a certain discourse that shows the contextual position in which a text is being written.[113] Foucault does not limit his theory to written texts. His work also applies to, for instance, music, painting, and other fields of expression. To express this, he assigns authors a "transdiscursive position".[114] Foucault concludes by devaluating the need for an author. A discourse clouded in anonymity would even lead to new questions that possess a more substantial nature. Foucault's opinion leads to indifference regarding the question who the author is.[115] Algorithms that serve as maker gain an advantageous position as they are not an author in the conventional sense. Not the author itself, but the substance of a work will become more important. As a result, any bias regarding an author's status and any value that can be derived from it, is equated with other authorless works. The positive outcome of this development is that the assessment of the value of a work can then be made without prejudice. Even though Foucault's opinion was not intended for algorithms, their application fits perfectly with Foucault's aim, that is devaluating the role of the author to create equality.

Gingsburg takes a more systematic approach in explaining authorship. She initially believes that the value of creativity of the author is the basis of copyright protected works. She has set up six principles that classify an author. The first principle states that the person who fulfils the 'intellectual-criterion' of intellectual property, can be considered the author. This principle demands a certain amount of mental effort from the author. Ginsburg's second principle values the mind of the human being over the efforts made by a machine. However, she acknowledges that the entitlement to authorship can decrease as the role of the machine rises. The third principle values originality of the author. Ginsburg recognizes that originality can vary depending on the jurisdiction. The fourth principle places perspiration before creativity, either qualitatively or quantitatively. The fifth principle requires the author to have to intent of becoming an author. This principle mostly applies in situations of the distribution of joint ownership of copyright in order to prove collaboration. The sixth principle acknowledges the interest of an employer and his right to pick the fruits of his employee's effort.[116] Ginsburg shows that authorship is not one fixed concept. It consists of several features, within which

[112] M. Foucault, *Language Counter-Memory, Practice*, Ithaca: Cornell University Press 1980 (translated by: D.F. Bouchard & S. Simon), p. 121.
[113] Ibid, p. 123.
[114] Ibid, p. 131.
[115] Ibid, p. 138.
[116] J.C. Ginsburg, 'The Concept of Authorship in Comparative Copyright Law', *DePaul Law Review* (52) 2003, iss. 4, p. 1072-1088.

there is room for variation. For instance, main concepts in the first four principles are intellectuality, mental effort, originality and perspiration. All these concepts have are ambiguously formulated and are therefore appropriate to be applied on more instances. Nonetheless, Ginsburg's principles do set boundaries in order to limit the meaning of authorship and set a framework that can be used to determine whether an entity can be named an author. The framework itself does not provide hard rules that must be complied with, but it merely contains guidelines. These guidelines do not necessarily pave the way for electronic personhood, but the open way in which they are formulated does show promise as it implies willingness to adapt to new situations by using these same principles.

Authorship in copyright can entail two different types of rights: moral rights and economic rights. Economic rights see to the property rights of the author and his exclusive right to exploit his work. Moral rights protect the integrity of the work, such as the right to object to alterations made to the work or the right to identify an author as the creator of the work.[117] Intellectual property rights are a quid pro quo. An author expects a reward for sharing its creative knowledge to the public, an incentive to innovate.[118] This in itself, according to Jaszi, is contradictory as copyright aims to disclose works to the public, but at the same time accords authors the power to have their work distributed as they wish.[119] Ng proposes a separation of economic and moral rights, in what she calls the public interests and private rights, where the author, at all times, keeps the intrinsic value of the work and the publisher merely holds the distribution rights. This distinction already exists, but Ng explores the boundaries to what extent third parties may use the work. In her opinion, the economic rights of the publisher should not surpass the rights of the author, because this could prevent authors from producing a work.[120] An algorithm, however, will not care about the financial benefits of its work.

The authors mentioned in this section make use of what Hart calls the "open-texture of law" when they explore the boundaries of legal personhood. With this, Hart means that laws are written in words that do not apply themselves, but must be applied by means of interpretation to gain meaning.[121] The open-texture of legal personhood creates possibilities for its definition to change by means of interpretation. The interpretation of ambiguous terms is a legal

[117] M.E. Kaminski, 'Authorship, Disrupted: AI Authors in Copyright and First Amendment Law', *University of California – Davis Law Review* (51) 2017, iss. 2, p. 598.
[118] A. Kur & T. Dreier, *European Intellectual Property Law. Text, Cases and Materials*, Cheltenham: Edward Elgar 2013, p. 6.
[119] P. Jaszi, 'Toward a Theory of Copyright: The Metamorphoses of "Authorship", *Duke Law Journal* (40) 1991, iss. 2, p. 463-464.
[120] A. Ng, 'Authors and Readers: Conceptualizing Authorship in Copyright Law', *Hastings Communications and Entertainment Law Journal* (30) 2008, iss. 3, p. 415-417.
[121] H.L.A. Hart, *The Concept of Law*, Oxford: Oxford University Press 1961, p. 128.

