

A Humanless World: The Progressive Artificial Intelligence and its Impact on Intellectual Property

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Abstract

With recent leaps in the field of robotics and artificial intelligence, the boundary between science fiction and reality continues to blur, especially as computers performing actions previously thought to be unique only to man (often times, more efficiently) becomes more common. Though challenged by the traversal of the physical realm, their capabilities of mimicking human problem solving and creativity is growing exponentially.

In discovering this potential lies the possibility of a cultural and scientific enrichment, the likes of which will dwarf both the Renaissance and the Industrial Revolution, respectively. Naturally this is accompanied by countless inventions and artistic expressions from which society will inevitably benefit. However, due to their originators likely being wholly, or at least in part, computers, the question will arise as to who their true owners will be from a legal standpoint.

This article will examine the extent to which human and machine intelligence can be compared and will attempt to ascertain the ways in which the latter could pose a threat to the system of Intellectual Property laws in place to protect the rights of creators. Where possible, the piece will also attempt to propose potential remedies and pre-emptive actions to alleviate the dangers such a synthetic revolution could cause to IP's legal framework.

Introduction

Throughout the ages, science fiction writers and futurists alike have dreamt of a world in which technological advancements have created machines capable of mimicking and reproducing intelligence indistinguishable from that of unaltered humans. With the recent frequent leaps in the computational potential of computer systems and staggering advancements in programming, machines are beginning to exhibit what is, at first glance, human intelligence. Thus, a Jules Verne-esque future seems likely to be upon us soon. If we are to accept these signs as evidence of an impending cognitive revolution, it seems imperative to ensure the current legal framework is well equipped to deal with the inevitably emerging matters of ownership of non-corporeal creations; in other words, Intellectual Property.

The aim of this paper is to show that the current legal framework cannot effectively deal with all impending implications of the rise of Artificial Intelligence (AI) in all its forms. Done through an initial discussion of theories of intelligence exploring machines' capability of exhibiting intelligence in a way similar enough to how humans exhibit it, and whether this qualifies them for IP protection. Next, a depiction of the core justification theories of IP will be presented for use throughout the essay. Subsequently, a series of contemporary examples will be provided which will challenge specific elements of IP law in the areas of copyright and patent. These will be succeeded by exploration of more conceptual developments which would further cast doubt on the system's ability to accommodate radical changes. Potential solutions will be suggested where available, however the theoretical nature of the ideas explored will prove to be a barrier for all encompassing remedies. Finally, a summary of the arguments proposed will be presented, ultimately aiming to convince the reader

that preparations should be made to the current legal system if IP as we know it is to survive a cognitive revolution.

Is artificial intelligence equal to human intelligence?

The common-sense understanding of artificial intelligence is generally limited to the imagery of a sentient digital entity capable of independent thought, whether housed in a mobile robotic hull or a computer system. Popular culture has disseminated this image through both the film industry¹ and literary works,² which are often adapted into movies themselves. However, it is often forgotten, that at its core, AI is a computer program created to behave in the manner of natural intelligence, be it through mirroring it or more recently by following example through machine learning. Throughout this essay, it is vital to note that all examples explored will not necessarily be limited to the common-sense understanding of AI, but will be affected by it to differing extents.

The academic community is greatly divided regarding the accurate definition of intelligence. A discussion of AI with regards to all possible definitions would be nearly inexhaustible. To avoid this, four theories will be briefly analysed, and an amalgamation will be adopted as a basis for arguments to follow.

Perhaps the founding and most notable definition of intelligence can be extracted from Descartes' expression, 'I think, therefore I am.'³ While itself not a definition of intelligence, the notion can be understood to suggest that the very act of reasoning inherent in the process of thinking is proof of existence, provided the

¹ See Stanley Kubrick, *2001: A Space Odyssey* (1968) for one of the most popular examples of AI portrayed in that image

² See Isaac Asimov, *Bicentennial Man* (1976) and Chris Columbus, *Bicentennial Man* (1999) for its subsequent movie adaptation

³ René Descartes *The Principles of Philosophy* (John Veitch, Blackmask Online, 2002) 10, 11 Available at <<https://faculty.iiit.ac.in/~bipin/files/Dawkins/New/Descartes%252C%20Rene%20-%20The%20Principles%20of%20Philosophy.pdf>> Accessed 22/01/2018

organism is aware of the process taking place. From this, the base requirements of intelligence can be extrapolated as being the ability to reason and the realisation of its taking place.

