Chapter 1

Introduction

1.1 General Introduction

Artificial intelligence is the order of the day and stands firmly intertwined into the fabric of our lives due to a series of breath-taking advancements in science and technology. Experts often dub this as the 'new electricity'. Along with bioinformatics and nanotechnology, it will touch and influence all major spheres of our lives, one of them being intellectual property rights. AI is considered by many experts to be a great replacement for human cognitive blind spots and offer a potent solution for complex problems which continue to evade human ingenuity.

Historically, instances of artificial things mimicking human behaviour can be seen in the way the Mongols would tie branches to the feet of horses to raise puffs of dust and make their armies appear larger from a distance.[1] In the modern age, the devices became more sophisticated and the best example was the analytical device designed by Sir Charles Babbage for processing data. 1960's and 1970's saw a boom in the computer industry in the United States when Gordon Moore, CEO of Intel, famously coined the Moore's law. In 1965, Moore's law estimated that as price of computers become half every year, the number of units in the integrated chip increase by double in the same period. Moore later revisited his initial estimate and theorized that the doubling time may be 1 to 2 years. Adding on to Moore's findings, Ray Kurzweil observed in 2000 that a computer could effectively make 100 million calculations per second and predicted that a supercomputer in 2050 could surpass the aggregate intelligence of the entire mankind.[2] Nick Bostrom's analysis of several surveys featuring AI experts predicts a 50% probability of human-level machine intelligence by 2040 and 90% by 2075.[3]

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[1] Chris Peers, *Genghis Khan And The Mongol War Machine* 72 (2015).

[2] Samuel Scholz, *A Siri-ous Societal Issue: Should Autonomous Artificial Intelligence Receive Patent Or Copyright Protection?*, 11 Cybaris INTELL. PROP. L. REV. 81, 86-87 (2020).

[3] Nick Bostrom, Superintelligence: Paths, Dangers, And Strategies 23 (2014). See also Robert C. Denicola, *Ex Machina: Copyright Protection for Computer Generated Works* 69 Rutgers U.L. Rev. 251, 256 (2016).

The world has moved away from the days of Turing Test which required a computer's ability to communicate to be assessed on the parameter of creating an illusion of 'Human to Human' interaction. Ginsburg formulated a three-step test requiring the machine to compute, learn and reason to earn the status of 'being human like'.[4]

James Albus defines 'intelligence' as the

"*…ability of a system to act appropriately in an uncertain environment, where appropriate action is that which increases the probability of success, and success is the achievement of behavioural sub goals that support the system's ultimate goal*."[5]

Thus, the AI technology is all about how we simulate a computer to behave intelligently.[6] Shlomit Yanisky-Ravid defines AI as a system which can do works normally requiring human intelligence – e.g. recognition, learning, communicating etc.[7] In the words of Prof. Ryan Calo,

"*Artificial intelligence is a set of techniques or instructions that are aimed to simulate some aspect of biological cognition using machines*."[8]

The world is gradually transitioning from traditional neural networks which would learn through trial and error. The computer architecture in AI is based on information being fed by the developer causing the programme to process and input in a certain way dictated by its algorithm. During the process of development, experiments are conducted to figure out whether the programme meets the desired efficiency standards when it comes to giving the output. The performance testing experiments are rapid and easily outpaces human evolution which is random by nature. As a result, over a period of time, AI has become empowered with supreme computational intelligence which puts the civilization firmly on

4 Matthew L. Ginsberg, *Multivalued Logics: A Uniform Approach to Reasoning in Artificial Intelligence*, 4 Computational Intelligence 265 (1988).

5 James S. Albus, *Outline for a Theory of Intelligence* IEEE Transactions on Systems, Man and Cybernetics, Vol. 21, No. 3, May/June 1991

6 MERRIAM-WEBSTER ONLINE DICTIONARY (2019), https://www.merriamwebster.com/dictionary/artificial%20intelligence, "*Al is a branch of computer science dealing with the simulation of intelligent behavior in computers*."

7 Shlomit Yanisky-Ravid, *Generating Rembrandt: Artificial Intelligence, Copyright and Accountability in the 3A Era - The Human-like Authors are Already Here - A New Model* (2017) Mich. St. Law Rev. 659, 673.

8 Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C.D. L. REV. 399, 404 (2017).

course for building the ultimate super computer that will overpower human cognition and existence. Professor Neil Richards and Professor William Smart believe that robots, which are one form of AI, are now smart enough to leave the laboratory and hit the consumer market in numbers.[9] Historically, AI would use a very rudimentary algorithm termed as 'heuristics' i.e. a 'thumb rule' to perform complex tasks like findings the way through a maze.[10] The initial years of machine learning AI can be best understood by how the programme can be trained, for instance, to recognize the picture of, say, a cat. The AI would first be shown several of cats. The numerous nodes/neural network would focus on different attributes of each image – e.g. colour, brightness, nose, eyes. The AI then pieces together components of a cat's face from the information collected.[11] Here, the AI program gets feedback and alters its algorithm to improve its performance of a specific task. Feedback may be received through supervised or unsupervised learning. Under supervised learning, the AI matches the label of the output with the label of the input fed into its system and adjusts its algorithm every time an input which closely corresponds to the output label is given to that AI. As opposed to this, in unsupervised learning, the AI is more keen on studying patterns in the input and adjusts the algorithm based on prior performance in generating outputs without being provided specific labels.[12] The following words from Jane Wakefield perfectly summarize the underlying mechanism of a machine learning AI:

"*...machine learning makes use of artificial neural networks that attempt to mimic the structure and workings of biological neural networks like the human brain*."[13]

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9 Neil M. Richards & William D. Smart, *How Should the Law Think About Robots?*, in ROBOT LAW 3 (Ryan Calo, et al. 2016).

10 Pamela Mccorduck, *Machines Who Think: A Personal Inquiry Into The History And Prospects Of Artificial Intelligence* 246 (2004)

11 McKenzie Raub, *Bots, Bias and Big Data: Artificial Intelligence, Algorithmic Bias and Disparate Impact Liability in Hiring Practices*, 71 ARK. L. REV. 529, 532 (2018); Curtis E.A. Karnow, *The Opinion of Machines*, 19 COLUM. SCI. & TECH. L. REV. 136, 143 (2017).

12 Jessica L. Gillotte, *Copyright Infringement in AI-Generated Artworks* 53 UC Davis L. REV. 2655, 2662 (2020).

13 Robert C. Denicola, *Ex Machina: Copyright Protection for Computer Generated Works* 69 Rutgers U.L. Rev. 251, 255 (2016).

In the 1970s, scientists created the first Al systems that could imitate the knowledge of human specialists in a particular domain. These were called the expert systems characterized by the modulization of the developer's personal expertise into an algorithm. E.g. In an AI that can author stories, programmers have to feed the English words, syntax rules, and the narrative rules.[14]

But a scientific experiment which once started out as an endeavour to emulate the mental steps taken by human beings in solving a problem from a set of inputs fed into its system has matured into more sophisticated forms. No longer is the programme acting as a mere mechanical assistant like a calculator for the human inventor or creator but current technology enables the AI to produce output either in autonomous fashion or offer a finite set of solutions out of which one is selected by the owner of the programme.[15] Microsoft has argued that with Moore's Law reaching its finite end, the next revolution in artificial intelligence could be driven by 'quantum computing' which can propel AI's to learn 30 times more than its current capacity.[16]

The following words of Mario Klingemann, a German artist, provide an insight into the resurgence of AI as an attractive upgrade over limited human capabilities:

"*Humans are not original...We only reinvent, make connections between things we have seen. While humans can only build on what we have learned and what others have done before us, machines can create from scratch*."[17]

On October 27, 2020, the United States Patent and Trademark Office published a report named 'Inventing AI: Tracing the diffusion of artificial intelligence with U.S. patents' where it was shown that

AI patent applications had gone up by more than 100% between 2002 and 2018 and the overall

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[14] Stan Franklin, *History, Motivations, and Core Themes*, in THE CAMBRIDGE HANDBOOK OF ARTIFICIAL INTELLIGENCE 15 (Keith Frankish William M. Ramsey eds., 2014). See also Pierre-Luc Racine, *Fostering Expressive Knowledge: The Copyrightability of Computer-Generated Works in Canada*, 60 IDEA 544, 552, 553 (2020).

15 R King et al, *The Robot Scientist Adam* (2009) 42 Computer 46-54, at 46.

[16] Victor M. Palace, *What If Artificial Intelligence Wrote This: Artificial Intelligence and Copyright Law* 71 Fla. L. Rev. 217, 222 (2019).

[17] Arthur Miller, Can Machines Be More Creative Than Humans?, The Guardian (Mar. 4, 2019), http://theguardian.com/technology/2019/mar/04/can-machines-be-more-creative-than-humans

percentage of applications containing AI rose from 9% to almost 16%.[18]

Another interesting policy challenge comes from the emergence of 'Generative AI' which shows human like responses and performances in the real-world context. A classic example of such an AI model would be ChatGPT created by Open AI which has unparalleled data processing and computing powers. Statistics show that at the turn of January, 2023, ChatGPT had one million users and continues to grow at a rapid pace as on date. On February, 2023, reputed law firm Allen & Overy, as a part of their trial run, used an AI application 'Harvey' to post responses to almost 40,000 queries.[19] Apprehension however remains as illustrated in a survey conducted by Thomson Reuters in April, 2023, covering numerous law firms across the globe. While 82% of the respondents attested to the capabilities of AI in doing legal work and 51% responded that AI ought to be used for such work, only 3% stated actual use of AI in the services offered by their respective firms.[20]

The inventions and creations of Dr. Stephen Thaler's Creativity Machine has created a massive stir in the patent and copyright regimes worldwide in recent times. The machine which was developed in 1994, combined artificial neural networks to generate multiple possibilities, evaluated and then proposed a nuanced solution at par with human cognitive capabilities of brainstorming. These artificial neurons were arranged in several layers with each layer responsible for abstraction of the data being fed into the system. The programme subsequently 'weighted' the input that is analysed it to detect patterns and differences in the information. The detection may be done pursuant to training the system using labelled data or without any training by allowing the system to analyse the information independently.

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[18] Rebecca Tapscott, USPTO Releases Benchmark Study on the Artificial Intelligence Patent Landscape, https://www.ipwatchdog.com/2020/10/28/uspto-benchmark-study-artificial-intelligence-patent-landscape/id=126847/, "*The study also identified the growth in the number of AI inventors as an indicator of diffusion. In particular, the diffusion trend for inventor-patentees started at 1% in 1976 and increased to 25% in 2018, which means that 25% of all unique inventor-patentees in 2018 used AI technologies in their granted patents*."

[19] Jennifer Steeve and Jeffrey W. Gordon, Generative AI Is Here and Ready to Disrupt, https://www.lexology.com/library/detail.aspx?g=3dcc6eda-2a73-4fd2-b853-24fb7a3cfe4c&utm_source=Lexology+Daily+Newsfeed&utm_medium=HTML+email+-+Body+-+General+section&utm_campaign=Lexology+subscriber+daily+feed&utm_content=Lexology+Daily+Newsfeed+2023-09-07&utm_term=

[20] AI & Future Technologies, New report on ChatGPT & generative AI in law firms shows opportunities abound, even as concerns persist, https://www.thomsonreuters.com/en-us/posts/technology/chatgpt-generative-ai-law-firms-2023/

More specifically, the programme used two artificial neural networks ("ANN") to process the input. A commonly used ANN is called Convolutional Neural Network ("CNN") invented by Yann LeCun in 1995 which alters algorithm based on evaluation of earlier performances. The disturbances created by the input in the first ANN was used to produce the output and the second ANN evaluated the effectiveness and utility of this output using benchmark prescribed by the creator beforehand. The second ANN would alter the disturbances to improve the efficacy of the generated output. [21]

It is far from a pre-programmed mechanical process of generating random data combinations with no tangible end product. Creativity Machine successfully developed a bristle design for the Oral-B tooth brush with better plaque removal and gingival health, and the same was patented under the name of Dr. Thaler though he had no intervention in its conception. [22]

The use of ANN has also created a profound impact on the drugs and pharmaceutical industry where the technique has been instrumental in identifying new uses for existing drugs through a more efficient analysis of outcomes of trials/experiments. Experts have predicted a significantly reduced cost and time expenditure incurred for such experimental activities and drug recovery if these deep neural networks continue to be employed on a more consistent scale.[23] A case in point would be Robot Eve which successfully screened the attributes of 5000 molecules of an anti-cancer drug to conclude that certain molecules from this set were anti-malarial by nature.[24] The use of General Adversarial Network ("GAN") represents an upgrade over CNN. GAN uses two trained networks together where one network (discriminative) attempts to find flaws and limitations in the output generated by the other

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21 Y LeCun et al., *Deep Learning* (2015) 521 Nature 436-444, at 439.

22 E Carayannis (ed), Encyclopedia Of Creativity, Invention, Innovation, And Entrepreneurship (Dordrecht: Springer, 2013) 447-456, at 451.

23 J Besnard et al, "Automated Design of Ligands to Polypharmacological Profiles" (2012) 492 Nature 215-220, at 219. See also J Patel, "Science of the Science, Drug Discovery and Artificial Neural Networks" (2013) 10 Current Drug Discovery Technologies 2-7, at 7; Jessica L. Gillotte, *Copyright Infringement in AI-Generated Artworks* 53 UC Davis L. REV. 2655, 2662 (2020).

24 K Williams et al, "Cheaper Faster Drug Development Validated by the Repositioning of Drugs Against Neglected Tropical Diseases" (2015) 12 Journal of the Royal Society Interface available at http://rsif.royalsocietypublishing.org/content/12/104/20141289

network (generative). As both networks try to outdo the other, the overall efficiency of the AI goes up.[25] These developments reinforce the proposition that AI programmes have now developed the capability to design experiment, formulate hypothesis, run experiment using automated tools and interpret results simultaneously.

Shortly to follow the footsteps of the Creativity Machine was the Invention Machine by Dr. Koza in 1996. This machine was devised for Genetic Programming which simulated the phenomenon of evolution in three steps – mutation, sexual recombination and natural selection, to come up with novel gene sequences eligible for plant variety patents. Two such patents have been granted to Dr. Koza in 2002 and 2005, though the inventions were conceived without his intervention. Genetic Programming uses an algorithm to generate multiple solutions to a known problem and arrives upon the best solution based on the termination criterion set by the user of the programme. Though the seed solution, termination criteria and fitness measures are set by the user, the execution of the programme is devoid of any human intervention. Interestingly, genetic programming does not produce massive changes to prior art but comes in handy in those fields of technology where small changes are significant and relationship between a complex set of variables is either unknown or unclear. A great example of this technique is the antennae designed by for NASA Space Technology 5 mission which was intuitively designed after the data on existing antennae designs was fed into the programme. The underlying algorithm was used to devise the new antennae with clear functional advantages over existing models. The technique also saved considerable time and labour making the whole process much more efficient.[26]

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[25] Ian J. Goodfellow et al., *Generative Adversarial Nets* 27 PROC. NEURAL INFO. PROCESSING SYSTEMS 2672, 2672 (2014).

26 R Poli and J Koza, "Genetic Programming" (2014) in E Burke and G Kendall (eds), Search Methodologies: Introductory Tutorials in Optimization and Decision Support Techniques (New York: SSBM, 2014), at 143; J Koza, Genetic Programming: On the Programming of Computers by Means of Natural Selection, Vol I (Cambridge: MIT Press, 1992)

In 2011, IBM's AI machine 'Watson' stunned the whole world by winning the reality show 'Jeopardy' beating its two previous winners. Watson functions on the principle of computational creativity which is deductive in nature. It produces billions of possibilities in its memory and narrows down to the most suitable solution to the problem posed. Currently, it is engaged in various activities like assistance with financial planning, cancer treatment, identification of genetic profiles compatible with certain drugs, travel concierge etc. The gradual evolution has been from machine learning deductive processes to a more nuanced mechanism dictated by artificial neural networks which mirrors the human brain circuitry.

Clearly, all these instances point in the direction of AI assuming more and more capability of inventing and creating without human assistance and exposing us to the possibility of treating them as eligible inventor, author and owner with the passage of time. The critical decisions on eligibility of an AI for authorship, inventorship and ownership will need to be taken before AI outpaces the human ability to regulate them. The question arises in such a case whether we can call such AI entities 'software agents' implementing the will of its creator within a range of choices programmed into its memory or do they exercise an independent skill or judgement bringing them into the realm of an inventor's or author's personality and conception of an invention or creation.[27] Russel and Norvig observe that rational thinking on its own does not qualify AI as human solely due to their capability to perceive, reason and act. Such programmes may at best qualify as intelligent things or objects but not as human.[28] Unless these issues are sorted out, the uncertainty will prevent legal systems from incentivizing research, knowledge diffusion and hinder innovation and creativity in the long run.[29] According to Prof. Ryan Abbott, providing inventorship and authorship to non-humans is a novel way to incentivize research

27 D Vaver, *Sprucing Up Patent Law* (2011) 22 Intellectual Property Law Journal 63-81, at 66; B Hattenbach and J Glucoft, *Patents In An Era Of Infinite Monkeys And Artificial Intelligence* (2015) 19 Stanford Technology Law Review 32-5 1, at 32.

28 Stuart J. Russell and Peter Norvig, Artificial Intelligence: A Modern Approach 2 (2009)

29 A Marco, "The Value of Certainty in Intellectual Property Rights: Stock Market Reactions to Patent Litigation" (2005) Vassar College Department of Economics Working Paper No 82 at 1, available at http://economics.vassar.edu/docs/working papers/VCEWP82.pdf

and development in AI.[30] As pointed out by Pearlman, unless the requisite investments are made, the scientific community cannot realize the full potential of AI.[31]

Equally important would be to create the right checks and balances so that the costs do not outweigh the benefits by endangering the welfare and existence of mankind.

An open letter from the Future of Life Institute titled 'Research Priorities for Robust and Beneficial Artificial Intelligence', echoed a similar sentiment by observing that:

"*...because of the great potential of AL, it is important to research how to reap its benefits while avoiding potential pitfalls*."[32]

The lack of human attributes poses the first hurdle in an AI being recognized as an inventor and author in patent and copyright matters respectively. After deciding whether the subject matter is protectable, the authority will need to ascertain whether AI is capable of conceiving and executing an invention, or exercise a range of creative choices through skill and judgement. The reason why personhood is so critical to the status of an inventor or author is because an inventor or author invents or creates to exercise a bundle of rights in relation to the concerned subject matter. This bundle of rights constitutes ownership over the subject matter and allows the holder of the intellectual property to exploit the work financially. Thus, to call AI an inventor or author would be determined by its ability to invent or create through the sheer incentive of these financial rights. Even if the AI invents or creates to eventually confer the ownership on its owner, this must happen through a contract, which would also requirement personhood in law. In such a case, if the owner wants to file an application for protecting the patent or copyright, the owner must indicate how he derived this right from the AI (through assignment or succession generally), where the lack of personhood of AI again becomes an obstacle. Likewise, if the

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[30] Ryan Abbott, *I Think, Therefore I Invent: Creative Computers and the Future of Patent Law*, 57 B.C. L. REV. 1079, 1098 (2016)

[31] Russ Pearlman, *Recognizing Artificial Intelligence (Al) as Authors and Inventors under US Intellectual Property Law* (2018) 24 (2) Richmond Journal of Law & Technology 1.

[32] Stuart Russell et al., Research Priorities for Robust and Beneficial Artificial Intelligence, https://futureoflife.org/data/documents/research_priorities.pdf

owner of the AI is treated as the inventor or author, with AI being the owner, the same set of problems arise because an AI cannot receive the invention or copyrightable work from its owner under a contract. Additionally, the AI cannot enjoy rights and obligations like a person in law because it cannot be expected to be driven by the desire to exploit the work, or diligently satisfy legal obligations like registration formalities, enforcing the rights by filing infringement suits or defending infringement claims etc. Due to the presence of these constraints, and the upcoming surge of AI inventions and works, the law must address the issues of inventorship, authorship and ownership in patents and copyright to clarify where AI exactly stands in case of inventions and works generated by the AI without human intervention. The present research is an earnest attempt in this direction.

1.2 Research Objectives

To ascertain whether

1. an AI programme can be an inventor or author under the patent or copyright laws in India, United States of America ("USA"), United Kingdom ("UK") and European Union ("EU"), or
2. the AI programme can enjoy ownership over the patent or copyright in these jurisdictions if the inventor or the author is the owner of such intellectual property.

1.3 Research Scope:

The research encompasses the patent and copyright laws in India, USA, UK and EU. At the outset, the basic principles of inventorship, authorship and ownership will be culled out from the relevant international treaties, conventions and agreements – for instance, TRIPS Agreement, Berne Convention, Paris Convention etc. After a perusal of the global regulatory framework, the focus of the research will be directed towards the domestic statutes and regulations in India, USA, UK and EU. Pursuant to identification of the important statutory provisions and rules, the endeavour would be to understand the manner in which the judiciary in all these jurisdictions have interpreted the provisions and rules to supplement their working with detailed principles. Based on a systematic examination of

the statutes, regulations and cases, the research will aim at extracting the essence of inventorship, authorship and ownership under the patent and copyright laws in India, USA, UK and EU. This theoretical groundwork will provide the necessary platform for formulating suitable responses to the listed research questions.

1.4 Research Questions:

a. Whether AI would qualify as an inventor under the existing patent laws in India, USA, UK and EU?
b. Can an AI own a patent under the legal framework in India, USA, UK and EU, or should such ownership vest in the human creator (developer) of AI?
c. Whether AI would qualify as an author under the existing copyright laws in India, USA, UK and EU?
d. Can an AI own a copyright under the legal framework in India, USA, UK and EU, or should ownership vest in the human creator (developer) of AI?
e. Whether the global intellectual property law regime needs to be supported by an ethical code of conduct to govern the behaviour of developers of AI?
f. Whether our jurisprudential understanding of personhood needs a re-examination based on the compatibility of the AI with the concept of personhood and theories of property?

1.5 Central Argument

a. AI must be considered as inventor under the patent laws in India, USA, UK and EU.
b. AI must not be considered as an owner of a patent under the laws in India, USA, UK and EU. Ownership must vest in the creator of the AI.
c. AI must be considered as author under the copyright laws in India, USA, UK and EU.
d. AI must not be considered as an owner of a copyright under the laws in India, USA, UK and EU. Ownership must vest in the creator of the AI.

e. AI qualifies as a legal person only for the limited purpose of qualifying as an inventor/author of patent/copyright but not as the owner of such right. To that extent our jurisprudential understanding of personhood needs a re-look.

1.6 Research Methodology:

The research has been conducted using **doctrinal methodology**. Conclusions have been drawn upon examination of the authorities and commentaries contained in various statutes, regulations, books, law reviews, newspapers, periodicals, and online articles.

1.7 Sources of the Research

a. Primary sources: For this research study, national patent legislations of USA, UK, EU and India have been referred. In addition to the above, relevant international conventions on patent and copyright laws have been referred to.

b. Secondary sources: Available and latest national and international literature on the subject area, journal articles, publications, periodicals, reports of different committees from different nations on the subject, national and international documents, articles, publications, reports of surveys, opinion polls, debates and the internet have been utilized.

1.8 Chapterisation

1. Introduction

The first chapter will introduce the thesis topic by explaining the issues at hand and the manner in which the research plan will be executed to resolve the stated research questions.

2. Understanding of AI as an Inventor/Creator and Owner under the Intellectual Property Regime – Perspectives and Recent International Developments

The second chapter will discuss the prevailing opinions and perspectives on the feasibility of reconciling AI and the domain of intellectual property. The research here will scrutinize arguments both favouring and opposing AI as an inventor/creator in the context of intellectual property rights. The chapter will also cover notable recent developments and debates at the international level

pertaining to inventorship and ownership of AI in patents and copyright.

3. Definitions and Related Concepts under International Law

The third chapter will cover the position of law related to patent inventorship and copyright authorship along with the principles of ownership through a survey of various international treaties and agreements like TRIPS Agreement, Berne Convention, Paris Convention etc.