trick jurists use to understand a concept in such a way that supports their argument. This is not limited to lawyers, but – especially in common law systems – judges use interpretation of existing norms to create law. Dworkin even argues that the notion of what law is, inevitably subjectively depends on what a judge finds most appropriate.[122] Earlier in this chapter, examples have been mentioned where the meaning legal personality has been stretched for it to be applied on rivers and foeti. Looking at this section, it has been made clear that legal personality allows to be freely interpreted. Therefore, the open interpretation of legal personality supports the argument to accord algorithms legal personality.

3.3 Electronic personhood

The last section has shown that the boundaries of legal personality are anything but certain. This section demonstrates that there are thoughts within the EU that try to make use of these vague boundaries and try to extend them. This section will first expand on the Committee's proposal in general to introduce a new type of personhood and will subsequently provide a comprehensive perspective on this type of personhood.

3.3.1 The Draft Report with recommendations on Civil Law Rules on Robotics

In response to the technological development of AI and Robotics, the Committee has proposed a new type of personhood in the Draft Report. In describing this new type of personhood, there first has to be an analysis of what the Committee exactly aims with their proposal. They ask the European Commission in recital 31(f) of the Draft Proposal to explore the possibility of creating a specific legal status for robots, granting them with specific rights and obligations, for instance concerning liability to any damage the robot causes. The Draft Report is in line with the EU-principle of subsidiarity, which means that what can be regulated on a national level, should be regulated on the national level. Only matters that pursue the goals of the EU and cannot be governed on the national level should be regulated on the EU-level. The Committee trusts that civil liability in the case of damage caused by robots is a fundamental matter that has to be touched upon and analysed on the EU-level. Furthermore, they believe governing electronic personality on Union level is the preferred choice as opposed to leaving it to the Member States on a national level, because of matters of efficiency, transparency and consistency and in light of legal certainty for civilians and corporations (Article 5(3) The Functioning of the European Union (TFEU)).[123]

[122] R. Dworkin, 'Law as Interpretation', *Critical Inquiry* (9) 1982, iss. 1, p. 196.
[123] Committee on Legal Affairs, *Draft report with recommendations to the Commission on Civil Law Rules on Robotics by the European Parliament*, Brussels: European Parliament 2016, p. 10.

Continuing to dissect the Draft Report, a first useful step is to determine an outline regarding the terminology used by the Committee on Legal Affairs (the Committee). They summarize several technological manifestations under the overarching term AI, for instance sophisticated robots, bots and androids. As has been stated in section 1.5, the various types of robots that are mentioned in this thesis all fall under the same meaning of robots that function using an AI-algorithm. This includes sophisticated robots, bots and androids Furthermore, the Committee mentions 'smart robots' and plead for a common European definition of this concept. They propose a smart robot should be able to acquire autonomy, using sensors, processing and analysing data (with its environment). It should have learning capabilities by means of interaction and experience. The robot must have physical support and it is required to adapt itself to its environment.[124] These characteristics should sound familiar, because they show overlap with ML capabilities.

Moreover, the Committee wants to register each smart robot that could be the harm doer in liability cases. The Committee proposes a rule of strict liability for which only causality requires proof. The damage suffered by the deprived party should be caused by the actions of the robot. Every robot should therefore have its own obligatory insurance scheme, provided by the producer, without taking the economic effects of this change into account. Another important aspect the Committee touches upon is the code of ethics that will be discussed more intensively in the next chapter.[125]

3.3.2 Electronic Personhood

The Committee literately suggests "creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations, including that of making good any damage they may cause, and applying electronic personality to cases where robots make smart autonomous decisions or otherwise interact with third parties independently".[126] As corporations have customized rights and obligations, so too – proposes the Committee – should electronic persons have modified rights and obligations. The Committee does not expand on the interpretation of electronic personhood. This sub-section will therefore look to the legal doctrine to infer an understanding in the sense of criteria of electronic personhood.