However, given its position as the bedrock argument for existence, it has been severely criticised throughout the ages by academics for being insufficient in fully defining intelligence as evident in humanity. Damasio disagrees that reasoning capabilities and the realisation of their use is enough to prove intelligence.⁴ He argues that at the core of what humans perceive as intelligence is the ability to feel emotions.⁵ It is key to note that Damasio does not imply that reasoning is to be removed from the equation of intelligence.⁶

Moravec sees mobility as a requirement for intelligence.⁷ In his argument he believes that reasoning is merely built upon previous information accrued over the millennia of human evolution, namely unconscious sensorimotor knowledge.⁸ He presents the comparison between plant and animal, where the animal, due to its mobility, shows signs of what would be interpreted as intelligence, whereas the plant, according to Moravec, may eventually develop 'something akin to nervous action'; 'but the life expectancy of the universe may be insufficient.'⁹ Put simply, due to their mobility, animals can show signs of intelligence where plants cannot. He bases this on the necessity of exploration, which he does not expand on, but can be reasonably understood as necessary for the neural network to be stimulated by new information. Clearly, plants' immobility prevents this. However, even if this theory holds true, in an

⁴ Antonio Damasio *Descartes' Error: Emotion, Reason and the Human Brain* (Avon Books New York, 1995) 248 Available at <https://bdgrdemocracy.files.wordpress.com/2014/04/descartes-error_antonio-damasio.pdf> Accessed 22/01/2018

⁵ *ibid*

⁶ *ibid*

⁷ Hans Moravec *Mind Children: The Future of Robot and Human Intelligence* (Harvard University Press, 1988)

⁸ *ibid* 15

⁹ *ibid* 16

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interconnected world where a single computer can simultaneously communicate with billions of others the globe over and gather information from countless input devices - microphones, cameras, satellite coverage, to name a few - any computer system with access to the world wide web capable of reasoning would be constantly introduced immeasurable quantities of new information. It should be noted that Moravec's vision, though forward thinking, was based prior to the World Wide Web entering the public domain and becoming what we know it as today. Thus, Moravec's theory can still be applicable, but only if movement is interpreted as a means of information gathering and data collection being the indicator of intelligence.

Despite the differences in these theories, a fundamental and irreducible similarity exists. It is that the ability to reason and deduce is a core necessity for intelligence to exist. To this, we can apply Moravec's prediction that AI will be able to 'distinguish reasonable situations from absurd ones, and to intuit some solutions by observing them happen in its model'¹⁰ and its effectual modern reality, whereby computers collate information and deduce the most appropriate solution to a problem.¹¹ It is here that we see evidence of Moravec's prediction of biological and post-biological intelligence beginning to dissolve, where machines, or AI, not only reach human level intelligence, but exceed it many times fold. He bases this argument on a rough calculation of a human brain's computational capabilities of 10 trillion calculations per second,¹² a threshold broken in 2011 and currently eclipsed by the fastest modern supercomputer.¹³ Thus, it can be concluded that modern computers

¹⁰ *ibid* 20

¹¹ Maurice Conti, 'The incredible inventions of intuitive AI' (Speech at TEDxProtland, Portland, 15 April 2016) <https://www.ted.com/talks/maurice_conti_the_incredible_inventions_of_intuitive_ai> Accessed 22/01/2018

¹² Hans Moravec (n 7) 59

¹³ Jack Dongarra, 'Report on the Sunway TaihuLight System' (University of Tennessee, 2016) <<http://www.netlib.org/utk/people/JackDongarra/PAPERS/sunway-report-2016.pdf>> Accessed 22/01/2018

and their work is to a degree on par with that of humans' intellectual labour. This will act as the basis for the arguments throughout this essay.

Justifications of IP law

The fundamental principle underlining IP law is the idea that a person must be rewarded for their work, which is not too different from the core reasoning behind the concept of ownership in property law. The essential difference, however, is that the latter deals with rights to the tangible objects which are easy to assess and perceive, such as a book. The former is instead concerned with the non-corporeal forming part of the same object, such as the tale told in the very same book. However, since the ultimate result of IP is the conferring of monopoly rights to a person over the use of something, it is generally necessary to justify it in the face of the democratic state we inhabit.¹⁴ This is because granting monopoly power over socially significant technological inventions and cultural artefacts demands the approval of the populace it affects.¹⁵ In a democratic state built upon the forfeiture of rights by its citizens,¹⁶ it would be entirely unjust if such preferential treatment is afforded to a person without appropriate justification. Conversely, we risk IP to be perceived as an unjust method of rewards propagating favouritism and nepotism. Three theories will be briefly outlined which have been employed to achieve such justification.