4. Inventorship and Ownership under the Domestic Patent Regulatory Frameworks – India, UK, EU and USA

The fourth chapter will look at specific provisions and case laws outlining the conditions to be satisfied for being considered as an inventor and owner with respect to a patent. The research shall encompass the relevant patent statutes and regulations in India, USA, UK and EU.

5. Authorship and Ownership under the Domestic Copyright Regulatory Framework – India, UK, EU and USA

The fifth chapter will look at specific provisions and case laws outlining the conditions to be satisfied for being considered as an author and owner with respect to a copyright. The research shall encompass the relevant copyright statutes and regulations in India, USA, UK and EU.

6. AI Guidelines – A Compatibility Check with the Standards and Guidelines issued by Regulatory Bodies

The sixth chapter will discuss the various standards and operational AI guidelines issued by self-regulatory organizations like Institute of Electrical and Electronics Engineers, European Commission for the Efficiency of Justice, Duke Initiative for Science & Society etc. and examine whether these standards and guidelines effectively address the status of AI as an inventor/creator under patent/copyright laws.

7. Personhood and Theories of Property – Evolution of Jurisprudence

Considering the fact that the core issues analysed in this thesis are focused around the personhood

of an AI programme under the patent and copyright laws, it becomes necessary to explore the theories of personhood in jurisprudence and the general theories of property which justify ownership. The seventh chapter will describe the theories of the personality contributed by noted jurists like Rawls, Savigny, Kant etc. This chapter will throw light on the manner in which these theories shape our understanding of a person recognized under law. Additionally, the chapter will also explore the underlying philosophy of ownership of property by looking at various theories which justify the existence of property like labour theory, personhood theory etc.

8. Conclusion and Suggestions

The last chapter would conclude based on an evaluation of the position of law examined in all the preceding chapters and attempt to provide a convincing response to all the stated research questions. Finally, based on the concluding remarks, the research will seek to affirm or negate every tentative point listed under the central argument.

1.9 Literature Review

1.9.1 Books

1. P. Narayanan, Patent Law (2018)

   This book represents an extensive commentary on topical issues on Indian patent law including trade secrets, biotechnological products, DNA sequences, computer related inventions etc. It approaches every topic from a purposive angle rather than going by sections sequentially.

2. VK Ahuja, Law of Copyright and Neighbouring States, National and International Perspectives (2015)

   This book comprehensively covers legal principles of copyright. It presents a thorough analysis of Copyright Act, 1957 and sheds light on concepts such as know-how and licences in great detail.

3. RESEARCH HANDBOOK ON THE INTERPRETATION AND ENFORCEMENT OF INTELLECTUAL PROPERTY UNDER WTO RULES 239-241 (Carlos M. Correa ed., 2010)

   This Handbook throws light on some of the most complex questions raised by the implementation of the TRIPS Agreement. It also deliberates on the application of GATT jurisprudence for the interpretation of the Agreement and evaluates the main issues relating to enforcement of intellectual property rights. The analysis is fortified by a comprehensive analysis of the most landmark cases on TRIPS adjudicated by WTO dispute settlement system.

4. Nuno Pires de Carvalho, The TRIPS Regime of Patent Rights 248, 306 (2010)

   The TRIPS Agreement is largely an aggregation of all previous international conventions on IPR. It provides for a global regime for the protection and enforcement of IPR and has a direct bearing on the daily life of every person – natural or juristic. This book with the authoritative mark of a noted international functionary, earlier with the WTO and currently with the WIPO comprises of a very lucid explanation of patent-related TRIPS provisions. Thus, this treatise is a

vital resource for ascertaining compliance with the TRIPS obligations.

5. G. Dutfield and U. Suthersanen, Global Intellectual Property Law 84 (2008)

   This work represents an intuitive and insightful commentary on the intellectual property law from different perspectives. It explains the main rights, outlining their fundamental traits and charting their evolution till the current times by analysing statutes, judicial precedents and international conventions.

6. Phillip W. Grubb & Peter R. Thomsen, Patents for Chemicals, Pharmaceuticals, and Biotechnology – Fundamentals of Global Law, Practice and Strategy 382, 404 (2010)

   This book is an instructive guide to patent law and practice which enables the reader to augment the commercial prospects of their clients. The emphasis is on concerned technology and industry practices, supplemented with the latest legal developments on patent law and procedure. The book effectively outlines the techniques and industry know-how required for an expert portfolio management globally.

7. Lionel Bentley & Brad Sherman, Intellectual Property Law 523 (2009)

   This is a definitive textbook and a comprehensive guide to intellectual property rights. The book provides the readers a broad context for understanding the key principles with immense clarity, yet without compromising on the details and structural aspects. The idea is to enable readers to make informed and critical decisions about recent trends.

8. John Gladstone Mills et al., Patent Law Fundamentals, 5 Pat. L. Fundamentals § 16:6 (2d ed.)

   This book provides in-depth information on contemporary patent law and practice offering vital pointers regarding the manner in which a patent problem could be researched and strategies prepared. The commentary also highlights the differences in patent law between USA and other jurisdictions.

9. Michael A. Epstein, Epstein on Intellectual Property 5-29 (2006)

This commentary provides up-to-date, comprehensive coverage of the intellectual property regulations in USA. It caters to the latest legal trends in biotechnology, intellectual property, employee inventions etc.

10. Janice M. Mueller, Patent Law 179 (2009)

This book is an extensive legal treatise for patent lawyers. The prime focus is on pathbreaking Federal Circuit and Supreme Court judgements. Mueller provides a sieve through which the content flood can be filtered. Rather than an information compendium, the commentary is a curated guide to appreciating the current state of patent law.

11. Paul Goldstein, Copyright: Principles, Law, And Practice § 4.2.1.2, at 379 (1989)

This treatise is an aggregation of major developments in IPR, including a detailed commentary on US, UK, France, and Germany. It provides a thorough analysis of international copyright and serves as a dependable tool for IP lawyers worldwide.

12. John Rawls, A Theory of Justice 358, 386 (1999)

In this book, Rawls provides a systematic exposition of the democratic tradition of justice as fairness as an alternative to utilitarianism, which had consumed the lion's share of the Anglo-Saxon tradition of political thought. Rawls replaces social contract by a more satisfactory version of liberties of citizens as free and equal participants in a democracy.

13. G.S. Alexander, An Introduction to Property Theory 17 (2012)

This book provides a detailed account of the modern theories of property then applies them to concrete contexts including the controversial ones including the right to exclude, intellectual property etc. This treatise offers the most comprehensive and accessible introduction to the theories of property and discusses every facet without sacrificing accuracy or sophistication. The book's lucid descriptions of contemporary debates are particularly useful.

14. Gopal Sreenivasan, The Limits of Lockean Rights in Property 21 (1995)

    Sreenivasan offers a detailed interpretation of Locke's theory of property, and an analytical assessment. Sreenivasan examines the extent to which Locke's theory is really palatable as a defence of private property. The ultimate regime of private property is both significantly egalitarian and varies from the age-old liberal institution of private property.

15. J. Waldron, The Right to Private Property 222 (1988)

    The book offers a detailed examination of the claim that of private property being a fundamental right. Waldron provides a detailed discussion of the theories of property gathered from Locke and Hegel, and documents original analyses of the ownership of property, finding that primary arguments about property could lead to strangely radical inferences.

16. R. Nozick, Anarchy, State and Utopia 176 (1974)

    This book has become an exemplary text of libertarian thought. Nozick argues that the rights of people are infringed as a state's responsibilities increase. The best way of avoiding this scenario is the creation of a minimalist state which merely enforces contracts and protects its citizens against force, fraud etc.

17. J.E. Penner, The Idea of Property in Law 171 (1997)

    This book aggressively tackles a tricky subject in a proactive style. It adopts a fresh and dynamic approach to property law, opposing the notion that property is simply a `bundle of rights'.

18. Hans Kelsen, General Theory of Law and State 94 (1949)

    The book is divided into two parts: the first dealing with law, and the second with the state, constituting the most detailed exposition of Kelsen's theory. The work is a major reformulation of Kelsen's ideas expressed in many other books in German. The juridical principles outlined in this treatise continue to remain relevant and valuable till date.

19. C.A. Nard, The Law of Patents (Wolters Kluwer, Aspen Publishers, New York, 1st Edn., 2008)

This is a crisp yet comprehensive treatise on the law of patents featuring useful introductory descriptions, easily accessible case laws, detailed explanations, comparative policy perspectives, and pertinent statutory references. The author has covered the most recent amendments to the America Invents Act, significant changes to 35 United States Code section 102, post-grant review of patent applications, inter-partes review, key new Supreme Court and Federal Circuit case laws, including but not limited to Myriad Genetics, Prometheus Labs, Global Tech, Akamai, Bowman, Actavis etc.

20. Kenneth W. Dobyns, The Patent Office Pony—A History of the Early Patent Office (1994)

The Patent Office Pony, is a chronicle of the United States Patent office from 1791, the year America's first patent law was enacted, to the present. The book concentrates on people and personalities rather than technologies and legalities. Patent office commissioners and examiners, presidents and senators, inventors and solicitors all cross the stage in Dobyns' detailed history.

21. Peter K. Yu, Intellectual property and Information Wealth: Copyright and related Rights (2007)

Until recently, issues of intellectual property were relegated to the experts—attorneys, legal scholars, rightsholders, and technology developers who wrangled over interpretations and enforcement of copyright, patent, and trademark protections. But in today's knowledge-based economy, intellectual property protection has taken on fundamentally new proportions, as a subject of urgency for businesses (whose survival depends on protection of their intangible assets) and as a subject of cultural importance that grabs front-page headlines (as the controversy over Napster and high-profile revelations of plagiarism, for example, have illustrated). This landmark set of essays brings new clarity to the issues, as societies around the world grapple with the intricacies and complexities of intellectual property, and its impact on

business, law, policy, and culture. Featuring insights from leading scholars and practitioners, Intellectual Property and Information Wealth provides rigorous analysis, historical context, and emerging practical applications from the public, private, and non-profit sectors.

Volume 1 focuses on protections to novels, films, sound recordings, computer programs, and other creative products, and covers such issues as authorship, duration of copyright, fair use of copyrighted materials, and the implications of the Internet and peer-to-peer file sharing. Volume 2 explains the fundamental protections to inventors of devices, mechanical processes, chemical compounds, and other inventions, and examines such issues as the scope and limits of patent protection, research exemptions and infringement, IP in the software and biotech industries, and trade secrets. Volume 3 looks at the protections to distinctive symbols and signs, including brand names and unique product designs, and features chapters on consumer protection, trademark and the first amendment, brand licensing, publicity and cultural images, and domain names. Volume 4 takes the discussion to the global level, addressing a wide range of issues, including not only enforcement of IP protections across borders, but also their implications for international trade and investment, economic development, human rights, and public health.

22. Lyman Ray Patterson, Copyright in the Historical Perspective (1968)

First published in 1968, Copyright in Historical Perspective remains one of the most important histories of early copyright traditions and laws. Starting in the late 15th century and going through the late 19th century, Lyman Ray Patterson traces the regulation of publishing in Europe and the United States and the threats to fair use and public domain caused by shifting understandings of copyright law.

23. Ronan Deazley, On the Origin of the Right to Copy: Charting the Movement of Copyright Law in Eighteenth Century Britain (2004)

    Taking as its point of departure the lapse of the Licensing Act 1662 in 1695, this book examines the lead up to the passage of the Statute of Anne 1709 and charts the movement of copyright law throughout the eighteenth century, culminating in the House of Lords decision in Donaldson v Becket (1774). The established reading of copyright's development throughout this period, from the 1709 Act to the pronouncement in Donaldson, is that it was transformed from a publisher's right to an author's right; that is, legislation initially designed to regulate the marketplace of the bookseller and publisher evolved into an instrument that functioned to recognise the proprietary inevitability of an author's intellectual labours. The historical narrative which unfolds within this book presents a challenge to that accepted orthodoxy. The traditional analysis of the development of copyright in eighteenth-century Britain is revealed as exhibiting the character of long-standing myth, and the centrality of the modern proprietary author as the raison d'être of the copyright regime is displaced.

24. Friedrich Carl von Savigny, System des heutigen Römischen rechts § (1840).

    Savigny, in his eight-volume treatise, System des heutigen römischen Rechts (1840–49; “System of Modern Roman Law”), has conducted a detailed analysis of Roman law as it evolved in modern Europe. This work also contains an elaboration on his system of international private law.

25. Steve Wilkens, Beyond bumper sticker ethics: an introduction to theories of right and wrong (2011)

    Ideas have consequences. And sometimes those ideas can be squeezed into slogans, slapped on

bumper stickers and tweeted into cyberspace. These compact messages coming at us from all directions often compress in a few words entire ethical systems. It turns out that there's a lot more to the ideas behind these slogans--ideas that need to be sorted out before we make important moral decisions as individuals or as societies. In this revised and expanded edition of Steve Wilkens's widely-used text, the author has updated his introductions to basic ethical systems:

a. cultural relativism

b. ethical egoism

c. utilitarianism

d. behaviourism

e. situation ethics

f. Kantian ethics

g. virtue ethics

h. natural law ethics

i. divine command theory

He has also added two new chapters:

a. evolutionary ethics

b. narrative ethics

With clarity and wit Wilkens unpacks the complicated ideas behind the slogans and offers Christian evaluations of each.

26. Peter Stein, The Character and Influence of the Roman Civil Law (1988)

Goethe is said to have likened the Roman civil law to a duck: sometimes it is visible, swimming prominently on the surface of the water, at other times it is hidden, diving amid the depths. but it is always there. This may be said to be true not only in continental Europe and Scotland, where Roman law has been a dominant influence, but also in England and the U.S.A., where Roman law has often informed and supplemented Common law. None of the great writers on Common law, with the exception perhaps of Coke, failed to take Roman law in to consideration, especially on the matters of legal theory. Indeed, the differences between the two systems can easily be exaggerated. Ne one is better qualified to write on these matters than Peter Stein; this collection of his articles covers both the nature and the tradition of Roman law and ranges from classical to modern times. The Character and Influence of the Roman Civil Law includes discussions of the ethos and principles of Roman law and of their transmission and transformation in medieval and modern times. Attention is drawn to the working of Roman law in San Marinom which retains the uncodified *ius commune*. Civil lawyers in England whose work is examined include Vacarius, Thomas Smith and Thomas Legge. Roman law in Scotland is looked at in depth, with special consideration for the natural law tradition there. A piece on the origin of the four-stage theory of social development, which grew out of that tradition and was adopted by Adam Smith, appears for the first time. Finally, Professor Stein shows the attraction of Roman law to lawyers in the U.S.A. when they were trying to establish their own legal system following Independence.

27. David Bainbridge, Intellectual Property (2009)

Intellectual Property 6th edition provides a substantial view of intellectual property law, dealing with principles, academic issues and practical considerations. Split into well-structured parts, each comprises an introductory chapter on basic principles, and subsequent chapters addressing the particular aspects of each right.

The book provides an historical background to the current statutory and common law framework and analyses the grey areas revealed as English law struggles to keep up with technological change and European harmonisation. Coverage is not limited to UK law, but includes appropriate international and regional legislation and decisions.

28. Edward W. Ploman, and L. Clark Hamilton, Copyright: Intellectual Property in the Information Age (1980).

Monograph on an analysis of the wider implications of copyright as an instrument for ordering the flows of information and culture within and among societies - discusses international aspects, etc. International law, relations between developed countries and developing countries, and deals with issues relating to telecommunications and the mass media, publishing and the rights of authors, information policies, etc.

29. Sam Ricketson and Jane C. Ginsburg, International Copyright and Neighbouring Rights, The Berne Convention and Beyond, Volume I 361-362 (2010)

This comprehensive volume examines the international framework concerned with the protection of copyright and neighbouring rights. The focal point of this commentary is the Berne Convention for the Protection of Literary and Artistic Works 1886, which was last revised in 1971, but the treatment extends beyond to the related conventions that have grown out of, or are based on, Berne. These include; the WIPO Copyright Treaty 1996, the Rome Convention for the Protection of Phonogram Producers, Performers and Broadcasting

Organizations 1961, the WIPO Performances and Phonograms Treaty 1996, and the 1994 Trade-Related Intellectual Property Rights Agreement (TRIPS Agreement) (an annexed agreement to the World Trade Organization). This edition also extends to conventions introduced since the publication of the previous edition, such as the Beijing Treaty on the Protection of Audio-visual Performances 2012, and the Marrakesh Treaty to Facilitate Access for Blind and Visually Impaired Readers 2013. The analysis in the commentary is thematic and grounded in the history and development of each of the treaties considered. While its primary focus is upon the way in which the obligations contained in these public law instruments are to be interpretated and applied in domestic law, it also addresses in some detail the private international law aspects of the protection of works and neighbouring rights.

1.9.2 Journal Articles

1. Adam D Moore, Intellectual Property, Innovation, and Social Progress: The Case Against Incentive Based Arguments (2011) 26 Hamline Law Review 602, 629

   After a concise discussion on IPR, an analysis of Anglo-American systems of IP protection has been conducted by the author. The author advocates that incentive-based social progress justifications do not work. A cost benefit analysis suggests that other models would improve our current set up. Social progress incentive-based arguments do not sufficiently explain the current systems of IPR. Even a change of stance will need concessions for multiple patents. Externally, rule-utilitarianism – is characterized by potential difficulties and cannot offer a strong base for intellectual property. On success of these assertions, we will have to locate another argument or do away with IPR protection completely.

2. Amir H. Khoury, Intellectual Property Rights for Hubots: On the Legal Implications of Human-like Robots as Innovators and Creators, 35 Cardozo Arts & Ent. L.J. 635, 665 (2017)

   This paper explores the solution to the following query: how should the IP regulatory

framework tackle inventions and works that are autonomously generated by artificial intelligence? The articles deal with the legal consequences of content generated by 'Human-Like Robots' ("Hubots"). The author argues that the content generated by Hubots are same as natural objects and should not be entitled to identical protection given to human beings. This analysis flows from a generalized approach under which Hubots should not be provided with human rights which also includes proprietary rights. IPR regulations must not provide for giving rights to Hubots. Their creations must always remain in the public domain regardless of the advancement, as long as natural persons continue to be the supervisors. IPR which can officially be owned by juristic entities should always return to a natural person as the owner. In the absence of a connection with a natural person, the creativity by hubots must enrich the 'collective wealth' of the public domain, further enhancing human civilization.

While the implications of Al are engaging and deeply fascinating, they remain too broad for a single research paper. That is why this Article focuses on a single, albeit important issue-patriating to intellectual property rights vis-d-vis robots with Al, and referred to throughout this Article, as Human-Like Robots ("Hubots"). The author's hypothesis is that no matter how Hubots develop and how far they progress, as long as humans remain the "masters" (for a lack of a better term), IP rights should be reserved only for humans. That is, intellectual property (IP) rights, which can formally be owned by nonhuman entities such as corporations, should always revert back to a designated human whether it is the owner and/or the stakeholder.

Absent such a link to a living human, the creativity by non-human entities such as Hubots, would naturally revert to the "collective wealth" and reside in the public domain, thus further enriching the human world and human culture. Simply stated, my hypothesis is that IP created by Hubots are equivalent to things found in or created by nature, and as such, should not, and cannot, qualify for the same IP protections that are awarded to human creators and innovators.

In answering the Hubot-Intellectual Property Rights question, this Article shall shed light on three issues. First, it will consider relevant legal issues that might arise from the introduction of Hubots. Here, the focus is on the question of liability and the agency approach.

This Article will examine how these views should be applied in the context of Al robotics. The author compares rights and liabilities and show why they are symmetric when it comes to the regulation of robotic entities. Second, the author focuses on the rationales behind granting intellectual property rights (IPRs), and consider the possibility of applying these rights to non-human entities (i.e. Hubots) wherein such innovative and creative subject matter is created absent any human intervention. The author will look into the prevailing conventional theories that underlie intellectual property protection namely the Incentive or Utilitarian Theory, and the Labor Theory. Furthermore, the author examines the possibility of applying these to nonhuman actors, namely the Hubots. The third issue that is dealt with involves moving into mostly uncharted territory-to propose a comprehensive IP legal approach to Hubots as creators and as innovators. Here the author puts forward a practical legal and regulative solution that is intended to provide a coherent theoretical backdrop and practical application for dealing with Hubots in their innovative and creative interactions with us and with our world.

While the bulk of this Article has focused primarily on a theoretical-based approach, I would like to conclude with a brief discussion on the practical aspects of implementing such legal norms in national law. My proposed model, which calls for viewing all IP products of Hubots as belonging to the public domain, could also rather easily fit into the conventional structure of international IP law. Such a legal norm, if introduced into law, would be in line with the "three step rule" that is currently applied by the TRIPS agreement with respect to the application of exceptions and limitations.

Given the argument that Hubots have no direct legitimate interests in the accumulation of

property, preserving incentives, and in effort, even if they are technically viewed as "creators," their products can be categorized by law as belonging to the exceptions and limitations. Once a determination is in place regarding the legitimacy, or the lack thereof, of rights over IP subject matter, then it should be rather easy for national legislators to introduce such exceptions and limitations into their respective national law while remaining compliant with the terms of the TRIPS agreement.

In examining the interface between intellectual property law and Hubots, the question of whether Hubots or robots qualify for some form of "human" rights, including the right to own property, is clearly an underlying theme. The author's position is that there is a great unbridgeable divide between humans and Hubots, no matter how sophisticated the later become. The author's position is based on two primary reasons the first reason is that Hubots cannot be considered to be alive, and second, that they do not have true consciousness. In order for a Hubot to theoretically be eligible for IP protection for its innovative or artistic "creation," it needs to meet those two conditions. Thus, it is important to explain why Hubots are, in fact, neither alive nor truly conscious of their surroundings. This section is devoted towards these complex issues. But before addressing these two cumulative conditions, the author has examined two situations where humans do not meet those two conditions but are still granted human rights: the first relates to deceased persons, or their remains, and the second relates to persons who are, for whatever reason, not mentally aware of their surroundings, such as when they are unconscious or in a state of coma. In those two cases, despite the absence of the two above-mentioned conditions, these humans are protected by human rights.

Robots, including Hubots, cannot be equated with human innovators and creators. Their "byproducts" are not generated in a way that resembles human creativity. In this regard, what they generate and "create," however awesome it may be, is no different from the music that is

created by the wind rustling through the trees or moving through wind chimes. Thus, IP laws must not allow for granting IP rights to Hubots, and their byproducts should forever rest in the public domain.

3. Andreas Matthias, The responsibility gap: Ascribing Responsibility for the Actions of Learning Automata (2004) 6 Ethics and Information Technology 175-183

   Historically, the producer of a machine was made accountable for the consequences of its working. Autonomous devices which operate through neural networks, genetic algorithms and agent architectures represent a fresh set of challenges where the person operating the device is in effect not able to forecast the subsequent conduct of the device, and therefore cannot be held accountable for it. The community ought to choose between not utilizing this sort of device or encounter a 'responsibility gap' which cannot be plugged through a conventional understanding of apportionment of liability. When a person acts in a certain manner, their behaviour has a bearing on the lives of third persona and communities. Over the ages, various legal systems have created comprehensive rule systems to apportion liability for a human conduct. When we hold a man to be accountable for his conduct, it is meant that the person should give an explanation of intentions and beliefs. An agent may be treated as responsible only if he or she is aware of the specific facts related to his or her conduct, and if such person can formulate a decision in relation to that conduct. The person should be able to choose an appropriate action based on this situation. We generally assign the accountability in respect of a device to the person who operates that device, for time such device acts under the command and control of the manufacturer. The operator accepts this responsibility by complying with the instructions of the manufacturer. If the device does not function in accordance with manufacturer's specification, we assign the liability to the manufacturer rather than the operator. The principle of control becomes a prerequisite to that of responsibility. The article discusses recent trends in

the manner of producing autonomous machines which invariably cause a significant reduction of the operator's control. The extent to which our community depends on the utilization of these kinds of machines is going up at an alarming pace. Human beings will probably have no option but to use them in the coming days. This leads to a 'responsibility gap' which must be addressed properly by the law and policy makers.