Chopra and White agree that the idea of modified rights and obligations is not so strange. Factors like age, (mental) health and nationality can cause for different rights. They

[124] Ibid, p.13.
[125] Ibid, p.13-18.
[126] Ibid, p. 12.

argue that it is not the rights that should be the starting point, but first the ability of the artificial entity and secondly assigning a compatible right.[127] As AIs, as of 2011, were not able to function fully autonomously, Chopra and White propose a dependent legal personality, where a legal person assists the electronic entity in exercising its rights. They also discuss the conditions under which an entity could have independent legal personality. This would require intellectual capacity and rationality from the entity. Furthermore it should be able to understand and follow its legal obligations, and it must be susceptible to punishment if it does not obey. Finally, it must be able to go into contractual relationships with others and be able to control money and own property. These last requirements enable the entity to take part in the economic sphere. [128]

To solve the issue Chopra and White envisage, different authors propose another idea that does not require fully autonomous AIs. Electronic personhood would bundle all legal responsibilities that are applicable to the AI's functioning. This could very well mean that other machines have different types of electronic personhood. It is unclear who would have to decide to what degree electronic personhood in this instance would reach, i.e. which rights and obligations it would have. It is clear, however, that decisions will have to be made in order to provide clarity on the division of rights and obligations, pursuant to legal certainty. For instance, it should be clear if the AI could be held liable.[129] The artificial personality, its scope of action and scope of decision-making decide what rights are appropriate for the AI. Beck discusses an important difference between legal personhood for corporations and electronic personhood to illustrate why electronic personhood is necessary. Electronic entities might develop emphatic capabilities and interact more with a human being than a corporation. However, they do not carry, as of yet, the moral values a human being has. As a consequence of not having the moral values of a human being, following Beck's line of argument, a new type of personhood is important to govern practical issues, such as liability and authorship/ownership, and at the same time be distinguished from conventional personhood in which moral values play a part. Therefore, it is necessary to develop a new type of personhood that is specifi-

[127] S. Chopra & L.F. White, *A Legal Theory for Autonomous Artificial Agents*, Ann Arbor: The University of Michigan Press 2011, p. 154-155.
[128] Ibid, p. 163.
[129] C. Leroux, R. Labruto, C. Boscarato et. al. 'Exploration track: non-human agents and electronic personhood', in: C. Leroux & R. Labruto (eds.), *Suggestion for a green paper on legal issues in robotics*, Augsburg: euRobotics 2012, p. 61.

cally meant for electronic entities, that is to fill the gap that currently resides between conventional legal personality and the issues that follow from the actions of electronic entities that do not fall under the conventional personality.[130]

3.4 Conclusion

The aim of this chapter was to assess electronic personhood when applied to an AI-algorithm and how it relates to the existing legal personhood. This chapter has shown that the conventional type of legal personhood is not undisputed. Its boundaries are open to interpretation and parties have tried to broaden its scope to, for instance, include animals or electronic entities. Legal personhood and electronic personhood are related in such a way that electronic personhood is a form of legal personhood that specifically sees to electronic entities. Electronic personhood explores the boundaries of legal personhood and it serves the approach of assigning rights based on capabilities and not merely on the type of entity. The need for a new type of personhood seems fitting looking at the flexible nature of electronic personhood. The next chapter will evaluate whether electronic personhood is a desirable option.

[130] S. Beck, 'Intelligent agents and criminal law-Negligence, diffusion of liability and electronic personhood', *Robotics and Autonomous Systems* (86) 2016, p. 142-143.

4 Legally and ethically evaluation electronic personhood

"William: Are you real?
Artificial Entity: Well, if you can't tell. Does it matter?"

Westworld, Season 1, Episode 2: Chestnut

4.1 Introduction

The Artificial Entity, known as Hosts, in the HBO-series Westworld, raises an interesting question: does it matter if a person does not know if something is real or not? After all, if you do not know if it is real, but it seems real, then what is the difference? The question ventures into the metaphysical notion of being. Up until now, this thesis has discussed technology, law, several legal concepts within the law and a proposal to change some of these legal concepts to make the technology fit better with the law and indirectly with society. More specifically, this thesis has discussed AI, copyright, legal personhood and a proposal to make AI fit better in society with regards to copyright by means of electronic personhood. This thesis has not yet addressed whether these changes have the desirable effect its proponents predict, i.e. if it matters whether an AI – an artificial entity – is awarded with electronic personhood. On the contrary, up until now, the introduction mentioned several experts in research fields close to AI who are critical of the arrival of an electronic personhood.