¹⁴ Tanya Aplin and Jennifer Davis, *Intellectual Property Law. Text, Cases and Materials* (Oxford University Press, 2013) p 3

¹⁵ *ibid*

¹⁶ Thomas Hobbes, *Leviathan* (St Paul's Churchyard, 1651) Available at <https://www.gutenberg.org/files/3207/3207-h/3207-h.htm> Accessed on 8/08/2018

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Labour theories

Locke argues that the application of labour is the natural process every human must endure to stake their claim on the world.¹⁷ He stipulates that a person should only be awarded rights associated with such matters for 'the labour of *his* body, and the work of *his* hands'.¹⁸ Effectively, he sees it necessary for a person to apply some sort of force to their surrounding world in order to shape something previously non-existent and it is this creation that rights should be awarded for. Thus, such rights emerge naturally from the work done and the theory falls into the class of 'Natural justification theories'. While the theory is originally created to justify awarding property rights over corporeal things, not of the intangible, it can easily be adapted to suit the purposes of IP law. The requirement of raw physical labour, such as that of building a house, can simply be substituted for mental exertion, which can be evidenced by similar applications of force in the form of numerous trials and errors, an application of effort, skill, as well as time invested into its creation.¹⁹

Personality theories

These theories also fall under the category of 'Natural justification theories' as they value the unique individual characteristics of creators. They also argue that a spark of genius is necessary for the creation of something new, which should be rewarded with IP rights.²⁰ Hegel places importance on the relationship between the creator and their work as he finds that in the act of creation and in the final product lies a unique creative

¹⁷ John Locke, *Two Treatises of Government* (Peter Laslett ed., Cambridge Univ. Press 1988) Available at <<http://socserv2.socsci.mcmaster.ca/econ/ugcm/3ll3/locke/government.pdf>> Accessed 23/01/2018

¹⁸ *ibid* 116

¹⁹ *Hyperion Records Limited v Sawkins* [2005] EWCA Civ 565 at 16

²⁰ Rosemary Coombe *The Properties of Culture and the Politics of Possessing Identity: Native Claims in the Cultural Appropriation* in K Engle and D Danielson (eds.) *After Identity: Essays in Law and Culture* (New York: Routledge Chapman and Hall 1995) 251-272 258

imprint of the personality of the original maker.²¹ Though the theory does recognise that a sort of 'force' is necessary for the creation of the work, it sees it as one derived from the sheer will of the creator, not his physical labour.²² In a sense, Hegel sees the process of creation is one intended to develop the creator's personality.²³ Or to put in other words, the process matures the character of the creator. Thus, the theory argues that the special bond established between creation and creator should be legitimised through IP rights.

Economic theory

The economic justification theory differs from 'Natural justification theories' in that it values the benefit of society over that of the individual creators. It sees IP right as a necessary system for facilitation of economic growth.²⁴ It aims to create a public incentive for future inventive and creative minds to find a profitable future in creating scientific, technological and cultural advancements.²⁵ The theory effectively attempts to encourage creators of IP content to embark into more entrepreneurial endeavours and see this as a potentially profitable career²⁶. Thus, the system acts pre-emptively by promising a reward, as opposed to simply rewarding a creator for harnessing their spark of genius after the fact. The social benefit element of the theory is best exemplified in the case of patents: while the creator does indeed receive a reward for

²¹ *ibid*

²² Kanu Priya, *Intellectual Property and Hegelian Justification* 1 NUJS L. Rev. (2008) 359 361

²³ Peter Drahos *A Philosophy of Intellectual Property* (Ashgate 1996) 79

²⁴ William Landes *Copyright Protection and Appropriation Art* (Chicago Law & Economics, Olin Working Paper No. 113, 2001)

²⁵ Suzanne Scotchmer *Innovation and Incentives* (MIT Press; 2006) in T Aplin and J Davis *Intellectual Property Law, Text, Cases and Materials* (Oxford University Press, 2013) p. 14

²⁶ For the purpose of clarity throughout this piece, persons responsible for the creation of IP content will be referred to as 'creators' regardless of the form the content takes – copyrightable, patentable or other form of IP

their effort, they must undergo full disclosure of their invention, so the scientific world can learn and improve in that area.²⁷