4. Arthur R. Miller, Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?, 106 HARV. L. REV. 977, 1073 (1993).

In 1976, the legislative body in the United States of America sanctioned the National Commission on New Technological Uses of Copyrighted Works ("CONTU") to ascertain and analyse the potential ramifications of computer and other associated technologies and to apprise the legislature on whether it would be feasible to integrate these emerging forms of technologies into the current copyright regulatory framework. After that, a lot of scholars and the industry in general have advanced arguments against CONTU's suggestions, voting for a change in the existing copyright regime or modified regulatory structure to tackle the relevant issues. Although these scholars portray multifarious approaches, they are unanimous in their view that the existing framework will result in an excessively wide protection. In the current paper, Professor Miller scrutinizes these views and arrives at the conclusion that CONTU's suggestions were right and that the existing framework is malleable enough to provide a redress to the concerns voiced by the academia and the industry. Initially, Professor Miller examines the progress of the judicial opinions on computer programs, and shows that a bunch of important copyright principles is beginning to kickstart a new era. Then, Professor Miller dissects the recent developments pertaining to artificial intelligence, and uses copyright tenets that have been enunciated in the spheres of computer programs and databases to establish the fact that at its present phase of development, artificial intelligence is not a threat to any form of copyright

analysis. Lastly, Professor Miller deals with the argument that it will become impossible to integrate computer-generated works into the copyright framework due to the fact that they lack human authorship. Professor Miller concludes that none of the cases contain any persuasive reason for extending copyright to computer generated works. The extension may however facilitate the constitutional dictate of promoting progress in useful arts.

5. B. Hattenbach and J. Glucoft, Patents In An Era Of Infinite Monkeys And Artificial Intelligence (2015) 19 Stanford Technology Law Review 32-5

   The authors argue that the human race stands on the brink of an epoch in which machines are not merely processing numbers but also producing works of a type that have been traditionally regarded as 'creative.' One of the corporations appear to claim albeit humorously that computers are about to create all possible creative text—the modern version of Emile Borel's band of typing monkeys capable of recreating the full works of Shakespeare. The progress of automation into domains traditionally reserved for human creativity leads to fundamental issues about the extent to which works created without human effort merit protection under IPR regulations. The fresh influx of computer-generated material is about to clash with the existing patent regulations. There are new companies which are utilizing brute-force computing ability of machines to randomly create numerous patent applications encompassing inventions and producing defensive publications to stop others from taking rival patent grant. This paper analyses whether the emerging forms of technology should be worthy of patent protection, and, if yes, who exactly be recognized as the inventor. The paper analyses the extent to which reproduction of computer-generated works should be considered as prior art and enabled to stop others from receiving patent protection on autonomously produced works. Our existing patent regulations appear ill-suited to tackling the exponential rise of computer-generated applications and inventions which would soon make their way to respective patent offices. While it appears

feasible to consider at least some of these claims as patentable and as prior art, diligent consideration should be given to putting limits beyond which seriousness will not be given to such topic. For providing patent protection to computer-generated inventions, some level of recognition could be consistent with the Constitutional imperative of promoting the progress of the useful arts. But the present situation is in desperate need of clearer standards when such protections may be available. The brute-force computing along with artificial intelligence will require a transition from traditional legal precepts and this issue needs to be sorted out with utmost promptness.

Our intellectual property system is suffering from growing pains in the digital age. The foundational principles of the system, and many of the laws implementing those principles, were developed in an era when steam engines and manual typewriters were cutting-edge technologies. Whereas existing copyright laws seem sufficiently robust to prevent the computerized equivalent of an army of monkeys from overrunning the Copyright Office, the same cannot necessarily be said of our patent laws. Our current patent laws do not seem particularly well-suited to handling the proliferation of computer-generated publications and inventions that may soon be headed toward the Patent Office and, thereafter, to the courts. While it seems sensible to treat at least some computer-generated claims as patentable and as prior art to other patents, careful thought must be given to establishing limits beyond which legal significance will not be accorded to such subject matter. With respect to automated generation of defensive prior art, allowing companies to flood competitors with a sea of predominantly useless references would impose burdensome externalities on the Patent Office as well as other patent applicants, arguably without a commensurate benefit to society; in contrast, targeted and thoughtful publications, even of content generated by computers, could be beneficial. With respect to patenting computer-generated inventions, according some

protections would be consistent with the Constitutional objective of advancing the progress of the useful arts; however, it would be helpful to have clearer standards delineating when such protections are and are not available

6. Bingbin Lu, A theory of 'authorship transfer' and its application to the context of Artificial Intelligence creations, Queen Mary Journal of Intellectual Property, Vol. 11 No. 1, pp. 2–24 (2021)

   This paper seeks to add to the copyright debate regarding AI productions. AI-created literary or artistic works could and must be protected by copyright regulations. However, current solutions to the aspect of distribution of authorship continue to be rather below par as a solution. A legitimate and practicable answer to this question could be set up with the help of the doctrine of 'authorship transfer' (the primary conveyance of authorship from the original author to a constructive one) under the modern copyright regulatory framework. The 'control of the creative process' theory can offer a palatable and plausible justification of 'authorship transfer'. The natural or artificial person who has exerted adequate control over the process of creation, should be considered as an author of the final product. This theory is really adaptable in the wake of the dynamic AI technology which offers a stiff confrontation to the existing copyright regulations. For AI-generated works, the authorship is more effectively conveyed to the creator behind the AI who could exert control over the entire manner of production for protecting the existing copyright framework and its core tenets. Interestingly, AI-generated things, along with a particular scheme for authorship, also require a special degree of care. In the meantime, if other key jurisdictions, for example the United Kingdom, the US, China and Japan, provide copyright ownership to AI-generated works, which could potentially be implemented subsequently by civil law countries to avert avoid foreseeable damage in international economy that may dissuade the progress in the AI industry and adversely affect the competitiveness in the

scientific sector of these jurisdictions. The present copyright principles and perspectives offer tremendous flexibility for the AI generated works, even for the most nuanced for AI beyond the instrumental perspective. A 'control of the creative process' theory can be ascertained premised on the current regulations of authorship conveyance in modern copyright regulations, to effectively provide a solution to the problems of AI creation for copyright regulations. The person who has legally exerted sufficient control in the process of production should be considered as an author of the final product. Although national copyright regulations change with the basic notions of author and authorship, the suggested answer could be taken on board and executed by jurisdictions from several copyright schools with adequate backing from their theoretical perspective. The borderless nature of AI as a form of technology may incentivise the confluence of regulatory frameworks in terms of technology as well as law.

Among other aspects of AI-copyright concerns, this article focuses on the assignment of authorship. Twenty-five years ago, Professor Miller proposed that there should be no obstacle to CGWs obtaining copyright protection; on the contrary, it is the question of authorship that demands more attention. This conclusion so far holds true in our new AI era.

AI is a broad topic and it further includes weak AI, strong AI and possible Artificial Superintelligence (ASI) in the future. People use weak AI in a tool sense and the authorship of creations with the assistance of this type of AI is more easily solved under current copyright law since people have also used other tools in the act of creation for a long time. What is challenging and problematic is strong AI or even ASI, which is not a tool in a traditional sense. Who should have copyright for a result created by strong AI or ASI?

This article will therefore further focus on AI in a non-tool sense. In this context, AI is actually the real author of an outcome. The author proposes that with a theory of 'authorship transfer' (transferring the authorship from the real author to a legally constructive one), AI creations in a

non-tool sense, could be integrated into current legal systems without utterly demolishing our carefully principled foundations. The author believes that the current copyright system is flexible enough for AI-created work if supported by an 'authorship transfer' theory. This article is thus dedicated to tailoring a reasonable theory of 'authorship transfer' (section 2) and to applying it to the context of AI creations (section 3).

Current copyright theory and doctrines present great adaptability in the context of AI creations, even for sophisticated AI beyond the tool sense. A 'control of the creative process' theory can be established based on existing rules of authorship transfer in modern copyright law, to satisfactorily answer the challenges of AI creation for copyright law. The person, either a natural or a juridical one, who has legally exercised sufficient control over the creative process should be constructed as an author of the outcome.

Although national laws vary with the concept of author and authorship, the proposed solution could be adopted and implemented by countries from different copyright traditions with support from their respective theories and policies. Finally, the borderless nature of technology may encourage the convergence of legal systems in terms of technology and law.

7. Britta van Beers, The Changing Nature of Law's Natural Person: The Impact of Emerging Technologies on the Legal Concept of the Person, 18 GERMAN L.J. 560 (2017).

This paper talks about the legal notion of the personhood against the backdrop of technological progress. A newer set of technologies are providing more revolutionary ways to change the biological and physiological features of life. Different legal scholars argue that the technological transformation of human life also requires a more synthetic and detached description of the natural person under the legal framework. According to these scholars, the differentiation between natural persons and artificial subjects (e.g. companies) is becoming lesser and increasingly immaterial. This paper advocates that, in an age of increasing

technological and postmodern detachment, the historical legal differentiation between natural and artificial entities continues to be important, though in a different manner. A detailed review of the legal notion of the personhood in biomedical law indicates that the legal classification of the natural person continues to have its advantages, not just in spite of technical progress, but, surprisingly enough, also due to them. Accumulating a strictly legal-technical and mechanical approach to personhood from a legal standpoint to remedy problems arising due to a fresh set of medical techniques can also cause unwanted, polarising and conflicting results. Especially for presumption of wrongful life, the mechanical domain of law is converted into a stunning legal hall of mirrors. The more we look into it, the more we cease to have the plot of where our real and artificial selves begin or end. Personhood in the legal parlance is hardly a legal reflection of natural persons. It is not even the manifestation of the notion of flesh-and-blood people. Instead, personhood, in its drastically mechanical form, appears to become a reproduction without original, a simulation to say the least. New form of technologies like artificial intelligence and medical biotechnology put the fundamentally contested notions of 'humanity, human dignity and human nature' into the regulatory agenda. No longer simply a matter of argument in the generally theoretical discussions amongst legal positivists and natural law jurists, human nature has now transcended the core of ardent political discussions on the regulation of techniques that may really influence the human life. These issues are not of a simply legal-technical type. Thus, a strictly legal-technical understanding of the personhood cannot be considered as sufficient in the control of emerging forms of technology. Instead, the need of the hour is a legal notion of the person which will successfully lend expression to what is the moot point in the advancing era of human augmentation technologies.

8. C.M. Rose, Property as story-telling perspectives of Game Theory, Narrative Theory and Feminist Theory Yale JL & Human 2 (1990): 37, 44-48

The first part of the article will deal with the classical theory of property, and specifically will look at the types of logical utility-maximizing choice options that this classical theory provides for in natural persons. The next portion of the article will offer some implementational hardships for the classical theory. It will provide a number of thought experiments on choice options, and will specifically choose some conventional choices that move away from the classical model-choice trends that are not 'simply natural' or 'just there' as a portion of a given human nature of logical benefit maximization, but that on the other hand appear to need a few post-hoc narrative account of how the choice-holders went in that direction. The third part will start to elucidate upon why a property regulatory framework requires the rhetorical phase of 'narrative and storytelling', a manner of operation that looks to provide explanation for events only after the fact, and that appears to assume a particular liberty among actors that is in contravention with a rational predictive description. This portion of the article will utilize the concept of game theory to state that the classic property theory itself possesses a type of explanatory defect: for property regulatory frameworks to operate, people ought to have other-regarding choice options that the classical property theory will not be able to forecast, and will only be able to justify post hoc through a narration. The concluding portion of the article will negate game theory with feminist theory and the theory of story-telling. Game theory offers some justification as to why the benefit-maximizing choice options appear more 'natural' than the remaining options even though the whole world is aware that there are several non-benefit maximizing choices out there in the actual reality. This portion of the article will try to find out some methods that feminist theory and story-telling theory utilize narration to negate the instincts that we typically associate with game theory: we utilize narration of an event to cut the

time of personal maximization, even in those more able than human beings; human narrate more effectively to produce a sphere in which cooperation is happening. Lastly, the article reverts to the story telling of classical property theory, and builds a nexus with the narration of classical property theory to a type of ethical discussion; it considers story telling as a coercive mechanism to the reader to outmanoeuvre a game theory, self-interested being and to carry on with the cooperative choice options that a property regime needs.

9. Carys Craig & Ian Kerr, The Death of the AI Author, 52 OTTAWA L. REV. 31 (2020)

Much of the existing literature on AI and authorship holds that if there is an increase in sophistication and independence of generative programming, it should reconsider traditional understanding about the concept of authorship. It is frequently stated that giving an acknowledgement to the created and thus protectable feature of AI-generated works may require a less detailed conceptual leap than has historically been understood. In this piece, the authors advocate that the standard of authorship is not dependent on the evolution of 'state of the art' in the field of robotics. Instead, the concept of AI-authorship is contingent on a mistake of determination: it is an error about the evolution of authorship. Additionally discussing on the established concept of the authorship, the authors advocate that the perishing of the romantic author equally leads to the diminishing status of the AI author. Right of AI authorship rely on a romanticized understanding of both authorship and AI, and it does not achieve a true meaning in terms of the practicalities of the sphere in which the issue arises. Those practicalities should keep us away from the mere doctrinal or utilitarian ethos about what an author should be doing. Instead, they require a jurisprudential examination of who an author should be. Gaining insights from language as well as politics, the author provides an account of authorship which is basically relational: authorship is an interactive and communicative conduct that is intrinsically sociological, with the ripening of personhood and societal relations being the whole focus of the

practice. This debate reconfigures discourses about copyright's vesting in AI-generated content; but it also pervades copyright regulations, reaching out to the nucleus of how the regulatory framework should ideally conceive AI, and their function in human societies. If the tremendous appeal of authorship to the community lies in enabling the human creativity 'to resist and transform existing patterns' this utility is absent in AI algorithms that simplify locate existing designs, supplement them, and reproduce them. To indicate that authorship is human, that it is basically related with humanness, is not to bring out the romantic perspective of authorship, nor is it to provide a type of bigotry that confers a special status on human-generated works over those that are produced by devices. Instead, it is to indicate that human interaction is the very focus of authorship as a sociological function — indeed, as a vital prerequisite of life. People do not believe they are romantic when they talk about authorship i.e. legitimately the domain of the human. The incorrect contradiction between the romantic author and the machine author is strongly comprehensible, but it does not look at huge volumes of philosophical, literary, and socio-cultural perspectives on the essence of language, functionality, and the legal paradigm. In doing so, it leads to the danger of oversimplifying the problems in question in our existing issues around the regulation of AI-generated content within our copyright regulations. This in turn endangers undermining attempts to create a wider teleological model for copyright regulations, directed by a more wholesome idea of culture and community than utilitarianism would have on view. Even at a more basic level, however, it loses out on a chance to engage with a basic, normative and ontological issues about the type, function, and relational webs into which AI is entering, and the societal values that should correspond to such governance.

The author's aim here, in providing this account of authorship, is not to propose specific answers to policy questions about whether and how exclusive rights should be granted in respect of AI-generated works. Rather, it is to urge that, however those answers are ultimately

arrived at, they must not flow from a loaded but mistaken notion of AI-as-author. The authors believe that they will misallocate legal rights and privileges — and the economic wealth and power they entail—if the policy-making efforts are begun by misattributing authorship to AI. The authors argue that AI-generated outputs are not works of authorship, then they belong for now in the public domain by default. But as the authors see it, the ontological inquiry into the plausibility of AI authorship transcends copyright law and its particular doctrinal conundrums in the digital age, going to the normative core of how law should—and should not—think about robots and AI, their regulation, and their role in human relations.

In what follows, Part II sets out to explain how we understand the idea of the romantic author and the significance of his so-called death, drawing on both legal and literary scholarship. In Part III, the authors consider the nature of AI, anthropomorphic framing, and the tendency to romanticize the AI-as-author. Part IV explains what it means to de-romanticize authorship in the copyright context and, in particular, why this requires something other than simply shifting focus away from authors to social welfare, or moving from rights-based to utilitarian accounts of the copyright system.

In Part V, the authors propose a de-romanticized ontology of authorship premised on relational theory that gets to the heart of why authorship matters—and why it is, therefore, a fundamentally human endeavour. Ultimately, the authors conclude that, paradoxical as it may seem, the demise of romantic authorship should also spell the death of the AI author.

To say authorship is human, that it is fundamentally connected with humanness, is not to invoke the romantic author, nor is it to impose a kind of chauvinism that privileges human-produced artifacts over those that are machine-made. Rather, it is to say that human communication is the very point of authorship as a social practice — indeed, as a condition of life. As such, we do not think we are being at all romantic when we say that authorship, in this sense, is properly the

preserve of the human. The false dichotomy between the romantic author and the AI author is readily understandable, but it ignores vast swathes of philosophical, literary, and socio-cultural theory on the nature of language, authorship, relationality, and law. In doing so, it risks oversimplifying the issues at stake in our current conundrums around the treatment of AI-generated works within our copyright framework. This in turn risks undermining efforts to develop a broader teleological vision for copyright policy, guided by a richer concept of culture and society than utilitarianism can offer. Even more fundamentally, however, it misses an opportunity to engage with essential normative and ontological questions about the nature, role, and relational networks into which AI is stepping, and the social values that should inform its regulation.

10. Carys J. Craig, The AI-Copyright Challenge: Tech-Neutrality, Authorship, and the Public Interest 12-2021, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4014811

    Many of copyright's fundamental principles— ranging from authorship to infringement and fair use—are being confronted by the quick evolution of autonomous AI. Whether in servility to creativity or wealth creation, however, copyright regulations are immaculately capable of countering this latest technological development. More fascinating than the doctrinal dialectics that AI engineers is the chance it presents to review the core objectives of the copyright regulations in the era of AI. After talking about the AI-copyright challenge in the first section of the article, the second one reviews the fundamental tenets and important objectives that form the basis of and so ought to conform to copyright regulations and its response to AI techniques. It proposes a substantive approach to tech-neutrality aimed at achieving normative equilibrium in the face of technological disruption. Applying this proposition with a stress on authorship and the community goals, the subsequent section elucidates on why AI-generated contents are therefore outside the scope of copyright protection and AI-training feed are not resulting in

infringement. It is not trite for copyright regulations to answer to these technological Trends in an officially tech-neutral manner, treating in the same way AI and human endeavours and contents that are relationally distinct in their inherent attributes. Nor it would suffice to stress on their operative equivalence, creating a nexus between AI and human functions and content without reference to the social rules and community objectives that inform the copyright regulatory system. Instead, it is the normative goals of the copyright regulations and the values they portray that should be considered as technologically impartial. The true AI-copyright problem then, is to avert this recent technological creativity from tilting the copyright equilibrium, creating a hurdle for its normative goals, and thereby compromising the social significance of authorship, creative development, and the public sphere. As discussed in the third part, this will need negating calls to provide copyright protection to encompass AI-generated content on the basis that they are not amounting to authorial works that copyright would like to incentivise. Likewise, focus on the expressive elements of authorship leads to restriction on the power of copyright owners to regulate the utilization of content as inputs for configuring AI programmes. Several regulatory and doctrinal doubts will come to the forefront by the inception of highly sophisticated AI programmes and their application in our cultural domain. Human civilization appears to be at a policy precipice, all set to jump or be propelled into the road of heightened commoditization and personal regulations as these systems increase in number. Due to romanticism about AI, misconceptions about creative developments, and excessive satisfaction about the social burden of copyright, important errors could be made. Both the securing of AI-generated content and the restriction of AI research and development by way of gradual increase of copyright regulation may lead to an uncertain consequence for human authors, consumers, and audiences, adversely affecting rather than promoting the cause of public interest that copyright is supposed to serve.

11. Christopher Buccafusco, A Theory of Copyright Authorship, 102 VA L. REV. 1229, 1261 (2016)

The U.S. Constitution provides the legislative body the authority to issue rights to 'Authors' for their works. In spite of the importance of these words in copyright terminology, neither the judiciary nor academicians have given any conclusive propositions about what enables a person to be an author or what allows a piece of content to be considered as writing. This paper posits and substantiates a principle of copyrightable authorship. It advocates that authorship entails the intentional production of 'mental effects' before an audience. A writing should be producing mental effects when affixed to a tangible medium. In accordance with this theory, copyright may subsist to the minimally literary or artistic form or way in which the creator produces mental effects. After fleshing out the theory, this paper introduces the concept to a number of present copyright cases. The authorship theory both elucidates and reduces the applicability of potentially copyrightable content. Some works that have before been kept outside the purview of copyright law now come within the ambit of constitutional entitlement. By contrast, features of copyrightable works like photographs and computer programs may not amount to copyright authorship. This proposition provides solution to several recent copyright judicial opinions, and it provides a fresh approach to the new problems associated with artificial intelligence and, ultimately, the looming revision of the Copyright law. This paper attempts to substantiate a theory of authorship and implements it to several key copyright cases, including the constitutional domain of authority and the area of copyright authorship in specific content. This theory has widespread application in several other fundamental intellectual property spheres. Additionally, copyright regulations must frequently ascertain whether a piece of content that adds up utilitarian characteristics with authorship should get the desired protection. The law and policy makers have failed to substantiate their approaches in a cohesive theory of authorship. Only through comprehension of what it is the moot point, we will be able to ascertain whether

these useful things contain separable attributes. Last but not the least, the approach to authorship that the author takes in the paper has significant consequences for remaining spheres of IP, including utility patent regulations, design patent regulations, and trademark. In this domain, the constitutional language also puts riders on congressional authority. More work is required to analyse the width of that authority.

12. Christopher Buccafusco, A Theory of Copyright Authorship, 102 VA L. REV. 1229, 1261 (2016)

This article argues that, to be an author of a writing, one must intend to produce some mental effect in an audience. Accordingly, a writing is any text, object, or medium that is capable of producing that mental effect. Copyright will subsist not in the mental effect produced but in the manner or form by which it is produced if that manner is original, minimally creative, and fixed in a tangible medium of expression. The Constitution grants Congress the power to extend copyright protection to those aspects of a person's behaviour that are intended to produce mental effects and that are original, minimally creative, and fixed. Behaviours, creations, utterances, depictions, expressions, or other representations made by a person that do not meet these criteria cannot constitutionally be granted copyrights.

This theory of authorship provides both an outer bound of congressional authority and a mechanism for delimiting the scope of copyright in protected works. It tells us whether Congress can extend copyright protection to certain classes of creativity and, if Congress has done so, which aspects of those works can receive protection. No component of a work that does not entail authorship can be copyrighted. Not all such aspects of a work will ultimately receive protection, but the authorship inquiry enables us to determine which parts of a work may be protected. The details for this theory will be worked out below in Part II.

With respect to the computer programmer, Congress has extended protection to software, and this seems acceptable according to my theory. The code that a programmer writes may entail

authorship in two ways. First, the code may instruct a computer to produce audio or visual outputs that are meant to create mental effects. In this case, the outputs, if they meet the other requirements, would be copyrightable. Second, the code itself may be written in such a way as to produce mental effects on other readers of the code. These effects must be distinguished from the aspects of the code that are intended to instruct the computer in its operations and that are chosen for purposes of efficiency and functionality rather than to produce mental effects. Here, the authorship requirement limits copyright protection to certain aspects of the work in question.

Part I of this Article explains the constitutional and statutory bases for copyright protection, and it shows why the accounts of courts and scholars about copyrightable authorship have been insufficient for generating a coherent theory of authorship. In Part II, this Article introduces and defends a new theory of copyrightable authorship based on categorial intentions to produce mental effects. It shows how this account of the writings of authors relates to other aspects of copyrightable authorship, including originality and creativity. Part III applies this theory of authorship to two central problems in copyright law: the scope of the constitutional grant of power and the aspects of works that count as copyrightable authorship.