It is therefore important to address the legal and ethical implications that are derived from granting an AI electronic personhood. The outline of the legal implications sees to the legal effects of electronic personhood. In other words, how the law is affected by imposing a new type of personhood. Ethics concern the question what the morally right action is, more specifically, whether imposing electronic personhood onto an algorithm is the right action. To demarcate the legal and ethical implications and to stay within the scope of this thesis, this section will only look to the implications that affect copyright-related consequences that follow out of electronic personhood. Evidently, there are other legal and ethical implications and sometimes legal and ethical implications can overlap. For instance, one of the aims of liability law is to distribute justice where justice is due. However, justice can also convey a more ethical question as it is both a legal and an ethical concept. In order to assess the legal and ethical implications of granting an AI with copyright by means of electronic personhood, this chapter will first systematically outline the legal and ethical implications. The starting point will be a

modified electronic personhood that has been discussed in the previous chapter. Subsequently, this chapter will evaluate these implications in order to determine whether electronic personhood is a desirable option.

4.2 Legal implications

What legal effects does granting an AI with electronic personhood have? What happens, legally speaking, if an AI acquires electronic personality? Why do experts from various fields of science question electronic personhood? This thesis started with the issue of copyright and all legal implications will be derived from this area of law. An algorithm creating a work and owning the rights to its work raises the legal question of ownership, or in terms of copyright authorship. What does electronic personhood do with our current understanding of authorship? Furthermore, another important issue is that of liability. Liability was intended for human beings who unlawfully cause harm to one another without necessarily committing a criminal act. In the case of copyright infringement, financial and/or reputational harm comes into being, which is possibly the direct consequence of the actions done by the infringer. What does it mean for liability to establish an electronic personhood? These questions all relate to the rights and obligations that an algorithm acquires. These specific rights and obligations will be briefly addressed and thoroughly evaluated in this section.

The last chapter has shown that an AI-algorithm would obtain a tailor-made type of legal personality, whereas not the entity but its function and the associated rights and obligations play a pivotal role. To fashion this theoretical conjunction a feasible construct, the features of these rights and obligations first have to be spread out. Starting with the fundamental object that changes with electronic personhood, namely ownership. As Solum points out, personhood is generally associated with ownership.[131] Ownership does not only entail the right to use or own property, it also conveys the duty to use the property within the boundaries of the law and it is linked to its value. Applied to copyright, the DCA has codified several rights and duties of the author that have been mentioned in chapter 2.

First, there is the issue of the term of protection. The term of copyright protection in the Netherlands is 70 years after the death of the author (Article 37(1) DCA). It can be assumed that an algorithm does not die. It does not age like human beings. Copyright protection can therefore be extended indefinitely. This requires a reinterpretation of the term of protec-

[131] L.B. Solum, 'Legal Personhood for Artificial Intelligences', *North Carolina Law Review* (70) 1992, iss. 4, p. 1238-1240.

tion, as this was intended to provide protection and benefit the author and his or her direct descendants.[132] An indefinite term of copyright protection might convey human rights issues whereas a human being generally has a much shorter term of protection. However, the argument can be made that a human being does not have any interest in needing indefinite protection, as he or she already enjoys protection for at least as long as he or she lives. Nonetheless, this would not have a desirable effect, as it would place copyright on par with its fellow intellectual property elements trademarks and trade secrets that can be prolonged indefinitely as well. If an algorithm creates a new algorithm, then a difficulty occurs. The original algorithm would have indefinite protection regarding its creation, but the second algorithm would also have its own type of personhood and in turn its own creations. In order to avoid overlapping rights and duties, clear agreements will have to be made about each of these bottlenecks.

Secondly, the author of a copyright protected work is entitled to reproduce and make the work known to the public (Art. 12 & 13 DCA). This distinction is made in Dutch law, but the author is evidently authorised to do whatever he wants with his work. These rights of determination do not impose any direct issues, as an author is not obligated to publish his work. In the hypothetical situation that an algorithm does publish a work, there is the matter of liability and especially accountability. Liability, as codified in Dutch law, means that he who commits an unlawful act towards another, for which he is accountable, is obligated to compensate the damage that the harmed party has suffered (Article 6:162 of the Dutch Civil Code). These requirements might vary depending on the jurisdiction as EU tort law has not been harmonized. However, these requirements could still serve as a standard to revise what the effects of electronic personhood are. Concretely, the conditions for liability in Dutch law are an unlawful act, accountability, harm, causality and relativity. The essential element that has brought changes into the equation is accountability. An electronic entity has gone from a non-legal entity to a legal person that could be held accountable for its actions. Fortunately, the Committee has proposed a solution to imbue the electronic entity with an insurance policy if it ever causes any harm. Practice will have to show whether this insurance policy is sufficient. Theoretically, an algorithm could cause tremendous harm, for instance, if it causes a fatal car accident. An insurance policy would not suffice in this case or it would be very costly. Again, clear agreements will have to be made to determine what happens when harm occurs. It is the task of the producer of an algorithm to protect the consumer from any harm that his product causes and the state (at least in Western society, based on human rights) is obligated

[132] K. Hristov, 'Artificial Intelligence and the Copyright Dilemma' *IDEA: The Journal of the Franklin Pierce Center for Intellectual Property* (57) 2017, iss. 3, p. 450.

to ensure that safety requirements are installed and met.