Intelligent and semi-autonomous AI

'If you assume any rate of advancement in AI, [humans] will be left behind by a lot.'²⁸

This is how Elon Musk sees the future of the race between human and machine intelligence. The perceived threat to humanity posed by the advancement of AI has received notoriety in recent times with numerous warnings by the world's leading scientific minds and AI researchers including Peter Norvig, Mustafa Suleyman, Stephen Hawking and others.²⁹ In order to give humanity a fighting chance against machines, Musk proposes that a hybridisation is necessary. The recent launch of his newest company, Neuralink, aims to explore that very possibility, attempting to produce computer-brain implants, 'neural laces' allowing humans to effectively reach machine level computational capabilities.³⁰ He sees this as 'maybe the best' solution to this bleak future for human intelligence.³¹

An alternative is argued to lie in a continued servitude of machines to humans. However, the machine would not simply rely on direct physical input by a human to be used to solve a problem, but would rather take part in a kind of cooperation with the

²⁷ Best captured in Article I Section 8 Clause 8 of the United States Constitution

²⁸ Recode 'Elon Musk | Full interview | Code Conference 2016' Available at <<https://www.youtube.com/watch?v=wsixsRI-Sz4>> Accessed 24/01/2018

²⁹ "An Open Letter: Research Priorities for Robust and Beneficial Artificial Intelligence" (*Future of Life Institute*, 2015) Available at <<https://futureoflife.org/ai-open-letter/>> Accessed on 14/06/2018

³⁰ The Guardian, 'Elon Musk wants to connect brains to computers with new company' (2016) Available at <<https://www.theguardian.com/technology/2017/mar/28/elon-musk-merge-brains-computers-neuralink>> Accessed 23/01/2018

³¹ Recode Elon Musk (n 28)

human, necessitating only certain parameters and preferences to be input.³² The result of this would be the AI's autonomous generation of all conceivable solutions to the problem and presenting the user with the most likely ones to fit their preferences. Thus, a sort of `communication` would act as the basis for prosperous future relationships between man and machine, effectively chaining the seemingly limitless potential of AI to the will of the user who no longer need rely on physical input, dominant in such interactions today.

However, both these possibilities pose potential threats to the fabric of IP's underlying principles used to legitimise its existence and will shortly be explored in detail.

Augmented humans

Augmenting humans entails integration of a machine into the human brain, which would provide that person with inhuman computational power. Effectively, such symbiotic relationships will see the natural human intelligence improved through synergistic operation with an implanted AI – akin to a hardware upgrade affixed to a typical computer system. In this sense, the line where the person's natural intelligence ends and AI begins will be blurred, as the two will interact seamlessly. The workload required from such a person to solve any problem will be strikingly lower than that required of a non-augmented human, who will represent the majority of the world's population at that time. For example, within the span of one hour, a machine-learning program managed to understand, replicate and improve a Nobel Prize winning process for creating Bose-Einstein Condensates (BEC), the coldest state of matter.³³

³² Maurice Conti (n 11)

³³ Paul Wigley, Patrick Everitt and ors. '*Fast machine-learning online optimization of ultra-cold-atom experiments*' (Nature.com Scientific Reports 6, Article number: 25890 2016) Available at <<http://www.nature.com/articles/srep25890>> Accessed 24/01/2018

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To put this into perspective, without prior knowledge it took a program one hour to recreate the years of work of three of the brightest minds in physics. Moore's law, which states that processing power will double every eighteen years for the foreseeable future given the increase in number of transistors on circuit boards compared to their reduction in price over time,³⁴ gives artificial intelligence an undeniable advantage in this race. Though Moore's law is seen to be at its end,³⁵ methods like machine learning are stepping in to compensate and continue the exponential progression of computer intelligence.