This Article defends a theory of authorship and applies it to a number of important copyright disputes, including the constitutional limit of powers and the scope of copyrightable authorship in particular works. This theory has broad applicability in a number of other central intellectual property areas. Only by understanding what it is that authors do can we determine whether these useful articles contain separable copyrightable features. Finally, the approach to authorship that the author takes in this Article has important implications for other areas of IP, including utility patent law, design patent law, and trademark law. In these areas, the constitutional text also imposes restrictions on congressional power. More work is necessary to appreciate the scope of

that power.

This Part has applied the author's theory of authorship to a series of important problems in copyright jurisprudence. Under this theory, the realm of copyrightable authorship is both broader and narrower than previously conceived. Some kinds of creativity that have not been heretofore recognized as copyrightable authorship fall within Congress's constitutional power. If the appropriate circumstances arise, Congress could grant copyright to a wider class of creative works, including perfumes, tactile works, and culinary dishes. In other respects, however, some works that would have received protection under the unconstrained-choice approach may now appear to lack the necessary features of authorship. Courts reviewing visual arts, methods, and computer code must inquire more deeply into creators' motivations and decisions than they previously have. Asking not simply whether creators made unconstrained choices, but instead analysing why those choices were made will likely yield a narrower range of protection in some classes of copyright works.

13. Curtis E.A. Karnow, The Opinion of Machines, 19 COLUM. SCI. & TECH. L. REV. 136, 143 (2017)

With the twin-fold objective of giving (a) an opening to the techniques associated with neural networks and (b) a substantiation for admitting mechanical opinion, this paper discusses the technology by initially analysing it at the comparatively familiar working of technology-assisted review of materials in a conventional case. The paper then talks about the widespread application of digital networks in the material world, which is utilized subsequently to advocate that machines trusted in the domain should be trusted before a judicial authority. The paper then focuses its attention on the regulations pertaining to evidence, stressing upon the sections covering the admissibility of data produced by the computer, including animated characters and simulated images. The gist of those provisions is, again, that dependency further leads to

admissibility. This provides the platform for the paper's basic argument, raised through four contentions, that the result of neural networks be admitted before a court of law. The paper concludes by talking about the requirement for significant cross-examination, outlining the risks—and hence the obvious aims of that cross examination—which come for the admission of views produced by neural networks. General admissibility regulations are not supposed to be burdensome. The thumb rule is that all relevant proof should be admissible, and if a view point is reliable and can be attributed to a contested factum, it ought to be relevant. The foundation of expert testimony generally must be spelt out to the judge and jury. However, this paper shows that, in the case of views produced by neural networks, the fact that the particular foundation for the view cannot be shown or summarised should not prevent the entry of that view, because the observation may yet be substantially dependable and remains a matter of significant cross-examination. To avert giving the jury a 'misleading aura of certainty' the judiciary may scrutinise the technology. It may come to the conclusion that the fundamental technology is in a proper condition, frequently used and approved in the actual world; that it is dependable because right scientific processes were utilised to construct and train the software; and that the software assists the jury. With all the involved people being properly informed and, in a position, to approve functionality, device opinions may offer insight no one else can give.

This section examines basic rules for the admissibility of computer-generated evidence generally, in preparation for a later discussion of the admissibility of machine opinion. Evidence introduced at trial, including software, may involve issues of hearsay and, more generally, of reliability. Authenticity is an aspect of reliability: thus, a document must be authenticated because otherwise it is not reliable. Hearsay objections are pertinent to some computer outputs but not to others. Software is used to generate simulations and animations—two very different types of evidentiary creatures with different admissibility requirements. As discussed below, the

rules governing the admissibility of simulations, in particular, are useful but insufficient in deciding whether the output of neural networks should be admitted.

14. D. Armitage, John Locke, Carolina and the Two Treatises of Government Jl. Pol. Theory 32 (2004) 632

Recent research regarding John Locke's 'Two Treatises of Government' has attracted specific attention to the British legacy and implementation of the theory of appropriation. This attention has happened simultaneously with a more general understanding among jurists in the historical and academic relationship between western liberal theory and colonialism. This article studies the remaining proof for Locke's study on the Carolina colony and advocates that it was both more comprehensive and more long lasting than what the earlier commentators have advocated. Specifically, the article offers proof that Locke was involved in changing the Fundamental Constitutions of Carolina at precisely the moment in the earlier part of 1682 when he was more likely to have written the fifth chapter and therefore that there was an immediate colonial backdrop that led to his separate theory of ownership of property. This epoch of service in both private and public government offered Locke with a greater awareness of his country's business and colonies than that which was in the possession of any canonical number in the chain of political thought prior to Edmund Burke. No such personality played a more major role in the institutional annals of European colonialism before James Mill and John Stuart Mill came into the governance of the East India Company. Additionally, no political scholar prior to the nineteenth century so proactively implemented the theory to colonial administration as Locke accomplished by virtue of his participation in the writing of the Fundamental Constitutions of Carolina. The involvement of Lockean liberalism along with British colonialism was therefore not initially brought to light by liberal self-analysis nor was it initially uncovered by an effort of postcolonial analysis. Tucker and Bentham's adverse views on Locke may have been vindictive

but they were academically acute. They were hardly aware that due to Locke's political involvements in 1682, their criticism was also historically correct.

15. D. Knowles, Hegel on Property and Personality Phil. Q. 33: 45, 51

The literary way is known to all. Human beings are known more effectively through their property. The skill of the author precludes complicated designs of recognition and identification thoroughly ingrained in our community life, patterns which are created and supported by customers and advertisers in the same way. The academic unravelling of these ways of presentation may be the subject of study by psychologists, anthropologists etc. but we all claim the identity of gifted novices. In this article, the author focuses on jurisprudential aspects of those relations between human beings and objects which we consider as proprietary relations. The author's reservation is mainly any definition or categorisation. The property owner may be classified as the holder of a few or all of complex combinations of legal and moral entitlements, obligations, powers and privileges concerning holding, use and advantages of property. The starting point will be more traditional and the main objective of the exercise will be to demystify the teachings of Hegel with an initial discussion on the work of Locke.

16. D. Vaver, Sprucing Up Patent Law (2011) 22 Intellectual Property Law Journal 63-81, at 66

This article analyses some features of the English patent regulations and questions whether some of the works it incentivises merit the protection they receive. The point is that patent regulations should more accurately match and provide incentive for disclosure by the inventor; that patents should not be given for ventures that require no incentive or are already sufficiently stimulated by remaining intellectual property regulations; that contents of the application should divulge all the inventor's knowledge about the product or process to as sweeping an audience as possible; that only works the patent owner and the general people reasonably anticipate to be included with the patent application should be brought within its purview; and that patents

should be brought into force in a manner that does not inequitably provide an advantage to patentees and unnecessarily put fetters on the commercial domain. While the article deals with the particular aspects of English law, many of the general observations it makes — for instance, on overly wide patents, conflicting protection, disclosure of most appropriate processes of working the invention, excessively wide claim interpretation and the injunction resolution — apply in the same way to the regulations of other jurisdictions.

Without patents, innovative endeavours have very small amount of protection. As soon as an invention executing a new idea arrives in the industry, any person can reproduce it and come to terms with the initial proprietor without expending the earlier costs of invention and its fruition. A patent therefore provides its owner an extensive breathing-room to facilitate the invention to be created and commercialised without competition barring non-infringing replacements. The patent owner can therefore get a return on its initial investment plus recoup an amount which is proportional with the amount the market ascribes to such invention. Issuing patents is thus not an end in itself. In a similar way to other laws, patent regulations must create an equilibrium between the rights and entitlements of inventors and their companies against rights and duties of at least identical significance, such as the entitlement of others to function, reproduce and compete. The manner in which patent regulation reconciles these attributes has undergone a sea change much over a period and changes among various jurisdictions and legal systems. The fundamental issue is whether the correct equilibrium of rights has been created or whether it requires modification.

We start from an international consensus that presumes a patent law with certain features is essential for effective national economic policy and world trade. That law has several goals. Overall, it aims to improve national or regional economic performance and contribute to social welfare. Without patents, ideas have little protection. As soon as a product implementing a new

idea hits the market, anybody can copy it and compete with the original producer without incurring the initial costs of invention and product development. A patent thus gives its holder a lengthy breathing-space to enable the invention to be developed and marketed without competition except from non-infringing substitutes. The patent holder can therefore recoup its initial outlay plus recover a profit commensurate with the value the market puts on the invention. The way patent law reconciles these values has changed much over time and continues to vary among countries and legal systems. The constant question is whether the right balance of interests has been achieved or whether it needs adjustment.

At least, one might expect patent laws to mirror the social and moral values found in the general law. There, those who profit by saying one thing one day and the opposite the next get little encouragement. Those who seek rewards beyond their due, especially when the reward is public and their due is measured by their public contribution, are looked at askance. Those who would torture the language of legal documents into meanings that benefit them but disadvantage others are also turned aside. Unfortunately, modern patent law embraces phenomena the general law repels. Its practitioners can hardly claim surprise if they find the public providing little support to a system that thrives on such exceptionalism. Patent law needs_sprucing up. This paper has not attempted to propose root and branch reform of the patent system. The shortfalls it has discussed give an idea of the work needed for such a project. The reforms it has suggested are meant to attune the patent system more closely with widely accepted social values, without undermining the goal of appropriately stimulating and rewarding invention. Patenting can hardly claim legitimacy or public support if its practice does not match its promise of providing fair public reward in return for fair public disclosure.

17. Danielle Keats Citron & Frank Pasquale, The Scored Society: Due Process for Automated Predictions 89 Wash. L. Rev. 1, 1 (2014).

Big Data is gradually being generated to rank and provide ratings to human users. Predictive algorithms carry on assessments regarding whether people are suitable credit risks, desirable workers, dependent tenants, attractive customers—or unreactive, isolated, menaces, and 'wastes of time'. Important chances are on the line inclusive of the ability to take credits, employment, real estate, and insurance. Though automated rating prevails and is consequential, it is also devoid of transparency and supervision. In one domain where law triumphs every other thing—credit—the regulation stresses on credit background, not the calculation of scores from personal information. Procedural propriety is fundamental for those tabooed by 'artificially intelligent' scoring mechanisms. The US due process history should provide fundamental safeguards. Government should be able to evaluate rating mechanisms to enable their equity and accuracy. Persons should be provided significant chances to counter adverse determinations based on numbers providing a wrong classification. Without such security in the right slots, algorithms could pilfer biased and random information into strong stigmatizing numbers. Offering supervision over scoring processes that can produce negative spirals should be a basic target of our regulatory system. Rating mechanisms have a strong attraction—their elementary nature gives the illusion of accuracy and dependency. But predictive algorithms not always be accurate and equitable. They can channel people's life chances in random and unwarranted ways. As a community, human beings have made commitments to secure customers from grave injuries that they have no ways to avert. It becomes imperative to give persons with communication about significant decisions which concern them and an opportunity to counter them. These binding obligations can assist us in creating a model of due process for rating mechanisms. Transparency is an important primary step, for questioning rating mechanisms under a standard

unfairness authority.

This Article uses credit scoring as a case study to take a hard look at our scoring society more generally. Part II describes the development of credit scoring and explores its problems. Evidence suggests that what is supposed to be an objective aggregation and assessment of data—the credit score—is arbitrary and has a disparate impact on women and minorities. Critiques of credit scoring systems come back to the same problem: the secrecy of their workings and growing influence as a reputational metric. Scoring systems cannot be meaningfully checked because their technical building blocks are trade secrets. Part III argues that transparency of scoring systems is essential. It borrows from our due process tradition and calls for "technological due process" to introduce human values and oversight back into the picture. Scoring systems and the arbitrary and inaccurate outcomes they produce must be subject to expert review.

Providing oversight over scoring systems that can cause negative spirals should be a critical aim of our legal system. Scoring systems have a powerful allure—their simplicity gives the illusion of precision and reliability. But predictive algorithms can be anything but accurate and fair. They can narrow people's life opportunities in arbitrary and discriminatory ways.

The author argues that, as a society, we have made commitments to protect consumers from serious harms that they have no means to prevent. We have also aspired to provide individuals with notice about important decisions made about them and a chance to challenge them. These commitments can help us develop a model of due process for scoring systems. Transparency is a crucial first step, first to the FTC who can interrogate scoring systems under their unfairness authority. Opening up the black box scoring systems to individuals or neutral experts representing them is key to permitting them to challenge "arbitrariness by algorithm." Our recommendations are provisional, yet, we hope the FTC and interested lawmakers move

forward in bringing procedural regularity and oversight into our scored society.

18. Dave Fagundes, What We Talk About When We Talk About Persons: The Language of a Legal Fiction 114 Harv. L. Rev. 1745, 1750 (2001)

While it gets comparatively small amount of attention from the judiciary or academics, the concept of personhood under the law rests at the core of some of the most problematic areas in the US regulatory scheme. This paper demonstrates this aspect by discussing three key spheres: body corporates (in which non-natural persons are considered as legal persons). American slavery where natural persons were considered as legal nonpersons and foetal homicide laws (in which nominal persons have an uncertain status under law). Legal personhood portrays not only a required antecedent question while talking about these and other questions, but also bears importance for determining an entity's legitimacy can, through law's expressive operation, influence the community status of that entity too. While legal personality may be an obvious means of putting a finger on law's objective, it is undeniably fundamental to American legal systems. The regulatory framework uses legal personality as an important methodology for pointing out its core objectives and though no substantial body of legal principles or jurisprudence exists regarding this legal syllogism; a bunch of rhetorical methods have been created in the vicinity. Additionally, the aspect of personality is inextricably interlinked into some of the most basic sources of American regulatory framework and lies at the nucleus of some of the most appealing traditional and recent legal problems. Through law's basic manifestation, this analogy reflects and conveys who may be treated as a legal person and to a certain degree as a natural person. Part 1 of this paper analyses the judicial introspection to the law of the person and then evaluates instances from domains in which the American law relating to personality has progressed - natural non persons, non-human persons and cases which are grey in nature - and then analyses the type of law of persons manifested in these

domains. Part II evaluates the consequences of the present state of affairs making a special note on the segregation of the US law of personhood in light of law's expressive elements and indicating that the law's apprehension portrays a fundamental ambivalence regarding status of the objective mentioned regarding unitary explanations of personhood and human life.

19. Dennis M. Sullivan, The Conception View of Personhood, (2003) Ethics and Medicine, 19:1, 11-33

This paper will analyse and defend the conception view of personhood: a human being is a person from the moment of conception and at every subsequent moment. The author has examined the biblical bases of this view, and show how Scripture affirms man's value through the image of God. The author has then shown the biblical evidence for the conception view, as well as the limitations of using Scripture in this regard. The author has then discussed the philosophical underpinnings of personhood, and shown how secular, functionalist views are basically flawed. The author has compared this with an ontological view that sees personhood as intrinsic to man, a perspective compatible with Judeo-Christian thought.

Finally, the author has examined the biological bases of the conception view and will look at several "decisive moments" in biological history. The author has shown that syngamy, the moment when the full complement of genetic material is established in human beings, is the only biologically unique point in time on which to base personhood. This moment corresponds with the union of sperm and egg in conception. The author's goal is a comprehensive, holistic view of personhood, intrinsic to the nature of human beings, and beginning at conception.

20. Diane Proudfoot, Anthropomorphism and AI: Turing's Much Misunderstood Imitation Game, 175 ARTIFICIAL INTELLIGENCE 950, 951 (2011)

The general inclination, even within AI, to metamorphose devices makes it simpler to persuade humans of their worth. How can a facile portrayal of intelligence in devices be relied upon if the AI analyst easily falls for the make-believe things? This is the major issue with anthropomorphism. The author advocates that the Turing test gives the required. This article demonstrates the event of displaced anthropomorphism and gives a fresh outlook on Turing's imitation game. It additionally analyses the function of the Turing test regarding the present issue between 'mindless intelligence' and its human level counterpart.

In an ideal scenario the basic issue of anthropomorphism would not become pertinent. Such a reality would include a true observer, a viewer without any tendency to displaced anthropomorphism, or a personable (in spite of the tendency) to give neutral decisions. Though in reality, ideal viewers are difficult to find, if not improbable. Turing's imitation offers a solution to the problem without instilling an ideal observer.

Regardless of the academic merits of Turing's test, there are the similar economic points in opposition to employing it. David Waltz, for instance, in recent times argued that in the coming days 'a small number of agencies or industries are likely to sponsor scholarly pursuits whose key objective is to clear some variant of the Turing Test. However, even if Waltz is right, those scholars who are desirous of creating devices with human-level intelligence will need some benchmark for deciding what constitutes success. Without a parameter of human-level intelligence in devices, it is improbable even to come up with theories about constructing such machines. Additionally, constructing human-level AI needs an evaluation of intelligence in devices that is not compromised by our inclination to anthropomorphize.

21. Dr. Axel Walz and Kay Firth-Butterfield, Implementing Ethics into Artificial Intelligence: A Contribution, from a Legal Perspective, to the Development of an AI Governance Regime 18 Duke L. & Tech. Rev. 176 (2019)

The growing use of AI and similar technologies will have unprecedented effects on society. In spite of many advantages, AI and similar techniques entail significant drawbacks that require redressal. Reducing these drawbacks will stress the respective advantages while simultaneously securing the core values explained by civil rights and fundamental constitutional ethos, thereby conserving a human oriented community. This paper roots for the need to have a detailed risk-benefit-analysis in relation to the use of AI and similar technologies. This paper indicates important points of criticism regarding AI and autonomous systems like reduction in employment opportunities, causation of harm, absence of transparency, escalating deprivation of humanity in community relationships, reduction of privacy and individual autonomy, potential data neutrality issues and the sensitivity to mistakes, and vulnerability to manipulation of AI and autonomous mechanisms.

The European Commission's Group on Ethics in Science and New Technologies indicates that this problem needs a 'collective, wide-ranging and inclusive process of reflection and dialogue' which is attentive towards 'on the values around which we want to organize society and on the role that technologies should play in it'. This paper strives to add on to this discourse by analysing potential means and mechanisms for executing policy-oriented values in AI-dominant techniques to result in constructing a human-oriented AI-community. The aim is to define approaches on the manner in which we should be determining an AI regulatory framework that supplements the advantages of AI and at the same time evaluates the relevant trade-offs emanating from the utilization of AI and similar systems. In this regard, this paper puts forward different principles that could be potentially implemented to make sure that the execution of AI

does not clash with ethical principles. The first section of this paper will demonstrate certain ethical problems in relation to the use of AI. The second portion will highlight and discuss the benefits and disadvantages of several governance mechanisms that could be utilized to in order to execute ethics in AI programmes. The third portion of the paper will portray different practical routes for regulation of AI programmes. Based on these thoughts, the fourth section of the paper concludes with suggestions as to the manner in which a holistic AI regulatory regime could be created.

This paper brings out major problems regarding AI and autonomous programmes such as job losses, potential information biases etc. This analytical commentary targets improving awareness for policy-makers to adequately solve these concerns and device a suitable AI regulatory regime with a attention on the conservation of a human-centric community. Improving awareness for subsequent risks and concerns should not be taken in a wrong way as an anti-innovative method. Instead, it is required to evaluate risks and problems sufficiently to ensure that fresh set of technologies such as AI and autonomous programmes are construed and handled in a manner that is desirable for individual users and the community at large. It is of special significance to construct an adequately secure, liberal and visionary AI regulatory framework that over and above potential advantages evaluates the relevant drawbacks to ensure that AI and autonomous devices can be utilized in a proactive and sufficient way to the advantage of the entire human race. As a substratum for the construction of a relevant ground breaking AI governance framework, this paper further portrays the different potential policy-making options. The diverse nature of such options, which policy-makers may be able to utilize, underscores that ethical problems do not necessarily require redressal by legislation or international treaties or agreements. Depending on the nature of the problem in view, a different set of regulatory steps such as technical standardization or certification could be a better way of

achieving the required objectives.

The increasing use of AI and autonomous systems will have revolutionary impacts on society. Despite many benefits, AI and autonomous systems involve considerable risks that need to be managed. Minimizing these risks will emphasize the respective benefits while at the same time protecting the ethical values defined by fundamental rights and basic constitutional principles, thereby preserving a human centric society. This Article advocates for the need to conduct in-depth risk-benefit-assessments with regard to the use of AI and autonomous systems. This Article points out major concerns in relation to AI and autonomous systems such as possible job losses, causation of damages, lack of transparency, increasing loss of humanity in social relationships, loss of privacy and personal autonomy, potential information biases and the error proneness, and susceptibility to manipulation of AI and autonomous systems. This critical analysis aims to raise awareness on the side of policy-makers to sufficiently address these concerns and design an appropriate AI governance regime with a focus on the preservation of a human-centric society. Raising awareness for eventual risks and concerns should not be misunderstood as an anti-innovative approach. Rather, it is necessary to consider risks and concerns adequately and sufficiently in order to make sure that new technologies such as AI and autonomous systems are constructed and operate in a way that is acceptable for individual users and society as a whole. It is of utmost importance to design a sufficiently protective, forward-thinking and visionary AI governance regime that in addition to potential benefits considers the relevant risks in order to make sure that AI and autonomous systems can be used in an effective and adequate manner to the benefit of humanity.

As a basis for the design of a corresponding visionary AI governance regime, this Article further outlines the various possible policy-making instruments. The variety of such instruments, which policy-makers can make use of, underlines that ethical concerns do not necessarily need to be addressed by legislation or international conventions. Depending on the ethical concern at hand, alternative regulatory measures such as technical standardization or certification may be preferable. For individual ethical concerns, even bilateral contractual agreements may be sufficient. As suggested herein, an approach to develop a corresponding visionary AI governance regime could be to follow a graded governance model for the implementation of ethical concerns in AI systems. Good AI governance consists of a balanced policy mix with as much legislation as necessary and as much freedom as possible, combined with appropriate certification systems, technology standards and monetary incentives. With regard to the latter, regulators should in particular take their own responsibility seriously and only support research and development compliant with fundamental ethical principles and values. In view of the AI's potential revolutionary impact, it is of utmost importance to further raise awareness for the need to consider ethical considerations not only on the side of policy-makers but also on the side of companies and designers of AI and autonomous systems. The IEEE Global Initiative and the World Economic Forum's projects are the first concrete global approaches. From a legal perspective, more projects should be pursued by additional stakeholders, because ethical concerns are highly diverse in nature. Maintaining ethical diversity is an ethical concern of its own as this ensures the protection of individuality as a core human value. Ethical diversity can, however, only be maintained if policy-makers promote the establishment of different solutions which meet the varied concerns of diverse stakeholders and institutions. At the same time, fundamental and universal ethical values need to be addressed on an international and cross-cultural basis. This underlines that beyond building a human-centric AI society, due

consideration of ethical concerns can turn into an immediate competitive advantage. Regulators and businesses should therefore share a common interest in ensuring that AI and autonomous systems provide a strict and high level of protection of ethical values.

22. Elvia Arcelia Quintana Adriano, THE NATURAL PERSON, LEGAL ENTITY OR JURIDICAL PERSON AND JURIDICAL PERSONALITY 4 Penn St. J. L. & Int'l Aff. 363, 373 (2015)

The analysis of business law can be categorised into the following compartments: (a) natural persons; (b) subject matter of commerce; (c) legal means and mechanism and (d) regulatory and legal processes. Commercial relations between natural persons and commercial entities need considerable legal record keeping, inclusive of atypical or non-standard commercial contracts. A basic tenet of all commercial transactions is the 'legal entity' ascribed to organizations internationally to carry on business. For several corporations to conduct mechanical functions, they must possess several of the identical legal entitlements and duties as natural persons. Put in a different way, these bodies need legal personality. This leads us to the issue of conferring legitimacy. The most commonly utilized legal mechanisms are non-standardized commercial contracts. Basically, this is the segregation of contracting parties as organizations with well-defined entitlements and duties. This legitimacy is premised on, in turn, the legal recognition of 'personhood' of the contracting persons, which is majorly a bone of contention in commercial relations. In spite of whether a person agrees to the use of terms 'legal entity' and 'legal personhood', they frequently lead to unquantifiable and different conflicts at a national, regional and at international level. This had resulted in attempts to augment the regulations surrounding the 'International Chamber of Commerce' and push up the performance levels of legal models that give guidance to different countries. The authors have analysed the works of several authors arriving at a conclusion with the personal observations of Elvia Arcelia Quintana.