The previously mentioned implications foremostly affected the economic rights of the author. An author also acquires moral rights to its work to object to distortion, mutilation, or other modifications of the work. This raises the third implication of enforcement. Enforcement is also an issue for human authors. Rights holders of copyright in the film industry, for instance, struggle everyday with users that download their copyright protected work. The Netherlands have a foundation called BREIN that protects copyright protected works in the interest of the authors.[133] A similar foundation could hold the solution for copyright protected works by an algorithm as the algorithm itself is not able to enforce its rights. Furthermore, the technology industry also has a major role in preventing copyright protected work being pirated by using their own regulatory tool – coined by Lessig as – 'code'.[134] This solutions ends however as a suggestion, as it is beyond the scope of this thesis to manufacture a code that is capable of preventing copyright protected works from being pirated.

4.3 Ethical implications

Ethics has an important, but many times undervalued part to play in technology. For instance, Singer emphasizes the importance of multidisciplinary schooled students who are able to understand technology and have a proper understanding of ethics at the same time.[135] Technology can be initiated with the best intentions, but ethics can shine a light on undiscovered – perhaps second-order – issues by approaching the technology from a different perspective. Ethics in AI can convey different meanings. First, designers, producers and users of AI have to make ethical choices about whether they think developing AI is the right choice. The importance of their use of ethics is emphasized by Russel & Norvig as well, who claim that it would be the moral responsibility of experts in the field of AI to revaluate their work if AI has more negative than positive effects.[136] Secondly, there is the role that ethics plays in the AIs decision-making, i.e. the way the AI applies ethics. What moral rules does the AI have to abide, if it is able to make autonomous decisions, i.e. to decide what is morally right? The Draft Ethics Guidelines for Trustworthy AI, mentioned in sub-section 1.1.2, do not apply to this section, because the guidelines concern the ethics of the use of AI itself. Nonetheless, a

[133] See: https://stichtingbrein.nl/english.php.
[134] Cf. L. Lessig, *Code 2.0*, New York: Basic Books 2006.
[135] P.W. Singer, 'Military robotics and ethics. A world of killer apps', *Nature* (477) 2011, iss. 7365, p. 401.
[136] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 1034.

useful justification that can be derived from the guidelines is that a specific ethics code, opposite to general ethical guidelines, always requires context-related and comprehensive details in order to apply them properly.[137] This section will describe a third category of ethics that relates to AI, namely whether administering electronic personhood to an AI is ethically the right choice. In order to determine this, first, it is important to ascertain what it means for a choice to be ethically right and when an ethically right choice applies. Next, how can the allocation of electronic personality to electronic entities be interpreted ethically, i.e. as being the ethically right choice. Finally, what ethical standards or guidelines need to be met in order for electronic personhood to be the right choice?

Ethics is about what is morally the right action, whether something is morally good or bad. One of the difficulties in ethics is that whether something is morally good or bad is fairly subjective. Different ethical theories can therefore seem contradictory. It is a matter of perspective and what is important from that perspective, whether an action is morally good. In this thesis it is important to assess whether there is an ethical boundary, set to refrain society from using electronic personhood. Value is a crucial element to assess whether electronic personhood is a desirable option, to be more precise, the value of the consequences of electronic personhood. The assessment will take place by abstracting criteria from ethical theories that concern value, more specifically the value of property and personality. First, utilitarianism will be grappled, as it is a sub-theory of consequentialism, which focusses on the consequences of actions. Secondly, the value of property will be discussed from the perspective of Locke's labour theory and Hegel's personality theory. During the research, other major ethical theories have been considered to be used as an ethical baseline, such as Kant's moral philosophy. The issue with Kant's moral philosophy was that according to his categorical imperative, one should only act according to that rule of which you would want it to become a universal law.[138] Kant's formalistic approach suits an algorithm, however, it would be impossible for an algorithm to apply every rule as if it would be an universal rule.