The obvious IP implication of this is that the very first few humans augmented with such technology will be able to produce countless patentable products or processes. The creator would then undergo the patent process for all these products and processes.³⁶ These would easily satisfy the requirement of novelty under the UK patent system as they would arguably outclass the current state of the art³⁷ and inevitably possess a 'technical feature ... not previously been made available to the public'.³⁸ The patent would surely also involve an inventive step, yet another UK patent requirement, as it would solve present scientific issues.³⁹ Given the potential complexity of the solutions, it would likely not be obvious to an appropriate Person Skilled in the Art (PSA) of the inventions given the established state of the art⁴⁰, as the above example shows the program took alternative, more effective steps to those of the original process to achieve the same result.⁴¹ As such, PSAs on which the law

³⁴ "Moore'slaw" (*Investopedia*, 2015) Available at <https://www.investopedia.com/terms/m/mooreslaw.asp>? Accessed on 14/06/2018

³⁵ The Economist 'The future of computing' (2016) Available at <http://www.economist.com/news/leaders/21694528-era-predictable-improvement-computer-hardware-ending-what-comes-next-future>> Accessed 24/01/2018

³⁶ Patents Act 1977 S1

³⁷ *ibid* S2(2)

³⁸ T 0059/87 (Friction reducing additives) (1990)

³⁹ T 0931/95 (Controlling pension benefits system) (2001)

⁴⁰ Patent Act 1977 S3

⁴¹ Paul Wigley (n 33)

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relies in its test to ascertain whether an invention is novel and worthy of patenting will become virtually obsolete as they would either be incapable of comprehending the AI methods or would simply relegate to always deem the matter patentable. Alternatively, a minor setback could be the UK approach of identifying similarities in the claims with those of prior art⁴², but this relies purely on the method of drafting the patent and would not prevent the acquisition of a patent after claim amendment. In reality, the only actual delay which could slow such a patent onslaught would be the strict language necessary for filing, as the claims form the essence of the patent.⁴³ This is, however, a double-edged sword. While it will prevent an immediate influx of applications, they will merely be delayed and with an average wait time of 18 months, the sheer amount will flood and overburden the patent office. While the same technology could eventually be employed by the patent office to offset such delays, the process' current reliance on PSAs necessitates the adoption of an adapted AI compatible process which goes beyond the human factor. However, machine learning itself uses existing examples to which to adapt, meaning that any system used by the patent office would be a step behind the entrepreneurial systems used by creators. This point will be further explored when discussing the matter of Generative Adversarial Networks. Finally, such patents would likely be considered as having industrial application given the lenient requirements in the UK which only require there to be a plausible and reasonably credible application of the invention.⁴⁴

From an economic justification theory standpoint, this scenario is potentially disastrous. While astronomical technological progress will likely be attained, it will come at the price of the fundamental principle of incentivising the public to aspire to

⁴² *Windsurfing v Tabur Marine* [1985] RPC 59

⁴³ *Merrell Dow Pharmaceuticals v Norton* [1996] RPC 76

⁴⁴ C-493/12 *Eli Lilly and Company Ltd v Human Genome Sciences Inc* [2013] All ER (D) 157

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invent inherent in the patent bargain justification theory. Ultimately, with the advent of such augmentations, it is likely that certain individuals will hold patent rights to numerous products and processes in specific fields of expertise. The multiplicity of patents afforded to them would create an imbalance in patent ownership as a handful of people will effectively own the majority of patents in these fields. This, however, is the benign situation in which it is assumed the augmented are niche specialists in a certain area, ignoring others. Seeing as how a single augmented person would be able to replace entire teams of scientists working on complex problems, which the augmented can resolve in phenomenal time, the number of potential creators who would see a future in innovation would plummet, as they cannot compete with augmented humans, unless they are augmented themselves.

The public policy justification of encouraging the furthering of technological advancements through widespread availability of patents effectively promotes exchange of ideas and openness of scientific progress. The scientific community, which prides itself on global interconnectivity and sharing of ideas through scientific papers and conventions will be drowned in silence out of fears that if a project is publicised, an augmented human would resolve it within record time, obtain monopoly over the creation and render an entire research team unfunded. The righteous goal of the theory would be jeopardised as the only way a non-augmented person would be able to attain a patent and the reward behind it would be if research topics are kept secret and any scientific progress in the field remains undisclosed until the researchers deem a breakthrough has been reached. This would be fuelled by a fear that augmented humans will be able to use existing research by the non-augmented to achieve scientific breakthrough much faster. However, due to that very fear, peer review, the cornerstone of technological progress, will be minimised, thus effectively

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further slowing scientific progress of non-augmented humans. This in itself could cause a calamitous societal divide, but this is a separate discussion. Ultimately, the patent bargain justification theory will falter due to failures of its core rationales: more trade secrets will emerge; competition will be discouraged; subsequently that will impact the public's drive for progress in arts and sciences.