After the authors have set up the arguments that lend validity to the current research, it becomes necessary to lay down that the juridical personality subject matter of the current research is not fundamental to the natural person and may thus be applied to validly registered organizations, ideal entities for the real scenario and additionally real for the domain of law. Effectively, juridical persons must satisfy the following five elements:

The first is concerned with the being or core of law, that in contrast to what a person could think, it does not require a physical manifestation to seek legal existence, and it is sufficient to have a meaning for the requirement of law. The next element is the desire of the subject, which is elaborated upon in the concerned bylaws. The third and fourth elements regarding subjective entitlements and duties, are recorded in the legal entity due to the reason that the juridical person commands a will of its own. However, there are instances in which it is not required to have the desire to come up with the necessary rights and duties, since there are specific parameters that decide it even if the contrary thing happens. In relation to the legal personality, as the last element, we could ascertain that the legal personality also needs the conjunction of multiple needs for its compatibility. One of the things that assist in formalising the legal personality is the real time situation that personalizes that subject. This happens when the juridical entity takes one of the corporate features foreseen in the 'General Law of Commercial Corporations' which personalizes it as a pre-determined corporation.

Additionally, due to the validity of certain types of juridical entities in the legal realm as discussed in the paper, we are able to derive the remaining constituent elements that apply to personality, which is the legal recognition of such personalization, at the same time, due to the concurrence of these factors, the legal body acquires a valid legal personality to be seen as a holder of entitlements and duties.

To summarize, we may arrive at the conclusion that, bringing together the aforementioned five elements that shall be required to construct personhood, the following definition may be suggested: The legal person is characterised by an abstract existence, legally derived with a will attributable to is character, including entitlements, duties and a juridical personality that personalises it in the dynamics of law and renders it a nucleus that produces rights and duties of an 'economic, financial and commercial' type. Pursuant to the order of premises set out in the research, the legal personality is additionally vulnerable to having an understanding which will enable it to differentiate this from the legal person. Personality is the naturalisation of the legal person through a factual circumstance in which it is put, foreseen by a regulatory norm that enables legal personality to differentiate it from other similar beings in the business-regulatory relationships in the contextual setting of law where the particular instance develops.

23. F. Patrick Hubbard, "DO ANDROIDS DREAM?": PERSONHOOD AND INTELLIGENT ARTIFACTS, 83 Temp. L. Rev. 405 (2011)

This paper suggests a test to be utilized in addressing a basic issue that has barely been answered through the study of jurisprudence: What would be the case if a human like machine communicated that it ought to be treated as a person instead of a tool? The paper advocates that this body should be given a legal entitlement to personhood if it portrays following capabilities: (1) a power to communicate with its surroundings and to involve itself in complex thinking and speech; (2) a feeling of being a personality with a plan for attaining its vision for life; and (3) the power to stay in a society with other people based on, at least, collective duties. To construct and put up a defence for this principle of personhood, the paper outlines the type and foundation of the progressive doctrine of personhood, examines the justification to provide or deny freedom to a body that satisfies the principle, and deliberates on, in terms of current and future techniques, the classes of artifacts that could be given the legal facet of self-ownership under

the principle. Due to the speculative type of the paper's subject, it concludes with a deliberation of the consideration of intelligent beings in science fiction.

This Article takes the position that it is time to address in detail the question of whether a machine system like this should be granted its rights claim if it can "prove" its capacity claim under an "appropriate" test for personhood. Because the machine is only one type of artifact that could make these claims, this Article also considers corporations; humans that have been substantially modified by such things as genetic manipulation, artificial prostheses, or cloning; and animals modified in ways that humans might be modified. As to all of these artifacts, this Article will argue that any artifact, including a machine-based entity like the university computer system, is entitled to treatment as a person rather than as property if it possesses the requisite capacities, unless there is a very good reason to deny some or all of the legal rights that normally go with personhood. This normative argument is limited to the political or legal right to self-ownership within a pluralist liberal polity. Concepts of moral personhood overlap with this topic, but the moral dimensions of personhood include a different, and in some ways more stringent and contentious, set of concerns. Issues involved in deciding whether an entity with a right of self-ownership should be granted broader political and civil rights are also beyond the scope of this Article. Before addressing the test to be used in assessing the capacity for personhood, this Article starts in Part 11 by sketching two fundamental claims about humans and personhood: first, the claim that because humans, and only humans, generally have the capacity to think and plan as self-conscious beings at a high level, only humans are entitled to the right of autonomous personhood, and second, the liberal assertion that all fully functioning humans are equally entitled to this right. This discussion also develops the problems raised by degrees in human capacity to exercise personhood and by charges of speciesism directed at human treatment of higher-order animals. Part III develops a test for determining whether an

artificial entity satisfies the claim of being the equivalent of a human in terms of the capacities required for autonomous personhood and argues that an entity, like the machine system in the imaginary scenario above, which passes the test is entitled to be treated as a person. This discussion focuses on personhood in terms of autonomy and self-ownership. Personhood in terms of more specific civil and political rights is also discussed, but a complete analysis of these topics is beyond the scope of this Article. Issues concerning the details and administration of the test of capacity are also not addressed. Part IV uses a technological perspective to analyse the types of intelligent artifacts that might be entitled to the status of personhood, while Part V addresses whether and how to limit or shape technological development so that artificial entities do not replace humans as the dominant species. Part VI uses science fiction as a way to consider the possible ways humans might relate to self-conscious artifacts capable of, and therefore entitled to, personhood. The conclusion argues that we should recognize the right of self-ownership where the capacity test is met and should seek to develop some form of peaceful coexistence, particularly one which fosters the development of a shared political community.

24. G. Calabresi and A.D. Melamed, Property Rules, Liability Rules and Inalienability: One View of the Cathedral Harv. L. Rev. 85 (1972): 1089

Professor Calabresi and Mr. Melamed construct a regime for legal scrutiny which they think works to incorporate different regulatory relationships which are historically dissected in different research areas like law of property and torts. By utilizing their framework to indicate answers to the environmental issue that has been ignored by scholars in the domain, and by relating the framework to the issue of criminal penalties, they show the use of such a multidisciplinary approach.

The initial question which ought to be countered by any legal system is one which is termed as the problem of rights. Whenever a government is faced with clashing interests of multiple stakeholders, or pressure or interest groups, it ought to determine which side must draw a favourable decision. In the absence of such a determination, access to commodities, services and the broader aspects of life will be determined on the foundation of 'might makes right'. Thus, the basic thing that law ensures is to determine which of the contesting persons will have the right to prevail.

A right is secured by a property regulation to the extent that a person who wants to remove the entitlement from its owner must purchase it from the owner in a manner in which the value of the right which leads to the least amount of government intervention. Once the original entitlement is determined, the government does not attempt to determine its real value. It rather allows the stakeholders opine on how much the ownership is to hum and provides the vendor a veto if the purchaser does not provide a sufficient amount. Property regulations entail a broader decision as to the value of the ownership. A right is inalienable to the degree that its assignment is not allowed between a willing purchaser and vendor. The government interferes not only to decide which person is primarily empowered and to decide the compensation which ought to be given if the right is appropriated or brought to an end, but additionally to prevent its sale under selected conditions. Inalienability regulations are therefore distinct from property regulations. As opposed to those rules, these provisions not only secure the right, they could also restrict or regulate the conferment of the right itself. This paper primarily looks at two questions:

a. In what situations should a person confer a specific right, and

b. Under what situation should a person determine to secure that right by utilizing a property, duty or inalienability provision?

25. Gregory R. Wheeler and Luis Moniz Pereira, Epistemology and artificial intelligence [2004] 2 J. Appl. Log, 469-493

In this article, the authors come up with the view that 'analytical epistemology' and AI are compatible domains. Both domains research epistemic dynamic, but while artificial intelligence treats this domain from the view point of understanding critical and computational attributes of systems intending to simulate some epistemic dynamic or other, historical epistemology confronts the area from the view point of ascertaining the attributes of epistemic relations from their conceptual characteristics.

The authors advocate that these two models should not be implemented in an isolated manner. The authors demonstrate this parameter by explaining how to portray a category of conclusion forms located in standard inferential statistical figures. This category of conclusion forms is fascinating because its members have two characteristics that are common to epistemic system, i.e. 'defeasibility and Para consistency'. The authors' modelling of customary inferential statistical points takes advantage of the consequences from both logical AI and analytical epistemology. The authors explain how their approach to this modelling issue may be put in a more general context to an interdisciplinary context to the research of epistemic relation.

The authors recommended that the logical AI studies provides an academic underpinning for such an effort, mainly due to the theoretical restrictions provided by making the rational address key obstacles countered more mechanical while considering the venture of modelling defeasible conclusion relations. The authors then demonstrated the manner in which it is so by discussing for a short while a semantics for default perspectives and rational algorithms, giving sufficient description to bring out how the communication results are deciphered.

26. H. Demsetz, Towards a Theory of Property Rights Am.Econ. Rev. 57 (1967) 347, 354-358

When a deal is finalised in the commercial arena, two sets of property rights change hands. A set of entitlement frequently comes with a physical good or service, however it is the significance of the entitlement that decides the value of the thing that is the subject matter of the transaction. Issues raised to the arrival of and admixture of the constituent parts of the set of entitlements are before those generally posed as questions by economic scholars. Economists generally obtain the set of property rights as a factum and ask for elaboration of the factors deciding the price and the quantity of a good where the entitlements attach.

In this article, the author purports to bring out some of the ingredients of an economic explanation of property entitlements. The article may be divided into three portions. The first part talks about the principle and function of property rights in community systems. The second portion provides some insight for coming to know the development of property as an institution. The third part lays down a few principles important to the 'coalescing of property rights' into specific sets and to deciding the ownership pattern that will be related with these sets. If a fresh perspective is freely made amenable to exploitation by the general public, if there exist public entitlements to new ideas for conceiving such ideas will be absent. The advantages obtained from these perspectives will not be focussed on their creators. If we stretch some extent of private entitlements to the originators, these notions will come forward at a more searing speed. But the being of the private entitlements does not entail that their influence on the belongings of other people will be straight away taken into consideration. A fresh perspective makes an old one outdated and another antiquated one a little dearer. These influences will not be taken into consideration, but they may be summoned to the focus of the creator of the new idea through commercial discussions. All issues of external issues are closely opposite to those which come up in the land ownership for instance. The important variables are after all exactly the same.

27. Ian J. Goodfellow et al., Generative Adversarial Nets 27 PROC. NEURAL INFO. PROCESSING SYSTEMS 2672, 2672 (2014).

The authors suggest a fresh mechanism for devising generative systems through an adversarial system, in which the operators simulate two models together: a generative one and a discriminative model that calculates the probability that a chosen string came from the training set instead of the generative model. The training process in the generative model is to augment the chance of the discriminative model making an error. This system maps to a maximum of two-player match. In the domain of arbitrary markers in the generative and discriminative models, a special answer comes to the forefront, with the generative model retrieving the training information and discriminative information equivalent of one-half in all the places. In the instance where the generative and discriminative model are explained by multilayer perceptron, the whole mechanism can be simulated with backpropagation. There is no requirement for any Markov sequences or unrolled rough conclusion networks during training or production of samples. Studies show that the capability of the mechanism through qualitative and quantitative tests of the produced samples.

28. Ida Blom, Structures and Agency: a transnational comparison of the struggle for women's suffrage in the Nordic countries during the long 19th century 37 SCAND. J. HIST. 600 (2012)

This paper is an international review and analysis of the movement for women's suffrage in 19th century, generally in and around 1900, with stress on the Denmark, Finland, Iceland, Norway and Sweden. This paper raised issues on the basic notion of these jurisdiction as similar democratic and non-military countries, in stark contrast from the remaining portion of Europe. It indicates that the timing of women's suffrage and the manner in which to claim for this transformation changed the perspective on the gendered connotation of political citizenship in addition to core elements in the viewing of masculinity and femininity. It goes on to review key

systemic modifications that have been viewed as engine for feminine suffrage: the advancement of democratic ideals, the building of nation states, transformations and wars, posing the question whether these parameters carried out a significant function in the Nordic countries similar to other places.

Lastly, the paper focuses on women's ability to become an agent, mobilization and ability to organize, searching for similarities and contrasts among the Nordic states.

29. J Besnard et al, Automated Design of Ligands to Polypharmacological Profiles (2012) 492 Nature 215-220, at 219

The clinical effectiveness and utility of a medicine is ascertained by its activity profile ranging through multiple proteins under the proteome. However, manufacturing drugs with a particular multi-target character is both complicated and hard. Therefore, processes to manufacture medicines logically a priori against character of different proteins would have tremendous significance in invention of the medicine.

In the paper, the authors come up with a fresh approach for the automated invention of ligands against characters of different medicine targets. The automated method can be of great utility when it comes to drugs of multi-target characters are needed to have either selectivity over remaining medicinal targets or an acceptable polypharmacology.

30. J Patel, Science of the Science, Drug Discovery and Artificial Neural Networks (2013) 10 Current Drug Discovery Technologies 2-7, at 7

Drug invention procedures several times comes across nuanced issues, which may be hard to resolve through human cognition. Artificial Neural Networks (ANNs) are being increasingly used for figuring out solutions to such complex issues. ANNs are extensively used for initial computerized analysis of chemical substances, quantitative structure dynamics, relationship researches, receptor tweaking, formulation evolution, pharmacokinetics and in all other

procedures which entail complex mathematical simulation. In spite of having such advanced techniques and sufficient comprehension of biological systems, invention of medicine continues to be a lengthy, expensive, hard and slow procedure with a small rate of fresh successful therapeutic inventions. In this article, the author has talked about the medicine invention science and ANN from very rudimentary perspective, which may be useful to comprehend the application of ANN for drug invention to augment efficiency.

ANN possess a fantastic ability to extract meaning from complex or inaccurate information and can be utilized to bring out patterns and identify ways of functioning that are far too complicated to be observed by natural persons or other digital algorithms. An ANN which is properly fed with input information may be considered as an 'expert' in the class of data it has been conveyed to scrutinise. The ANN can then be utilised to provide predictions and given fresh circumstances to provide solutions to 'what if' questions. In our day to day lives, ANN has been applied successfully in diverse domains. Drug invention is a complex field to comprehend but once perceived in the right way, it becomes a recipe for a relatively straight forward implementation. ANN flows from the study of formal science and possesses unparallel capabilities to make the daily tasks of human beings simpler if the proper application is done. ANN has been able to produce effective results, for instance, in invention process of medicines. Selection and augmentation of ANN architecture and its constituent parts like the number of potential parameters, layers, sum function, transfer, measurement and occupational tasks greatly have a bearing on the capabilities of ANN.

31. J. Stevens, The Reasonableness of John Locke's Majority Pol. Theory 24 (1996) 423, 439

Intelligence is explained as that which generates effective behaviour. Intelligence is said to be an effect from natural selection. A system is advocated that merges knowledge from study in both natural and artificial frameworks. The model comprises a hierarchical model architecture

thereby: (1) regulated bandwidth reduces a type of value at each elevated level, (2) perceptive solution of spatial and time related design contracts about an 'order-of-magnitude' at each elevated stage, (3) objectives increase in scope and organization improves in time about an 'order-of-magnitude' at each elevated stage, and (4) models of the system and memories of places increase their range in a domain for an order-of-magnitude at different stages. At certain stages, functional modules carry out behaviour patterns (work disintegration planning and carrying out the plan), world modelling, cognitive processing, and value determination. Sensory feedback regulations loops are terminated at every stage.

32. JC Ginsburg, The Concept of Authorship in Comparative Copyright Law (2003) 52 DePaul L. Rev. 1064, 1067.

In current discussions over copyright, the concept of the author is frequently missing. Hence, these debates tend to miss out on the copyright's function in augmenting creativity. The author feels that reorienting the debate on authors-the constitutional creator of copyrightable work should reinstate a legitimate view on copyright regulations, as a mechanism devised to further the public objective of increasing knowledge, through incentivising the works and thinking of creative people.

Copyright cannot be conceived simply as a reluctantly tolerated stop on the way to the public realm. Nor does a perspective of copyright as a required incentive to expend money in circulation of copy-vulnerable creations sufficiently account for the type and extent of regulatory recognition. A large portion of copyright regulations in the United States and in foreign jurisdictions makes sense only if a person takes into account the central role of the author, the human originator of the work. Since copyright emanates out of the act of generating a work, creators have extra-legal entitlements that neither corporation intermediaries nor customer users can stoically claim. This makes it imperative to try to understand just what

authorship signified in today's legal parlance. This paper attempts to find out the notion of authorship in common law as well as civil law countries. It considers legal, judicial and scholarly authorities in the United States, United Kingdom, Canada, and Australia, in addition to the civil law countries of France, Belgium, and the Netherlands. The regulatory systems here analysed seem to concur that an author is a natural person who asserts subjective skill in creation the work and who influences its final execution. But that account may neither completely capture nor finalise the classification of ‘authors’. Arguing extra or disjunctive authorial features range from ‘sweat of the ordinary brow’ to ‘highly skilled effort’, to ‘intent to be creative author’ to the ‘investment theory’. The ability to include or exclude subjective judgment parameter is contingent on the remaining features national laws demand. In spite of these changes, the author still concludes that in copyright regulations, an author is or ought to be a human creator who, regardless of the restrictions of the work, becomes successful in exerting minimum personal freedom in creation of the work. To the degree that the author modifies the creation to his imagination, the author deserves not only recognition and financial reward, but to assert some artistic influence over the work. If copyright regulations do not gain their legitimacy from human creativity, but rather obtain compensation investment, then the degree of protection should be reconsidered and possibly decreased.

Analysis of the sources shows that the core concepts of human, subjective creativity in conceiving the work and controlling its execution hold firm. The competing criteria for authorship flow from three different impulses; two of these are not inconsistent with the above characterization of authorship in copyright. Some alternative approaches seek more to refine the concept of human subjective authorship than they endeavour to overturn it. Others appear primarily preoccupied with the consequences of authorship attribution. The courts appear to think it through as follows: "Were we to find authorship in this instance, then the consequence

would be X, and, as X is an undesirable result, plaintiff cannot be an author." X most often concerns ownership and power over the work's disposition. This is especially true when more than one claimant vies for authorship status, or when courts fear that recognizing authorship in a thinly creative, or derivative work, will curtail access to the subject matter or underlying work. This is not to suggest that consequentialist reasoning is illegitimate, but rather that in these instances the courts too often are following a misguided consequentialism: their reasoning takes as its premise a wrongly-identified consequence.) By contrast, some systems nonetheless still determine authorship, at least in part, by assigning greater value to economic initiative and control than to creative contribution.

A copyright law for "continuity experts," or, as the French might more pithily put it, *le droit d'auteur sans auteur* is what generalization of the U.S. doctrine of works made for hire and its foreign law analogues ultimately promises. It is not, the author believes, what modern copyright/authors' rights laws were meant to protect. Without belittling the role of investment in common and civil law copyright regimes, those regimes' moral centre, their *raison d'itre*, remains human creativity. To answer the question the author posed at the outset ("Who is an author in copyright law?"), in copyright law, an author is (or should be) a human creator who, notwithstanding the constraints of her task, succeeds in exercising minimal personal autonomy in her fashioning of the work. Because, and to the extent that, she moulds the work to her vision (be it even a myopic one), she is entitled not only to recognition and payment, but to exert some artistic control over it. Before the Statute of Anne, the author surrendered his manuscript, and any rights he may have had, to his bookseller. He "got a price for his stuff" and then had to "beat it." With the shift from printing privileges to author-vested copyright, there gradually came an appreciation and an expansion of the rights of ownership that flow from the creative act. If we no longer value creativity, then we shall require another basis for recognizing

exclusive rights in works, be they works of authorship or other productions. More importantly, the scope of the rights we then install would have to be rethought and probably drastically reduced.

33. Jessica L. Gillotte, Copyright Infringement in AI-Generated Artworks 53 UC Davis L. REV. 2655, 2662 (2020).

When AI-generated content confronts those of human creators, people may cease to create as they perceive the market for their product reduce. This article dissects potential copyright infringement questions emanating from AI-generated artistic works and advocates that, under existing copyright regulatory framework, a programmer may utilize copyrighted content to enable an AI program to produce artistic works without being subject to infringement liability.

The article may be divided into three parts. Part I gives an overview of the manner in which AI can be utilized to produce artistic works and offers backdrop on the questions of copyrightability and ownership of such content. Part II discusses the questions of infringement. It first does away with the point that the utilization of copyrighted works in 'machine learning' is to be treated as a non-infringing mechanical utilization. The Part then gives account of a circuit differentiation as to what infringing works are and lays down two scenarios that could lead to creation of infringing copies: (1) utilizing unauthorized creations to constitute a training set, and (2) producing unauthorized intermediate reproductions during the various stages of machine learning.

Last but not the least, Part III advocates that even if infringement happens while machine learning the ongoing, preparing AI for creation of copyrighted works would most probably be exempted by the fair use doctrine. The article therefore concludes that in spite of some calls for the Copyright Act to be tweaked, there may be no necessity to expressly provide resolution by law the copyright infringement questions that emanate from the use of AI to produce artistic

works.

The article gives context for the evaluation of copyright infringement questions that are the focal point of this article. Part I gives a brief summary of AI, machine learning, and neural networks, elaborating on the manner in which the techniques may be utilizing copyrighted content. Part I.B takes up for consideration copyright questions beyond the domain of infringement, for instance, the copyrightability of AI-generated content and who may be entitled to the copyright in such content. There are several sub-areas of AI development and this article places attention on machine learning. Put in a broad way, machine learning is a language through which AI detects patterns from heavy quantity of information and utilizes those patterns to acquaint itself with the restrictions of the work it is anticipated to generate without being expressly trained to produce such content.

These AI-generated artworks likely sell for such high prices primarily because of the novelty of their source — computers — and not because they resemble the paintings used as input data for the AI program. Therefore, while in certain cases the market for AI works may overlap with that of the original artist, consumers will usually regard AI-generated art as belonging to a different category of art. There might thus only be a small impact on the market for human-created artwork. Further, using Rembrandt's painful lived experiences that inspired his brilliant paintings to justify shrinking the market for AI-generated art that resembles his works requires relying on the moral rights theory of copyright law, which as discussed above, is a theory credited neither by the Constitution nor the U.S. Supreme Court. The constitutional purpose of copyright law is to incentivize the production of works regardless of who the author is — whether machine or human. Using AI to generate artworks thus aligns with the utilitarian theory, which prevails in U.S. copyright doctrine. Consequently, the fourth fair use factor will likely also be resolved in favour of fair use.

While there are some calls for the Copyright Act to be amended, there may be no need to expressly address copyright issues that arise from the use of AI to generate artworks. Using AI to generate artwork marks a promising technological advance, but there have been real concerns that copyright law's uncertain application to these works casts a pall over their future. Further, although regulating copyright-related activities and potentially infringing uses is difficult, advances in technology make enforcement of copyright law on digital platforms increasingly practicable. Nonetheless, this Note has shown that using copyrighted works to train AI programs that generate art might be permitted in some courts, or that such uses would be considered fair use. Expanding the permissible uses of copyrighted works in machine learning helps engineers continue making advances in computer science and technology, an outcome that is not only socially desirable but constitutionally approved.

34. JL Schwab, Audiovisual Works and the Work for Hire Doctrine in the Internet Age (2011) 35 Colum. J.L. & Arts 141, 149.