In the first paragraph of this section, Russel & Norvig seem to follow a utilitarian approach.[139] Utilitarianism is the ethical theory that favours acts that maximizes the net good in

[137] High-Level Expert Group on Artificial Intelligence, *Draft Ethics Guidelines for Trustworthy AI*, Brussels: European Commission 18 December 2018, p. 2.
[138] J.E. Mahon, 'Kant and the Duty Not to Lie', *British Journal for the History of Philosophy* (14) 2006, iss. 4, p. 661.
[139] S.J. Russel & P. Norvig, *Artificial Intelligence. A Modern Approach*, Harlow: Pearson Education Limited 2016, p. 1034.

society above all. It is a theory that is based on consequentialism, which looks at the consequences of actions to determine whether an act is morally right.[140] More interesting for this research is evaluative consequentialism, which focusses on the value of consequences to determine the morally right choice. Value, in this instance, can be both tangible and intangible.[141] One of the rationales of intellectual property rights is based on utilitarianism. A utilitarian approach to copyright is to stimulate authors to create works in order to increase the net benefit in social welfare.[142] Utilitarianism broadens the discussion of electronic personhood from a moral discussion about the value of the humanity of an author to a discussion about benefitting the net social welfare of everyone in society.[143] It amplifies the view that authorship is not centred on being human and it signifies that electronic personalities do not interfere with its objective.[144] Electronic entities do not desire incentivization and increase the net social welfare by imbuing society with their creatively and intelligently established work. Applied to electronic personhood, in the context of copyright, the utilitarian perspective therefore implicitly reveals the value of electronic personhood that can be inferred from its consequence, which is the increase of the net social welfare. On the other hand, a critique could be that this perspective on value is too focussed on consequences and does not take into consideration what the purpose of electronic personhood is. This argument can be easily refuted, as the purpose of electronic personhood implicitly aims to increase the net social welfare as well, by, for instance, closing the gaps on liability issues.

The second theory concerns the matter of the value of property. According to Locke's theory of labour everything in nature has little value, up until a human being imbues labour into the object and thus creating property. He argues that everything on Earth is given to every human being by God and that a person gains property by imbuing the fruits of his labour on a piece of this initially communal good.[145] Value is not a characteristic of copyright protected works. The law requires creativity and originality. It was Justice Holmes who said that creativity can be achieved with a very modest degree of art, such as in handwriting.[146] Nonetheless, value in conjunction with copyright is still important in the context of this thesis, as it

[140] J. Bentham, 'Chapter 1 – Of the Principle of Utility', in: J. Bentham, *An Introduction to the Principles of Morals and Legislation*, Mineola: Dover Publications 2007.
[141] D. Sosa, 'Consequences of Consequentialism', *Mind* (102) 1993, iss. 405, p. 101-122.
[142] W. Fisher, 'Theories of Intellectual Property', in: S.R. Munzer, *New Essays in the Legal and Political Theory of Property*, Cambridge: Cambridge University Press 2001, p. 177.
[143] M.E. Kaminski, 'Authorship, Disrupted: AI Authors in Copyright and First Amendment Law', *University of California, Davis Law Review* (51) 2017, iss. 2, p. 599.
[144] Ibid, p. 614.
[145] J. Locke, *Second Treatise of Government*, Chicago: Infomotions 2000, p 14.
[146] M.E. Kaminski, 'Authorship, Disrupted: AI Authors in Copyright and First Amendment Law', *University of California – Davis Law Review* (51) 2017, iss. 2, p. 601.

acts as a justification why electronic personhood is the morally right choice. Building on utilitarianism, a higher value of the consequences of electronic personhood, in turn increases net social welfare. The value, in this instance, would be the value imbued in property. Regarding Locke's labour theory, one could argue that an algorithm is the result of human labour and therefore correspondingly indirectly has permeated its work with value. It seems it would be difficult for an algorithm to impart the fruits of his labour on a communal good, as an algorithm does not labour in the conventional sense of the word, that is with its own sweat and tears. However, Drahos clarifies that labour, in the sense Locke's theory of labour, should be interpreted as meaning producing intellectual property as well. At the same time, Drahos critiques this approach, because there is no such thing as a communal intellectual good, something that can be taken away by the community.[147] However, in intellectual property law, ideas have to be expressed in order for protection to apply. Think of an idea of a story that is written in a book or a film that is recorded on camera. This expression serves as something that can be taken away. Therefore, according to Locke's theory of labour, the creation of an AI-algorithm has value, even though it regards intellectual property and an algorithm does not labour in the conventional sense of the word. This implies that the idea of electronic personhood, would be the morally right choice, as it increases the net social welfare by protecting the value that the algorithm has imbued onto the piece of intellectual property.