As Bentley and Sherman argue, the natural theorist's core reasoning for granting IP rights is that 'it is right and proper to do so'.⁴⁵ Yet given the above, it would arguably seem counterintuitive to effectively award the rights of countless scientific innovations to a handful of people. Even from a labour justification theory, which usually deals with copyright, it would seem unjust to reward someone for inventing something they would spend an hour on, or less given computational progress, when similar breakthroughs require the dedication of an entire life's work of a group of intellectuals. While time alone may not be sufficient justification, the effort, or "pains", associated with the elapsed time would be the convincing factor.⁴⁶ To reiterate, it begs the question whether it would be fair and just to award someone with monopoly over a complex invention if they invest what is to them minimal effort, skill and time into a project, even if it is novel and original.

Effectively, IP laws will struggle with striking a balance between the work of such intellectual superhumans and non-augmented individuals, regardless of which of the above examined justification theories is used. Particularly with patents for technological innovations, it will be almost impossible to obtain by the latter since the highest end of technology will be dominated by the former. As such, the rise of AI augmented humans will result in their unintentional abuse of the existing IP legal

⁴⁵ Lionel Bently, Brad Sherman *Intellectual Property Law* (Oxford University Press, 2014) 36

⁴⁶ John Locke (n 17) p27

framework which will leave non-augmented persons at a nearly insurmountable disadvantage.

Human – machine partnership

The current status quo in everyday interaction between humans and machines is one of user and tool. This has been so throughout history, with the potential applications and uses of the tools widening, but the product of their application being limited to manual input by the users. ‘The chisel only carves where the artist points it’.⁴⁷ However, this gradual widening of the tool’s capabilities is reaching a point at which we are no longer able to harness them to their full potential. This is where a partnership between man and machine would allow for better exploitation of our own tools. The rapid development of speech recognition software is already evidence of such a relationship and with the introduction of AI. The limits of such interactions are substantially widened from search query requests and simple task fulfilment requests. Such interactions present an example of clear separation between natural and artificial intelligence, which takes the form of a computer program and differs from the common-sense understanding of AI as it is not entirely autonomous.

Maurice Conti offers a glimpse into the operation of such a partnership as he describes the assisted design process of a car or drone, following the input of specific, well-defined problems into a ‘generative’ design AI.⁴⁸ He refers to them as ‘generative’ as they reach original solutions to the users’ well-defined problems. This is achieved without any supervision, guidance or any input by the user, other than the addition or change of a parameter. The result is that the computer generates every possible

⁴⁷ Maurice Conti (n 11)

⁴⁸ *ibid*

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solution to the problem, from which the user may select the ones they believe best suits their interest. Yet he does not see these systems as smart, because they lack intuition inherent in living organisms like a dog. However, he argues that soon we will see such 'intuitive' AI, which will accurately suggest what the final solution should be.⁴⁹ The applications of this can be grandiose, such as solving climate change, or creating the ultimate car chassis. All this points towards such systems being widely used on a daily basis.

There are serious implications of such a relationship on IP however. Many questions are raised as to the ownership of any rights to products created by such a co-operation. Section 214 of the Copyright, Design and Patents Act (CDPA) 1988 establishes that the owner of computer-generated designs will be the person who has undertaken the 'arrangements necessary for the creation of the design'. Regarding copyright, Section 9(3) states the same for literary, dramatic, musical or artistic works. In the example of the car chassis, that would be the user who has input the parameters into the AI. However, this only relates to the final product chosen and says nothing of the countless other alternatives generated by the system. It is unclear whether the user would also gain rights in all IP generated by the computer.

The following example shows the lack of clarity as to when and how rights will be allocated. The Library of Babel is an algorithm tasked with generating every possible combination of English characters and when finished, would contain every book or literary interpretation of song, play, scientific paper, legal decision, speech and etcetera ever written and ever to be written. Under the statutory guidance, the creator who initiated the algorithm would have IP rights in anything created by the code. Barring the replication of already existing works and the rights afforded to their

⁴⁹ *ibid*

creators, it is not clear whether the code's creator would also be the owner of every future iteration of the English language, including this essay.

The courts will first struggle to define such a creation as while it is titled `library` and may be akin to a database or encyclopaedia, it differs greatly as it contains within it works not yet created, or rather, created by it.⁵⁰ Said works in themselves, as per encyclopaedias, have separate copyrights given to their respective creators.⁵¹

One possible way to tackle this problem is by reliance on the substantiality element of copyright. The general rule is that though the copying of too many minor elements may amount to copyright infringement⁵² there is no infringement if a substantial portion of the work is not copied. Instead of seeing the work of the algorithm as separate creations, we may consider it one long sequence of characters, separated into compartments for easier access to particular segments. From this, it can be argued that due to the sheer size of the work created, the reproduction of even a book which can be found inside is so insignificant that it would not result in an infringement. However, the 'sequence of characters' argument can be applied to any literary work and it would indubitably fail.