Chris Carter was an eminent writer in the television parlance in the 1990s. His creations include "Millennium" and, most importantly, "The X-Files." He created "The X-Files" and was the leader in the television segment for a long time. He either created or signed off on every creative aspect related with different types episode—including the creation, direction, designing of the entire set up, dress and the content editing. As is prevalent in the segment of audio-visual creations, Mr. Carter did not have ownership over the copyright to "The X-Files." This led to an issue for Mr. Carter, since the lure of "The X-Files" made it an ideal prospect for syndication i.e. second run programming, the commercial side to television production. The producer of "The X-Files," Twentieth Century Fox Television, assigned the syndication rights to a subsidiary. This transaction was followed by allegations of self-dealing. Fox subsequently reassigned the content to NBC Universal's USA Network. When Fox effected the re-

assignment, the studio argued that the contract was not a fresh syndication contract, but, instead, a license of the original contract. This differentiation was especially significant for Mr. Carter because his contract assured him a percentage of Every assignment executed by Fox. If the contract with USA was merely a license, Mr. Carter was entitled to no portion of a profitable agreement. Mr. Carter lodged proceedings to enforce what he felt was a syndication right.

Contemporary technological advancements are rapidly changing the nature and type of the entertainment segment. Modification in expenses and access to production and distribution objects offer a better chance for performers to produce and exhibit their work. Technically, this wider access could result in more creative liberty for performers who will no longer be tied down by the studio-centric distribution mechanism. This liberty, on the other hand, could lead to general advantages, including being exposed to a bigger gamut of artists and to the tales of persons with contrasting upbringings presently under-portrayed in the audio-visual realm. In spite these potential advantages, a several structural and economic indices render the dissolving of the present studio-based mechanism of audio-visual creation highly remote in the not-so-distant future. This article will look into the feasibility that changing or substituting the work for hire principle could considerably augment the tendency of audio-visual performers to take benefit of technological advancements in production and distribution. Part I will talk about the tradition of work for hire, the principle's function in assigning ownership of the protected content and current audio-visual media scenario that has led to the execution of the doctrine. Part II will initially analyse technical developments in audio-visual works and how those developments might confer advantages on individual performers, and then indicated specific issues unique to real time audio-visual content that could stop artists from obtaining full advantage of these technical chances. Part III will indicate modifications to the work for hire principle that would enable audio-visual performers to more comprehensively take

advantage of fresh technologies while still staying within the studio set up.

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

Authorship of protected works in copyright has been a severely debated question in the American regulatory framework for more than 200 years. With the current expansion of artificial intelligence, a greater number of creative works have been the consequence of non-human creators. Computer programmes and learning devices have become a fresh point of origin of creativity and inventiveness. The U.S. Copyright Office, though, has not readily admitted the importance of AI in the process of creation by refusing copyright of non-human content and making them enter the public domain. This article talks about the question of IP product entitlement of AI generated content. It advocates that providing the status of 'author' to AI programmers and holders is instrumental to the future progress of the AI segment.

The article argues that instead of re-analysing "authorship" to make room for non-humans, it is merely required to reinterpret the words "employee" and "employer" in the work for hire concept in the U.S. Copyright law. This revision would enable the existing IP system to remain in favour of facilitating 'the progress of science and useful arts' without an elaborate or controversial revision of the provisions which are currently there in place.

The current progress of machine learning capabilities has led to a greater number of AI generated content and a perspective that natural persons are not the only point of origin of creativity or innovation. The obsolete provisions of the existing U.S. Copyright Act, though, do not portray this current reality, leading to the exemption of a large number of AI generated content the public realm. This interpretation does not provide any advantage the programmers and holders of AI devices and restricts their eagerness to spend resources in the subsequent development and progress of AI. The effect of this lacunae in copyright law is fundamental and may lead to a reduction in valuable fresh content at the disposal of academicians and

consumers, and a considerable time in technological advancements in the modern society and economy. As important as this question may be, it is yet to be properly answered and a need for a practical answer still remains. This answer should be an incentive to AI developers and in consonance with the existing regulatory framework. Satisfying these needs would ensure the hassle-free progress of AI and obtain its long-term function as a propeller of creativity and innovation. The new meaning of the words “employee” and “employer” in the work for hire principle is a practical way to provide a solution to the deficit in the U.S. Copyright Act. Under this fresh perspective in the work for hire doctrine, authorship of AI content would be given to the holders of AI devices. This legal incentive would reward persons responsible for AI creation, leading to a considerable boost in research and development in the AI sector and the reform of a fast-declining effectiveness of the U.S. Copyright Act.

This paper divides AI generated works into two main categories. The first category is represented by works generated by AI programs with the direct guidance, assistance or input of human beings. In this category, AI is used as a tool to achieve a determined or predicted goal or outcome. An example may be the creation of a painting by an artist who has selected the colours, tool type (brush size and stroke style) and has to some extent input his requirements into the AI algorithm used to create the work. Although the artist cannot exactly predict the final version of the generated painting, he has directly contributed to its creation and has some expectations as to what it may look like. Under U.S. copyright law, an author of such a work may have legal claims over the resulting creation if he cites the AI program as a tool or medium used in the creative process.

The second category of works, which this paper focuses on in detail, deals with autonomously generated AI creations. The computer programs responsible for autonomously generating works are the result of human ingenuity, their source code may be copyrighted as a literary work under

the U.S. Copyright Act. The artworks generated by such programs, however, are not copyrightable if not directly influenced by human authors.

A relative interpretation would mean that an “employer” may be considered as someone who employs the services of another entity in order to achieve a goal or complete a task. A programmer or owner of an AI machine would satisfy this definition as he or she employs the services of the AI device in order to generate new creative works. Furthermore, if a relative interpretation is used, an AI machine could be considered an employee since its generative services are employed by its programmer or owner. This new interpretation of two of the terms (employer and employee) in the made for hire doctrine could prove essential for the future development of AI by providing the incentive of copyright protection to innovative AI developers. In essence under the provisions of the made for hire doctrine, the employer is not the actual author of the work, but is only considered as such to satisfy requirements of the law.

The U.S. Copyright Act has gone through a number of revisions over the years. Each new addition to the U.S. Copyright Act reflects a fundamental change in the way American society perceives the creative process and the tools deemed necessary to reinforce it. No changes, however, have been exercised to reflect the most recent technological phenomenon of machine learning, commonly referred to as artificial intelligence. The following segment of this paper summarizes the necessary steps needed to bring the U.S. Copyright Act to modernity by directly addressing the issue of AI generated works and their copyright eligibility.

The recent development of machine learning capabilities has resulted in an increased number of AI generated works and an understanding that humans are no longer the only source of creativity or innovation. The outdated nature of the current U.S. Copyright Act, however, fails to reflect this contemporary reality, resulting in the release of a great number of AI generated works into the public domain. This trend does not benefit the programmers and owners of AI

devices and limits their willingness to invest resources in the future development of AI. The consequences of this gap in copyright law are far reaching and may result in a decrease of valuable new works available to scholars, researchers, and consumers, and a significant delay in technological and artistic progress of modern society. As significant as this issue may be, it has yet to be effectively addressed and a need for a practical solution still exists. This solution should be both motivational to AI developers and non-disruptive to the current legal system. Satisfying these requirements would ensure the smooth development of AI and secure its long-term role as a driver of creativity and innovation.

The proposed reinterpretation of the terms "employee" and "employer" in the made for hire doctrine is an effective and practical way to address the abovementioned shortcoming of the U.S. Copyright Act. Under a new interpretation of the terms in the made for hire doctrine, authorship of AI generated works would be awarded to the programmers and owners of AI devices. This legal incentive would financially benefit those responsible for AI development, resulting in a significant boost in research and investment in the AI sector and the modernization of a rapidly aging U.S. Copyright Act.

36. Kenneth J. Burchfield, Revisiting the "Original" Patent Clause: Pseudohistory in Constitutional Construction 2 HARV. J.L. & TECH. 155 (1989)

The present Article is concerned generally with the dialectic of history and precedent, and more particularly with the Supreme Court's approving reliance upon extrinsic history in reinterpreting basic constitutional provisions. Without questioning the philosophical premise that history is capable of providing authoritative guidance, the author proposes to examine the historical methodology employed by the Court, considering the Court's use of history in reaching a decision rather than simply the result extracted by this process. In an effort to avoid the Scylla of hidden individualistic biases implicit in distinguishing preferred constitutional values, and he

Charybdis of personal moral judgements seen in the constitutional mirror as fundamental rights, the author steers wide of modern constitutional debate and turns instead to the article I, section 8 legislative power. By addressing the historical basis of the Court's recent pronouncements on the patent portion of this clause, the author hopes that the present Article will contribute to a re-appraisal of the actual history of patent law and the constitutional extent of the enumerated power. More generally, a critique is attempted of the historical methodology employed by the Court, proceeding on the belief that a detailed analysis of the history of a single constitutional topic can lead to conclusions of more general validity by identifying the Court's approach to history and suggesting limitations inherent in the process of decision that are independent of particular subject matter. By examining the historical exegesis of the Court against the background of a discrete and well documented early legal history, the present Article addresses a broader issue: whether the citation of extrinsic history is an appropriate basis for constitutional construction by the courts.

37. Kenneth E. Goodpaster & John B. Jr. Matthews, Can a Corporation Have a Conscience?, 60 HARV. BUS. REV. 132 (1982)

The authors argue that the conventional train of thought offers a significant hurdle to the advancement of business ethics as a subject of study and as a practical compulsion in managerial determinations. This is a case of which company directors must be philosophical and philosophers must be more oriented towards reality. A corporation must have a conscience. The linguistics of philosophy clearly possesses a slot in the lexicon of a company. There need not be a disjunction of the type attributable to James Weston. Organizational agents like companies should not exist without moral accountability in a manner similar to ordinary persons.

The authors feel that an analogy exists with respect to the individual and the corporation. If we take into account the notion of moral responsibility as applicable to persons, we can conclude that applying it to companies as agents in the social set up is feasible. A reviewer must ideally pose two questions:

a. Does it make sense to apply moral precepts to stakeholders who are not persons but who are on the other hand constituted persons?
b. If meaningful, is it an acceptable course of action?

If an organization can behave like a natural person in a certain manner, then we can anticipate that it will also behave like a natural person in other ways. It is common knowledge that persons organized into an association can take a course of action as a group. As corporate people would be aware, legally a company is treated as a unit. To achieve unity, an association usually requires a type of internal mechanism, a framework of regulations that bring out authority relationships and particularise the parameters under which few persons' conduct become official course of conduct for the group.

If it could be said that persons conduct themselves with accountability only if they accumulate data about the influence of their conduct on third parties and utilize it in preparing decisions, we can understandably have the same course of action for jural entities. The suggested frame of reference for conceiving and executing corporate duty targets laying down the processes related with the ethical accountability of persons and casting them at the stage of corporations. This is identical to Plato's method in the classical treatise 'Republic', in which the notion of justice in the society is demonstrated as a model for justice in case of inhabiting persons.

Thus, companies that track their employment habits and the consequences of their production techniques and products on the surroundings and human health exhibit the identical type of logic and respect that ethically accountable individuals do. Thus, ascribing conduct, plans, determinations, and ethical accountability to companies as entities differentiated from those who held positions in them creates no issue. And on taking a look, it is readily discernible that differences in ethical accountability among corporations in roughly the identical manner so that contrast between persons becomes obvious. Some entities have constructed attributes into their innovation framework, administrative structures, internal regulatory mechanisms, and research plan that could be termed as 'self-control, integrity, and conscientiousness'. Entities have institutionalized knowledge and readiness for customers, workers, and the rest of the public in a manner that third parties have not.

As a matter of course of conduct, some companies cater to the human influence of their works and principles and refuse processes and principles that are questionable. Regardless of the issue, be it the biological effects of cereal or cigarettes, freedom in the company or the society, an association divulges the essence as surely as a natural person does. The parallel may be also more theatrical. For the ethical accountability portrayed by a person progresses over time from childhood to adulthood, in a similar way we may anticipate phases of development in corporate character that demonstrate important patterns.

Principles like ethical accountability are not only feasible when applied for organizations but also offer touchstones for devising more efficient models than the existing ones for creating corporate by laws. Several commentators have termed as a double standard—a disconnect between our personal lives and those in corporate scenario. The concept of 'moral projection' not only assists in creation of the types of demands that we may pit against corporations and other entities but also offers the chance of reconciling those demands with our very own.

38. Lior Zemer, On the value of copyright theory (2006) Intellectual Property Quarterly 55, 57

This paper advocates that any framework of property rights, particularly set ups distributing exclusive entitlements in cultural and authorial items, will effectively address several sociological problems emanating from this allocation, only if an equilibrium between the written part and practical aspects is created. The author posits that theoretical perspectives should be integrated into current discourses on the prospects of intellectual property regimes more frequently.

This paper advocates that theoretical facets are the foundation of construction of every doctrine of intellectual property, and substantiates the argument that keeping aside the practical progression of intellectual property regulations from theoretical parameters incurs the risk of increasing the wedge between apparent advantages and societal costs. This paper posits that theory and practice must maintain a certain equilibrium. It revisits the fundamental approaches governing the realm of copyright theory and portrays the advantages we can assert from theory while dealing with copyright regulations and policy. The author advocates that the progression of theoretical advances to copyright and their influence on the progression of intellectual property laws and regulations are predicated on the manner in which the intellectual property domain perceives the multiplicity of approaches to entitlement of authorial and cultural goods. In this paper, the author identifies six main ways that occupy the bulk of literature on copyright theory: the utilitarian way; the labour theory; the personhood theory; traditional and authorial theories. This classification could be criticised and is definitely not conclusive. These methods emerge and seek support from basic points of arguments that have featured in the basic ingredients of intellectual property, constitutional aspect, cases, legislative statutes, and briefs created during the appeal stage.

Post the introduction, the six following portions of the Article will analyse the ascertained six main theoretical ways to studying copyright. Each way will be scrutinized distinctly. Every part will structure the important arguments that rest at the nucleus of each specific theory. The author shall lay emphasis on the clashing explanations to copyright theory, and construct a criticism of the drawbacks that are intrinsic in each manner of explaining copyright. The author posits that no theory portrays adequate substantiation power on which to form a conclusive approach to copyright and that the lack of ability on part of the intellectual property society to give ascent to the equitable, moral and financial standing of competing perspectives, does not allow the concerned parties in arriving at an agreement on the legitimate equilibrium between public good and private interest in copyright, and influences the progression of law and the effectiveness of international attempts to reconcile conflicting frameworks in IPR. The concluding portion advocates that in a combination, the collective bunch of copyright theories offer the necessary theoretical structure necessary for copyright law and its implementation.

39. Lorna McGregor et al., International Human Rights Law as a Framework for Algorithmic Accountability 68 INT'L & COMPAR. L.Q. 309, 330 (2019)

Current ways of studying 'algorithmic accountability', like transparency, offer a significant baseline, but does not suffice in dealing with the possible detriment to human rights induced by the utilization of algorithms in making determinations. To efficiently address the influence on human rights, the authors advocate that a mechanism that develops a shared process and means of computing such harm; possesses sufficient capability to address several actors and multiple types of responsibility; and may be implemented across the complete algorithmic life cycle, from the beginning to application, is required.

While not considered in discussions on algorithmic accountability, in this paper, the authors argue that international human rights law explains this structure. The authors discuss this

mechanism to demonstrate the influence it has on the options to implement algorithms in decision-making processes and the guidelines which needs to be followed as safeguards. Though the authors' study shows that in some situations, the application of algorithms may be limited, the authors advocate that the research does not go against innovation but instead suitable checks and balances to make sure that algorithms lead to attainment of sustainable goals for the society, while keeping the stakeholders safe against risks.

This paper counters this portrayal of International Human Rights Law ("IHRL) and such course of action, lays down key priorities for its future evolution. The manner of its ability to continue to involve itself in critical dissection of how IHRL can proactively counter the diverse and multifaceted challenges it counters. Second, instead of refraining from progressing due to criticism of overexpansion, IHRL should set an order of priority for the articulation and adjustment of how IHRL would be rendered applicable to entities which fail to utilize their rights in practice and to fresh perspectives and international challenges, such as artificial intelligence. Lastly, it should construct and further the process to the operationalization of IHRL to make sure that it fits within the basic points of key actors that can facilitate a transformation, including across government bodies as well as within companies and social revolutions.

40. MacLeod, Accident or Design? George Ravenscroft's Patent and the Invention of Lead Crystal Glass (1987) 28 Technology & Culture 776

Accidental discoveries and inventions are the stock-in-trade of modern-day legends: Newton's apple, Watt's kettle, and Archimedes' bath persist in popular imagination, along with the conception of inventors as unworldly geniuses who are rewarded for their persistence and material privations by stumbling on their invention by some happy accident. No reader of this journal would adopt such an uncritical view of inventive activity or countenance the simplistic heroic model it embodies. Yet, since so much of the history of invention at least starts with a

biographical approach, it is unfortunate how far we are dependent on material written by, or drawing on, Victorian hagiographers. It can be difficult to fight one's critical way past the giants of invention, lovingly inflated by Smiles and his like, to discover how an invention really reached the workplace or the market, especially when the records are sparse. Also inherent in this Victorian model are an unwillingness to regard inventors as economic agents, sullied by the search for gain, and a tendency to regard ultimate success as inevitable once the "right" solution had been discovered, with correspondingly little attention paid to development.' While historians of technology since the 1920s have adopted more sophisticated models of technical change, their tendency to concentrate on innovation and broader socioeconomic questions has meant that a critical reappraisal of invention (with some notable exceptions) has been relatively overlooked.

41. McKenzie Raub, Bots, Bias and Big Data: Artificial Intelligence, Algorithmic Bias and Disparate Impact Liability in Hiring Practices, 71 ARK. L. REV. 529, 532 (2018)

The paper can be broken down into three components. The first part will offer a short summary of artificial intelligence techniques, its community effects, and utilize emerging applications in hiring processes. The second part will debate the potential for influence attributable to the application of artificial intelligence in recruitment. Lastly, the third part will come up with possible answers to the problems related with the utilization of artificial intelligence technology, finally recommending an approach that requires thorough choice of the artificial intelligence program and creating an equilibrium in the use of artificial intelligence technique with human perception.

Initially, this paper will debate the manner in which machine learning and big data function conjointly under the aegis of artificial intelligence programme. The attention will then switch to both the beneficial and adverse societal consequences of big data and machine learning in the

community at large, and how this technique is applied in the recruitment scenario. Lastly, there will be a concise discourse on the problems attributable to the lack of significant diversity in the software segment and community view of artificial intelligence programme.

It is evident that artificial intelligence and predictive algorithms are here to stay in the community at large. Their significant ability to enhance efficiency and enable corporations to pay more attention to innovation instead of routine assignments makes it very likely that they will hold a considerable space in the office, including the hiring system. However, it is also evident that with the considerable potential artificial intelligence has one view, comes a number of challenges that could significantly enhance a company's disparate impact obligation under law.

The discussion is divided into three basic parts. Part one will provide a brief overview of artificial intelligence technology, its societal implications, and use emerging uses in hiring. Part two will discuss the potential for Title VII disparate impact arising from the use of artificial intelligence in hiring. Finally, part three will discuss proposed solutions to the challenges associated with the use of artificial intelligence technology, ultimately advocating for an approach that involves careful selection of the artificial intelligence program and balancing the use of artificial intelligence technology with human intuition.

First, this section will discuss in broad terms how machine learning and big data work together under the umbrella of artificial intelligence technology. The focus will then shift to both the positive and negative societal implications of big data and machine learning in society at large, and how this technology is utilized in the hiring context. Finally, there will be a brief discussion of the challenges stemming from a lack of meaningful diversity in the technology industry and public perceptions of artificial intelligence technology.

The author argues that employers should use their influence to push technology companies to

increase racial and gender diversity in the workforce. Given how pervasive and deeply-rooted the problems associated with a lack of racial and gender diversity in tech, it is unlikely that this change will come in the short term. However, given how drastically this could reduce the discriminatory effect of algorithms, the meaningful use of time and financial resources would likely be a worthwhile investment in the future of predictive hiring algorithms as a whole. Shunning algorithms completely because of their bias does nothing to solve the problems that create disparate impact liability. Employers seeking to take advantage of the benefits of artificial intelligence technology to increase hiring efficiency should be prepared to ask difficult questions and ensure that this technology is implemented in a way that is responsible. A balance between human accountability and a responsibly created and chosen artificial intelligence system may be the best way to deal with these core tensions. Bias is a challenge that is rooted in human nature, and it is passed in code to predictive hiring algorithms. As a result, attention must be given to both the short-term issues with biased algorithms and long-term issues associated with regulation and increasing diversity in the technology industry.

42. Michael Callier and Harly Callier, Blame it on the Machine: A Socio-Legal Analysis of Liability in an AI World 14 Wash. J. L. Tech. & Arts 49, 53 (2018)

As technology continues to progress, communication between humans and artificial intelligence will escalate. It is significant to comprehend that the influence AI can have on community, as well as the possible detriment and consequent liability that could lead to the development of the best practices devised to provide answers to them. The authors argue that U.S. urgently requires a regulatory framework to control the planning, creation, utilization and risks related with AI. No such mechanism has been brought in place as on date.

This paper adopts a socio-legal, interdisciplinary pathway to debate concepts on socio-ethical

issues and theories of liability related with AI, and implements a sociological view point to analyse current legal systems that presently regulate human-AI communication. By taking an interdisciplinary methodology, this paper wishes to enable holistic and comprehensive dialogue about the manner in which AI could be programmed and handled, hoping that humans and AI can exist simultaneously in a conciliatory manner. It also suggests a mechanism to control such progression in the U.S. There are a small number of restrictions as discussed in this paper.

Due to the fast pace of scientific change, the subsequent status of AI will be in stark contrast to the current condition. Therefore, the mechanism discussed in this paper could subsequently become outdated. Second, this paper is obtained from secondary sources and, though the data obtained includes considerable empirical information, no basic information was produced with the exception of the authors' perspective. Third, only particular features of AI were chosen for study – there are other parameters in policy, society and law that are not dealt with. Lastly, this paper is concerned with Western cultures, North America and Europe. Thus, it might not be capable of implementation internationally.

This paper dissects the dynamic between human beings and AI, and the regulations that control their communications. This paper first dissects how humans deal with AI, and specifically, with Socially Assistive AI. Subsequently, this paper analyses philosophical and moral problems related to human-AI interactions. Third, this paper attempts to comprehend whether an adequate legal and regulatory setting regulating human-AI interaction can be executed. Lastly, this article floats an ethical and legal mechanism to regulate AI development.

Recent progress in science and technology have plotted AI on a path to communicate with humans in unexpected ways. As human-AI communication increases, so will the related risks, many of which amount to threats to the civilization. Under the existing regulatory regime, responsibility frameworks to deal with and nullify those dangers are insufficient and put the

average customer at a considerable disadvantage when put against companies in a suitable situation to advance AI. A socio-legal angle is perfectly suited to plug that gap as it evaluates the sociological features of how human initiatives are formulated and classified. Additionally, legislators and the community at large must achieve the proper equilibrium between protecting community interests, scientific advancements and the economic advantages that could come out of the process. Documenting underlying policies to have a bearing on the programming of AI for the improvement of community with the help of the Asilomar Principles is the perfect beginning.

Robots and robotic technologies are now mature enough to leave the research lab and come to the consumer market in large numbers. These early technologies are just the start, and we might soon be witnessing a personal robotics revolution. These systems have the potential to revolutionize our daily lives and to transform our world in ways even more profound than broad access to the Internet and mobile phones have done over the past two decades. We need to be ready for them and, in particular, we need to think about them in the right way so that the lawmakers can craft better rules for them, and engineers can design them in ways that protect the values our society holds dear.

43. Neil M. Richards & William D. Smart, How Should the Law Think About Robots? ROBOT LAW 3 (2016)

This paper is to consider and dissect some of the fundamental questions related to law and artificial intelligence, to bring out their consequences. It relies on our perception as a cyberlaw expert and a roboticist to try an interdisciplinary adventure at few of the regulatory and technological questions we will counter. In this paper, the authors bring forward four claims regarding the manner in which the academia and the community should resolve this problem.

First, the authors propose a definition of artificial intelligence as non-biological independent

entities that the authors feel catches the fundamental essence of the legal and technical problems that artificial intelligence offers, and which could on a utilitarian basis be the foundation of a legal framework. Next, the authors deliberate on the unexpectedly advanced capacities of artificial intelligence in the contemporary era, and portray what artificial intelligence may be able to do accomplish over the next decade.