Following on Locke's theory, Hegel's personality theory vividly explains that a human being can only truly own property if it is connected to that which is absolutely his or hers. In Hegel's view, only the mind and body are truly the absolute property of a person. If a person is able to connect what is truly ours as a person (our mind) to an object, only then does this become property by imbuing one's personality into the object.[148] Elements Hegel finds essential in order to imbue one's personality onto an object are free will of the person, a lack of will in the object and a person must be able to place his will into the object without a will.[149] Hegel's personality theory seems troublesome for artificial entities, because they do not (currently) have free will. As a result, the property that is created by artificial entities cannot even be classified as property, because they cannot connect to their creation. However that may be, Hegel's theory can also be positively interpreted with regards to electronic personhood. Hegel's theory is based on a notion that human beings have free will, except with our

[147] P. Drahos, *A Philosophy of Intellectual Property*, Acton: ANU eText 2016, p. 56-64.
[148] G.H.W. Hegel, *Philosophy of Right*, Kitchener: Batoche Books Limited 2001 (translated by: S.W. Dyde), p. 64.
[149] J. Penner, *The Idea of Property in Law*, Oxford: Oxford Scholarship online 2010, p. 173-174.

current advances in neurosciences, this understanding of free will is not necessarily true. Free will is highly debated.[150] Moreover, following Hegel's line of reasoning, properties that are personalised are put out of reach of others. In other words, the possibilities of others are limited or put beyond their will.[151] This negative aspect of property does not hold with property that is created by AI, because an AI cannot impart its personality onto an object. To follow-up on the thoughts of Foucault in section 3.2.2, a less personalised creation, such as that produced by an artificial entity, would prevent any bias with regards to the author, and as a result of Hegel's personality theory, it will not limit others' will. In a more abstract sense, the ethical implication is that electronic personhood is the right choice, as it ensures that the will of a human being will not be limited as a result of its inability to imbue its will into an object.

Lastly, it should be mentioned that, according to Sparrow, a machine will only have moral standing in society if it is sometimes reasonable to choose a machine over a human individual. This does not apply to electronic personhood as of yet, but it could be more realistic in the future if an electronic entity can be considered a moral person. In such a future, it would be necessary to reassess the notion of electronic personhood. However flexible its meaning might be, electronic personhood is not meant to grant a machine with any moral rights.[152]

The aim of this section was to show what ethical implications were the result of electronic personhood and whether these implications were morally good or bad. To determine the moral status of the beforementioned implications, each implication has been argumentatively substantiated at the hand of a utilitarian point of view, that is whether the implication benefits or hurt the net social welfare. This has been the measure that binds the arguments in this section together and, the result is, that electronic personhood increases net social welfare and therefore can be considered the morally right choice.

4.4 Conclusion

The underlying issue in this chapter was to determine whether electronic personhood is sufficiently problematic to not grant electronic entities with this type of personhood at all, by looking its legal and ethical implications. This chapter has shown that electronic personhood, as a consequence, does have several implications that require a change in order for it to be more

[150] V. Dubljevic & M. Shipman, 'Study Tackles Neuroscience Claims to Have Disproved 'Free Will', *NC State News* 2018 <https://news.ncsu.edu/2018/03/free-will-review-2018> Accessed 8 November 2018.
[151] P. Drahos, *A Philosophy of Intellectual Property*, Acton: ANU eText 2016, p. 104-105.
[152] R. Sparrow, 'Can Machines Be People? Reflections on the Turing Triage Test', in: P. Lin, K. Abney & G.A. Bekey (eds.), *Robot Ethics. The Ethical and Social Implications of Robotics*, Cambridge: The MIT Press 2012, p. 309.

desirable. For instance, the term of protection has to be amended to not create a too skewed image in relation to the term of protection that is accorded to a human being. Moreover, clear agreements have to be made in case of liability issues, because an AI could cause substantial harm. The ethical implications of electronic personhood have been analysed through a value consequentialist lens. As a result, this chapter has shown that by increasing the net social welfare, electronic personhood is the morally right choice. It can be argued that the merits exceed the flaws for society as people gain knowledge and the enjoyment of art that they would not have gained if not for the algorithm. In conclusion, this means that predominately the legal implications should be addressed appropriately, but do not impose a persuading issue insofar to impede the idea of electronic personhood for the simple reason that the legal issues can be solved by making clear agreements, also weighing the ethical merits of electronic personhood.

5 Conclusion

"Should an AI-algorithm be entitled to a legal status in order for it to obtain copyright to the artwork which is the result of its actions, based on the concept of legal personhood that we know so far or with respect to electronic personhood and in light of any legal and ethical implications granting an algorithm with legal personhood carries?"