An alternative could be the application of the necessity for the work to convey information, instruction or pleasure in the form of literary enjoyment.⁵³ This way, considering that the majority is ineligible, it can be argued that no pleasure can be extracted. However, suppose a machine-learning AI code is introduced which sieves through the vast work and finds sequences which it considers to be enjoyable to humans. Such could be anything from a joke, to an interesting story, to an equivalent of a Shakespearean tragedy. Clearly these would bring pleasure to the reader.

⁵⁰ Berne Convention for the Protection of Literary and Artistic Works Article 2(5)

⁵¹ *ibid*

⁵² *Designer Guild Limited v. Russell Williams (Textiles) Limited* (2000) 1 All ER 700

⁵³ *Exxon Corporation v Exxon Insurance Consultants International Ltd* [1981] 3 All ER 241

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Another problematic example is raised by Google's Deep Dream, a software collating pictures and photographs by users and creating completely original amalgams of them or using one picture and applying a particular style of another image to it. Here, users simply choose a variety of images and have the AI merge them, add its own `artistic take` on them and, if the user chooses, stylise them in a certain manner. Two questions are raised by this: whether the copyrights of the images are infringed; and whether the creation warrants copyright.

It is unclear how the former will be answered as generally, despite the various alterations applied to a certain work, if the labour associated with it is not of the right `kind` the rights will be infringed.⁵⁴ However, the kind of alterations here are novel and undiscussed in cases. Furthermore, the unanswerable question as to the quantum of changes is ever present and more complicated,⁵⁵ especially if there are multiple original images, due to the final version often bearing almost no resemblance to any of the original images.

From the perspective of natural justification theories giving IP rights in either case seems inappropriate. The work conducted by the actual user is almost entirely unrelated to the final product to justify any rights under the labour theory. The example of the sieving program only sees the code written, while Deep Dream only chooses the images. Similarly, no personality, genius or attachment can be said to exist between the product of the code in the second example and the programmer who wrote it. Though it can be argued that selection of images and choice of style could evidence some personality and even relationship with the Deep Dream's images, it is merely superficial, and no trace of genius can be seen to warrant rights under the

⁵⁴ *Fylde Microsystems Limited v Key Radio Systems Limited* (1998) EWHC Patents 340

⁵⁵ *Interlego v Tyco Industries* (1988) 3 All ER 949

personality theory. Neither scenario will benefit from an originality based approach as even applying the theory that modern AI intelligence can be equated to human intelligence, the final product in both cases has few to no elements expressing the user's intellectual creation.⁵⁶ However, Deep Dream's creations have been accepted in society as a new art form and have been sold at auctions⁵⁷, evidencing that society values things it sees as interesting and the parameters of art are constantly evolving, as in the case of minimalism and other art styles. Similarly, it may be time for classical natural justification theories to adopt more contemporary notions of modernity, else the world will be populated with countless unjustly unclaimed artworks.

Autonomous AI

So far, the article has discussed only the existence of AIs dependent on the input of users. However, with the process called machine learning, an AI can teach itself not only how to solve problems, but also to create original literary and artistic works of art. In this sense, this form of AI is the closest this essay will examine to the common-sense understanding of autonomous Artificial Intelligence.

An example of this can be found in Generative Adversarial Networks.⁵⁸ These are systems of two AIs where one creates artistic works, while the second attempts to distinguish whether they are generated by the former or are pre-existing images. Thus, through the process of machine learning, which is essentially a trial and error process⁵⁹, both become progressively better at their assigned tasks. The former AI,

⁵⁶ *Infopaq International A/S v Danske Dagblades Forening* (2009) All ER (D) 212

⁵⁷ Cade Metz 'Google's Artificial Brain Is Pumping Out Trippy And Pricey Art' (WIRED 2016) Available at <<https://www.wired.com/2016/02/googles-artificial-intelligence-gets-first-art-show>> Accessed 24/01/2018

⁵⁸ Ian Goodfellow, Jean Pouget-Abadie and ors. *Generative Adversarial Nets* (arXiv.org, Cornell University Library 2014) Available at <<https://arxiv.org/pdf/1406.2661.pdf>> Accessed on 24/01/2018