Third, the authors advocate that the project of law and artificial intelligence at the beginning should keenly study the experience of cyber-law, which has failed to detect the issues of new digital techniques for almost twenty years. This perception has divulged one especially significant lesson: when perceiving new technologies in regulatory parlance, the comparisons we utilise to comprehend them are of vital importance. Legal professionals are accustomed to perceiving legal subjects in the metaphoric sense, particularly in developing fields of the law like fresh technologies. If we get the comparisons wrong for artificial intelligence, the issues of cyber-law divulge that it could have adverse effects. Lastly, the authors advocate that one specifically attractive comparison for artificial intelligence should be dismissed at all costs, the perception that AI are "just like people" and there is a significant contrast between human and non-human artificial intelligence. This perception is termed as the 'the Android Fallacy'.

44. Neil Wilkof, Theories of intellectual property: Is it worth the effort? (2014) 9:4 J. Intell. Prop. L. & Pract. 257

While never distinguishing between the philosophy of, process, and a perspective of intellectual property, Prof. William Fisher talks about four critical interpretations, which are known as theories of intellectual property rights —(i) utilitarian for improving the conclusive social parameter, (ii) Lockean theory (a person has the right to the result of his intellectual endeavours); (iii) protecting personality in the secured work; and (iv) creating a just and fruitful mechanism.

The utilitarian theory may be executed in economic explanations to indicate the way in which intellectual property can assume the Benthamite way of 'the greatest good for the greatest number'. Latent in the more current notion of 'wealth-maximization', the focus is the way in which to produce a balance between the social costs and benefits associated with ensuring a regulatory outcome to IP laws. While the theory has produced many wonderful prospects on the way in which to achieve this balance, it has been observed to be horribly difficult to generate effective ways to dissect inputs, outputs and the process.

The labour theory is desirous of executing the basic rationale of John Locke to property rights. Locke suggested that a person should enjoy a natural right in the creation of his labour in applying raw materials that are 'held in common' into a finished product of increased value, and the regulator has a duty to implement the natural right attributable to such labour. The main questions with implementing this theory is that it does not offer an account on why labour won over and above a thing 'held in common' should give an entitlement to a person in such thing; if the response to that query is "yes", what is the significance of 'intellectual labour' and 'held in common'; and to what degree should one's rights be computed in the result of his labour (as Robert Nozick observed, "*if I pour my can of tomato juice into the ocean, do I own the ocean?*"). As a result, needing to execute the Lockean theory on property must definitely end in unthinkable uncertainty.

The personality theory is explained by Prof. Fisher as justifying property rights 'when and only when they would promote human flourishing by protecting or fostering fundamental human needs or interests'. An uncertainty can be traced here as well: in what way can we distribute the requirements or rights for the objective of promotion? Fisher talks about four such rights appropriate for intellectual property: 'privacy, personal self-actualization, existence, and kindness'. However, consensus is missing on the way in which to implement them. For

instance, is protecting trade secrets needed to protect entitlement of privacy? Some comment positively (right of privacy can be implemented to the freedom to disclose to a particular circle of persons in the absence of the apprehension that it will be disclosed to the general public), while rest of the commentators remark “no” (since a large portion of trade secrets are regulated and controlled by firms, that do not comprise of ‘personal features’ that privacy is intended to secure).

The last point of view requires a lesser amount of a stable foundation (‘an eclectic cluster of political and legal theorists’ ranging from Thomas Jefferson to the recent era). Called as “social planning theory”, it is considerably different from the utilitarian perspective in the way that it desires to go above the notion of ‘social welfare’ to a much broader range of the community lubricated by the regulation on intellectual property rights. An example offered is Neil Netanel's theory on copyright as desirous of serving ‘a robust, participatory, and pluralist civil society’ where ‘unions, churches, political and social movements, civic and neighbourhood associations, schools of thought, and educational institutions’ are present in considerable quantity. The main question with this theory is that it cannot, acquire a consensus on what are the objectives that such “social planning” intends to achieve. It is too small.

Fisher still refrains from raising his rhetorical arms. If none of these perspectives can really offer a one-stop shop for imagining intellectual property, they continue to be precious. To quote Fisher, “they can catalyse useful conversations among the various people and institutions responsible for shaping the law”, can “improve conversations between lawmakers and their constituents”, and “through continued conversations, there may lie some hope of addressing the inadequacies of the existing theories.” A person can determine whether acquiring such “conversation” requires the energy of wanting to construct “theories” of intellectual property.

45. Pierre-Luc Racine, Fostering Expressive Knowledge: The Copyrightability of Computer-Generated Works in Canada, 60 IDEA 544, 552, 553 (2020)

Artificial intelligence systems can now generate nuanced artistic and literary content independent of human intervention. Taking into account the lack of authorship, these contents are as of now not regulated by copyright regulations in Canada. In the last few decades, several academicians advocated for their regulation, with their arguments based primarily on the economic arguments. Developing further on this body of work, this paper will base the premises in the financial parameters of Canadian copyright regulations, through the concept of the equilibrium of rights forged in *Théberge* by the Supreme Court. Under this method, copyright regulations target encouragement of both the manufacture and allocation of creative content sharing expertise with the community. Since computer-generated content also include this expertise, this paper will indicate that it can be conversant to issue restricted economic entitlements to the persons who allocate them. This can provide financial motivation for these works rendering them accessible to the general people.

In this paper, the author argues that including computer-generated content in the domain of Canadian copyright regulation may be substantiated since its objective is primarily economic, subsequent to the concept of the equilibrium of interests formulated in Théberge. Copyright generally targets encouragement of the production and allocation of creative content disseminating expressive knowledge to the community. Therefore, ideally there should be the grant of a limited copyright to people taking part in the manufacture and sharing of computer-generated content, which is inclusive of aesthetic characteristics comparable to human-created content. A limited number of researchers have weighed this issue under the theory of Canadian law, so this paper represents a vital addition to the burgeoning field of study. Since they possess similar roots with Canadian copyright regulations, the author has looked at scholarly articles

from western liberal jurisdictions like the United States, the United Kingdom, and Australia. In Part II, the author has examined the technologies which form the basis of AI systems, especially the technologies that generate artistic and literary content. It will offer adequate perspectives to arrive at the conclusion that content generated by AI systems are not created by humans in the sense that was the intention of copyright regulations. In Part III, the author will provide arguments in favour of re-examining Canadian copyright law, that computer-generated content is excluded from its domain. Under the existing framework, only human creators can satisfy the originality parameter needed to obtain copyright. Regardless of all these developments, the author records that lack of human authorship does not include at the inception the broadening of the Canadian Copyright Act to content devoid of human input. Copyright regulations have traditionally been amenable to inculcate works generated with the backing of the inventions (for instance photography, phonograms, and cinematographic classes of copyrightable content). Few entitlements are even distributed to non-authors. It is therefore understandable that the Copyright Act can cover computer-generated content. Under the present framework, only human authors can satisfy the originality parameter needed to secure copyright protection. The author records that the lack of human authorship does not stop the broadening of the Canadian Copyright law to content devoid of human intervention. Copyright law has an inherent malleability for inculcation of content generated with the help of the inventions. Few entitlements are even distributed to non-authors. It is therefore imaginable that the Copyright regulations can cover computer-generated content.

In Part IV, to cover the discussion on the copyrightability of content and clarify the importance of the current research, the author has examined the Anglo-American materials on this issue and its dynamic rise almost four decades back. Beginning early 1980s, the initial research majorly back the inclusion of computer-generated content within the realm of copyright. For several

onlookers, computers were seen as implements helping humans in their creative projects. However, through the decades, the perception of AI technologies and the notion of copyright creations have gone through considerable changes, so questions about the real human contribution increased within academic circles. Nevertheless, it did not stop various researchers from continuing to suggest schemes for their inclusion under the regulatory regime of copyright. They fundamentally depend on their identical attributes with respect to human-authored creations and assert that such steps have already been adopted by some jurisdictions such as the United Kingdom. Finally, under the last part, substantiating on the basis of this groundwork, the author advances arguments regarding the economic goal of Canadian copyright regulations. The author will argue that the inclusion of computer-generated content may be in sync with copyright instrumentalist goals because they can be as attractive as human-authored creations and, more significantly, their security can motivate the replication of creative content. Hence, the author will indicate the conferring of a limited economic entitlement, under a framework similar to neighbouring rights, to the entities who set up the generation of computer-generated content.

46. R.A. Posner, Utilitarianism, Economics and Legal Theory J. Legal Stud. 8 (1979) 103, 119

Based in the academic precepts of utilitarianism and deontology, this article intends to analyse the question of child labour from a philosophical viewpoint. By connecting utilitarianism with normative stakeholder perspective, relevant stakeholder interests are being ascertained in order to analyse their effect on and function in the happening of child labour enabling a practical solution. The research may help corporate entities in particular as a foundation for decision-making in the construction of their value chains. The author utilizes a literature review to vet the findings of current research on the aspect of child labour in a philosophical backdrop, thereby relying on literature, cited in ‘Web of Science’ and ‘Google Scholar’ by applying

progressive and regressive evaluation. The investigation of child labour for the philosophical aspect, produces contradicting outcomes. From a deontological view point, child labour can never be driven by ethics and should always be refused as it is not desired to become a general regulatory scheme. As opposed to this, according to a utilitarian perspective, child labour is principally valid as long as the people benefiting from the effort are greater in frequency than the kids working or being inflicted with harm. The analysis of child labour from the aspect of deontology and utilitarianism in addition to normative stakeholder perspective constitutes a novelty in the domain of philosophy. The combination of theoretical research into a practical commercial context offers additional utility for managers and international supply chain coordinators.

47. Robert C. Denicola, Ex Machina: Copyright Protection for Computer Generated Works 69 Rutgers U.L. Rev. 251, 256 (2016)

A professor in France claims to have written a million books using his computer software platform. Many of the sports and financial news stories available on the Internet are written by computers. Computers also draw, paint, and compose music. Is their output copyrightable? Copyright law requires an identifiable human author because authors own copyrights and computers do not possess the personhood necessary to own property. The Copyright Office and some courts and commentators go further, requiring for copyright not only an identifiable human author, but also human authorship of the protected work. They demand, in other words, that the copyrightable expression in a work emanate from a human being. If a person uses a computer to assist in the manipulation of expression created by the user, the result is copyrightable. If a user's interaction with a computer prompts it to generate its own expression, the result is excluded from copyright. This is a tenuous and ultimately counter-productive distinction. It denies the incentive of copyright to an increasingly large group of works that are

indistinguishable in substance and value from works created by human beings. The copyright statute does not define "author" and the constitutional interpretation of that concept is sufficiently broad to include a human being who instigates the creation of a work. A computer user who initiates the creation of computer-generated expression should be recognized as the author and copyright owner of the resulting work. A number of foreign countries have already taken this step. The United States should join them.

48. Roberto Esposito, The Dispositif of the Person 8 L. CULT. & HUMAN. 17 (2012)

In this essay one of Italy's leading philosophers examines the category of person from legal, historical, and biopolitical perspectives. Reading texts ranging from Roman law to Christian theology to bioethics, Esposito shows how person functions in Foucault's terms as a 'dispositif', that is as a way of arranging the relation between the human and animal in contemporary subjectivity. Drawing on the etymology of person from persona or mask, Esposito shows how the term allows a subject to dispose of his or her animal half through the gift of grace in order to become a human person. Reading Saint Augustine, Simone Weil, and others, Esposito shows how the archaic role played by the person in Roman law returns today in liberalism's objectification of the body as a thing. Esposito concludes by elaborating a 'counterdispositif' of the impersonal as a way of transforming our political lexicon.

49. Rochelle Cooper Dreyfuss, Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm, 31 CARDOZO L. REV. 1437 (2010)

Arguments for strong intellectual property protection proceed on the assumption that exclusive rights are necessary to generate the incentives that encourage intellectual production. However, recent events suggest that that this assumption is questionable. Many creative endeavours are flourishing without strong intellectual property protection. Examples include fashion, stand-up comedy, magic, cuisine, and software (consider Linux, Apache, Firefox). Academic research

has long been conducted under a sharing regime, and even after the Bayh-Dole Act permitted universities to claim patent rights in faculty inventions, the Mertonian norm of communalism continues to exert a strong influence over academic practices. And as Eric von Hippel has amply demonstrated, users generate and share the fruits of their creativity in contexts as varied as extreme sports, surgery, library science, and commercial high-tech manufacturing. Now that the existence of these robust forms of production has been recognized, it is tempting to argue that traditional intellectual property rights should be abolished. At the same time, however, there may be limits to creative production outside the intellectual property paradigm. Ostensibly open systems are sometimes functionally dependent on copyright, patent, trademark, or trade secrecy law. The operation of these systems can also be highly contingent – sometimes on the innovative industry at issue or the technological infrastructure supporting it; sometimes on the sensibilities of particular individuals. Much of the theoretical work treats the education of creative workers as exogenous to the problem of innovation, but the calculus can vary once the need to motivate the acquisition of human capital is taken into account. There are also normative problems: Open innovation may be nonoptimal, it may lead to undesirable strategies for maintaining a competitive advantage, and it can be exploitative of knowledge workers. This paper therefore starts from the proposition that intellectual property rights will not soon disappear. It is intended to contribute to a new conversation on how intellectual property law ought to change in order to accommodate and sustain what Mario Biagioli has termed IP without IP.

50. Rochelle C. Dreyfuss, The Federal Circuit: A Case Study in Specialized Courts 64 N.Y.U. L. REV. 1 (1989)

In 1987, when the Federal Circuit was five years old, the author conducted a study of its administration of patent law. The article the author had written was gratifyingly well received, and many people suggested that the author re-examines the work of the court on the occasion of its twentieth anniversary. Unfortunately, the methodology that the author adopted the first time out could no longer be utilized. At the time, there were so few patent cases published that the author could read each one and analyse it both procedurally and substantively. Now, the number of cases is too large to make that tactic feasible. The time period is four times longer; patent filings and issuances have grown; more disputes are litigated; and the Federal Circuit has added new judgeships.

This study of the Federal Circuit therefore relies on secondary sources and anecdotal materials. The author had the great benefit of consulting with the Federal Trade Commission on its Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy and serving as a member of the National Academy of Science's Committee on Intellectual Property in the Knowledge-Based Economy. These positions have given the author the opportunity to listen to people who have studied the patent system from a wide variety of perspectives.

51. Russ Pearlman, Recognizing Artificial Intelligence (Al) as Authors and Inventors under US Intellectual Property Law, (2018) 24 (2) Richmond Journal of Law & Technology 1

U.S. IP law has grappled with the issue of non-human authorship and inventorship since the middle of the twentieth century when computer systems were first used in the generation of music and imaginative ideas. Today’s advanced Artificial Intelligence systems have “created” numerous works including musical compositions, art, writings, recipes, and potentially

patentable inventions. However, common-law, along with the policies and procedures of the U.S. Copyright Office and the U.S. Patent and Trademark Office, rejects the idea of non-human authorship or inventorship. These doctrines are not based off statutory requirements but on assumptions about computer capabilities stemming from an analysis done in the mid- twentieth century, almost 40 years ago.

Other contributors to this question have denied that AI authorship should ever be allowed or that AI should be treated as inert tools of creation no different than cameras or photocopiers. However, both approaches fail to appreciate the independent creation of modern AI's that process information in ways much like human brains—well beyond simple mechanical devices using simple mathematical algorithms.

This paper will begin with a review of the current state of AI, then turn to an examination of the legal treatment of non-human authors and inventors in U.S. intellectual property law, and finally, propose a change in the law to accommodate the designation of AI as authors and inventors. AI has advanced to the point where it can independently beat humans at the most complex games, compose works of art, and even generate potentially patentable inventions. Nevertheless, the law axiomatically denies that any non-human may apply for a copyright based on cases going all the way back to the 1800's, whereby courts and the law have grappled with fundamental questions of what it means to be creative and inventive. To that end, the law must change to recognize the reality of the advances of AI and shed the prejudices and postulations of the past.

Thus, to be consistent with the purpose of intellectual property law—to serve the public interest in the advancement of arts and sciences—United States law must recognize AI authorship and inventorship. This paper proposes a framework whereby AI may be granted ownership rights along with a necessary rights assignment scheme. The first step of the framework contains two

essential prongs in answering if an AI is sufficiently creative to gain recognition as an author or inventor: (1) the subject matter of the AI's output and (2) the AI's causation in development of the work or invention. The subject matter prong dives into the question of originality, while the causation prong dives into the question of independent creativity. Since similar rules have been applied by courts to determine both copyright and patent eligibility, adopting such a framework could rely on existing case law. Additionally, for AI works that pass the test, the law must be revised to support assignment of those IP rights to natural or legal persons, drawing from the work-for-hire and employed-to-invent assignment mechanisms that exist today.

Thus, this paper argues for recognition of AI authorship and inventorship. To that end, this paper presents a framework to analyse when such rights should be recognized based on (1) the subject matter (i.e., independence of the work) and (2) the causation (i.e., independence of the AI). In addition, the framework introduces an IP rights assignment regime like "work-for-hire" and "employed-to-invent" based on the nexus between the AI and the natural persons programming and/or using it. This approach avoids the complication of naming an AI as a legal or natural person under the law.

51. Ryan Calo, Artificial Intelligence Policy: A Primer and Roadmap, 51 U.C.D. L. REV. 399, 404 (2017)

This Essay, prepared in connection with the UC Davis Law Review's Fiftieth Anniversary symposium, Future-Proofing Law: From rDNA to Robots, is the author's attempt at introducing the AI policy debate to recent audiences, as well as offering a conceptual organization for existing participants. The Essay is designed to help policymakers, investors, scholars, and students understand the contemporary policy environment around artificial intelligence and the key challenges it presents. These include:

• justice and equity;

• use of force;

• safety and certification;

• privacy and power; and

• taxation and displacement of labour.

In addition to these topics, the Essay will touch briefly on a selection of broader systemic questions:

• institutional configuration and expertise;

• investment and procurement;

• removing hurdles to accountability; and

• correcting flawed mental models of AI.

In each instance, the Essay endeavours to give sufficient detail to describe the challenge without prejudging the policy outcome. This Essay is meant to be a roadmap, not the road itself. Its primary goal is to point the new entrant toward a wider debate and equip them with the context for further exploration and research. Part I offers a short background on artificial intelligence and defends the terminology of policy over comparable terms such as ethics and governance. Part II lays out the key policy concerns of AI as of this writing. Part III addresses the oddly tenacious and prevalent fear that AI poses an existential threat to humanity — a concern that, if true, would seem to dwarf all other policy concerns. A final section concludes.

52. Samuel Scholz, A Siri-ous Societal Issue: Should Autonomous Artificial Intelligence Receive Patent Or Copyright Protection?, 11 Cybaris INTELL. PROP. L. REV. 81, 86-87 (2020)

The issue is whether human creators or AI may receive copyright or patent protection for an original work that the AI autonomously creates. Current U.S. copyright and patent law is largely unsettled on this issue. Copyright and patent protection should not be granted to autonomous derivative works of an AI or deep learning algorithm. The following background section

provides a history of court cases and guidelines from the USPTO and U.S. Copyright Office. The discussion section illustrates why derivative works from AI or deep learning algorithms are not entitled to copyright and patent protection because they are not a product of human creativity and they fail to present a net social benefit.

As our society enters a new age of AI and supercomputing, we must consider the consequences of granting copyright or patent protection to autonomous AI derivative works. By applying Moore's Law, we can expect computing power to continue to grow exponentially. The protection of autonomous AI derivative works has been limited in copyright law by requiring some type of human intervention. In patent law, the 2019 guidelines show an intent to expand the patentability of software beyond the Supreme Court's rulings in Mayo and Alice by creating three enumerated groupings of previously abstract ideas that are no longer considered abstract: (1) mathematical concepts, (2) certain methods of organizing human activity, and (3) mental processes. However, other concepts that are abstract must still pass the modified Mayo test under the 2019 guidelines to achieve subject matter eligibility.

Additionally, patents and copyrights are likely granted to promote a net social benefit, and because the costs of patenting and copyrighting autonomous AI derivative works likely outweighs its benefits, we can conclude that patent and copyright protection cannot be granted because autonomous AI derivative works do provide a net social benefit.

53. SaritK. Mizrahi, *Jack of All Trades, Master of None: Is Copyright Protection Justified for Robotic Faux-Riginality?* WEROBOT 1, 2, 8 (Apr. 2019)

The twenty-first century is credited with machines that can generate anything from poems to novels, as well as musical compositions and works of art – all with a certain level of proficiency that would have any human doubting that it was created by a machine.

In view of machines' capacity to generate creative works that are indistinguishable from those

of humans, several scholars have posited that such content ought to be entitled to copyright protection because it ostensibly satisfies copyright's low originality threshold. Very few, however, have seriously contemplated whether these imitations of authorship are the types of works that copyright even ought to promote. This article argues that, despite the ability for machine-generated content to appear creative, it is inherently incapable of pursuing the goals that are fundamental to achieving copyright's purpose and should therefore not be afforded such protection. By delineating the types of intellectual endeavours copyright was historically constructed to protect, the first part of this article distinguishes authorship's essence from what the originality principle has come to embody in modern copyright legislation. It demonstrates why copyright's low originality threshold is not enough to justify protecting robotic works, despite their appearance of creativity.

The second part of this article proceeds to unearth the social dialogue that sits at the core of authorship and illustrates why robots lack the necessary qualities enabling them to participate in this crucial discourse. In its third part, this article exposes the acute difference between robotic productions and rule-based creations by humans. It demonstrates how the lack of intellectual labour implicated in the former makes it impossible to advance – and even risks hindering – the social dialogue underlying copyright. By illustrating how the denial of copyright protection for machine-generated content is unlikely to thwart advances in this arena, this article concludes that there is little to justify extending copyright protection to such works and offers support for their inclusion in the public domain.

Robots lack the necessary qualities for authorship, not only because their creations are not borne from any desire to convey a message to an audience, but also because their content is generated in isolation from the works of prior creators despite being based on them. Their inability to understand the cultural and historical significance behind the words and symbols

that make up natural-language effectively bars them from contributing to the social dialogue. Without the capacity to internalize and think critically about the writings of others, they can neither respond to what was written before them nor advance the state of knowledge in any meaningful way.

The ability to build upon the works of others is an absolute necessity in order to be successful in this undertaking. Not only is it impossible for robots to achieve this feat, but the speed with which they generate content could further impede the world's knowledge database by limiting the social dialogue. With robots' inherent inability to pursue copyright's goals, there is nothing to justify offering protection to machine-generated content, regardless of its ability to appear creative.

54. Shlomit Yanisky-Ravid, Generating Rembrandt: Artificial Intelligence, Copyright and Accountability in the 3A Era - The Human-like Authors are Already Here – A New Model (2017) Mich. St. Law Rev. 659, 673.

Artificial intelligence (AI) systems are creative, unpredictable, independent, autonomous, rational, evolving, capable of data collection, communicative, efficient, accurate, and have free choice among alternatives. Similar to humans, AI systems can autonomously create and generate creative works. The use of AI systems in the production of works, either for personal or manufacturing purposes, has become common in the 3A era of automated, autonomous, and advanced technology. Despite this progress, there is a deep and common concern in modern society that AI technology will become uncontrollable. There is therefore a call for social and legal tools for controlling AI systems' functions and outcomes. This Article addresses the questions of the copyrightability of artworks generated by AI systems: ownership and accountability.

The Article debates who should enjoy the benefits of copyright protection and who should be

responsible for the infringement of rights and damages caused by AI systems that independently produce creative works. Subsequently, this Article presents the AI Multi- Player paradigm, arguing against the imposition of these rights and responsibilities on the AI systems themselves or on the different stakeholders, mainly the programmers who develop such systems.