This thesis started with the assumption of a legal vacuum that remains whenever an AI-algorithm creates a work. Instead of looking to existing legal solutions, such as solving it by means of a contractual relationship, this thesis' aim was – taking into account the intelligence of AI – to look to legal personhood and to what extent this could be extended to fit AI within its meaning. The Committee has assisted this aim by proposing a new type of legal personhood, that is electronic personhood. The question at the beginning of this chapter can now be answered by abstracting knowledge from the previous three chapters.

The second chapter has been important to describe the technology-side of this thesis in order to get a clear comprehension of the notion of AI. Without a proper qualification of AI, what its features are and its adjacent implications, it would have been unclear in the continuation of the research to describe its relation to personhood. In summary, AI has been qualified as a piece of code, an algorithm, that instructs a device that works on electricity to perform actions that can be considered as intelligent. More importantly, these instructions have effect in the physical world by means of robots, to that extent that it could even acquire rights. In order for an AI to be able to obtain copyright, it has to fulfil several criteria, such as the creativity and originality criteria to create a work, and it needed to be a legal person to bear rights and duties. It was important to address copyright, because the creation of an AI could inflict with others' copyright protected works. Chapter two has shown that an algorithm fulfils the beforementioned criteria that pertain to copyright, except for the role of the author as an algorithm does not have legal personality. Especially the right to enforce its rights appeared to be problematic. The key point of this chapter was that the element of legal personality needed a closer look on the exact rationale of why it is not meant for electronic entities.

Chapter three analysed the notion of legal personhood and compared it with electronic personhood. An interesting finding in this chapter is that the notion of legal personality is not as fixed as it beforehand seemed to be. It is formulated in an open way, or in the words of

Hart, formulated using the open texture of law, and as such creates possibilities for other entities to obtain legal personhood. The idea is to produce a tailormade type of legal personality in order for the subject of the legal personality to gain fitting rights and duties. The type of rights can vary depending on the entity that needs personhood. Therefore, an assessment will have to be made on a case-by-case basis what rights and duties fit with the corresponding entity. This consequence of the open texture of legal personality has an up- and downside with regards to technology. An upside is that the flexibility of legal personality suits the changing nature of technology, which can be very diverse. The downside is that technology develops much faster than the law can keep up with. As a result, by the time a fitting type of personality has been assigned to a new technology, it could be possible that a newer version of that technology has already been made available, and make that type of technology obsolete. Another implication of the flexible nature of legal personhood, is that it can be extended to other (non-)living entities, provided that it is adequately substantiated. Specifically focused on authorship, an algorithm as author would devaluate the concept of an author, and that is not necessarily a bad thing. According to Foucault, it would have advantages like no more bias towards an author and a increased focus on the substance of a work. Electronic personhood, as a new interpretation of legal personhood, would offer a solution for the issues that have been outlined by Foucault.

The inevitable conclusion, an answer to the research question, only lacks an assessment of the notion of electronic personhood and whether it is legally and ethically the right choice. Is it something that should be desired? Generally speaking, chapter four has shown that electronic personhood does have its legal and ethical issues. More specifically, a practical legal issue is the term of protection that lasts forever with a copyright protected work made by an algorithm. Moreover, liability is not something that can be generally solved. However, it does require a closer look, as it can have disastrous consequences. Liability requires suitable agreements made beforehand that see to the specific type of liability that could occur as a result of the actions of the specific AI. A feat that is not insurmountable, but can become problematic if not handled appropriately. Case law can interpret the hard cases, but the industry behind AI and perhaps even science or the state can set preliminary guidelines on possible liability issues and how to approach them. With regards to ethics, the main point that has been made is that from a utilitarian perspective with a focus on value, electronic personhood is morally right, because it increases the net welfare in society. The value of electronic personhood regarding property can be derived from the extensive labour, in the broad sense of the word, that adds value to the creations of the AI-algorithm that require protection. The value of

electronic personhood regarding personality is derived from a more abstract idea of not limiting other's will by not imbuing its personality onto an object. Both have the benefit of creating a society in which value is added in property, without limiting one's will.

In conclusion, to answer the research question, an AI-algorithm should be entitled to a legal status in order for it to obtain copyright to the artwork which is the result of its actions, based on the concept of legal personhood that we know so far and with respect to electronic personhood and in light of any legal and ethical implications granting an algorithm with legal personhood carries. At the same time, it is also useful to notice the limits of this research. For instance, the scope has been limited to a research that took in computer science, law and ethics. That does not necessarily mean that other disciplines do not contribute to this subject. For example, economics, sociology and psychology could play a fair part by researching the financial benefits of electronic personhood, by empirically researching in what it means that the social welfare has been benefitted by electronic personhood and by zooming in on the psychological effects electronic personhood has on the human mind.

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