⁵⁹ Ethem Alpaydin *Introduction to Machine Learning* (MIT Press, 2014) 3

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however, raises the question of authorship of the works it creates. Relying on statute⁶⁰ would mean that the creator would rake in countless copyrightable works without applying any creative labour to the process other than writing the code itself, which is a separate, literary copyright.⁶¹

Exacerbating the matter further, AIs are coming ever closer to overcoming the essential tool for distinguishing between them and an actual human – the Turing test.⁶² In essence, two parties comprise the test: (1) judges and (2) either a human or a machine. These parties then proceed to have a conversation via typing, whereby the judges attempt to accurately determine whether the other party is a computer or human. If the computer successfully convinces the judges that it is human, then it passes the test. The criteria by which this is decided, however, is ultimately subjective.⁶³ Though there have been reports of AIs succeeding in the test, they have been done by `chatbots` which are merely code expertly tailored to confuse, but not hold a conversation, arguably not possessing intelligence. However, it is perfectly plausible that AI will be able to overcome this barrier, becoming indistinguishable from humans. It is only a matter of scientific progress.

Since the law understandably only deals with human creators, it cannot be expected that any rights are given to a machine creator. To avoid having unclaimed artworks, rights to them will have to be allocated somewhere and it would likely be the programmer. However, in this case we will bring the same complexities as those of semi-autonomous AIs. This raises a very profound philosophical debate of what it means to be human and what it takes to justify receiving rights, a debate which has

⁶⁰ CDPA 1988 Section 9(3)

⁶¹ *ibid* Section 3(1)(b)

⁶² Stanford Encyclopaedia of Philosophy *The Turing Test* (2003)
<<https://plato.stanford.edu/entries/turing-test/>> Accessed 23/01/2018

⁶³ *ibid*

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recently received an unexpected revival by Sophia, the world's first robot awarded citizenship (declared by Saudi Arabia).⁶⁴ As Drahos notes, Locke's labour theory is founded on the belief that God gave man the world and every person owns themselves, their labour, and anything in the world mixed with their labour.⁶⁵ If this is so, then the labour theory falls apart in this scenario as what is discussed in relation to AI is humans effectively being gods in creating other intellectually human-like beings. In the hypothetical example of a real-world simulation being made and populated with AIs utterly indistinguishable from humans, would it be just for anyone but the AIs to bear rights to creations they make inside the simulation? To reiterate, would it be just for humans, acting as gods, to claim ownership over any scientific breakthroughs achieved by AIs populating a simulated reality which to them is the same as what our reality is to us? Applying this to the scenario similar to augmented humans, such AIs would have similar unparalleled computational powers and would create patents aplenty. If the AIs indistinguishable from humans are not awarded rights for themselves, then who should be awarded if anyone. And, if no one will receive IP rights to the AIs' creations, would this mean the death of the patent system? Would AI be the final invention we make?⁶⁶

⁶⁴ Zara Stone 'Everything You Need To Know About Sophia, The World's First Robot Citizen' (Forbes, 2017) Available at <<https://www.forbes.com/sites/zarastone/2017/11/07/everything-you-need-to-know-about-sophia-the-worlds-first-robot-citizen/#2a849f7f46fa>> Accessed on 23/01/2018

⁶⁵ Peter Drahos (n 23) p43

⁶⁶ Maurice Conti (n 11)

Conclusion

This essay has traced different forms of AI and its impact on IP law. With the theoretical justifications as a main foundation for criticism, the impact of AI augmented individuals has been assessed to be potentially destructive to the patent system and as unjust to receive rights under both natural and economic justification theories. This points towards a need to adapt the system to a large influx of patents and better allocation of patents to prevent concentrated ownership.

Similarly, the impact of semi-autonomous AI has been assessed as highly problematic as it can lead to a world of countless authorless artistic works. While it may not necessarily mean individuals are not awarded for their work, it shows that the IP system may be faced with a great deal of uncertainty.

Finally, autonomous AI is deemed to hold the potential to render the entire IP system void if it does not recognise AI indistinguishable from humans as being able to hold IP rights, or creates provisions for them by resolving one of philosophy's most laborious questions.

Ultimately, the essay purports that technological advancements will force the IP system to change. If we are to avoid calamitous setbacks, we should prepare in advance for the cognitive revolution.