Most importantly, this Article proposes the adoption of a new model of accountability for works generated by AI systems: the AI Work Made for Hire (WMFH) model, which views the AI system as a creative employee or independent contractor of the user. Under this proposed model, ownership, control, and responsibility would be imposed on the humans or legal entities that use AI systems and enjoy its benefits. This model accurately reflects the human-like features of AI systems; it is justified by the theories behind copyright protection; and it serves as a practical solution to assuage the fears behind AI systems. In addition, this model unveils the powers behind the operation of AI systems; hence, it efficiently imposes accountability on clearly identifiable persons or legal entities. Since AI systems are copyrightable algorithms, this Article reflects on the accountability for AI systems in other legal regimes, such as tort or criminal law and in various industries using these systems.

In this Article, the author argues that under the "3A era" of automated, autonomous, and advanced technology, sophisticated AI systems and robots turn into talented authors. Indeed, these AI systems already function in the 3A era, generate products and services, make decisions, act, and independently create artworks. Can our legal system cope with questions of ownership and responsibility in the 3A era that have never been seen before? This discussion has deep roots in the copyright regime because AI systems are, ultimately, software algorithms that are regulated under the existing copyright law regime. The author argues that one of the main challenges in the near future, the accountability of AI systems, may be solved through the use of copyright lens.

Although diverse solutions have been proposed for dealing with the important issue of accountability for the works generated by autonomous AI systems, no one has yet seriously considered the solutions hidden within the paradigms embedded in the law of copyright. This Article proposes a new solution for dealing with the primary struggle regarding accountability of AI systems based on the copyright regime. The Article will address the fundamental intersection of AI systems and intellectual property laws. The Article proposes a solution taken from the copyright domain, one that might further influence the discussion of accountability for other products, such as autonomous cars and weapons, the drug industry, communication, and more. This relationship and the proposed solution (the new Model) have not been extensively discussed in the current literature. In an attempt to fill this gap in the literature, this Article will focus solely on the copyright regime.

This Article argues that the traditional laws of copyright are inadequate to cope with the new technology involved in creating artworks. I further argue that products and services independently generated by machines challenge the justifications under IP and copyright laws, which rely on humans to create the works. Copyright laws are simply ill-equipped to accommodate this tech revolution and are therefore unlikely to survive in their current form. In order to address the change in the way art is being created, we must either rethink these laws, give them new meaning, or be ready to replace them.

This Article proposes a few alternative scenarios of the new 3A era in which AI systems are capable of generating independent works. After discussing the drawbacks of these scenarios, I propose adopting a new model based on a broader version of the Work Made for Hire (WMFH) doctrine. 44 I propose that AI systems should be seen as the creative employee or self-contractor creators working for or with the user—the firm, human, or other legal entity operating the AI system. On the one hand, this proposal reflects and maintains the human

features of the AI system, such as independence, creativity, and intelligence. On the other hand, this proposal ensures that the employer or the user maintain the appropriate rights and duties, which include accountability for the outcomes of the AI system. This may be the best solution to the current problem of a lack of accountability for independent AI systems. Seeing the AI system through the copyright lens will provide new opportunities for imposing ownership and accountability on the known legal entities. Implementing a modified WMFH model may structure a feasible solution in the near future and impose responsibilities on the users who have affinities to the AI systems.

Part I of this Article will provide background on AI systems by discussing the different types of systems and their development over recent years. This Part will describe the features that make AI systems intelligent and creative and thus substitutes for human authors. Part II will address the question of who owns, and who takes the responsibility for, works created by AI systems. This Part presents two options. The first option is to see one of the humans or entities involved in the development of an AI system as the one who bears ownership and accountability for the outcomes of that system. The second option is to see the AI systems themselves as the digital, creative, and autonomous authors and hence the owners and the responsible entities for the works they produce. Part III will consider the various theoretical justifications for intellectual property protection. It will examine whether or not these theories lend any support or justification for these options or, alternatively, for a new option. Part IV will discuss the proposed model of AI systems, the WMFH model, and its implications for AI systems. Part V will discuss how U.S. copyright law is unprepared for the recent developments and challenges of AI systems, focusing primarily on the human authorship principle and extending copyright protection to works generated by automated creative AI systems. After determining that existing law is somewhat irrelevant and outdated, I propose that the AI WMFH model can cure not only

the inapplicability of current copyright law to new and advanced AI systems, but can also cure the desire to control these systems as well as to impose accountability on a legal known entity, such as the user of AI systems. By implementing the proposed model—one that sees AI systems as independent contractors or employees of the users and amending the law to accommodate the AI WMFH model—we can control the users of these systems, thus preventing situations in which the public loses control over the unknown outcomes of the AI systems.

55. Toni Selkala and Mikko Rajavuori, *Traditions, Myths, and Utopias of Personhood: An Introduction* 18 German L.J. 1017, 1029 (2017)

Legal personhood continues to serve an important role in the legal system. The millennial distinction of persons and things, while often unarticulated, is an essential building block of all legal relations. This introduction to persons and things outlines the past tradition, draws on present myths, and construes a utopia of which the articles in this special issue will comment, clarify, and criticize.

It is commonplace to argue that personhood is "grossly undertheorized" while at the same time participating in a lively debate over personhood across number of disciplines. This foundational myth constitutes the power of a proposed solution and its original, explanatory power by revealing the unprecedented inattention to personhood and, in doing so, making the author's attention to it even more mystical in return. Most often, the myth of unprecedented inattention highlights the fact that due to this inattention, a legal entity is discriminated against or not seen in the proper light. The present notion of personhood, grossly undertheorized as it might be, is a malign ideological lens that inverts the universal legal reality it is supposed to uphold to veer towards particularism. Re-adjusting personhood, the myth insists, will correct the wrongs endured.

Here, the authors attempt to steer away from repeating the myth of unprecedented inattention.

Rather, the authors seek to analyse the curious perception that often the very act of casting a light on inattention has been employed to perpetuate injustices attributed to that inattention. Thus, the authors attempt to build a new tradition and construct a myth to uphold an ideological utopia of legal personality, or, alternatively, a readjustment of the present voluminous debate to address that which hides in the plain sight.

This introduction is divided into two distinct parts. The first part provides a brief historical background of the conceptual development of legal personhood in the Occidental legal systems and their offspring, the Eurocentric international law. The latter part offers a more contemporary backdrop within which the articles of the present special issue operate as well as a modest proposal for a lens through which to reflect the emerging arguments for and against new categories of personhood. Even though these parts function independently, the theory formulation in the latter part builds upon the nuanced history of legal personhood.

56. Victor M. Palace, *What If Artificial Intelligence Wrote This: Artificial Intelligence and Copyright Law* 71 Fla. L. Rev. 217, 222 (2019).

The increasing sophistication and proliferation of artificial intelligence has given rise to a provoking question in copyright law: Who is the copyright owner of a work created by autonomous artificial intelligence? In other words, when a machine learns, thinks, and acts without human input, and it creates a work, what person should own the copyright, if any? This Note explains why this is a pressing question and why current laws and practices fail to address the issue. It then analyses the arguments for and against the possible choices: the artificial intelligence, the user, the programmer, the company that owns the artificial intelligence, and entrance into the public domain. Finally, this Note arrives at the conclusion that the work's immediate entrance into the public domain is the solution. For purposes of this Note,

"autonomous artificial intelligence" is artificial intelligence where the only human inputs are the initial algorithm and the "rules"; the machine performs the learning, thinking, and acting. Legal tension arises from the fact that it is not immediately clear who owns the copyright of a work created by such a machine.

To resolve this, Congress and the federal courts may choose to grant the copyright for such works to the artificial intelligence, the user, the programmer, or the artificial intelligence company. Or they may choose to grant no copyright at all; that is, they may choose to place such works into the public domain immediately upon creation, where everyone would be free to use them. This Note explains why this tension is a pressing issue, why current copyright law fails to address it, and why the last choice, immediate entrance into the public domain, is the solution.

Part I explains why Congress or the federal courts will soon have to make this choice. It provides a brief historical outline and current developments regarding computers to conclude that the sophistication of artificial intelligence will continue to increase. This Part also discusses the increasing popularity of artificial intelligence to highlight the urgency of the issue. It concludes that the continuing increase in sophistication and popularity of artificial intelligence will soon force Congress or the federal courts to act.

Part II explains why current copyright law fails to address the question. It discusses congressional silence, judicial reluctance, and the Copyright Office's rules. This Part then explains why the only source of guidance, the Copyright Office's rules, is based on law that is blind to the issue. It concludes that the Copyright Office's rules are ambiguous and antiquated and thus fail to properly answer the question.

Part III explains the arguments for and against the possible choices: the artificial intelligence, the user, the programmer, the company that owns the artificial intelligence, and entrance into the public domain. It then compares the arguments to conclude that immediate entrance into the public domain is the answer.

The increasing sophistication and proliferation of artificial intelligence has given rise to a pressing question: Who is the copyright owner of a work created by autonomous artificial intelligence? Thus far, Congress has remained silent on the issue, federal courts have yet to face the question, and the little guidance provided by the Copyright Office is ambiguous and antiquated. Out of the possible choices, immediate entrance into the public domain is the best option. Allocation of copyright ownership to the artificial intelligence would lead to nonhuman standing, which would lead to unnecessary uncertainty in the legal system. This would also lead to lost incentives, which is contrary to the goals of the Patent and Copyright Clause of the Constitution. Likewise, allocation to the user, programmer, or artificial intelligence company would lead to over-rewarding, and it could lead to unequal access to artificial intelligence. On the other hand, immediate entrance into the public domain would ensure that the users, programmers, and companies are adequately rewarded, and it would ensure that humans remain an integral part of the creative fields.

57. Y S Kharitonova and V S Savina, *Artificial Intelligence Technology and Law: Challenges of Our Time* 49 Perm U Herald Jurid Sci 524, 540 (2020)

The article is devoted to the analysis of issues of protecting the rights to digital content created using artificial intelligence technology and neural networks, which are updated with the development of these technologies and the expansion of their application in various areas of society. Issues on protecting the rights and legitimate interests of developers have come to the fore in the field of intellectual property law. At the same time, with the help of intelligent

systems, it can be created not only legally readable content but also other data, relations about which are also subject to protection. In this regard, the standardization of requirements for procedures and means of storage big data used in the development, testing, and operation of artificial intelligence systems, as well as the use of blockchain technology, are of particular importance.

Purpose: to form an idea of the areas of legal and the prospects for the application of artificial intelligence technology from a legal perspective based on an analysis of Russian and foreign scientific sources.

Methods: empirical methods of comparison, description, interpretation; theoretical methods of formal and dialectical logic. Private scientific methods were used: legal-dogmatic and the method of interpretation of legal norms. Results: analysis of the practice of using artificial intelligence systems showed the analysis of the practice of using artificial intelligence systems has shown that today intelligent algorithms are understood as a variety of technologies that are based on or related to intelligent systems but do not always fall under the concept of classical artificial intelligence. Strictly speaking excellent, The results created by autonomous artificial intelligence have features of works. At the same time, the resolution of issues of a public law nature is required: obtaining consent to the processing of data from the subjects of this data, determining the legal personality of these persons, establishing legal liability in connection with the unfair use of data obtained for decision-making. Standardization and application of blockchain technology can help in their resolution.

Conclusions: In connection with the identified and continuously changing composition of high technologies that fall under the definition of artificial intelligence highlights various issues that are divided into groups. Several issues of legal regulation in this area have already been resolved and have lost their relevance for advanced legal science (legal personality of artificial

intelligence technology), some issues can be resolved using existing legal mechanisms (analysis of personal data and other information in the course of applying computational intelligence technology for decision-making). Some require new approaches from legal science (development of a sui generis legal regime for the results of artificial intelligence technology, provided that the first result is obtained).

58. Annsley Merelle Ward, The role of big data, SEPs, PAEs and copyright in Digital Transformation: IP Tech Summit 2020 Report, https://ipkitten.blogspot.com/2021/01/guest-post-role-of-big-data-seps-paes.html

Our understanding of artificial intelligence is linked to human intelligence: visual perception, language understanding and creativity. AI distinguishes itself over previous technology in terms of its complexity and its capabilities.

Does this require changes in the law? Opinions were strongly divided on whether existing legal systems have adequate flexibility to accommodate the different aspects related to the development of AI (such as gathering and utilizing training data, developing the algorithm/model, and utilizing the output). Aurélie Jiminez (Member of EPO Board of Appeal 3.1.0.1) is of the opinion that the existing legal framework (specifically talking about the EPC) is flexible enough and that we are still talking about CII, regarding which extensive case law has already been developed. Others argued that current patent systems are too slow for fast-paced technology such as AI (also described as a "moving target"), making patenting infeasible at least for start-up companies. Martin Müller (President of EPO Board of Appeal 3.5.06) added that we may have to reconsider the statutory exclusions from patentability if AI inventions are excluded solely because the contribution lies within mathematics.

It quickly became apparent that one's ability to navigate through existing patent law in order to protect an AI/CII invention depends greatly on claim drafting, both in Europe and in the US.

The fact that there is no standardized terminology, makes an already difficult topic even more complex. In any event, it was recommended to avoid mathematical equations and terms like 'neural networks'. Another difficulty is that AI systems largely depend on data, which is difficult to include in a patent application, and that it can be problematic to reproduce an AI achievement due to the large number of parameters involved (the so-called "replication crisis"). This requires guidance from patent offices. The EPO has already issued guidance on this topic (see here), and guidelines will soon follow from the USPTO (see here). Likewise, Dr. Ulrike Till (Director of the AI Policy Division at WIPO) hinted at the near arrival of guidelines, strategies and instruments applicable to AI and IP prepared by WIPO.

Finally, what would an AI session be without a debate on DABUS, the first named AI-inventor on a patent application (see here)? Although this was welcomed as an interesting attempt to develop the rules on AI and patents, most panellists agreed that the EPO in the currently pending appeal will not allow an AI-system to be named as the inventor on a patent application. This point of view was also recently adopted in AIPPI Resolution Q272 (see here), which states: "An AI should not be considered an inventor or a co-inventor of an invention, nor be permitted to be named as such, even if no contribution to the invention by a natural person is identifiable." The question of AI-inventorship was described as more important for the US, where a patent can be deemed unenforceable if it does not identify the inventor correctly.

59. Jennifer O'Farrell and Doug Ealey, AI & IP Consultation - Focus on Patents, https://www.dyoung.com/en/knowledgebank/articles/ai-ip-consultation-patents

As AIs become increasingly autonomous and complex, the patents section of the current consultation focuses on whether AIs could, and should, be listed as inventors, as has recently been accepted in Australia and South Africa. This is of course an important issue in the UK, where patent ownership follows inventorship. The UKIPO's current system for determining

inventorship of inventions made using an AI is not fit for purpose since it gives no credit for the invention to the devisor of the AI, even though they may have been instrumental in arriving at the invention.

The authors consider that, for the foreseeable future, AIs simply cannot be considered to be inventors. AIs are increasingly capable of generating new things which are not obvious to a person skilled in the art, as required for inventive step. However, this does not mean that the AI is the devisor of the invention because there is an implication of planning, forethought and foresight within the term 'devise' that cannot be achieved by current AIs.

Typically, the planning, forethought, and foresight required to devise an invention are provided by the people responsible for creating and training an AI. The AI then generates an output or function, which is latent within a concept space occupied by the training set and inputs provided by those people. Hence whilst the output of the AI may be novel and non-obvious, the AI is merely a sophisticated processing tool and therefore cannot be considered an inventor. Rather, in this scenario, the inventors should be the people responsible for training the AI.

Option 1 could be achieved by amending the Patents Act to include a new provision similar to section 9(3) of the Copyright, Designs and Patents Act 1988 (CDPA), where authorship is accorded to the person "by whom the arrangements necessary for the creation of the work are undertaken". This seems to be a clear and straightforward option, and would unify the approach between copyright, designs and patents.

As discussed, the authors consider that AIs are simply not capable of devising inventions, and therefore cannot be considered inventors. In addition, identifying AIs as inventors on UK patent applications would lead to a series of additional problems. For example, declaring AIs to be inventors opens up questions for inventive step, who the skilled person still is and what forms the state of the art. The skilled person is conventionally understood to have full knowledge, but

a limited capacity for innovation. Meanwhile the knowledge of an AI is limited to its training and by its architecture, but within that it may have the potential to fully explore the concept space these define.

Different training, architectures, and inputs of AIs can be assumed to generate different inventive capabilities, but are all unknowns that create a new degree of uncertainty when assessing inventive step. This uncertainty would be mirrored in deciding what constitutes the state of the art for an AI. For example, AIs could be considered exempt from knowledge that is offline such as paper-only books, or public prior use. Conversely, AIs could be considered able to use machine-readable data such as binary or encoded information not normally treated as practically accessible to the skilled person.

There are also a number of practical obligations placed upon inventors, including assigning and licencing patent applications. These could not be performed by an AI. We must also consider the implications that amending UK law to list AIs as inventors would have on applications which are subsequently filed in other jurisdictions. For example, an AI could not fulfil the assignment and declaration requirements of the US. Further, where an AI is in the cloud, it may be difficult to assign a nationality to an AI, which would have implications in countries which require patent applications to be first filed as a national application. Finally, if an AI can be acknowledged as an inventor in the UK, but not in other jurisdictions, there are implications for both the inventorship and ownership of applications claiming priority to a UK application which lists an AI as an inventor. This may lead to the need to first file outside the UK in a jurisdiction which does not allow AIs to be listed as inventors, to ensure a valid priority application which can be relied on in all jurisdictions.

In short, allowing AIs to be listed as inventors has a number of legal and practical implications in both the UK and other jurisdictions which would need to be addressed if this option were

pursued._The final option proposed in the UKIPO consultation is a new sui generis right for alleged AI inventions. We consider that there is no need for such a right if we accept that AIs are not capable of devising inventions. Further, the introduction of a new right is also likely to lead to additional issues making it an unattractive proposal.

Although many people discuss AIs as though they were identical this is, of course, incorrect. A new right for alleged AI inventions would require AIs to be accurately defined in order to determine which inventions should be protected by this right. Since not all innovation which involves the use of an AI is likely to be derived solely by the AI, careful consideration would also need to be given to when an AI is used as a tool and when the AI itself has produced the invention. In such a rapidly developing field these are likely to represent ongoing and substantial challenges.

It would represent another challenge to determine the appropriate scope of protection for such a new right. If the scope were the same as that of a traditional patent one would query why the new right is actually required. Similarly, if the new right were to offer more limited protection the new right may be unappealing, as may currently be the case for utility patents in some jurisdictions.

There are also likely to be difficulties associated with claiming priority from the new right in jurisdictions which do not offer a corresponding right for AI inventions. This could represent a significant hurdle, requiring either a large number of bilateral agreements or an amendment to the Paris Convention to recognise the new right.

There are also likely to be difficulties if an invention is considered to have been co-invented by a human and an AI. At present it is not clear whether such an invention should be protected by a patent or by a new sui generis right, and whether it would be possible for an invention to be transferred between the patent system and the new sui generis right if, for example, the claims

were limited during prosecution to exclude the contribution made by the human or by the AI. This would lead to new uncertainty for third parties.

It is apparent that AIs will make a comprehensive contribution to innovation over the coming years. There is therefore a need to ensure that such innovation is appropriately protected and attributed in order to encourage innovation. However, the authors consider that AIs are simply not capable of devising inventions, and that they should therefore not be listed as inventors on patent applications. A sui generis right would be unlikely to offer appropriate protection, both in the UK and abroad, particularly in view of the rapidly evolving nature and widespread use of this technology.

The authors consider that the most appropriate response to the present consultation is an expanded definition of the term "inventor" to include humans responsible for an AI system which generates patentable subject-matter. In this way, such innovations would be appropriately protected and owned whilst maintaining certainty for all parties.

On 20 October 2020, the European Parliament adopted a resolution on IP rights for the development of AI technologies. In parallel, on 25 November 2020, the European Commission published a commissioned study on challenges posed by AI to the European IP rights framework. The study, which was carried out by researchers at the Institute for Information Law and the Joint Institute for Innovation Policy (JIIP), examines the state of the art of copyright and patent protection in Europe for AI-assisted outputs in general and in three priority domains: science (in particular meteorology), media (journalism), and pharmaceutical research. The term "AI-assisted outputs" is used in the study to refer to productions or applications generated by or with the assistance of AI systems, tools or techniques.

For EU copyright law, the study looks into whether AI-assisted outputs qualify as works, at issues of authorship and ownership of AI outputs, at their protection by related rights, and at

specific case studies in the areas of automated journalism and meteorology. The analysis is concentrated on the EU copyright acquis and its interpretation by the Court of Justice of the EU (CJEU)._As the state-of-the-art review demonstrates, the use of AI systems in the realms of culture, innovation and science has grown spectacularly in recent years and should continue to do so. AI systems have become almost ubiquitous in meteorology and in pharmaceutical research and are making deep inroads into media and journalism. Outside these domains, AI systems are being used to generate diverse literary and artistic content, including translations, poems, scripts, novels, photos, paintings, etc. Likewise, a wide variety of innovative and inventive activity relies on AI systems for its development and deployment, from facial recognition to autonomous driving.

AI systems have become increasingly sophisticated and autonomous, and they will continue to improve their capacity. The study assumes that fully autonomous creation or invention by AI does not yet exist, nor will not exist for the foreseeable future. The study, therefore, views AI systems primarily as tools in the hands of human operators. The legal part of the study examines whether, and to what extent, AI-assisted outputs are protected by European copyright law, related rights or patent law. For copyright, the analysis is concentrated on the EU copyright acquis and its interpretation by the Court of Justice of the EU. The patent analysis concentrates on the European Patent Convention (EPC).

For EU copyright law, the study looks into whether AI-assisted outputs qualify as works, at issues of authorship and ownership of AI outputs, at their protection by related rights, and at specific case studies in the areas of automated journalism and meteorology. The study reaches the following conclusions and recommendations:

i. Current EU copyright rules are generally sufficiently flexible to deal with the challenges posed by AI-assisted outputs.

ii. The absence of (fully) harmonised rules of authorship and copyright ownership has led to divergent solutions in the national law of distinct Member States in respect of AI-assisted works, which might justify a harmonisation initiative.

iii. Further research into the risks of false authorship attributions by publishers of "work-like" but "authorless" AI productions, seen in the light of the general authorship presumption in art. 5 of the Enforcement Directive (2004/48/EC), should be considered.

iv. Related rights regimes in the EU potentially extend to "authorless" AI productions in a variety of sectors: audio recording, broadcasting, audiovisual recording, and news. In addition, the sui generis database right may offer protection to AI-produced databases that are the result of substantial investment.

v. The creation/obtaining distinction in the sui generis right is a cause of legal uncertainty regarding the status of machine-generated data that could justify revision or clarification of the EU Database Directive (96/9/EC).

In respect of European patent law – and in particular, the EPC – the study looks into a number of issues related to AI-assisted outputs: inventorship, ownership, novelty assessment, inventive step, sufficiency of disclosure, and the case study of drug discovery. On these topics, the study offers the following conclusions and recommendations:

i. The EPC is suitable to address the challenges posed by AI technologies in the context of AI-assisted inventions or outputs.

ii. When assessing novelty, national IPOs and the EPO should consider investing in maintaining a level of AI capability that matches the technology available to sophisticated patent applicants.

iii. When assessing inventive step, it may be advisable to update EPO Examination Guidelines to adjust the definition of the "person skilled in the art" and secondary indicia to track developments in AI-assisted inventions or outputs.

iv. When assessing sufficiency of disclosure, it would be useful to study the feasibility and usefulness of a deposit system for AI algorithms and/or training data and models that would require applicants in appropriate cases to provide information that is relevant to meet this legal requirement.

v. For the remaining potential challenges identified, it may be good policy to wait for cases to emerge in particular before national courts to identify actual issues that require a regulatory response, if any.

vi. Further study of the role of alternative IP regimes to protect AI-assisted outputs, such as trade secret protection, unfair competition and contract law, should be encouraged.

In sum, the study concludes that the current state of the art in AI does not require or justify immediate substantive changes in copyright and patent law in Europe. The existing concepts of copyright and patent law are sufficiently abstract and flexible to meet the current challenges from AI. Producers of AI-assisted outputs also have access to less demanding regimes, such as related (neighbouring) rights and sui generis database protection.